VyOS Documentation

Release 1.3.x (equuleus)

VyOS maintainers and contributors

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Get / Build VyOS Quickly *Build* your own Image or take a look at how to *download* a free or supported version.

Install VyOS Read about how to install VyOS on *Bare Metal* or in a *Virtual Environment* and how to use an image with the usual *cloud* providers

Configuration and Operation Use the *Quickstart Guide*, to have a fast overview. Or go deeper and set up *advanced routing*, *VRFs*, or *VPNs* for example.

Automate Integrate VyOS in your automation Workflow with *Ansible*, have your own *local scripts*, or configure VyOS with the *HTTPS-API*.

Examples Get some inspiration from the *Configuration Blueprints* to build your infrastructure.

Contribute and Community

There are many ways to contribute to the project.
Add missing parts or improve the *Documentation*.
Discuss in Slack or the Forum.
Or you can pick up a Task and fix the *code*.

CHAPTER

ONE

ABOUT

VyOS is an open source network operating system based on Debian GNU/Linux.

VyOS provides a free routing platform that competes directly with other commercially available solutions from well known network providers. Because VyOS runs on standard amd64, i586 and ARM systems, it is able to be used as a router and firewall platform for cloud deployments.

We use multiple live versions of our manual, hosted thankfully by https://readthedocs.org. We will provide one version of the manual for every VyOS major version starting with VyOS 1.2 which will receive Long-term support (LTS).

The manual version is selected/specified by it's Git branch name. You can switch between versions of the documentation by selecting the appropriate branch on the bottom left corner.

VyOS CLI syntax may change between major (and sometimes minor) versions. Please always refer to the documentation matching your current, running installation. If a change in the CLI is required, VyOS will ship a so called migration script which will take care of adjusting the syntax. No action needs to be taken by you.

CHAPTER

TWO

HISTORY

2.1 In the beginning…

There once was a network operating system based on Debian GNU/Linux, called Vyatta.*[0] 2006 onwards, it was a great free software alternative to Cisco IOS and Jupiter JUNOS. It came in two editions: Vyatta Core (previously Vyatta Community Edition) that was completely free software, and Vyatta Subscription Edition that had proprietary features and was only available to paying customers.†[0]

Vyatta was acquired by Brocade Communication Systems in 2012. Shortly after, Brocade renamed Vyatta Subscription Edition to Brocade vRouter, discontinued Vyatta Core and shut down the community forum without a notice. The bug tracker and Git repositories followed next year.

It's worth noting that by the time Brocade acquired Vyatta, development of Vyatta Core was already stagnated. Vyatta Subscription Edition (and thus, Vyatta development as a whole) had been replacing core components with proprietary software, meaning few features made it to Vyatta Core, and those that did were bug-ridden and hamstrung.

In 2013, soon after Vyatta Core was abandoned, the community forked the last Vyatta Core version (6.6R1) and VyOS Project came into being. Sentrium SL was established by VyOS maintainers in 2014 to fund VyOS development by selling support, consulting services and prebuilt long-term support images.

Brocade was acquired by Broadcom in 2016 and sold what remains of erstwhile Vyatta to AT&T in 2017, who in turn sold it to Ciena in 2021.

2.2 Major releases

VyOS major versions used to be named after elements in order of atomic numbers. With 1.2, this naming scheme was replaced with the much cooler scheme of Latin names of IAU designated constellations by solid angle area, starting from the smallest.

[0] From the Sanskrit adjective "Vyātta" (), meaning opened.
[0] A business model comparable to that of Redis, rather than that of VyOS today.

2.2.1 Hydrogen (1.0)

Released just in time for holidays on 22 December 2013, Hydrogen was the first major VyOS release. It fixed features that were broken in Vyatta Core 6.6 (such as IPv4 BGP peer groups and DHCPv6 relay) and introduced command scripting, a task scheduler and web proxy LDAP authentication.

2.2.2 Helium (1.1)

Helium was released on 9 October 2014, exactly on the day VyOS Project first came into being in the previous year. Helium came with a lot of new features, including an event handler and support for L2TPv3, 802.1ad QinQ and IGMP proxy, as well as experimental support for VXLAN and DMVPN (the latter of which was also broken in Vyatta Core due to its reliance on a proprietary NHRP implementation).

2.2.3 Crux (1.2)

Crux (the Southern Cross) came out on 28 January 2019 and was the first major release of VyOS as we know it today. The underlying Debian base was upgraded from Squeeze (6) to Jessie (8).

Although Crux came with too many new features to mention here, some noteworthy ones are: an mDNS repeater, a broadcast relay, a high-performance PPPoE server, an HFSC scheduler, as well as support for Wireguard, unicast VRRP, RPKI for BGP and fully 802.1ad-compliant QinQ ethertype. The telnet server and support for P2P filtering were removed.

Crux is the first version to feature the modular image build system. CLI definitions began to be written in the modern, verifiable XML templates. Python APIs were introduced for command scripting and configuration migration. Introduction of new Perl and shell code was proscribed and the rewriting of legacy Perl code in pure Python began with Crux.

As of 2022, Crux is still supported and maintained.

2.2.4 Equuleus (1.3)

The current long-term support version of VyOS, Equuleus (the Pony) came out on 21 December 2021, once again in time for the winter holidays.

Equuleus brought many long-desired features with it, most notably an SSTP VPN server, an IPoE server, an OpenConnect VPN server and a serial console server, in addition to reworked support for WWAN interfaces, support for GENEVE and MACSec interfaces, VRF, IS-IS routing, preliminary support for MPLS and LDP, and many other initialisms.

As of 2022, Equuleus is in the stable.

2.2.5 Sagitta (1.4)

Sagitta (the Arrow) is the codename of the current development branch, so there's no VyOS 1.4 yet.

2.3 A note on copyright

Unlike Vyatta, VyOS never had (nor will ever have) proprietary code. The only proprietary material in VyOS is non-code assets, such as graphics and the trademark "VyOS".‡[0] This means you can build your own long-term support images (as the entire toolchain we use is free software) and even distribute them, given you rename it and remove such assets before building. Although note that we do not provide support for images distributed by a third-party. See the artwork license and the end-user license agreement at `/usr/share/vyos/EULA` in any pre-built image for more precise information.

[0] This is not unlike how Linus Torvalds owns the trademark "Linux".

CHAPTER

THREE

CHANGELOG

3.1 1.3 Equuleus

3.1.1 2024-04-25

- T6249 (default): ISO builder fails because of changed buster-backport repository

3.1.2 2024-04-23

- T6261 (default): Typo in op_mode connect_disconnect print statement for check_ppp_running

3.1.3 2024-04-17

- T6243 (bug): Update vyos-http-api-tools for package idna security advisory

3.1.4 2024-04-12

- T3437 (bug): BGP Confederation Addition Causes Error

3.1.5 2024-04-10

- T6124 (bug): Docker equuleus build image doesn't build due to fpm

3.1.6 2024-04-08

- T6196 (bug): Route-map and summary-only do not work in BGP aggregation at the same time

3.1.7 2024-04-07

- T1244 (default): Support for StartupResync in conntrackd

3.1.8 2024-04-05

- T2590 (bug): DHCPv6 not updating nameservers and search domains since replacing isc-dhcp-client with WIDE dhcp6c

3.1.9 2024-04-04

- T4146 (bug): Nginx should not listen on port 80
- T1976 (default): deleting address-family under neighbor will disable neighbor
- T5625 (default): "restart vpn" does not work if ipsec-interfaces is not set
- T3020 (bug): The "scp" example is wrong in the bash-completion for "set system config-management commit-archive location"
- T2250 (default): vyos-build "make iso" error if configure was ran outside of the docker container
- T2139 (default): openvpn: allow "dh-file none" to disable DH for ECDH keys
- T2014 (default): Use vendor specific NTP Pool hostname
- T1118 (bug): Obsolete "utc" option in time selector in firewall
- T948 (feature): integrate aws cloud watch scripts into AMI

3.1.10 2024-04-02

- T6150 (bug): Impossible to set a static IP address via Radius in IPoE

3.1.11 2024-04-01

- T6193 (bug): dhcp-client: invalid warning "is not a DHCP interface but uses DHCP name-server option" for VLAN interfaces

3.1.12 2024-03-22

- T6110 (bug): dhcp server - If failover is defined, range is required
- T5624 (default): Remove /etc/debian_version from the image

3.1.13 2024-03-11

- T2998 (bug): SNMP v3 oid "exclude" option doesn't work
- T6096 (bug): Config commits are not synced properly because 00vyos-sync is deleted by vyos-router
- T6057 (feature): Add ability to disable syslog for conntrackd
- T5504 (feature): Keepalived VRRP ability to set more than one peer-address

3.1.14 2024-03-07

- T3992 (bug): Traceback on adding interface to bridge with configured ip address

3.1.15 2024-03-06

- T6088 (bug): Configuration corrupted after saving and powercut or force reboot

3.1.16 2024-02-16

- T2113 (bug): OpenVPN Options error: you cannot use –verify-x509-name with –compat-names or –no-name-remapping
- T5418 (bug): PPPoE-Server Client IP pool Subnet

3.1.17 2024-02-15

- T2612 (bug): HTTPS API, changing API key fails but goes through
- T656 (enhancment): Rewrite wirelessmodem in new style XML interface definition

3.1.18 2024-02-14

- T2044 (bug): RPKI doesn't boot properly

3.1.19 2024-02-08

- T6014 (feature): Bump keepalived version

3.1.20 2024-02-07

- T6017 (bug): Update vyos-http-api-tools for security advisory

3.1.21 2024-02-02

- T5914 (bug): CVE-2023-48795 - Terrapin vulnerability
- T5739 (bug): Password recovery does not work if public keys are configured

3.1.22 2024-02-01

- T5967 (bug): Multi-hop BFD connections can't be established; please add minimum-ttl option.

3.1.23 2024-01-22

- T4721 (feature): Static IPv6 Route Tags Missing

3.1.24 2024-01-20

- T5187 (bug): Update Realtek r8152 driver
- T5182 (bug): Update Intel ice driver
- T5180 (bug): initramfs-tools ignores firmware from updates directory
- T4990 (bug): Commit results may not be properly saved if power is cut immediately after a successful commit
- T4039 (feature): Rsyslog to use 'protocol23format' for protocol UDP
- T3813 (bug): Some custom sysctl parameters can't be applied bug
- T2579 (feature): The root task for VRF features
- T2546 (feature): The root task for rewriting [op-mode] to XML
- T2452 (default): Serial console related issues

3.1.25 2024-01-19

- T5543 (bug): Fix source address handling in static joins

3.1.26 2024-01-14

- T5715 (bug): IPSec VPN: restart vpn is not working

3.1.27 2024-01-13

- T5924 (bug): Build cannot pass the smoketest dialup-router-medium-vpn

3.1.28 2024-01-11

- T5275 (default): Add op mode commands for exporting certificates to PEM files with correct headers
- T5274 (default): Add a deprecation warning for OpenVPN site-to-site with pre-shared secret
- T3191 (bug): PAM RADIUS freezing when accounting does not configured on RADIUS server

3.1.29 2024-01-10

- T4646 (bug): USB serial output console does not work
- T4466 (bug): intel i225-v nic does not detect link after boot
- T4222 (feature): Support for TWAMP as round-trip metric
- T1369 (bug): GCP Networking Failure

3.1.30 2024-01-09

- T3242 (bug): PPPoE Server overhead on virtual interfaces creation
- T2755 (default): Requirements for partial interface setup
- T2494 (bug): systemd dependencies issues
- T2343 (feature): Disable memory ballooning in VM templates
- T2254 (default): Provide more information on the build branch in the version data
- T2223 (feature): convert operational show interfaces to python/XML
- T1925 (bug): DMVPN is always listed as down in “show vpn ipsec sa”
- T1297 (feature): Add GARP settings to VRRP/keepalived

3.1.31 2024-01-08

- T5318 (bug): Security Vulnerabilities for VyOS 1.3.3
- T3980 (bug): vrrp transition-script validator makes warning fatal and also causes a python NameError exception
- T2799 (feature): VyOS Certificates Manager

3.1.32 2023-12-29

- T5852 (bug): Reboots fail with eapol WAN interface

3.1.33 2023-12-22

- T4760 (bug): VyOS does not support running multiple instances of DHCPv6 clients

3.1.34 2023-12-21

- T5714 (bug): IPSec VPN: op-mode: “show log vpn” does not show results
- T3039 (feature): Resize a root partition and filesystem automatically during deployment in virtual environments
- T2404 (bug): Cannot change MTU
- T2353 (bug): Interface [conf_mode] errors parent task
- T5796 (bug): Openconnect - HTTPS security headers are missing

3.1.35 2023-12-19

- T2116 (feature): Processing configuration via Cloud-init User-Data

3.1.36 2023-12-18

- T2191 (feature): Using tallow to block sshd probes

3.1.37 2023-12-15

- T5824 (bug): busybox cannot connect some websites from initramfs

3.1.38 2023-12-12

- T5817 (bug): Show openvpn server fails in some cases
- T5413 (default): Deny the opportunity to use one public/private key pair on both wireguard peers.

3.1.39 2023-11-30

- T4601 (bug): dhcp : relay agent IP address issue.

3.1.40 2023-11-28

- T5777 (bug): frr: backport and upstream recent bgpd daemon crashes

3.1.41 2023-11-27

- T5763 (bug): Fix imprecise check for remote file name in vyos-load-config.py

3.1.42 2023-11-25

- T5655 (bug): commit-archive: Ctrl+C should not eror out with stack trace, signal should be cought

3.1.43 2023-11-24

- T5402 (bug): VRRP router with rfc3768-compatibility sends multiple ARP replies

3.1.44 2023-11-22

- T5578 (bug): "ikev2-reauth" description contains outdated information

3.1.45 2023-11-15

- T5661 (enhancment): Add show show ssh dynamic-protection attacker and show log ssh dynamic-protection
- T1276 (bug): dhcp relay + VLAN fails

3.1.46 2023-11-07

- T5586 (feature): Disable by default SNMP for Keepalived VRRP

3.1.47 2023-11-06

- T4269 (feature): node.def generator should automatically add default values

3.1.48 2023-10-26

- T5684 (bug): services using VRF generates the error "Failed to load BPF prog: 'Operation not permitted'" when the system boots.
- T5594 (bug): VRRP - Error if using IPv6 Link Local as hello source address

3.1.49 2023-10-21

- T5670 (bug): bridge: missing member interface validator
- T5191 (default): Replace underscores with hyphens in command-line options generated by vyos.opmode
- T4402 (bug): OpenVPN client-ip-pool option is broken
- T2719 (feature): Standardized op mode script structure

3.1.50 2023-10-19

- T5669 (bug): VXLAN interface changing port does not work

3.1.51 2023-10-17

- T5235 (bug): SSH keys with special characters cannot be applied via Cloud-init

3.1.52 2023-10-08

- T5630 (feature): pppoe: allow to specify MRU in addition to already configurable MTU

3.1.53 2023-10-06

- T5576 (feature): Add bgp remove-private-as all option

3.1.54 2023-10-04

- T5632 (feature): Add jq package to parse JSON files

3.1.55 2023-09-25

- T5533 (bug): Keepalived VRRP IPv6 group enters in FAULT state

3.1.56 2023-09-20

- T5271 (default): Add support for peer-fingerprint to OpenVPN

3.1.57 2023-09-11

- T5557 (bug): bgp: Use treat-as-withdraw for tunnel encapsulation attribute CVE-2023-38802
- T3424 (default): PPPoE IA-PD doesn't work in VRF

3.1.58 2023-09-10

- T5555 (bug): Fix timezone migrator (system 13-to-14)
- T5545 (bug): sflow is not working

3.1.59 2023-09-08

- T4426 (default): Add arpwatch to the image

3.1.60 2023-09-05

- T5524 (feature): Add config directory to liveCD
- T2958 (bug): DHCP server doesn't work from a live CD
- T5428 (bug): dhcp: client renewal fails when running inside VRF

3.1.61 2023-09-04

- T5506 (bug): Container bridge interfaces do not have a link-local address

3.1.62 2023-08-31

- T5190 (feature): Cloud-Init cannot fetch Meta-data on machines where the main Ethernet interface is not eth0
- T5140 (bug): Firewall network-group problems
- T4895 (bug): Tag nodes are overwritten when configured by Cloud-Init from User-Data
- T4874 (default): Add Warning message to Equuleus
- T4855 (bug): Trying to create more than one tunnel of the same type to the same address causes unhandled exception
- T4776 (bug): NVME storage is not detected properly during installation
- T3546 (feature): Add support for running scripts on PPPoE server session events
- T738 (feature): Add local-port and resolver port options for powerdns in CLI configuration tree

3.1.63 2023-08-30

- T5221 (bug): BGP as-override behavior differs from new FRR and other vendors
- T4933 (default): Malformed lines cause vyos.util.colon_separated_to_dict fail with a nondescript error
- T4790 (bug): RADIUS login does not work if sum of timeouts more than 50s
- T4475 (bug): route-map does not support ipv6 peer
- T4459 (bug): API service with VRF doesn't work in 1.3.1
- T4407 (bug): Network-config v2 is broken in Cloud-init 22.1 and VyOS 1.3
- T4113 (bug): Incorrect GRUB configuration parsing
- T1764 (bug): Use lists instead of whitespace-separated strings in vyos.config
- T4121 (bug): Nameservers from DHCP client cannot be used in specific cases
- T4151 (feature): IPV6 local PBR Support
- T4306 (default): Do not check for ditry repository when building release images

3.1.64 2023-08-29

- T3940 (bug): DHCP client does not remove IP address when stopped by the 02-vyos-stopdhclient hook
- T3713 (default): Create a meta-package for user utilities
- T3339 (bug): Cloud-Init domain search setting not applied
- T2640 (feature): Running VyOS inside Docker containers
- T3577 (bug): Generating vpn x509 key pair fails with command not found

3.1.65 2023-08-28

- T4745 (bug): CLI TAB issue with values with '-' at the beginning in conf mode
- T2611 (bug): Prefix list names are shared between ipv4 and ipv6
- T2296 (default): Upgrade WALinux to 2.2.41
- T2123 (default): Configure 3 NTP servers
- T469 (bug): Problem after commit with errors

3.1.66 2023-08-25

- T4412 (bug): commit archive: reboot not working with sftp
- T3702 (feature): Policy: Allow routing by fwmark
- T3536 (default): Unable to list all available routes

3.1.67 2023-08-24

- T5006 (bug): Http api segfault with concurrent requests
- T5305 (bug): REST API configure operation should not be defined as async

3.1.68 2023-08-23

- T5387 (feature): dhcp6c: add a no release option

3.1.69 2023-08-20

- T5470 (bug): wlan: can not disable interface if SSID is not configured

3.1.70 2023-08-17

- T5486 (bug): Service dns dynamic cannot pass the smoketest
- T5223 (bug): tunnel key doesn't clear

3.1.71 2023-08-15

- T5273 (default): Add op mode commands for displaying certificate details and fingerprints
- T5270 (default): Make OpenVPN *tls dh-params* optional

3.1.72 2023-08-10

- T5329 (bug): Wireguard interface as GRE tunnel source causes configuration error on boot

3.1.73 2023-07-24

- T5354 (feature): Add sshguard to protect against brut-forces for 1.3

3.1.74 2023-07-17

- T2051 (bug): Throughput anomalies

3.1.75 2023-07-14

- T305 (default): loadbalancing does not work with one pppoe connection and another connection of either dhcp or static

3.1.76 2023-07-13

- T3045 (bug): Changes to Conntrack-Sync don't apply correctly (Mutlicast->UDP)
- T971 (bug): authentication public-keys options quoting issue

3.1.77 2023-07-12

- T5009 (bug): op-mode command: restart dhcp relay-agent not working
- T4927 (bug): Need to change restart to reload-or-restart in Webproxy module
- T3835 (bug): vyos router 1.2.7 snmp Dos bug
- T4959 (feature): Add container registry authentication config for containers
- T425 (feature): AWS CloudWatch monitoring scripts

3.1.78 2023-07-11

- T4862 (bug): webproxy domain-block does not work
- T4844 (bug): Incorrect permissions of the safeguard DB directory
- T4262 (bug): install image doesn't respect chosen root partition size
- T3810 (bug): webproxy squidguard rules don't work properly after rewriting to python.
- T1928 (bug): Is the 'Welcome to VyOS' message when using SSH an information leak?
- T4737 (bug): FRRouting/zebra 7.5.1 does not redistribute routes to other protocols
- T3852 (bug): DHCP client issue - interface has two dhclient processes when link is unpluged and then plug again
- T2118 (bug): Failure to boot after power outage due to dirty filesystem and no fsck in initramfs

3.1.79 2023-07-05

- T5331 (bug): ath10k_pci not functioning

3.1.80 2023-06-30

- T5315 (feature): vrrp: add support for version 3
- T5313 (bug): UDP broadcast relay - missing verify() that relay interfaces have an IP address assigned

3.1.81 2023-06-26

- T5272 (default): Upgrade OpenVPN to 2.6 in Equuleus
- T5265 (bug): WAN load-balancing: missing completion helpers

3.1.82 2023-06-25

- T5240 (bug): Service router-advert failed to start radvd with more then 3 name-servers

3.1.83 2023-06-21

- T5280 (bug): Update Expired keys (2023-06-08) for PowerDNS

3.1.84 2023-06-13

- T5213 (feature): Accel-ppp sending accounting interim updates acct-interim-interval option

3.1.85 2023-05-29

- T5243 (bug): Default route is inactive if an interface has multiple ip addresses of the same subnet in 1.3.2 Equuleus

3.1.86 2023-05-19

- T5186 (bug): QoS test cannot pass for 1.3

3.1.87 2023-05-12

- T2769 (feature): Add VRF support for syslog

3.1.88 2023-05-08

- T5212 (bug): snmp community name -error with special carracter

3.1.89 2023-04-27

- T5175 (bug): http-api: error in MultiPart parser for FastAPI version >= 0.91.0
- T5176 (bug): http-api: update vyos-http-api-tools for FastAPI security vulnerability

3.1.90 2023-04-13

- T5152 (bug): Telegraf agent hostname isn't qualified
- T4727 (feature): Add RADIUS rate limit support to PPTP server
- T4939 (bug): VRRP command no-preempt not work as expected
- T3608 (default): Standardize warnings from configure scripts

3.1.91 2023-04-05

- T4975 (bug): CLI does not work after cutting off the power or reset
- T5136 (bug): Possible config corruption on upgrade

3.1.92 2023-04-01

- T5047 (bug): Recreate only a specific container

3.1.93 2023-03-31

- T5111 (bug): pppd-dns.service startup failed

3.1.94 2023-03-29

- T5033 (bug): generate-public-key command fails for address with multiple public keys like GitHub
- T5097 (bug): the operational command "show interfaces ethernet ethx" doesn't reflect a call to 'clear counters'

3.1.95 2023-03-21

- T5098 (feature): PPPoE client holdoff configuration

3.1.96 2023-03-19

- T4925 (feature): Need to add the possibility to configure Pseudo-Random Functions (PRF) in IKEv2

3.1.97 2023-03-16

- T3083 (feature): Add feature event-handler
- T2516 (bug): vyos-container: cannot configure ethernet interface

3.1.98 2023-03-09

- T5066 (bug): Different GRE tunnel but same tunnel keys error

3.1.99 2023-03-08

- T4381 (default): OpenVPN: Add "Tunnel IP" column in "show openvpn server" operational command
- T4872 (bug): Op-mode show openvpn misses a case when parsing for tunnel IP

3.1.100 2023-03-07

- T2838 (bug): Ethernet device names changing, multiple hw-id being added
- T2649 (default): Ensure configration mode scripts conform to coding guidelines
- T4900 (default): Cache intermediary results of get_config_diff in Config instance

3.1.101 2023-03-03

- T4625 (enhancment): Update ocserv to current revision (1.1.6)

3.1.102 2023-02-28

- T4955 (bug): Openconnect radiusclient.conf generating with extra authserver
- T4219 (feature): support incoming-interface (iif) in local PBR

3.1.103 2023-02-25

- T5008 (bug): MACsec CKN of 32 chars is not allowed in CLI, but works fine
- T5007 (bug): Interface multicast setting is invalid
- T5017 (bug): Bug with validator interface-name
- T4992 (bug): Incorrect check is_local_address for bgp neighbor with option ip_nonlocal_bind set
- T4978 (bug): KeyError: 'memory' container_config['memory'] on upgrading to 1.4-rolling-202302041536
- T4948 (feature): pppoe: add CLI option to allow definition of host-uniq flag

3.1.104 2023-02-22

- T5011 (bug): Some interface drivers don't support min_mtu and max_mtu and verify_mtu check should be skipped

3.1.105 2023-02-18

- T4743 (feature): Enable IPv6 address for Dynamic DNS

3.1.106 2023-02-16

- T4971 (feature): Radius attribute "Framed-Pool" for PPPoE

3.1.107 2023-02-15

- T4993 (bug): Can't delete conntrack ignore rule

3.1.108 2023-02-14

- T4999 (feature): vyos.util backport dict_search_recursive
- T1993 (feature): Extended pppoe rate-limiter

3.1.109 2023-02-13

- T4153 (bug): Monitor bandwidth-test initiate not working

3.1.110 2023-02-11

- T2603 (feature): pppoe-server: reduce min MTU

3.1.111 2023-02-08

- T1288 (feature): FRR: rewrite staticd backend (/opt/vyatta/share/vyatta-cfg/templates/protocols/static/*)

3.1.112 2023-02-07

- T4117 (bug): Does not possible to configure PoD/CoA for L2TP vpn

3.1.113 2023-02-01

- T4970 (default): pin OCaml pcre package to avoid JIT support

3.1.114 2023-01-30

- T4954 (bug): DNS cannot be configured via Network-Config v1 received from ConfigDrive / Cloud-Init

3.1.115 2023-01-24

- T4949 (feature): Backport “monitor log” and “show log” op-mode definitions from current to equuleus
- T4947 (feature): Support mounting container volumes as ro or rw

3.1.116 2023-01-23

- T4798 (default): Migrate the file-exists validator away from Python
- T4683 (enhancment): Add kitty-terminfo package to build
- T4875 (default): Replace Python validator ‘interface-name’ to avoid Python startup cost
- T4664 (bug): Add validation to reject whitespace in tag node value names

3.1.117 2023-01-22

- T4906 (bug): ipsec connections shows only one connection as up

3.1.118 2023-01-21

- T4896 (bug): ospfv3: Fix broken not-advertise option
- T4799 (bug): PowerDNS >= 4.7 does not get reloaded by vyos-hostsd

3.1.119 2023-01-17

- T4902 (bug): snmpd: exclude container storage from monitoring

3.1.120 2023-01-15

- T4832 (feature): dhcp: Add IPv6-only dhcp option support (RFC 8925)
- T4918 (bug): Odd show interface behavior

3.1.121 2023-01-09

- T4922 (feature): Add ssh-client source-interface CLI option

3.1.122 2023-01-07

- T4884 (bug): Missing a community6 in snmpd config

3.1.123 2023-01-05

- T3937 (default): Rewrite “show system memory” in Python to make it usable as a library function

3.1.124 2023-01-03

- T4869 (bug): A network with */32* or */128* mask cannot be removed from a network-group

3.1.125 2022-12-31

- T4898 (feature): Add mtu config option for dummy interfaces

3.1.126 2022-12-26

- T4511 (bug): IPv6 DNS lookup
- T4809 (feature): radvd: Allow use of AdvRASrcAddress

3.1.127 2022-12-18

- T4709 (bug): TCP MSS clamping broken in equuleus

3.1.128 2022-12-15

- T4671 (bug): linux-firmware package is missing symlinks defined in WHENCE file

3.1.129 2022-12-04

- T4825 (feature): interfaces veth/veth-pairs -standalone used

3.1.130 2022-12-02

- T4122 (bug): interface ip address config missing after upgrade from 1.2.8 to 1.3.0 (when redirect is configured?)
- T1024 (feature): Policy Based Routing by DSCP

3.1.131 2022-11-23

- T4793 (feature): Create warning message about disable-route-autoinstall when ipsec vti is used

3.1.132 2022-11-21

- T4812 (feature): IPsec ability to show all configured connections

3.1.133 2022-11-06

- T2913 (bug): Failure to install fpm while building builder docker image

3.1.134 2022-11-04

- T2417 (feature): Python validator cleanup

3.1.135 2022-11-01

- T4177 (bug): Strip-private doesn't work for service monitoring

3.1.136 2022-10-31

- T1875 (feature): Add the ability to use network address as BGP neighbor (bgp listen range)
- T4785 (feature): snmp: Allow !, @, * and # in community name

3.1.137 2022-10-21

- T2189 (bug): Adding a large port-range will take ~ 20 minutes to commit

3.1.138 2022-10-18

- T4533 (bug): Radius clients don't have simple permissions

3.1.139 2022-10-13

- T4312 (bug): Telegraf configuration doesn't accept IPs for URL

3.1.140 2022-10-12

- T4730 (bug): Conntrack-sync error - listen-address is not the correct type in config as it should be

3.1.141 2022-10-11

- T4680 (bug): Telegraf prometheus-client listen-address invalid format

3.1.142 2022-10-04

- T4702 (bug): Wireguard peers configuration is not synchronized with CLI
- T4652 (feature): Upgrade PowerDNS recursor to 4.7 series
- T4648 (default): PPPoE: Ignore default router from RA when PPPoE default-route is set to none
- T4582 (default): Router-advert: Preferred lifetime cannot equal valid lifetime in PIOs

3.1.143 2022-09-17

- T4666 (bug): EAP-TLS no longer allows TLSv1.0 after T4537, T4584

3.1.144 2022-09-15

- T4679 (bug): OpenVPN site-to-site incorrect check for IPv6 local and remote address
- T4630 (bug): Prevent attempts to use the same interface as a source interface for pseudo-ethernet and MACsec at the same time

3.1.145 2022-09-12

- T4647 (feature): Add Google Virtual NIC (gVNIC) support

3.1.146 2022-09-05

- T4668 (bug): Adding/removing members from bond doesn't work/results in incorrect interface state
- T4628 (bug): ConfigTree() throws ValueError() if tagNode contains whitespaces

3.1.147 2022-08-29

- T4653 (bug): Interface offload options are not applied correctly
- T4061 (default): Add util function to check for completion of boot config
- T4654 (bug): RPKI cache incorrect description
- T4572 (bug): Add an option to force interface MTU to the value received from DHCP

3.1.148 2022-08-26

- T4642 (bug): proxy: hyphen not allowed in proxy URL

3.1.149 2022-08-23

- T4618 (bug): Traffic policy not set on virtual interfaces
- T4538 (bug): Macsec does not work correctly when the interface status changes.

3.1.150 2022-08-22

- T4629 (bug): Raised ConfigErrors contain dict instead of only the dict key
- T4632 (bug): VLAN-aware bridge not working

3.1.151 2022-08-19

- T4616 (bug): openconnect: KeyError: 'local_users'
- T4614 (feature): OpenConnect split-dns directive

3.1.152 2022-08-16

- T4592 (bug): macsec: can not create two interfaces using the same source-interface
- T4584 (bug): hostap: create custom package build
- T4537 (bug): MACsec not working with cipher gcm-aes-256

3.1.153 2022-08-15

- T4565 (bug): vlan aware bridge not working with - Kernel: T3318: update Linux Kernel to v5.4.205 #249
- T4206 (bug): Policy Based Routing with DHCP Interface Issue
- T2763 (feature): New SNMP resource request - SNMP over TCP

3.1.154 2022-08-14

- T4579 (bug): bridge: can not delete member interface CLI option when VLAN is enabled
- T4421 (default): Add support for floating point numbers in the numeric validator
- T4415 (bug): Include license/copyright files in the image but remove user documentation from /usr/share/doc to reduce its size
- T4313 (bug): "generate public-key-command" throws unhandled exceptions when it cannot retrieve the key
- T4082 (bug): Add op mode command to restart ldpd
- T3714 (bug): Some sysctl custom parameters disappear after reboot
- T4260 (bug): Extend vyos.configdict.node_changed() to support recursiveness
- T3785 (default): Add unicode support to configtree backend
- T3507 (bug): Bond with mode LACP show u/u in show interfaces even if peer is not configured

3.1.155 2022-08-11

- T4476 (default): Next steps after installation is not communicated properly to new users

3.1.156 2022-08-02

- T4515 (default): Reduce telegraf binary size

3.1.157 2022-07-30

- T4575 (feature): vyos.utill add new wrapper "rc_cmd" to get the return code and output
- T4532 (bug): Flow-accounting IPv6 server/receiver bug

3.1.158 2022-07-27

- T4571 (bug): Sflow with vrf configured does not use vrf to validate agent-address IP from vrf-configured interfaces

3.1.159 2022-07-18

- T4228 (bug): bond: OS error thrown when two bonds use the same member
- T4534 (bug): bond: bridge: error out if member interface is assigned to a VRF instance
- T4525 (bug): Delete interface from VRF and add it to bonding error
- T4522 (feature): bond: add ability to specify mii monitor interval via CLI
- T4521 (bug): bond: ARP monitor interval is not configured despite set via CLI

3.1.160 2022-07-14

- T4491 (bug): Use empty string for internal name of root node of config_tree

3.1.161 2022-07-13

- T1375 (feature): Add clear dhcp server lease function

3.1.162 2022-07-12

- T4527 (bug): Prevent to create VRF name default
- T4084 (default): Dehardcode the default login banner
- T3864 (enhancment): Add Edgecore build to VyOS 1.3 Equuleus

3.1.163 2022-07-09

- T4507 (feature): IPoE-server add multiplier option for shaper
- T4468 (bug): web-proxy source group cannot start with a number bug
- T4373 (feature): PPPoE-server add multiplier option for shaper

3.1.164 2022-07-07

- T4456 (bug): NTP client in VRF tries to bind to interfaces outside VRF, logs many messages
- T4509 (feature): Feature Request: DNS64

3.1.165 2022-07-06

- T4513 (bug): Webproxy monitor commands do not work

3.1.166 2022-07-05

- T4510 (bug): set system static-host-mapping doesn't allow IPv4 and IPv6 for same name.
- T2654 (bug): Multiple names unable to be assigned to the same static mapping
- T2683 (default): no dual stack in system static-host-mapping host-name

3.1.167 2022-07-01

- T4489 (bug): MPLS sysctl not persistent for tunnel interfaces

3.1.168 2022-06-20

- T1856 (feature): Support configuring IPSec SA bytes

3.1.169 2022-06-16

- T3866 (bug): Configs with DNS forwarding listening on OpenVPN interfaces or interfaces without a fixed address cannot be migrated to the new syntax

3.1.170 2022-06-15

- T1890 (feature): Metatask: rewrite flow-accounting to XML and Python

3.1.171 2022-06-09

- T2580 (feature): Support for ip pools for ippoe

3.1.172 2022-06-08

- T4447 (bug): DHCPv6 prefix delegation *sla-id* limited to 128
- T4350 (bug): DMVPN opennhrp spokes dont work behind NAT

3.1.173 2022-05-30

- T4315 (feature): Telegraf - Output to prometheus

3.1.174 2022-05-27

- T4441 (bug): wwan: connection not possible after a change added after 1.3.1-S1 release

3.1.175 2022-05-26

- T4442 (feature): HTTP API add action "reset"

3.1.176 2022-05-25

- T2194 (default): "show firewall" garbled output

3.1.177 2022-05-19

- T4430 (bug): Show firewall output with visual shift default rule

3.1.178 2022-05-16

- T4377 (default): generate tech-support archive includes previous archives

3.1.179 2022-05-12

- T4100 (feature): Firewall increase maximum number of rules

3.1.180 2022-05-11

- T4405 (bug): DHCP client sometimes ignores *no-default-route* option of an interface

3.1.181 2022-05-10

- T1972 (feature): Allow setting interface name for virtual_ipaddress in VRRP VRID

3.1.182 2022-05-07

- T4361 (bug): *vyos.config.exists()* does not work for nodes with multiple values
- T4354 (bug): Slave interfaces fall out from bonding during configuration change

3.1.183 2022-05-03

- T4395 (feature): Extend show vpn debug

3.1.184 2022-05-01

- T4369 (bug): OpenVPN: daemon not restarted on changes to "openvpn-option" CLI node
- T4363 (bug): salt-minion: default mine_interval option is not set

3.1.185 2022-04-29

- T4388 (bug): dhcp-server: missing constraint on tftp-server-name option
- T4366 (bug): geneve: interface is removed on changes to e.g. description

3.1.186 2022-04-26

- T4235 (default): Add config tree diff algorithm

3.1.187 2022-04-19

- T4344 (bug): DHCP statistics not matching, conf-mode generates incorrect pool name with dash
- T4268 (bug): Elevated LA while using VyOS monitoring feature

3.1.188 2022-04-08

- T4331 (bug): IPv6 link local addresses are not configured when an interface is in a VRF
- T4339 (bug): wwan: tab-completion results in "No such file or directory" if there is no WWAN interface
- T4338 (bug): wwan: changing interface description should not trigger reconnect
- T4324 (bug): wwan: check alive script should only be run via cron if a wwan interface is configured at all

3.1.189 2022-04-07

- T4330 (bug): MTU settings cannot be applied when IPv6 is disabled
- T4346 (feature): Deprecate "system ipv6 disable" option to disable address family within OS kernel
- T4337 (bug): isis: IETF SPF delay algorithm can not be configured - results in vyos.frr.CommitError
- T4319 (bug): The command "set system ipv6 disable" doesn't work as expected.
- T4341 (feature): login: disable user-account prior to deletion and wait until deletion is complete
- T4336 (feature): isis: add support for MD5 authentication password on a circuit

3.1.190 2022-04-06

- T4308 (feature): Op-comm "Show log frr" to view specific protocol logs

3.1.191 2022-03-29

- T3686 (bug): Bridging OpenVPN tap with no local-address breaks

3.1.192 2022-03-24

- T4294 (bug): Adding a new openvpn-option does not restart the OpenVPN process
- T4230 (bug): OpenVPN server configuration deleted after reboot when using a VRRP virtual-address

3.1.193 2022-03-21

- T4311 (bug): CVE-2021-4034: local privilege escalation in PolKit
- T4310 (bug): CVE-2022-0778: infinite loop in OpenSSL certificate parsing

3.1.194 2022-03-12

- T4296 (bug): Interface config injected by Cloud-Init may interfere with VyOS native
- T4002 (default): firewall group network-group long names restriction incorrect behavior

3.1.195 2022-03-11

- T4297 (bug): Interface configuration saving fails for ice/iavf based interfaces because they can't change speed/duplex settings

3.1.196 2022-03-05

- T4259 (bug): The conntrackd daemon can be started wrongly

3.1.197 2022-02-28

- T4273 (bug): ssh: Upgrade from 1.2.X to 1.3.0 breaks config
- T4115 (bug): reboot in <x> not working as expected

3.1.198 2022-02-24

- T4267 (bug): Error - Missing required "ip key" parameter

3.1.199 2022-02-23

- T4264 (bug): vxlan: interface is destroyed and rebuild on description change
- T4263 (bug): vyos.util.leaf_node_changed() dos not honor valueLess nodes

3.1.200 2022-02-21

- T4120 (feature): [VXLAN] add ability to set multiple unicast-remotes

3.1.201 2022-02-20

- T4261 (feature): MACsec: add DHCP client support
- T4203 (bug): Reconfigure DHCP client interface causes brief outages

3.1.202 2022-02-19

- T4258 (bug): [DHCP-SERVER] error parameter on Failover

3.1.203 2022-02-17

- T4241 (bug): ocserv openconnect looks broken in recent bulds of 1.3 Equuleus
- T4255 (bug): Unexpected print of dict bridge on delete
- T4240 (bug): Cannot add wlan0 to bridge via configure
- T4154 (bug): Error add second gre tunnel with the same source interface

3.1.204 2022-02-16

- T4237 (bug): Conntrack-sync error - error adding listen-address command

3.1.205 2022-02-15

- T4201 (bug): Firewall - ICMPv6 matches not working as expected on 1.3.0
- T3006 (bug): Accel-PPP & vlan-mon config get invalid VLAN
- T3494 (bug): DHCPv6 leases traceback when PD using

3.1.206 2022-02-13

- T4242 (bug): ethernet speed/duplex can never be switched back to auto/auto
- T4191 (bug): Lost access to host after VRF re-creating

3.1.207 2022-02-11

- T3872 (feature): Add configurable telegraf monitoring service
- T4234 (bug): Show firewall partly broken in 1.3.x

3.1.208 2022-02-10

- T4165 (bug): Custom conntrack rules cannot be deleted

3.1.209 2022-02-08

- T4227 (bug): Typo in help completion of hello-time option of bridge interface

3.1.210 2022-02-07

- T4233 (bug): ssh: sync regex for allow/deny usernames to "system login"
- T4087 (feature): IPsec IKE-group proposals limit of 10 pieces

3.1.211 2022-02-05

- T4226 (bug): VRRP transition-script does not work for groups name which contains -(minus) sign

3.1.212 2022-02-04

- T4196 (bug): DHCP server client-prefix-length parameter results in non-functional leases

3.1.213 2022-02-03

- T3643 (bug): show vpn ipsec sa doesn't show tunnels in "down" state

3.1.214 2022-02-01

- T4198 (bug): Error shown on commit

3.1.215 2022-01-28

- T4184 (bug): NTP allow-clients address doesn't work it allows to use ntp server for all addresses

3.1.216 2022-01-24

- T4204 (feature): Update Accel-PPP to a newer revision

3.1.217 2022-01-17

- T3164 (bug): console-server ssh does not work with RADIUS PAM auth

3.1.218 2022-01-15

- T4183 (feature): IPv6 link-local address not accepted as wireguard peer
- T4110 (feature): [IPV6-SSH/DNS} enable IPv6 link local adresses as listen-address %eth0

3.1.219 2022-01-12

- T4168 (bug): IPsec VPN is impossible to restart when DMVPN is configured
- T4167 (bug): DMVPN apply wrong param on the first configuration
- T4152 (bug): NHRP shortcut-target holding-time does not work

3.1.220 2022-01-10

- T3299 (bug): Allow the web proxy service to listen on all IP addresses
- T3115 (feature): Add support for firewall on L3 VIF bridge interface

3.1.221 2022-01-09

- T3822 (bug): OpenVPN processes do not have permission to read key files generated with *run generate openvpn key*
- T4142 (bug): Input ifbX interfaces not displayed in op-mode
- T3914 (bug): VRRP rfc3768-compatibility doesn't work with unicast peers

3.1.222 2022-01-07

- T3924 (bug): VRRP stops working with VRF

3.1.223 2022-01-06

- T4141 (bug): Set high-availability vrrp sync-group without members error

3.1.224 2022-01-03

- T4065 (bug): IPSEC configuration error: connection to unix:///var/run/charon.ctl failed: No such file or directory
- T4052 (bug): Validator return traceback on VRRP configuration with the script path not in config dir
- T4128 (bug): keepalived: Upgrade package to add VRF support

3.1.225 2021-12-31

- T4081 (bug): VRRP health-check script stops working when setting up a sync group

3.1.226 2021-12-29

- T2922 (bug): The *vpn ipsec logging log-modes* miss the IPSec daemons state check
- T2695 (bug): Flow-accounting bug with subinterfaces
- T2400 (default): OpenVPN: dont restart server if no need
- T4086 (default): system login banner is not removed on deletion.

3.1.227 2021-12-28

- T3380 (bug): "show vpn ike sa" does not display IPv6 peers
- T2933 (feature): VRRP add option virtual_ipaddress_excluded

3.1.228 2021-12-27

- T2566 (bug): sstp not able to run tunnels ipv6 only
- T4093 (bug): SNMPv3 snmpd.conf generation bug
- T2764 (enhancment): Increase maximum number of NAT rules

3.1.229 2021-12-26

- T4104 (bug): RAID1: "add raid md0 member sda1" does not restore boot sector

3.1.230 2021-12-25

- T4101 (bug): commit-archive: Use of uninitialized value $source_address in concatenation
- T4055 (feature): Add VRF support for HTTP(S) API service

3.1.231 2021-12-24

- T3854 (bug): Missing op-mode commands for conntrack-sync

3.1.232 2021-12-23

- T4092 (bug): IKEv2 mobike commit failed with DMVPN nhrp
- T3354 (default): Convert strip-private script from Perl to Python

3.1.233 2021-12-22

- T3356 (feature): Script for remote file transfers

3.1.234 2021-12-21

- T4053 (bug): VRRP impossible to set scripts out of the /config directory
- T4013 (bug): Add pkg cloudwatch for AWS images
- T3913 (bug): VRF traffic fails after upgrade from 1.3.0-RC6 to 1.3.0-EPA1/2

3.1.235 2021-12-20

- T4088 (default): Fix typo in login banner

3.1.236 2021-12-19

- T3912 (default): Use a more informative default post-login banner

3.1.237 2021-12-17

- T3176 (bug): Ordering of ports on EdgeCore SAF51015I is mixed up?
- T4059 (bug): VRRP sync-group transition script does not persist after reboot

3.1.238 2021-12-16

- T4046 (feature): Sflow - Add Source address parameter
- T2615 (default): Provide an explicit option for server fingerprint in commit archive, and make insecure the default
- T4076 (enhancment): Allow setting CORS options in HTTP API
- T3378 (bug): commit-archive source-address broken for IPv6 addresses

3.1.239 2021-12-15

- T4077 (bug): op-mode: bfd: drop “show protocols bfd” in favour of “show bfd”
- T4073 (bug): “show protocols bfd peer <>” shows incorrect peer information.

3.1.240 2021-12-14

- T4071 (feature): Allow HTTP API to bind to unix domain socket

3.1.241 2021-12-12

- T4036 (bug): VXLAN incorrect raiseError if set multicast network instead of singe address

3.1.242 2021-12-10

- T4068 (feature): Python: ConfigError should insert line breaks into the error message

3.1.243 2021-12-09

- T4033 (bug): VRRP - Error security when setting scripts
- T4064 (bug): IP address for vif is not removed from the system when deleted in configuration
- T4063 (bug): VRRP log error - /usr/libexec/vyos/vyos-vrrp-conntracksync.sh - No such file or directory
- T4060 (enhancment): Extend configquery for use before boot configuration is complete

3.1.244 2021-12-08

- T4024 (bug): Access-lists and prefix-lists disappear when setting ldp hello-ipv4-interval

3.1.245 2021-12-07

- T4041 (servicerequest): “transition-script” doesn’t work on “sync-group”

3.1.246 2021-12-06

- T4012 (feature): Add VRF support for TFTP

3.1.247 2021-12-05

- T4034 (bug): “make xcp-ng-iso” still includes vyos-xe-guest-utilities
- T2076 (feature): RAID install: sfdisk change-id is deprecated in favor of –part-type
- T1126 (bug): Reusing a RAID from a BIOS install in an EFI install causes a failure to boot

3.1.248 2021-12-04

- T4049 (feature): support command-style output with compare command
- T4047 (bug): Wrong regex validation in XML definitions
- T4045 (bug): Unable to “format disk <new> like <old>”

3.1.249 2021-12-02

- T4035 (bug): Geneve interfaces aren’t displayed by operational mode commands

3.1.250 2021-12-01

- T3695 (bug): OpenConnect reports commit success when ocserv fails to start due to SSL cert/key file issues

3.1.251 2021-11-30

- T3725 (feature): show configuration in json format

3.1.252 2021-11-29

- T2661 (bug): SSTP wrong certificates check
- T3946 (enhancment): Automatically resize the root partition if the drive has extra space

3.1.253 2021-11-28

- T3999 (bug): show lldp neighbor Traceback error

3.1.254 2021-11-26

- T4019 (bug): Smoketests for SSTP and openconnect fails

3.1.255 2021-11-25

- T4005 (feature): Feature Request: IPsec IKEv1 + IKEv2 for one peer

3.1.256 2021-11-24

- T4015 (feature): Update Accel-PPP to a newer revision
- T1083 (feature): Implement persistent/random address and port mapping options for NAT rules

3.1.257 2021-11-23

- T3990 (bug): WATCHFRR: crashlog and per-thread log buffering unavailable (due to files left behind in /var/tmp/frr/ after reboot)

3.1.258 2021-11-20

- T4004 (bug): IPsec ike-group parameters are not saved correctly (after reboot)

3.1.259 2021-11-19

- T4003 (bug): API for "show interfaces ethernet" does not include the interface description
- T4011 (bug): ethernet: deleting interface should place interface in admin down state

3.1.260 2021-11-18

- T3995 (feature): OpenVPN: do not stop/start service on configuration change
- T4008 (feature): dhcp: change client retry interval form 300 -> 60 seconds
- T3795 (bug): WWAN: issues with non connected interface / no signal

3.1.261 2021-11-17

- T3350 (bug): OpenVPN config file generation broken
- T3996 (bug): SNMP service error in log

3.1.262 2021-11-15

- T3934 (bug): Openconnect VPN broken: ocserv-worker general protection fault on client connect
- T3724 (feature): Allow setting host-name in l2tp section of accel-ppp

3.1.263 2021-11-14

- T3974 (bug): route-map commit fails if interface does not exist

3.1.264 2021-11-11

- T1349 (bug): L2TP remote-access vpn terminated and not showing as connected
- T1058 (default): hw-id is ignored when naming interfaces
- T914 (feature): Extend list_interfaces.py to support multiple interface types
- T688 (enhancment): Move component versions used for config migration purposes into vyos-1x

3.1.265 2021-11-10

- T3982 (bug): DHCP server commit fails if static-mapping contains + or .

3.1.266 2021-11-09

- T3962 (bug): Image cannot be built without open-vm-tools
- T2088 (bug): Increased boot time from 1.2.4 -> 1.3 rolling by 100%
- T2136 (bug): XML command definition convertor doesn't disallow tag nodes with multi flag on

3.1.267 2021-11-07

- T2874 (feature): Add MTU and TCP-MSS discovery tool
- T3626 (bug): Configuring and disabling DHCP Server

3.1.268 2021-11-06

- T3971 (feature): Ability to build ISO images for XCP-NG hypervisor
- T3514 (bug): NIC flap at any interface change

3.1.269 2021-11-05

- T3972 (bug): Removing vif-c interface raises KeyError

3.1.270 2021-11-04

- T3964 (bug): SSTP: local-user static-ip CLI node accepts invalid IPv4 addresses

3.1.271 2021-11-03

- T3610 (bug): DHCP-Server creation for not primary IP address fails

3.1.272 2021-11-01

- T3846 (bug): dmvpn configuration not reapllied after "restart vpn"
- T3956 (bug): GRE tunnel - unable to move from source-interface to source-address, commit error

3.1.273 2021-10-31

- T3945 (feature): Add route-map for bgp aggregate-address
- T3341 (bug): Wrong behavior of the "reset vpn ipsec-peer XXX tunnel XXX" command
- T3954 (bug): FTDI cable makes VyOS sagitta latest hang, /dev/serial unpopulated, config system error
- T3943 (bug): "netflow source-ip" prevents image upgrades if IP address does not exist locally

3.1.274 2021-10-29

- T3942 (feature): Generate IPSec debug archive from op-mode

3.1.275 2021-10-28

- T3941 (bug): "show vpn ipsec sa" shows established time of parent SA not child SA's

3.1.276 2021-10-27

- T3944 (bug): VRRP fails over when adding new group to master

3.1.277 2021-10-25

- T3935 (bug): Update from rc5 to EPA2 failed

3.1.278 2021-10-22

- T3188 (bug): Tunnel local-ip to dhcp-interface Change Fails to Update

3.1.279 2021-10-21

- T3920 (bug): dhclient exit hook script 01-vyos-cleanup causes too many arguments error
- T3926 (bug): strip-private does not sanitize "cisco-authentication" from NHRP configuration
- T3925 (feature): Tunnel: dhcp-interface not implemented - use source-interface instead
- T3927 (feature): Kernel: Enable kernel support for HW offload of the TLS protocol

3.1.280 2021-10-20

- T3922 (bug): NHRP: delete fails
- T3918 (bug): DHCPv6 prefix delegation incorrect verify error
- T3921 (bug): tunnel: KeyError when using dhcp-interface

3.1.281 2021-10-19

- T3396 (bug): syslog can't be configured with an ipv6 literal destination in 1.2.x
- T690 (feature): Allow OpenVPN servers to push routes with custom metric values

3.1.282 2021-10-17

- T3786 (bug): GRE tunnel source address 0.0.0.0 error
- T3425 (bug): Scripts from the /config/scripts/ folder do not run on live system
- T3217 (default): Save FRR configuration on each commit
- T3076 (bug): Router reboot adds unwanted 'conntrack-sync mcast-group '225.0.0.50" line to configuration
- T2800 (bug): Pseudo-Ethernet: source-interface must not be member of a bridge
- T3422 (bug): Dynamic DNS doesn't allow zone field with cloudflare protocol
- T3381 (bug): Change GRE tunnel failed
- T3254 (bug): Dynamic DNS status shows incorrect last update time
- T3253 (bug): rpki: multiple peers cannot be configured

- T3219 (default): Typo in openvpn server client config for IPv6 iroute
- T2100 (feature): BGP route adverisement wih checks rib
- T1663 (enhancment): T1656 equuleus: buster: arm64/aarch64: ipaddrcheck does not complete testing
- T1243 (bug): BGP local-as accept wrong values
- T770 (bug): Bonded interfaces get updated with incorrect hw-id in config.
- T697 (bug): Clean up and sanitize package dependencies
- T3837 (default): OpenConnect: Fix typo in help property
- T1440 (bug): Creating two DHCPv6 shared-network-names with the same subnet is allowed, causes dhcpd to fail to start.
- T578 (feature): Support Linux Container

3.1.283 2021-10-16

- T3879 (bug): GPG key verification fails when upgrading from a 1.3 beta version
- T3851 (bug): Missing ospf and rip options for bridge vifs

3.1.284 2021-10-13

- T3904 (bug): NTP pool associations silently fail
- T3277 (feature): DNS Forwarding - reverse zones

3.1.285 2021-10-11

- T2607 (feature): Support for pppoe-server radius mode auth and config radius accouting port

3.1.286 2021-10-10

- T3750 (bug): pdns-recursor 4.4 issue with dont-query and private DNS servers
- T3885 (default): dhcpv6-pd: randomly generated DUID is not persisted
- T3899 (enhancment): Add support for hd44780 LCD displays

3.1.287 2021-10-09

- T3894 (bug): Tunnel Commit Failed if system does not have *eth0*

3.1.288 2021-10-08

- T3893 (bug): MGRE Tunnel commit crash If sit tunnel available

3.1.289 2021-10-04

- T3888 (bug): Incorrect warning when poweroff command executed from configure mode.
- T3890 (feature): dhcp(v6): provide op-mode commands to retrieve both server and client logfiles
- T3889 (feature): Migrate to journalctl when reading daemon logs

3.1.290 2021-10-03

- T3880 (bug): EFI boot shows error on display

3.1.291 2021-10-02

- T3882 (feature): Upgrade PowerDNs recursor to 4.5 series
- T3883 (bug): VRF - Delette vrf config on interface

3.1.292 2021-10-01

- T3877 (bug): VRRP always enabled rfc3768-compatibility even when not specified

3.1.293 2021-09-30

- T3874 (bug): D-Link Ethernet Interface not working.

3.1.294 2021-09-27

- T3858 (bug): Deleting OSPFv3 process yields: Unknown command: no router-id

3.1.295 2021-09-26

- T3860 (bug): Error on pppoe, tunnel and wireguard interfaces for IPv6 EUI64 addresses
- T3857 (feature): reboot: send wall message to all users for information
- T3867 (bug): vxlan: multicast group address is not validated
- T3859 (bug): Add “log-adjacency-changes” to ospfv3 process

3.1.296 2021-09-23

- T3850 (bug): Dots are no longer allowed in SSH public key names

3.1.297 2021-09-21

- T2602 (bug): pptp/sstp/l2tp add possibility enable or disable CCP

3.1.298 2021-09-19

- T3841 (feature): dhcp-server: add ping-check option to CLI
- T2738 (bug): Modifying configuration in the "interfaces" section from VRRP transition scripts causes configuration lockup and high CPU utilization
- T3842 (feature): Backport DHCP server improvements from VyOS 1.4 sagitta to 1.3 equuleus
- T3840 (feature): dns forwarding: Cache size should allow values > 10k
- T3672 (bug): DHCP-FO with multiple subnets results in invalid/non-functioning dhcpd.conf configuration file output

3.1.299 2021-09-11

- T3402 (feature): Add VyOS programming library for operational level commands

3.1.300 2021-09-10

- T3802 (bug): Commit fails if ethernet interface doesn't support flow control
- T3819 (bug): Upgrade Salt Stack 3002.3 -> 3003 release train
- T3421 (bug): MTR/Traceroute broken in 1.3-beta
- T3820 (feature): PowerDNS recursor - update from 4.3 -> 4.4 to sync with current
- T1770 (bug): webproxy breaks commit and http access on routed client
- T915 (feature): MPLS Support

3.1.301 2021-09-09

- T3816 (bug): Error after entering outbound-interface command in NAT
- T3814 (bug): wireguard: commit error showing incorrect peer name from the configured name
- T3805 (bug): OpenVPN insufficient privileges for rtnetlink when closing TUN/TAP interface

3.1.302 2021-09-07

- T2322 (bug): CLI [op-mode] bugs. Root task
- T1894 (bug): FRR config not loaded after daemons segfault or restart
- T3807 (bug): Op Command "show interfaces wireguard" does not show the output
- T3808 (default): ipsec is mistakenly restarted after delete

3.1.303 2021-09-06

- T3806 (bug): Don't set link local ipv6 address if MTU less then 1280
- T3803 (default): Add source-address option to the ping CLI
- T3431 (bug): Show version all bug
- T3362 (bug): 1.3 - RC1 ifb redirect failing to commit
- T3291 (bug): Fault on setting offload RPS with single-core CPU
- T2920 (bug): Commit crash when adding the second mGRE tunnel with the same key
- T2895 (bug): VPN IPsec "leftsubnet" declared 2 times
- T2019 (bug): LLDP wrong config generation for interface 'all'

3.1.304 2021-09-05

- T3804 (feature): cli: Migrate and merge "system name-servers-dhcp" into "system name-server"

3.1.305 2021-09-04

- T3697 (bug): Impossible to delete IPsec completely
- T3619 (bug): Performance Degradation 1.2 –> 1.3 | High ksoftirqd CPU usage
- T1785 (bug): Deleting partitions on disks (Raid1) with default value 'no'

3.1.306 2021-09-03

- T3788 (bug): Keys are not allowed with ipip and sit tunnels
- T3683 (bug): VXLAN not accept ipv6 and source-interface options and mtu bug
- T3634 (feature): Add op command option for ping for do not fragment bit to be set

3.1.307 2021-09-02

- T3792 (bug): login: A hypen present in a username from "system login user" is replaced by an underscore
- T3790 (bug): Does not possible to configure PPTP static ip-address to users

3.1.308 2021-09-01

- T2434 (bug): Duplicate Address Detection Breaks Interfaces

3.1.309 2021-08-31

- T3789 (feature): Add custom validator for base64 encoded CLI data
- T3782 (default): Ingress Shaping with IFB No Longer Functional with 1.3

3.1.310 2021-08-30

- T3777 (bug): adding IPv6 EUI64 address fails commit in 1.3.0-rc6
- T3768 (default): Remove early syntaxVersion implementation
- T2558 (feature): Add some CPU information to *show version* + fix broken hypervisor detection
- T2430 (default): cannot delete specific route static next-hop
- T1350 (bug): VRRP transition script will be executed once only
- T2941 (default): Using a non-ASCII character in the description field causes UnicodeDecodeError in config-source.py
- T3787 (bug): Remove deprecated UDP fragmentation offloading option
- T3677 (feature): "sipcalc" not included in 1.3

3.1.311 2021-08-29

- T3708 (bug): isisd and gre-bridge commit error
- T3783 (bug): "set protocols isis spf-delay-ietf" is not working
- T2750 (default): Use m4 as a template processor

3.1.312 2021-08-27

- T3182 (bug): Main blocker Task for FRR 7.4/7.5 series update
- T2108 (default): Use minisign/signify instead of GPG for release signing

3.1.313 2021-08-26

- T3781 (bug): Revert the NAT implementation in 1.3 back to iptables
- T3776 (default): Rename FRR daemon restart op-mode commands
- T3779 (feature): Backport all 1.4 IS-IS features and configuration to 1.3 except VRF

3.1.314 2021-08-25

- T3773 (bug): Delete the "show system integrity" command (to prepare for a re-implementation)
- T1514 (default): Add ability to restart frr processes

3.1.315 2021-08-24

- T3772 (bug): VRRP virtual interfaces are not shown in show interfaces

3.1.316 2021-08-23

- T2555 (bug): XML op-mode generation scripts silently discard XML nodes

3.1.317 2021-08-21

- T3682 (bug): Remove running dhclient from ether-resume.py

3.1.318 2021-08-20

- T1950 (default): Store VyOS configuration syntax version data in JSON file

3.1.319 2021-08-19

- T2759 (bug): validate-value prints error messages from validators that fail even if overall validation succeeds
- T3234 (bug): multi_to_list fails in certain cases, with root cause an element redundancy in XML interface-definitions
- T3732 (feature): override-default helper should support adding defaultValues to default less nodes
- T1962 (default): Add syntax version to schema

3.1.320 2021-08-17

- T2525 (bug): OSPFv3 missing route map, not establishing
- T508 (bug): ISC DHCP incorrect UDP checksum generation
- T1643 (bug): Deleting all firewall zones failed and locked out box
- T1550 (bug): Add support for Large BGP Community show commands

3.1.321 2021-08-16

- T3738 (default): openvpn fails if server and authentication are configured
- T1594 (bug): l2tpv3 error on IPv6 local-ip

3.1.322 2021-08-15

- T3756 (default): VyOS generates invalid QR code for wireguard clients

3.1.323 2021-08-14

- T3745 (feature): op-mode IPSec show vpn ipse sa sorting
- T521 (bug): Network services may fail if vyatta-router.service startup takes longer than a few seconds

3.1.324 2021-08-13

- T3740 (bug): HTTPs API breaks when the address is IPv6

3.1.325 2021-08-12

- T3731 (bug): verify_accel_ppp_base_service return wrong config error for SSP
- T3405 (feature): PPPoE server unit-cache
- T2432 (default): dhcpd: Can't create new lease file: Permission denied
- T3746 (feature): Inform users logging into the system about a pending reboot
- T3744 (default): Dns forwarding statistics formatting missing a new line

3.1.326 2021-08-10

- T3730 (bug): op-mode conntrack-sync miss some functions

3.1.327 2021-08-09

- T1501 (bug): VPN Commit Errors

3.1.328 2021-08-08

- T2027 (bug): get_config_dict is failing when the configuration section is empty/missing
- T169 (feature): Image install should put correct serial console device in created GRUB menu entry

3.1.329 2021-08-07

- T548 (feature): BGP IPv6 multipath support

3.1.330 2021-08-06

- T1153 (bug): VyOS 1.2.0RC10, RAID-1, fresh install, unable to save config

3.1.331 2021-08-05

- T696 (feature): Rewrite conntrack sync to XML

3.1.332 2021-08-04

- T3704 (feature): Add ability to interact with Areca RAID adapers
- T320 (default): OSPF does not redistribute connected routes associated with virtual tunnel interfaces

3.1.333 2021-08-02

- T2623 (bug): Creating sit tunnel fails with "Can not set "local" for tunnel sit tun1 at tunnel creation"
- T2161 (default): snmpd cannot start if ipv6 disabled
- T3601 (default): Error in ssh keys for vmware cloud-init if ssh keys is left empty.

3.1.334 2021-08-01

- T3707 (bug): Ping incorrect ip host checks

3.1.335 2021-07-31

- T3716 (feature): Linux kernel parameters ignore_routes_with_link_down- ignore disconnected routing connections
- T1626 (bug): BGP exchanges prefixes without specified address-family

3.1.336 2021-07-30

- T1176 (default): FRR - BGP replicating routes
- T1123 (bug): Inconsistency in community-list naming validation

3.1.337 2021-07-29

- T2931 (bug): Unicode decode error causes vyos.configd service to restart
- T2727 (bug): Add a dotted decimal value validator
- T2328 (default): dhcpv6 server not starting (disable check reversed?)
- T1758 (default): Switch vyos.config to libvyosconfig
- T954 (bug): Using the 10.255.255.0/24 subnet on other interfaces breaks L2TP/IPSec

3.1.338 2021-07-23

- T3699 (bug): login: verify selected "system login user" name is not already used by the base system.

3.1.339 2021-07-21

- T3689 (bug): static ipv6 route doesn't deleted in some cases
- T3685 (feature): IPv6 PBR doesn't allow setting of an egress interface

3.1.340 2021-07-20

- T3691 (bug): GRETAP: key is not applied when interface is created

3.1.341 2021-07-13

- T3679 (default): Point the unexpected exception message link to the new rolling release location

3.1.342 2021-07-11

- T3665 (bug): Missing VRF support for VxLAN but already documented

3.1.343 2021-07-06

- T3660 (feature): Conntrack-Sync configuration command to specify destination udp port for peer

3.1.344 2021-07-01

- T3658 (feature): Add support for dhcpdv6 fixed-prefix6

3.1.345 2021-06-29

- T3593 (bug): PPPoE server called-sid format does not work

3.1.346 2021-06-25

- T3650 (bug): OpenVPN: Upgrade package to 2.5.1 before releasing VyOS 1.3.0
- T3649 (feature): Add bonding additional hash-policy

3.1.347 2021-06-24

- T2722 (bug): get_config_dict() and key_mangling=('-', '_') will alter CLI data for tagNodes

3.1.348 2021-06-22

- T3629 (bug): IPoE server shifting address in the range

3.1.349 2021-06-20

- T3637 (bug): vrf: bind-to-all didn't work properly

3.1.350 2021-06-19

- T3633 (feature): Add LRO offload for interface ethernet

3.1.351 2021-06-17

- T3631 (feature): route-map: migrate "set extcommunity-rt" and "set extcommunity-soo" to "set extcommunity rt|soo" to match FRR syntax

3.1.352 2021-06-16

- T2425 (feature): Rewrite all policy zebra filters to XML/Python style
- T3630 (feature): op-mode: add "show version kernel" command

3.1.353 2021-06-13

- T3620 (feature): Rename WWAN interface from wirelessmodem to wwan to use QMI interface
- T3622 (feature): WWAN: add support for APN authentication
- T3621 (bug): PPPoE interface does not validate if password is supplied when username is set

3.1.354 2021-06-10

- T3250 (bug): PPPoE server: wrong local usernames
- T3138 (bug): ddclient improperly updated when apply rfc2136 config
- T2645 (default): Editing route-map action requires adding a new rule

3.1.355 2021-06-09

- T3602 (bug): Renaming BGP Peer Groups Leaves Router Broken
- T2916 (bug): A state of VTI interface in a configuration does not being processing properly

3.1.356 2021-06-08

- T3605 (default): Allow to set prefer-global for ipv6-next-hop
- T3607 (feature): [route-map] set ipv6 next-hop prefer-global

3.1.357 2021-06-07

- T3581 (bug): Incomplete command *show ipv6 ospfv3 linkstate*
- T3516 (bug): FRR 7.5 adds a second route when you attempt to change a static route distance instead of overwriting the old route
- T3461 (bug): OpenConnect Server redundancy check
- T3455 (bug): system users can not be added in "edit"

3.1.358 2021-06-04

- T3592 (feature): Set default TTL 64 for tunnels

3.1.359 2021-06-01

- T406 (bug): VPN configuration error: IPv6 over IPv4 IPsec is not supported when using IPv6 ONLY tunnel.

3.1.360 2021-05-30

- T1866 (bug): Commit archive over SFTP doesn't work with non-standard ports
- T3589 (feature): op-mode: support clearing out logfiles from CLI
- T3508 (bug): Check if there's enough drive space for an upgrade before downloading an image
- T1506 (enhancment): commit-archive scp/sftp public key authentication

3.1.361 2021-05-29

- T3135 (bug): BFD configurations fail to be applied
- T3103 (default): Rewrite parts of vyosfrr.py for readability, logging and to fix mulitiline regex "bugs"
- T2739 (default): vyos-utils is not compiled with a Jenkins pipeline.
- T2451 (bug): Cannot use !tcp or !tcp_udp while adding firewall rule
- T2436 (default): equuleus: Testing: vyos-1x: syntax checking Python scripts in PR
- T2184 (bug): OpenVPN op_mode tools broken
- T1944 (bug): FRR: Invalid route in BGP causes update storm, memory leak, and failure of Zebra

3.1.362 2021-05-28

- T1579 (feature): Rewrite all interface types in new XML/Python style

3.1.363 2021-05-27

- T2629 (bug): VXLAN interfaces don't actually allow you to configure most settings
- T2617 (feature): Rewrite vyatta-op-quagga "show" to XML
- T2512 (feature): vyatta-op-quagga [show ip] to XML format
- T1905 (default): Update to Keepalived 2.0.19
- T2669 (bug): DHCP-server overlapping ranges.

3.1.364 2021-05-26

- T3558 (default): autocomplete options for dhcp-interface is not showing for the static route command
- T3540 (bug): Keepalived memory utilisation issue when constantly getting its state in JSON format
- T2807 (feature): IPv6 Link-Local Address - Automatically generation/configuration on GRE Interfaces

3.1.365 2021-05-24

- T3575 (bug): pseudo-ethernet: must check source-interface MTU
- T3571 (bug): Broken Show Tab Complete
- T3576 (bug): ISIS does not support IPV6

3.1.366 2021-05-23

- T3570 (default): Prevent setting of a larger MTU on child interfaces
- T3572 (feature): Basic Drive Diagnostic Tools

3.1.367 2021-05-20

- T3554 (feature): Add area-type stub for ospfv3

3.1.368 2021-05-19

- T3562 (feature): Update Accel-PPP to a newer revision
- T3559 (feature): Add restart op-command for OpenConnect Server

3.1.369 2021-05-18

- T3525 (default): VMWare resume script syntax errors
- T2462 (default): LLDP op-mode exception: IndexError: list index out of range

3.1.370 2021-05-15

- T3549 (bug): DHCPv6 "service dhcpv6-server global-parameters name-server" is not correctly exported to dhcpdv6.conf when multiple name-server entries are present
- T3532 (bug): Not possible to change ethertype after interface creation
- T3550 (bug): Router-advert completion typo
- T3547 (feature): conntrackd: remove deprecated config options
- T3535 (feature): Rewrite vyatta-conntrack-sync in new XML and Python flavor
- T2049 (feature): Update strongSwan cipher suites list for IPSec settings

3.1.371 2021-05-14

- T3346 (bug): nat 4-to-5 migration script fails when a 'source' or 'destination' node exists but there are no rules
- T3248 (default): Deal with VRRP mode-force command that exists in 1.2 but not in 1.3
- T3426 (default): add support for script arguments to vyos-configd

3.1.372 2021-05-13

- T3544 (feature): DHCP server should validate configuration before applying it
- T3543 (feature): Support for setting lacp_rate on LACP bonded interfaces

3.1.373 2021-05-12

- T3302 (default): Make vyos-configd relay stdout from scripts to the user's console

3.1.374 2021-05-11

- T3526 (bug): Smoketest policy fail in CI

3.1.375 2021-05-10

- T3528 (bug): Frr 7.5.1 uses 'seq' for community-lists

3.1.376 2021-05-08

- T3517 (bug): FRR 7.5 bfd behavior for 1.3

3.1.377 2021-05-07

- T1171 (bug): 1.2.0 epa2 - IPsec VPN initiation

3.1.378 2021-05-06

- T3519 (bug): Cannot add / assign L2TPv3 to vrf

3.1.379 2021-05-01

- T3379 (feature): Add global-parameters name-server for dhcpv6-server
- T3491 (default): Change Kernel HZ to 1000

3.1.380 2021-04-30

- T3170 (default): Add a sanity check for empty node.def files

3.1.381 2021-04-29

- T3502 (bug): "system ip multipath layer4-hashing" doesn't work
- T3029 (bug): Generated NGINX configuration is wrong for the redirection (http -> https)
- T3156 (feature): Add op and additional conf commands for ISIS
- T2012 (feature): Global PBR
- T1314 (feature): Allow BGP on unnumbered interfaces

3.1.382 2021-04-27

- T2946 (bug): Calling 'stty_size' causes show interfaces API to fail

3.1.383 2021-04-25

- T3468 (bug): Tunnel interfaces aren't suggested as being available for bridging (regression)
- T1802 (feature): Wireguard QR code in cli for mobile devices

3.1.384 2021-04-23

- T3290 (bug): Disabling GRE conntrack module fails

3.1.385 2021-04-18

- T3481 (default): Exclude tag node values from key mangling
- T3475 (bug): XML dictionary cache unable to process syntaxVersion elements

3.1.386 2021-04-15

- T3386 (bug): PPPoE-server don't start with local authentication

3.1.387 2021-04-14

- T3055 (bug): op-mode incorrect naming for ipsec policy-based tunnels

3.1.388 2021-04-12

- T3454 (enhancment): dhclient reject option

3.1.389 2021-04-05

- T1612 (default): dhcp-server time-offset fails to validate
- T3438 (bug): VRF: removing vif which belongs to a vrf, will delete the entire vrf from the operating system
- T3418 (bug): BGP: system wide known interface can not be used as neighbor

3.1.390 2021-04-04

- T3457 (feature): Output the "monitor log" command in a colorful way

3.1.391 2021-03-31

- T3445 (bug): vyos-1x build include not all nodes

3.1.392 2021-03-25

- T2639 (feature): sort output of show vpn ipsec sa

3.1.393 2021-03-22

- T3284 (bug): merge/load fail silently if unable to resolve host

3.1.394 2021-03-21

- T3416 (bug): NTP: when running inside a VRF op-mode commands do not work

3.1.395 2021-03-20

- T3392 (bug): vrrp over dhcp default route bug (unexpected vrf)
- T3373 (feature): Upgrade to SaltStack version 3002.5
- T3329 (default): "system conntrack ignore" rules can no longer be created due to an iptables syntax change
- T3300 (feature): Add DHCP default route distance
- T3306 (feature): Extend set route-map aggregator as to 4 Bytes

3.1.396 2021-03-18

- T3411 (default): Extend the redirect_stdout context manager in vyos-configd to redirect stdout from subprocesses
- T3271 (bug): qemu-kvm grub issue

3.1.397 2021-03-17

- T3413 (bug): Configuring invalid IPv6 EUI64 address results in "OSError: illegal IP address string passed to inet_pton"

3.1.398 2021-03-14

- T2271 (feature): OSPF: add per VRF instance support
- T175 (feature): Add source route option to VTI interfaces

3.1.399 2021-03-13

- T3406 (bug): tunnel: interface no longer supports specifying encaplimit none - or migrator is missing
- T3407 (bug): console-server: do not allow to spawn a console-server session on serial port used by "system console"

3.1.400 2021-03-11

- T3399 (bug): RPKI: dashes in hostnames are replaced with underscores when rendering the FRR config
- T3305 (bug): Ingress qdisc does not work anymore in 1.3-rolling-202101 snapshot
- T2927 (bug): isc-dhcpd release and expiry events never execute
- T899 (bug): Tunnels cannot be moved from one bridge to another
- T786 (feature): new style xml and conf-mode scripts: posibillity to add tagNode value as parameter to conf-script

3.1.401 2021-03-09

- T3382 (bug): Error creating Console Server

3.1.402 2021-03-08

- T3387 (bug): Command "Monitor vpn ipsec" is not working

3.1.403 2021-03-07

- T3319 (bug): VXLAN uses ttl 1 (auto) by default
- T3391 (feature): Add CLI support for specifying maximum-paths per address family ipv4 unicast and ipv6 unicast
- T3211 (feature): ability to redistribute ISIS into other routing protocols

3.1.404 2021-03-05

- T2659 (feature): Add fastnetmon (DDoS detection) support

3.1.405 2021-03-04

- T2861 (bug): route-map “set community additive” not working correctly

3.1.406 2021-03-03

- T2966 (feature): tunnel: add new encapsulation types ip6tnl and ip6gretap

3.1.407 2021-03-01

- T3342 (bug): On xen-netback interfaces must set “scattergather” offload before MTU>1500

3.1.408 2021-02-28

- T3370 (bug): dhcp: Invalid domain name “private”
- T3369 (feature): VXLAN: add IPv6 underlay support

3.1.409 2021-02-27

- T2291 (bug): Bad hostnames in /etc/hosts with static-mapping in dhcp server config
- T3364 (feature): tunnel: cleanup/rename CLI nodes
- T3368 (feature): macsec: add support for gcm-aes-256 cipher
- T3366 (bug): tunnel: can not change local / remote ip address for gre-bridge tunnel
- T3173 (feature): Need ‘nopmtudisc’ option for tunnel interface

3.1.410 2021-02-26

- T3357 (default): HTTP-API redirect from http correct https port

3.1.411 2021-02-24

- T3303 (feature): Change welcome message on boot

3.1.412 2021-02-21

- T3163 (feature): ethernet ring-buffer can be set with an invalid value

3.1.413 2021-02-19

- T3326 (bug): OSPFv3: Cannot add L2TPv3 interface

3.1.414 2021-02-18

- T3259 (default): many dnat rules makes the vyos http api crash, even showConfig op timeouts

3.1.415 2021-02-17

- T3047 (bug): OSPF : virtual-link and passive-interface default parameters does not work together
- T3312 (feature): SolarFlare NICs support

3.1.416 2021-02-16

- T3318 (feature): Update Linux Kernel to v5.4.208 / 5.10.142

3.1.417 2021-02-14

- T2152 (bug): ddclient has bug which prevents use_web from being used
- T3308 (feature): BGP: add gracefull shutdown support

3.1.418 2021-02-13

- T3028 (feature): Create a default user when metadata is not available (for Cloud-init builds)
- T2867 (feature): Cleanup DataSourceOVF.py in the Cloud-init
- T2726 (feature): Allow to use all supported SSH key types in Cloud-init
- T2403 (feature): Full support for networking config in Cloud-init
- T2387 (feature): Create XML scheme for [conf_mode] BGP
- T2174 (feature): Rewrite protocol BGP to new XML/Python style
- T1987 (bug): A default route can be deleted by dhclient-script in some cases
- T723 (feature): Add support for first boot or installation time saved config modification
- T1775 (bug): Cloud-init not running userdata runcmd
- T1389 (feature): Add support for NoCloud cloud-init datasource
- T1315 (feature): Allow BGP to use address-family l2vpn evpn

3.1.419 2021-02-11

- T2638 (default): FRR: New framework for configuring FRR

3.1.420 2021-02-08

- T3295 (feature): Update Linux Kernel to v5.4.96 / 5.10.14

3.1.421 2021-02-07

- T3293 (bug): RPKI migration script errors out after CLI rewrite

3.1.422 2021-02-06

- T3285 (feature): Schedule reboots through systemd-shutdownd instead of atd
- T661 (feature): Show a warning if the router is going to reboot soon (due to "commit-confirm" command)

3.1.423 2021-02-05

- T2450 (feature): Rewrite "protocols vrf" tree in XML and Python
- T208 (feature): Ability to ignore default-route from dhcpcd per interface

3.1.424 2021-02-03

- T3239 (default): XML: override 'defaultValue' for mtu of certain interfaces; remove workarounds
- T2910 (feature): XML: generator should support override of variables
- T2873 (bug): "show nat destination translation address" doesn't filter at all

3.1.425 2021-02-02

- T3018 (bug): Unclear behaviour when configuring vif and vif-s interfaces
- T3255 (default): Rewrite protocol RPKI to new XML/Python style

3.1.426 2021-02-01

- T3268 (feature): Add VRF support to VIF-S interfaces
- T3274 (default): ask_yes_no() doesn't handle EOFError

3.1.427 2021-01-31

- T3276 (feature): Update Linux Kernel to v5.4.94 / 5.10.12

3.1.428 2021-01-30

- T3269 (bug): VIF-C interfaces don't verify configuration
- T3240 (feature): Support per-interface DHCPv6 DUIDs
- T3273 (default): PPPoE static default-routes deleted on interface down when not added by interface up

3.1.429 2021-01-29

- T3262 (bug): DHCPv6 client runs when dhcpv6-options is configured without requesting an address or PD
- T3261 (bug): Does not possible to disable pppoe client interface.

3.1.430 2021-01-27

- T3257 (feature): tcpdump supporting complete protocol
- T3110 (bug): Broken pipe in show interfaces
- T651 (enhancment): Split CI'ed, VyOS-specific packages and other packages into separate repos
- T597 (enhancment): Code testing on sonarcloud.com
- T516 (default): Make Python / XML code development more testable
- T625 (default): Lack of IKEv1 lifetime negotiation
- T613 (bug): Missing linux-kbuild
- T505 (bug): Hostapd cannot log

3.1.431 2021-01-26

- T3251 (bug): PPPoE client trying to authorize with the wrong username
- T2859 (bug): show nat source translation - Errors out

3.1.432 2021-01-25

- T3249 (feature): Support operation mode forwarding table output

3.1.433 2021-01-24

- T3230 (bug): RPKI can't be deleted
- T3243 (feature): Update Linux Kernel to v5.4.92 / 5.10.10

3.1.434 2021-01-18

- T2761 (feature): Extend "show vrrp" op-mode command with router priority
- T2679 (feature): VRRP with BFD Failure Detection
- T3212 (bug): SSH: configuration directory is not always created on boot
- T3231 (bug): "system option ctrl-alt-delete" has no effect

3.1.435 2021-01-17

- T3222 (bug): Typo in BGP dampening description
- T2944 (bug): NTP by default listen on any address/interface
- T3226 (bug): Repair bridge smoke test damage
- T2442 (enhancment): Move application of STP settings for bridge members from interfaces-bridge.py to Interface.add_to_bridge()
- T2381 (bug): OpenVPN: openvpn-option parsed/rendered improperly

3.1.436 2021-01-16

- T3215 (bug): Operational command "show ipv6 route" is broken
- T3172 (bug): Builds sometime after 2020-12-17 have broken routing after reboot
- T3157 (bug): salt-minion fails to start due to permission error accessing /root/.salt/minion.log
- T3167 (default): Recurring bugs in Intel NIC drivers
- T3151 (default): Decide on the final list of packages for 1.3
- T3137 (feature): Let VLAN aware bridge approach the behavior of professional equipment
- T3223 (feature): Update Linux Kernel to v5.4.89 / 5.10.7

3.1.437 2021-01-15

- T3210 (feature): ISIS three-way-handshake
- T3184 (feature): Add correct desctiptions for BGP neighbors
- T2850 (feature): Add BGP template for FRR

3.1.438 2021-01-14

- T3218 (feature): Replace Intel out-of-tree drivers with Linux Kernel stock drivers.

3.1.439 2021-01-13

- T3186 (bug): NAT: Commit failed when applying negated(!) addresses

3.1.440 2021-01-12

- T3205 (bug): Does not possible to configure tunnel mode gre-bridge

3.1.441 2021-01-11

- T3208 (bug): Does not possible to change user password
- T3198 (bug): OSPF database filtering issue
- T3206 (bug): Unable to delete destination NAT rule
- T3193 (bug): DHCPv6 PD verification issues
- T3201 (bug): Operational command "show log all" is not working for RADIUS users

3.1.442 2021-01-10

- T3178 (feature): Migrate vyatta-op-quagga to vyos-1x

3.1.443 2021-01-09

- T2467 (bug): Restarting flow accounting fails with systemd error
- T3199 (feature): Update Linux Kernel to v5.4.88 / 5.10.6

3.1.444 2021-01-07

- T3192 (feature): login: radius: add support for IPv6 RADIUS servers

3.1.445 2021-01-05

- T3169 (enhancment): Reimplement smoke test of span (mirror)
- T3161 (default): Consider removing ConfigLoad.pm
- T1398 (default): Remove vyatta-config-migrate package
- T805 (enhancment): Drop config compatibility with Vyatta Core older than 6.5

3.1.446 2021-01-04

- T3185 (bug): [conf-mode] Wrong CompletionHelp for Tunnel local-ip
- T2601 (bug): pppoe-server: Cannot disable CCP

3.1.447 2021-01-03

- T3180 (bug): DHCP server raises NameError

3.1.448 2021-01-02

- T2321 (feature): VRF support for SSH, NTP, SNMP service
- T3177 (bug): Rolling Release no longer reports VMware UUID

3.1.449 2021-01-01

- T3171 (feature): Add CLI option to enable RPS (Receive Packet Steering)

3.1.450 2020-12-31

- T3162 (bug): Wrong PPPoE server pado-delay parameter added to config
- T3160 (bug): PPPoE server called-sid option defined in wrong section
- T3168 (feature): Update Linux Kernel to v5.4.86

3.1.451 2020-12-29

- T3082 (bug): multi_to_list must distinguish between values and defaults
- T1466 (feature): Add EAPOL login support

3.1.452 2020-12-28

- T1732 (feature): Removing vyatta-webproxy module
- T2666 (feature): Packet Processing with eBPF and XDP
- T2581 (default): webproxy: implement proxy chaining
- T563 (feature): webproxy: migrate 'service webproxy' to get_config_dict()

3.1.453 2020-12-27

- T3150 (bug): When configuring QoS, the setting procedure of port mirroring is wrong

3.1.454 2020-12-23

- T3143 (bug): OpenVPN server: Push route config format is wrong
- T3146 (feature): Upgrade FRR from 7.4 -> 7.5 version incl. new libyang
- T3145 (feature): Update Linux Kernel to v5.4.85
- T3147 (feature): Upgrade to SaltStack version 3002.2

3.1.455 2020-12-22

- T3142 (bug): OpenVPN op-command completion fails due to missing status file
- T2940 (feature): Update FRR to 7.4
- T2573 (bug): BFD op-mode commands are broken
- T2495 (feature): Add xml for ISIS [conf_mode]
- T1316 (feature): Support for IS-IS

3.1.456 2020-12-21

- T2619 (bug): Bug: Changes in NAT or ZONES from 1.2 to 1.3

3.1.457 2020-12-20

- T3131 (bug): Typo in ipsec preshared-secret help
- T3134 (bug): DHCPv6 DUID configuration node missing
- T3140 (feature): Relax “ethernet offload-options” CLI definition
- T3132 (feature): Enable egress flow accounting

3.1.458 2020-12-17

- T2810 (default): Docs for vpn anyconnect-server
- T2036 (default): Open Connect VPN Server () support

3.1.459 2020-12-14

- T3128 (bug): pppoe smoke test failed
- T3129 (feature): Update Linux Kernel to v5.4.83
- T3089 (feature): Migrate port mirroring to vyos-1x and support two-way traffic mirroring
- T3130 (feature): Replace vyos-netplug with upstream debian version

3.1.460 2020-12-13

- T3114 (bug): When the bridge member is a non-ethernet interface, setting VLAN-aware bridge parameters fails

3.1.461 2020-12-11

- T3123 (bug): Configuration of vti interface impossible

3.1.462 2020-12-10

- T3117 (bug): OpenVPN config migration errors upgrading from 1.3-rolling-202010280217 to 1.3-rolling-202012060217

3.1.463 2020-12-09

- T3122 (feature): Update Linux Kernel to v4.19.162
- T3121 (bug): get_config_dict() and key_mangling=('-', '_') Broke PowerDNS dns_forwarding config file

3.1.464 2020-12-08

- T2562 (bug): VyOS can't be used as a DHCP server for a DHCP relay

3.1.465 2020-12-07

- T3120 (bug): Python error when deleting nat rule
- T3119 (feature): migrate "system ip" to get_config_dict() and provide smoketest

3.1.466 2020-12-05

- T2744 (bug): igmp-proxy issue: Address already in use

3.1.467 2020-12-04

- T3108 (bug): Section config overlapped match with FRRConfig
- T3112 (feature): PPPoE IPv6: remove “enable” node
- T3100 (feature): Migrate DHCP/DHCPv6 server to get_config_dict()

3.1.468 2020-12-03

- T3105 (bug): static-host-mapping writing in one line
- T3107 (feature): Update Linux Kernel to v4.19.161
- T3104 (bug): LLDP Traceback error

3.1.469 2020-12-01

- T3102 (bug): Destination NAT fails to commit
- T2713 (bug): VyOS must not change permissions on files in /config/auth

3.1.470 2020-11-30

- T3091 (feature): Add “tag” for static route
- T1207 (feature): DMVPN behind NAT

3.1.471 2020-11-29

- T3095 (feature): Migrate dhcp-relay and dhcpv6-relay to get_config_dict()

3.1.472 2020-11-28

- T2890 (bug): NAT error adding translation address range
- T2868 (bug): Tcp-mss option in policy calls kernel-panic
- T3092 (feature): nat: migrate to get_config_dict()

3.1.473 2020-11-27

- T2715 (feature): Duplicate address detection option supporting ARP
- T2714 (feature): A collection of utilities supporting IPv6 or ipv4
- T3088 (feature): Migrate IGMP-Proxy over to get_config_dict() and add smoketests

3.1.474 2020-11-24

- T3087 (feature): Update Linux Kernel to v4.19.160

3.1.475 2020-11-23

- T2177 (default): Commit fails on adding disabled interface to bridge
- T3066 (bug): reboot in - Invalid time
- T2802 (bug): Tunnel interface does not apply EUI-64 IPv6 Address
- T2359 (bug): Adding IPIP6 tun interface to bridge [conf_mode] errors
- T2357 (bug): GRE-bridge conf_mode errors
- T2259 (feature): Support for bind vif-c interfaces into VRFs
- T2205 (bug): "set interface ethernet" fails on Hyper-V
- T2182 (bug): Failure to commit an IPv6 address on a tunnel interface
- T2155 (bug): Cannot set anything on Intel 82599ES 10-Gigabit SFI/SFP+
- T2153 (bug): traceroute circular reference
- T3081 (bug): get_config_dict() does not honor whitespaces in the CLI values field
- T3080 (bug): OpenVPN failing silently for a number of reasons in rolling post Nov/02
- T3074 (bug): OpenVPN site-to-site creates wrong peer address
- T2542 (bug): OpenVPN client tap interfaces not coming up
- T3084 (bug): wifi: TypeError on "show interfaces wireless info"

3.1.476 2020-11-21

- T3079 (bug): Fix the problem that VLAN 1 will be deleted in VLAN-aware bridge
- T3060 (bug): OpenVPN virtual interface not coming up after upgrade

3.1.477 2020-11-20

- T3078 (feature): CLI cleanup: rename "system options" -> "system option"
- T2997 (feature): DHCP: disallow/do-not-request certain options when requesting IP address from server
- T3077 (feature): WireGuard: automatically create link-local IPv6 adresses
- T2550 (default): OpenVPN: IPv4 not working in client mode
- T3072 (feature): Migrate tunnel interfaces to new get_config_dict() approach
- T3065 (feature): Add "interfaces wirelessmodem" IPv6 support
- T3048 (feature): Drop static smp-affinity for a more dynamic way using tuned

3.1.478 2020-11-19

- T3067 (bug): Wireless interface can no longer be added to the bridge after bridge VLAN support
- T3075 (feature): Update Linux Kernel to v4.19.158

3.1.479 2020-11-16

- T3003 (enhancment): Extend smoketest framework to allow loading an arbitrary config file

3.1.480 2020-11-15

- T3069 (bug): OpenVPN routed networks not available
- T3038 (feature): Supporting AZERTY keyboards
- T2993 (bug): op-mode: lldp: show lldp neighbors - AttributeError: 'str' object has no attribute 'items'

3.1.481 2020-11-14

- T3041 (bug): Intel QAT: vyos-1.3-rolling-202011020217-amd64 kernel panic during configure

3.1.482 2020-11-13

- T3063 (feature): Add support for Huawei LTE Module ME909s-120
- T3059 (bug): L2TPv3 interface: Enforced to shutdown but no command to enable interface permanently

3.1.483 2020-11-12

- T3064 (feature): Update Linux Kernel to v4.19.157

3.1.484 2020-11-10

- T2103 (bug): Abnormal interface names if VIF present

3.1.485 2020-11-08

- T3050 (bug): Broken address/subnet validation on NAT configuration

3.1.486 2020-11-07

- T2914 (bug): OpenVPN: Fix for IPv4 remote-host hostname in client mode:
- T2653 (feature): "set interfaces" Python handler code improvements - next iteration
- T311 (feature): DHCP: set client-hostname via CLI

3.1.487 2020-11-06

- T3051 (bug): OpenVPN: multiple client routes do not work in server mode
- T3046 (bug): openvpn directory is not auto-created
- T3052 (feature): Update Linux firmware files to 20201022 version
- T2731 (bug): "show interfaces" returns invalid state when link is down

3.1.488 2020-11-05

- T3049 (feature): Update Linux Kernel to v4.19.155
- T2994 (feature): Migrate OpenVPN interfaces to get_config_dict() syntax

3.1.489 2020-11-03

- T3043 (feature): Wireless: Refactor CLI
- T3034 (feature): Add WiFi WPA 3 support
- T2967 (bug): Duplicate IPv6 BFD peers created
- T2483 (bug): DHCP most likely not restarting pdns_recursor

3.1.490 2020-11-02

- T3024 (bug): DHCPv6 PD configuration doesn't really render an expected behavior

3.1.491 2020-11-01

- T3036 (feature): OpenVPN remote-address does not accept IPv6 address
- T2193 (feature): Display disabled VRRP instances in a *show vrrp* output

3.1.492 2020-10-30

- T2790 (feature): Add ability to set ipv6 protocol route-map for OSPFv3
- T3033 (feature): Update Linux Kernel to v4.19.154
- T2969 (bug): OpenVPN: command_set on interface is not applied, if interface doesn't come up in commit

3.1.493 2020-10-28

- T2631 (default): l2tp, sstp, pptp add option to disable radius accounting
- T2630 (feature): Allow Interface MTU over 9000
- T3027 (bug): Unable to update system Signature check FAILED
- T2995 (bug): Enhancements/bugfixes for vyos_dict_search()
- T2968 (feature): Add support for Intel Atom C2000 series QAT

3.1.494 2020-10-27

- T3026 (default): qemu: update script for deprecated ssh_host_port_min/max
- T2938 (feature): Adding remote Syslog RFC5424 compatibility
- T2924 (bug): Using 'set src' in a route-map invalidates it as part of a subsequent boot-up
- T2587 (bug): Cannot enable the interface when the MTU is set to less than 1280
- T2885 (default): configd: print commit errors to config session terminal
- T2808 (default): Add smoketest to ensure script consistency with config daemon
- T2582 (default): Script daemon to offload processing during commit
- T1721 (bug): Recursive Next Hop not updated for static routes

3.1.495 2020-10-24

- T3007 (default): HTTP-API should use config load script, not backend config load
- T3009 (bug): vpn l2tp remoteaccess require option broken
- T3010 (bug): ttl option of gre-bridge
- T3005 (bug): Intel: update out-of-tree drivers, i40e driver warning
- T3004 (feature): ConfigSession should (optionally) use config load script
- T2723 (feature): Support tcptraceroute

3.1.496 2020-10-22

- T2978 (bug): IPoE service does not work on shared mode
- T2906 (bug): OpenVPN: tls-auth missing key direction

3.1.497 2020-10-21

- T2828 (bug): BGP conf_mode error enforce-first-as
- T2749 (bug): Setting ethx configuration takes a long time
- T2138 (default): Can't load archived configs as they are gzipped

3.1.498 2020-10-20

- T2987 (bug): VxLAN not working properly after upgrading to latest October build and with a new installation
- T2989 (default): MPLS documentation expansion

3.1.499 2020-10-19

- T1588 (bug): VRRP failed to start if any of its interaces not exist
- T1385 (feature): Allow bonding interfaces to have pseudo-ethernet interfaces
- T3000 (bug): Mismatch between "prefix-length" and "preference" in dhcp6-server syntax
- T2992 (feature): Automatically verify sha256 checksum on ISO download
- T752 (feature): Add an option to disable IPv4 forwarding on specific interface only

3.1.500 2020-10-18

- T2965 (feature): Brief BFD Peer Info
- T2907 (feature): OpenVPN: Option to disable encryption
- T2985 (feature): Add glue code to create bridge interface on demand

3.1.501 2020-10-17

- T2980 (bug): FRR bfdd crash due to invalid length
- T2991 (feature): Update WireGuard to 1.0.20200908
- T2990 (feature): Update Linux Kernel to v4.19.152
- T2981 (feature): MPLS LDP neighbor session clear capability
- T2792 (default): Failed to run *sudo make qemu* with vyos-build container due to the change of packer

3.1.502 2020-10-13

- T2976 (bug): Client IP pool does not work for PPPoE local users

3.1.503 2020-10-12

- T2951 (bug): Cannot enable logging for monitor nat
- T2782 (bug): Changing timezone, does not restart rsyslog

3.1.504 2020-10-06

- T2957 (bug): show openvpn not printing anything

3.1.505 2020-10-05

- T2963 (bug): Wireless: WIFI is not password protected when security wpa mode is not defined but passphrase is

3.1.506 2020-10-04

- T2953 (feature): Accel-PPP services CLI config cleanup (SSTP, L2TP, PPPoE, IPoE)
- T2829 (bug): PPPoE server: mppe setting is implemented as node instead of leafNode
- T2960 (feature): sstp: migrate to get_config_dict()

3.1.507 2020-10-03

- T2956 (feature): Add support for list of defaultValues
- T2955 (feature): Update Linux Kernel to v4.19.149

3.1.508 2020-10-02

- T2952 (bug): configd: timeout breaks synchronization of messages, causing freeze

3.1.509 2020-10-01

- T2945 (bug): Interface removed from bridge on setting change
- T2948 (bug): NAT: OSError when configuring translation address range
- T2936 (feature): Migrate PPPoE server to get_config_dict() do reduce boilerplate code

3.1.510 2020-09-30

- T2939 (bug): Wireguard Remove Peer Fails

3.1.511 2020-09-29

- T2919 (feature): PPPoE server: Called-Station-Id attribute
- T2918 (feature): Accounting interim jitter for pppoe, l2tp, pptp, ipoe
- T2917 (feature): PPPoE server: Preallocate NAS-Port-Id
- T2937 (feature): Update Linux Kernel to v4.19.148

3.1.512 2020-09-27

- T2930 (feature): Support configuration of MAC address for VXLAN and GENEVE tunnel

3.1.513 2020-09-26

- T2856 (bug): equuleus: *show version all* throws broken pipe exception on abort
- T2929 (bug): Upgrading from 1.2 (crux) to 1.3 rolling causes vyos.configtree.ConfigTreeError for RADIUS settings
- T2928 (bug): MTU less then 1280 bytes and IPv6 will raise FileNotFoundError
- T2926 (bug): snmp.py missing an import
- T2912 (feature): When setting MTU check for hardware maximum supported MTU size

3.1.514 2020-09-25

- T2915 (bug): Lost "proxy-arp-pvlan" option for vlan
- T2925 (feature): Update Linux Kernel to v4.19.147
- T2921 (feature): Migrate "service dns forwarding" to get_config_dict() for ease of source maintenance

3.1.515 2020-09-24

- T2896 (bug): set ip route 0.0.0.0/0 dhcp-interface eth0
- T2923 (bug): Configuring DHCPv6-PD without a interface to delegate to raises TypeError

3.1.516 2020-09-23

- T2846 (bug): ip route doesn't show longer-prefixes

3.1.517 2020-09-20

- T2904 (feature): 802.1ad / Q-in-Q ethertype default not utilized
- T2905 (feature): Sync CLI nodes between PPPoE and WWAN interface
- T2903 (feature): Q-in-Q (802.1.ad) ethertype should be defined explicitly and not via its raw value

3.1.518 2020-09-19

- T2894 (bug): bond: lacp: member interfaces get removed once bond interface has vlans configured
- T2901 (feature): Update Linux Kernel to v4.19.146
- T2900 (bug): DNS forwarding: invalid warning is shown for "system name-server" or "system name-servers-dhcp" even if present

3.1.519 2020-09-18

- T945 (bug): Unable to change configuration after changing it from script (vbash + script-template)

3.1.520 2020-09-16

- T2886 (bug): RADIUS authentication broken only returns operator level
- T2887 (bug): WiFi ht40+ channel width is not set in hostaptd.conf

3.1.521 2020-09-15

- T2515 (bug): Ethernet interface is automatically disabled when removing it from bond

3.1.522 2020-09-14

- T2872 (bug): "Show log" for nat and openvpn got intermixed
- T2301 (bug): Cannot delete PBR
- T2880 (feature): Update Linux Kernel to v4.19.145
- T2879 (feature): Cleanup 4.19.144 kernel configuration

3.1.523 2020-09-13

- T2858 (feature): Rewrite dynamic dns client to get_config_dict()
- T2857 (feature): Cleanup Intel QAT configuration script
- T2877 (feature): LACP / bonding: support configuration of minimum number of links

3.1.524 2020-09-12

- T2863 (default): Wireguard IPv6 Link-Local Addresses Are Not Unique
- T2876 (feature): Update Linux Kernel to v4.19.144

3.1.525 2020-09-10

- T2870 (feature): Update Linux Kernel to v5.8.8

3.1.526 2020-09-09

- T2728 (bug): Protocol option ignored for IPSec peers in transport mode
- T1934 (default): Change default hostname when deploy from OVA without params.
- T1953 (bug): DDNS service name validation rejects valid service names

3.1.527 2020-09-07

- T1729 (default): PIM (Protocol Independent Multicast) implementation

3.1.528 2020-09-06

- T2860 (bug): Update Accel-PPP to fix l2tp CVE

3.1.529 2020-09-02

- T2833 (bug): RIP outgoing update filter list no longer operational
- T2849 (bug): vyos.xml.defaults should return a list on multi nodes, by default

3.1.530 2020-08-31

- T2636 (bug): get_config_dict() shall always return a list on <multi/> nodes

3.1.531 2020-08-30

- T2843 (feature): Upgrade Linux Kernel to 5.8 series
- T2814 (default): kernel 5.1+ : NAT : module *nft_chain_nat_ipv4* renamed
- T2839 (feature): Upgrade WireGuard user-space tools and Kernel module
- T2842 (feature): Replace custom “wireguard, wireguard-tools” package with debian-backports version

3.1.532 2020-08-29

- T2836 (default): show system integrity broken in 1.3

3.1.533 2020-08-28

- T2126 (bug): show vpn ipsec sa IPSec - Process NOT Running
- T2813 (bug): NAT: possible to commit illegal source nat without translation
- T1463 (bug): Missing command *show ip bgp scan* appears in command completion

3.1.534 2020-08-27

- T2832 (feature): Migrate vyos-smoketest content into vyos-1x

3.1.535 2020-08-26

- T2830 (default): Migrate "service https" to use get_config_dict()
- T2831 (feature): Update Linux Kernel to v4.19.142

3.1.536 2020-08-25

- T2826 (bug): frr: frr python lib error in replace_section

3.1.537 2020-08-24

- T2423 (bug): Loadkey scp ssh key errors

3.1.538 2020-08-23

- T2811 (bug): Cannot delete vpn anyconnect
- T2823 (bug): VXLAN has state A/D after configuration
- T2812 (default): Add basic smoketest for anyconnect

3.1.539 2020-08-22

- T2822 (feature): Update Linux Kernel to v4.19.141
- T2821 (feature): Support DHCPv6-PD without "address dhcpv6"
- T2677 (feature): Proposal for clearer DHCPv6-PD configuration options

3.1.540 2020-08-20

- T2209 (bug): Documentation has reference to the old 'user x level admin' option
- T1665 (default): prefix-list and prefix-list6 rules incorrectly accept a host address where prefix is required
- T2815 (default): Move certbot config directory under /config/auth

3.1.541 2020-08-19

- T2794 (bug): op-mode: lldp: "show lldp neighbors" IndexError: list index out of range
- T2791 (feature): "monitor traceroute" has no explicit IPv4/IPv6 support
- T1515 (bug): FRR ospf6d crashes when performing: "show ipv6 ospfv3 database"

3.1.542 2020-08-16

- T2277 (bug): dhclient-script-vyos does not support VRFs
- T2090 (default): Deleting 'service salt-minion' causes python TypeError

3.1.543 2020-08-15

- T2797 (feature): Update Linux Kernel to v4.19.139
- T2796 (bug): PPPoE-Server: listen interface is mandatory but validation check is missing

3.1.544 2020-08-14

- T2795 (bug): console server fails to commit

3.1.545 2020-08-12

- T2786 (bug): OSPF Interface Cost
- T2325 (bug): NHRP op-mode errors with missing daemon socket
- T2227 (feature): MPLS documentation
- T2767 (bug): The interface cannot be disabled for network enabled configuration
- T2316 (bug): DHCP-server op-mode errors

3.1.546 2020-08-11

- T2779 (bug): LLDP: "show lldp neighbors interface" does not yield any result
- T2379 (bug): DHCPv6 address for interface deletion triggers a script error
- T2784 (default): Remove unused arg from host_name.py functions verify and get_config

3.1.547 2020-08-10

- T2780 (feature): Update Linux Kernel to v4.19.138

3.1.548 2020-08-08

- T2716 (bug): Shaper-HFSC shapes but does not control latency correctly
- T2497 (default): Cache config string during commit
- T2501 (bug): Cannot recover from failed boot config load
- T1974 (feature): Allow route-map to set administrative distance
- T1949 (bug): Multihop IPv6 BFD is unconfigurable

3.1.549 2020-08-04

- T2758 (bug): router-advert: 'infinity' is not a valid integer number
- T2637 (bug): Vlan is not removed from the system
- T1287 (bug): No DHCPv6 leases reported for "show dhcpv6 client leases"

3.1.550 2020-08-03

- T2241 (default): Changing settings on an interface causes it to fall out of bridge
- T2757 (bug): "show system image version" contains additional new-line character breaking output
- T1826 (bug): Misleading message on "reboot at" command
- T1511 (default): Rewrite ethernet setup scripts to python
- T1600 (default): Convert 'ping' operation from vyatta-op to new syntax
- T1486 (bug): Unknown LLDP version reported to peers
- T1414 (enhancment): equuleus: buster: 10-unmountfs.chroot fail under apply
- T1076 (bug): SSH: make configuration (sshd_config) volatile and store it to /run
- T2724 (feature): Support for IPv6 Toolset
- T2323 (bug): LLDP: "show lldp neighbors detail" returns warnings when service is not configured
- T1754 (bug): DHCPv6 client is impossible to restart

3.1.551 2020-08-02

- T2756 (feature): Accel-PPP: make RADIUS accounting port configurable

3.1.552 2020-08-01

- T2752 (bug): Exception when configuring unavailable ethernet interface
- T2751 (feature): Update Linux Kernel to v4.19.136
- T2753 (feature): Rewrite "add system image" op mode commands in XML
- T2690 (feature): Add VRF support to the add system image command

3.1.553 2020-07-30

- T2746 (feature): IPv6 link-local addresses not configured
- T2678 (bug): High RAM usage on SSH logins with lots of IPv6 routes in the routing table.
- T2701 (bug): *vpn ipsec pfs enable* doesn't work with IKE groups
- T2745 (feature): router-advert: migrate to get_config_dict()

3.1.554 2020-07-29

- T2743 (feature): WireGuard: move key migration from config script to migration script
- T2742 (feature): mDNS repeater: migrate to get_config_dict()

3.1.555 2020-07-28

- T1117 (feature): 'show ipv6 bgp route-map' missing
- T928 (feature): Add support for PIM (Protocol-Independent Multicast)

3.1.556 2020-07-27

- T2729 (feature): Pseudo-ethernet replace fail message
- T1249 (feature): multiple PBR rules can set to a single interface
- T1956 (feature): PPPoE server: support PADO-delay
- T1295 (feature): FRR: update documentation
- T1222 (bug): OSPF routing problem - route looping
- T1158 (bug): Route-Map configuration dropped updating rc11 to epa2
- T1130 (bug): Deleting BGP communities from prefix does not work
- T2067 (feature): pppoe-server: Add possibility set multiple service-name

3.1.557 2020-07-26

- T2734 (feature): WireGuard: fwmark CLI definition is inconsistent
- T2733 (feature): Support MTU configuration on pseudo ethernet devices
- T2644 (default): Bonding interfaces cannot be disabled
- T2476 (bug): Bond member description change leads to network outage
- T2443 (feature): NHRP: Add debugging information to syslog
- T2021 (bug): OSPFv3 doesn't support decimal area syntax
- T1901 (bug): Semicolon in values is interpreted as a part of the shell command by validators
- T2000 (bug): strongSwan does not install routes to table 220 in certain cases
- T2091 (bug): swanctl.conf file is not generated properly if more than one IPsec profile is used
- T1983 (feature): Expose route-map when BGP routes are programmed in to FIB
- T1973 (feature): Allow route-map to match on BGP local preference value
- T1853 (bug): wireguard - disable peer doesn't work
- T1985 (feature): pppoe: Enable ipv6 modules without configured ipv6 pools

3.1.558 2020-07-25

- T2730 (feature): Update Linux Kernel to v4.19.134
- T2106 (bug): Wrong interface states after reboot
- T1507 (default): cli: logical redundancy with boolean type

3.1.559 2020-07-24

- T2097 (bug): Problems when using <path> as completion helper in op-mode
- T2092 (bug): dhcp-server rfc3442 static route should add default route
- T1817 (bug): BGP next-hop-self not working.
- T1462 (bug): Upgrade path errors 1.1.8 to 1.2.1-S2
- T1372 (bug): Diff functionality behaves incorrectly in some cases
- T2073 (feature): ipoe-server: reset op-mode command for sessions
- T1715 (bug): System DNS Server Order Incorrect

3.1.560 2020-07-23

- T2673 (bug): After the bridge is configured with Mac, bridge is automatically disabled
- T2626 (bug): Changing pseudo-ethernet mode, throws CLI error
- T2608 (bug): delete pseudo-ethernet failed (another error type)
- T2527 (bug): bonding: the last slave interface is not deleted
- T2358 (bug): ip6ip6 bridge conf_mode errors
- T2346 (bug): Setting hostname yields temporary file error
- T2330 (bug): Vpn op-mode syntax
- T2188 (default): NTP op-mode commands don't work

3.1.561 2020-07-22

- T2718 (bug): ntp.conf updated incorrectly
- T2658 (bug): Interface description comment display error
- T2643 (bug): show interfaces does not scale with terminal width
- T2725 (bug): Config fails to load if user has no password
- T2707 (default): Allow alternative initialization data for Config

3.1.562 2020-07-20

- T2709 (bug): Destination NAT translation port without address fails to commit
- T2519 (bug): Broadcast address does not add automatically

3.1.563 2020-07-19

- T2708 (bug): "show flow-accounting" should not display script's "usage" help
- T2592 (default): dhcp-relay discarding packets on valid interfaces
- T2712 (feature): udp-broadcast-relay: serivce no longer starts
- T2706 (feature): Support NDP protocol monitoring

3.1.564 2020-07-18

- T2704 (bug): connect/disconnect Missing newline in op-mode tab completion helper
- T2689 (feature): Add helper functions to query changes between session and effective configs
- T2585 (bug): Unable to access the Internet after opening PPPoE on-demand dialing

3.1.565 2020-07-15

- T2675 (bug): DNS service failed to start
- T2596 (feature): Allow specifying source IP for 'add system image'

3.1.566 2020-07-12

- T1575 (default): *show snmp mib ifmib* crashes with IndexError
- T2696 (bug): Some bugfixes of vyatta-wanloadbalance

3.1.567 2020-07-11

- T2687 (feature): SNMP: change logic on v3 password encryption
- T2693 (bug): Dhcp6c cannot be restarted after PPPoE link is reset

3.1.568 2020-07-08

- T2692 (bug): Evaluate Setting Default Hash Policy to L3+L4
- T2646 (bug): Sysctl for IPv4 ECMP Hash Policy Not Set

3.1.569 2020-07-07

- T2691 (bug): Upgrade from 1.2.5 to 1.3-rolling-202007040117 results in broken config due to case mismatch
- T2389 (bug): BGP community-list unknown command
- T2686 (bug): FRR: BGP: large-community configuration is not applied properly after upgrading FRR to 7.3.x series

3.1.570 2020-07-06

- T2680 (bug): dhcp6c service cannot recover when it fails

3.1.571 2020-07-05

- T2684 (feature): Update Linux Kernel to v4.19.131
- T2685 (feature): Update Accel-PPP to fix SSTP client issues
- T2681 (bug): PPPoE stops negotiating IPv6

3.1.572 2020-07-04

- T2682 (bug): VRF aware services - connection no longer possible after system reboot

3.1.573 2020-07-03

- T2670 (default): Remove dependency on show_config from get_config_dict
- T2676 (feature): NTP: migrate to get_config_dict() implementation

3.1.574 2020-07-02

- T2668 (default): get_config_dict: add get_first_key arg to utility function get_sub_dict

3.1.575 2020-07-01

- T2662 (default): get_config_dict includes node name as key only for tag and leaf nodes
- T2667 (feature): get_config_dict: Use utility function for non-empty path argument

3.1.576 2020-06-28

- T2660 (bug): XML: Python default dictionary does not obey underscore (_) when flat is False

3.1.577 2020-06-27

- T2656 (bug): XML: Python default dictionary returns wrong dictionary level(s)

3.1.578 2020-06-26

- T2642 (bug): sshd fails to start due to configuration error
- T2588 (default): Add support for default values to the interface-definition format
- T2622 (bug): Pseudo-ethernet interface config disappears across versions
- T2057 (feature): Generalised Interface configuration
- T2625 (feature): Provide generic Library for package builds

3.1.579 2020-06-25

- T2487 (bug): VRRP does not display info when group disabled
- T2329 (bug): Show remote config openvpn
- T2165 (bug): When trying to add route to ripng it complains that ip address should be IPv4 format
- T2159 (default): webproxy log read from wrong file
- T2101 (feature): Fix VXLAN config option parsing
- T2062 (bug): Wrong dhcp-server static route subnet bytes

- T1986 (bug): Python configuration manipulation library leaks open files
- T1762 (bug): VLAN interface configuration fails after internal representation of edit level was switched from a string to a list
- T1538 (bug): Update conntrack-sync packages to fix VRRP issues
- T1808 (feature): add package nftables

3.1.580 2020-06-24

- T2634 (feature): remove autogeneration of interface "ip section" from vyatta-cfg-system
- T2633 (bug): Error with arp_accept on tun interface
- T2595 (feature): Update Linux Kernel to v4.19.128
- T1938 (bug): syslog doesn't start automatically

3.1.581 2020-06-23

- T2632 (bug): WireGuard: Cannot use only one preshared-key for one peer
- T1829 (bug): Install Image script does not respect size of partition greater than 2G but less than disk size
- T2635 (feature): SSH: migrate to get_config_dict()

3.1.582 2020-06-22

- T2486 (bug): DNS records set via 'system static-host-mapping' return NXDOMAIN from 'service dns forwarding' after a request to a forwarded zone
- T2463 (bug): DHCP-received nameserver not added to vyos-hostsd
- T2534 (bug): pdns-recursor override.conf error
- T2054 (bug): Changing "system name-server" doesn't update dns forwarding config, neither does "restart dns forwarding"
- T2225 (default): PIM/IGMP documentation

3.1.583 2020-06-21

- T2624 (feature): Serial Console: fix migration script for configured powersave and no console
- T2610 (bug): default-lifetime is not reflected in the RA message
- T2299 (feature): login radius-server priority
- T1739 (bug): Serial interface seems not to be deleted properly
- T480 (bug): Error if no serial interface is present (/dev/ttyS0: not a tty)

3.1.584 2020-06-20

- T2621 (bug): show interfaces repeats interface description if it is longer then an arbitrary number of characters
- T2618 (default): Conversion from 1.2 to 1.3 lost RADVD prefix autonomous-flag setting

3.1.585 2020-06-19

- T2589 (bug): delete pseudo-ethernet failed
- T2490 (feature): Add serial (rs232) to ssh bridge service

3.1.586 2020-06-18

- T2614 (default): Add an option to mangle dict keys to vyos.config.get_config_dict()
- T2026 (default): Make cli-shell-api correctly exit with non-zero code on failures
- T1868 (default): Add opportunity to get current values from API

3.1.587 2020-06-17

- T2478 (feature): login radius: use NAS-IP-Address if defined source address
- T2141 (bug): Static ARP is not applied on boot
- T2609 (bug): router-advert: radvd does not start when lifetime is improperly configured
- T1720 (feature): support for more 'show ip route' commands

3.1.588 2020-06-16

- T2604 (default): Remove use of is_tag in system-syslog.py
- T2605 (bug): SNMP service is not disabled by default
- T2568 (bug): Add some missing checks in config
- T2156 (default): PIM op-mode commands

3.1.589 2020-06-15

- T2600 (bug): RADIUS system login configuration rendered wrongly
- T2599 (bug): "show interfaces" does not list VIF interfaces in ascending order
- T2591 (bug): show command has wrong interfaces ordering
- T2576 (bug): "show interfaces" does not return VTI

3.1.590 2020-06-14

- T2354 (bug): Wireless conf_mode errors
- T2593 (bug): source NAT translation port can not be set when translation address is set to masquerade
- T2594 (default): Missing firmware for iwlwifi

3.1.591 2020-06-11

- T2578 (bug): ipaddrcheck unaware of /31 host addresses - can no longer assign /31 mask to interface addresses
- T2571 (bug): NAT destination port with ! results in error
- T2570 (feature): Drop support for "system console device <device> modem"
- T2586 (bug): WWAN default route is not installed into VRF
- T2561 (feature): Drop support for "system console netconsole"
- T2569 (feature): Migrate "set system console" to XML and Python representation

3.1.592 2020-06-10

- T2575 (bug): pppoe-server: does not possibly assign IP address
- T2565 (bug): Cannot connect to l2tp server with radius auth
- T2553 (bug): set interface ethN vif-s nnnn does not commit

3.1.593 2020-06-08

- T2559 (feature): Add operational mode command to retrieve hardware sensor data

3.1.594 2020-06-07

- T2529 (feature): WWAN: migrate from ttyUSB device to new device in /dev/serial/by-bus
- T2560 (feature): New op-mode command to display information about USB interfaces

3.1.595 2020-06-05

- T2548 (bug): Interfaces allowing inappropriate network addresses to be assigned
- T1958 (default): Include only firmware we actually need

3.1.596 2020-06-04

- T2514 (enhancment): "mac" setting for bond members

3.1.597 2020-06-02

- T2129 (feature): XML schema: tagNode not allowed on first level in new XML op-mode definition
- T2545 (feature): Show physical device offloading capabilities for specified ethernet interface
- T2544 (feature): Enable Kernel KONFIG_KALLSYMS
- T2543 (feature): Kernel: always build perf binary but ship as additional deb package to not bloat the image
- T1096 (bug): BGP process memory leak

3.1.598 2020-06-01

- T2535 (feature): Update Intel QAT drivers to 1.7.l.4.9.0-00008
- T2537 (feature): Migrate "show log dns" from vyatta-op to vyos-1x
- T2536 (bug): "show log dns forwarding" still refers to dnsmasq
- T2538 (feature): Update Intel NIC drivers to recent release (preparation for Kernel >=5.4)
- T2526 (feature): Wake-On-Lan CLI implementation

3.1.599 2020-05-31

- T2532 (feature): VRF aware OpenVPN

3.1.600 2020-05-30

- T2388 (feature): template rendering should create folder and set permission
- T2531 (feature): Update Linux Kernel to v4.19.125
- T2530 (bug): Error creating VRF with a name of exactly 16 characters

3.1.601 2020-05-29

- T2528 (bug): "update dns dynamic" throws FileNotFoundError excepton

3.1.602 2020-05-28

- T1291 (default): Under certain conditions the VTI will stay forever down

3.1.603 2020-05-27

- T2395 (feature): HTTP API move to flask/flask-restx as microframework
- T1121 (bug): Can't search for prefixes by community: Community malformed: AA:NN

3.1.604 2020-05-26

- T2520 (bug): show conntrack fails with Perl error
- T2502 (bug): PPPoE default route not installed for IPv6 when "default-route auto"
- T2458 (feature): Update FRR to 7.3.1
- T2506 (feature): DHCPv6-PD add prefix hint CLI option

3.1.605 2020-05-25

- T2391 (bug): pppoe-server session-control does not work
- T2269 (feature): SSTP specify tunnels names
- T1137 (bug): 'sh ip bgp sum' being truncated

3.1.606 2020-05-22

- T2491 (feature): MACsec: create CLI for replay protection
- T2489 (feature): Add MACsec interfaces to "show interfaces" output
- T2201 (feature): Rewrite protocol BGP [op-mode] to new XML/Python style
- T2492 (feature): Do not set encrypted user password when it is not changed
- T2496 (feature): Set default to new syntax for config file component versions
- T2493 (feature): Update Linux Kernel to v4.19.124
- T2380 (bug): After PPPoE 0 is restarted, the default static route is lost

3.1.607 2020-05-21

- T1876 (bug): IPSec VTI tunnels are deleted after rekey and dangling around as A/D
- T2488 (feature): Remove logfile for dialup interfaces like pppoe and wwan
- T2475 (bug): linting
- T1820 (bug): VRRP transition scripts for sync-groups are not supported in VyOS (anymore)
- T2364 (default): Add CLI command for mroute
- T2023 (feature): Add support for 802.1ae MACsec

3.1.608 2020-05-20

- T2480 (bug): NAT: after rewrite commit tells that dnat IP address is not locally connected

3.1.609 2020-05-19

- T2481 (feature): WireGuard: support tunnel via IPv6 underlay
- T421 (bug): Add Pv6 prefix delegation support
- T815 (feature): Add DHCPv6 server prefix-delegation support

3.1.610 2020-05-17

- T2471 (feature): PPPoE server: always add AdvAutonomousFlag when IPv6 is configured
- T2409 (default): At boot, effective config should not be equal to current config

3.1.611 2020-05-16

- T2466 (bug): live-build encounters apt dependency problem when building with local packages
- T2470 (feature): Update to PowerDNS recursor 4.3
- T2469 (feature): Update Linux Kernel to v4.19.123
- T2198 (default): Rewrite NAT in new XML/Python style

3.1.612 2020-05-15

- T2449 (bug): 'ipv6 address autoconf' and 'address dhcpv6' don't work because interfaces have accept_ra=1 (they should have accept_ra=2 when forwarding=1)

3.1.613 2020-05-14

- T2456 (bug): netflow source-ip cannot be configured

3.1.614 2020-05-13

- T2435 (bug): Pseudo-ethernet Interfaces Broken
- T2294 (bug): ipoe-server broken (jinja2 template issue)

3.1.615 2020-05-12

- T2454 (feature): Update Linux Kernel to v4.19.122
- T2392 (bug): SSTP with ipv6

3.1.616 2020-05-10

- T2445 (bug): VRF route leaking for ipv4 not working
- T2372 (bug): VLAN: error on commit if main interface is disabled
- T2439 (bug): Configuration dependency problem, unable to load complex configuration after reboot

3.1.617 2020-05-09

- T2427 (default): Interface addressing broken since fix for T2372 was merged
- T2438 (default): isc-dhcp-server(6).service reports startup success immediately even if dhcpd fails to start up
- T2367 (default): Flush addresses from bridge members

3.1.618 2020-05-08

- T2441 (bug): TZ validator has a parse error
- T2429 (bug): Vyos cannot apply VLAN sub interface to bridge

3.1.619 2020-05-06

- T2402 (bug): Live ISO should warn when configuring that changes won't persist

3.1.620 2020-05-05

- T1899 (bug): Unionfs metadata folder is copied to the active configuration directory

3.1.621 2020-05-04

- T2412 (bug): ping flood does not work as unprivileged user
- T701 (bug): LTE interface dosen't come up
- T951 (bug): command 'isolate-stations true/false' does not make any changes in the hostapd.conf

3.1.622 2020-05-03

- T2420 (feature): Update Linux Kernel to v4.19.120
- T2406 (feature): DHCPv6 CLI improvements
- T2421 (feature): Update WireGuard to Debian release 1.0.20200429-2_bpo10+1

3.1.623 2020-05-02

- T2414 (feature): Improve runtime from Python numeric validator
- T2413 (feature): Update Linux Kernel to v4.19.119

3.1.624 2020-05-01

- T2411 (feature): op-mode: make "monitor traceroute" VRF aware
- T2347 (bug): During commit, any script output directed to stdout will contain path
- T2239 (default): build-vmware-image script ignores the predefined file path, uses the environment variable unconditionally.

3.1.625 2020-04-29

- T2399 (bug): op-mode "dhcp client leases" does not return leases
- T2398 (bug): op-mode "dhcp client leases interface" completion helper misses interfaces
- T2394 (feature): dhcpv6 client does not start
- T2393 (feature): dhclient: migrate from SysVinit to systemd
- T2268 (bug): DHCPv6 is broken

3.1.626 2020-04-28

- T1227 (bug): rip PW can't be set at interface config

3.1.627 2020-04-27

- T2373 (feature): Required auth options for pppoe-server
- T1381 (feature): Enable DHCP option 121 processing
- T2010 (bug): Reboot at reports wrong time or missing timezone

3.1.628 2020-04-26

- T2386 (bug): salt: upgrade to 2019.2 packages
- T2385 (bug): salt-minion: improve completion helpers
- T2384 (bug): salt-minion: log to syslog and remove custom logging option
- T2383 (feature): Update Linux Kernel to v4.19.118
- T2382 (bug): salt-minion: Throws KeyError on commit
- T2350 (bug): Interface geneve conf-mode error

3.1.629 2020-04-25

- T2304 (feature): "system login" add RADIUS VRF support
- T1842 (bug): Equuleus: "reboot at 04:00" command not working

3.1.630 2020-04-24

- T2375 (feature): WireGuard: throw exception if address and port are not given as both are mandatory
- T2348 (bug): On IPv6 address distribution and DHCPv6 bugs

3.1.631 2020-04-23

- T2369 (feature): VRF: can not leak interface route from default VRf to any other VRF
- T2368 (bug): VRF: missing completion helper when leaking to default table
- T2374 (bug): Tunnel interface can not be disabled
- T2362 (default): IPv6 link-local addresses missing due to EUI64 address code, causing router-advert not to work
- T2345 (default): IPv6 router-advert not working

3.1.632 2020-04-22

- T2361 (bug): Unable to delete VLAN vif interface
- T2339 (bug): OpenVPN: IPv4 no longer working after adding IPv6 support
- T2331 (bug): VRRP op-mode errors
- T2320 (bug): Wireguard creates non-existing interfaces in [op-mode].
- T2096 (feature): Provide "generate" and "show" commands via the http API
- T2351 (feature): Cleanup PPTP server implementation and CLI commands

3.1.633 2020-04-21

- T2341 (bug): Pseudo-ethernet Interfaces Not Loaded on Boot
- T2270 (bug): using load with scp/sftp and a username and password does not work
- T2255 (bug): DNS forwarding op-mode error
- T1907 (bug): Traceback on a non-existent interface.
- T2204 (feature): Support tunnel source-interface

3.1.634 2020-04-20

- T2335 (bug): Unable to assign IPv6 from ISP
- T2317 (bug): l2tp overwriting ipsec config files
- T2292 (bug): Ensure graceful shutdown of vyos-http-api
- T2344 (bug): PPPoE server client static IP assignment silently fails

3.1.635 2020-04-19

- T2337 (default): hw-id gone missing from interfaces after upgrade to 1.3-rolling-202004191028
- T2340 (feature): Remove informational "sg" messages from syslog
- T2338 (bug): Can't delete static IPv6 route on vrf
- T2336 (bug): OpenVPN service fails to start
- T2308 (default): openvpn op-mode scripts broken after migrating to systemd service
- T2185 (default): Start daemons with systemd units instead of with start-stop-daemon

3.1.636 2020-04-18

- T2318 (bug): dns-forwarding migration script breaks with invalid interface name
- T2319 (feature): Update Linux Kernel to v4.19.116
- T2314 (feature): Cleanup PPPoE server implementation and CLI commands
- T2313 (bug): Accel-PPP / PPPoEserver raises "Floating point exception" when not all limits are defined
- T2312 (feature): Use LED modules to enable more visible feedback on VyOS hardware chassis
- T2306 (feature): Add new cipher suites to the WiFi configuration
- T2286 (default): IPoE server vulnerability
- T2224 (feature): Update Linux Kernel to v4.19.114
- T2110 (feature): RADIUS: supply include file for radius config to have a uniform CLI
- T2324 (feature): Cleanup IPoE server implementation and CLI commands

3.1.637 2020-04-17

- T2275 (bug): flow-accounting broken in rolling
- T2256 (feature): Accel-ppp op-mode syntax

3.1.638 2020-04-16

- T2295 (bug): Passwords with Special Characters Broken
- T2305 (feature): Add release name to "show version" command
- T2235 (default): OpenVPN server client IP doesn't reserve that IP in the pool
- T149 (feature): IPv6 support in OpenVPN tunnel

3.1.639 2020-04-15

- T2293 (bug): OpenVPN: UnboundLocalError after merging server_network PullRequest
- T2298 (bug): Errors PDNS with name-server set

3.1.640 2020-04-14

- T2213 (bug): vyos-1x: WiFi mode ieee80211ac should also activate ieee80211n

3.1.641 2020-04-13

- T2283 (default): openvpn not starting: ccd path in template not moved to /run/openvpn/ccd
- T2236 (bug): DMVPN broken after tunnel rewrite to XML/Python
- T2284 (default): Upgrade ddclient to 3.9.1 which also brings systemd files
- T2282 (feature): Clarify hw-id in ethernet and wireless interface nodes
- T611 (feature): Static route syntax should reflect *ip* command routing capabilities, if possible.

3.1.642 2020-04-12

- T2273 (default): OpenVPN no longer starts in latest rolling, migrate to systemd
- T2263 (feature): Reset feature for SSTP sessions
- T2262 (bug): Broken reset commands for pptp and l2tp
- T2031 (bug): pseudo-ethernet link interface cannot be changed

3.1.643 2020-04-11

- T2264 (feature): l2tp: cleanup CLI definition
- T2233 (bug): Typos in wlanX.cfg
- T2238 (bug): After re-writing list_interfaces.py to use Interfaces() pseudo-ethernet is missing

3.1.644 2020-04-10

- T2265 (feature): DHCP to be an attribute of the class instead of a inheritance
- T2261 (bug): "client-config-dir" not being set for openvpn
- T2248 (bug): PPPoE Broken in Latest 1.3 Rolling (1.3-rolling-202004070629)
- T1629 (bug): IP addresses configured on vif-s interfaces are not added to the system
- T2266 (default): openvpn bridged client-server doesn't work (validation error)
- T2253 (default): Fix use of cmd in merge config and remote function helpers

3.1.645 2020-04-09

- T2260 (feature): vxlan, pseudo-ethernet: convert link nodes to source-interface
- T2172 (feature): Enable conf VXLAN without remote address
- T2237 (bug): l2tp, pptp, pppoe wrong chap-secrets file

3.1.646 2020-04-08

- T2244 (feature): WireGuard: cleanup Python implementation and reduce amount of boilerplate code
- T2186 (feature): Provide more information to the user when a traceback is reported to the user
- T2246 (bug): LLDP op-mode error
- T2240 (feature): Support for bind vif-c interfaces into VRFs
- T2160 (feature): Allow restricting HTTP API to specific virtual hosts
- T2247 (feature): WireGuard: add VRF support

3.1.647 2020-04-05

- T2212 (bug): vyos-1x: WiFi card antenna count not set accordingly
- T2230 (feature): Split out inlined Jina2 template to data/templates folder
- T2206 (feature): Split WireGuard endpoint into proper host and port nodes

3.1.648 2020-04-04

- T2158 (bug): Commit fails if ethernet interface doesn't support flow control (pause)
- T2221 (bug): Ability to remove a VRF that has a next-hop-vrf as target
- T2211 (bug): vyos-1x: VHT channel width not set accordingly
- T2208 (bug): vyos-1x: commit on interfaces wireless wlanX capabilities vht link-adaptation (both|unsolicited) fails
- T2183 (bug): A number of bugs with wireguard script due to interface rearrangement
- T2104 (default): ifconfig.py size
- T2028 (feature): Convert "interfaces tunnel" to new XML/Python representation
- T2219 (bug): VRF default route of PPPoE and WWAN interfaces do not get added into proper routing table
- T2222 (default): openvpn: requires "multihome" option to listen on all addresses with udp protocol

3.1.649 2020-04-02

- T2072 (bug): Shell autocomplete of option (config node) with quoted value doesn't work
- T1823 (feature): l2tpv3 interface migration fails
- T2202 (feature): Update PowerDNS recursor to 4.2 series
- T2200 (feature): Add VRF support on wirelessmodem interfaces

3.1.650 2020-03-31

- T2166 (bug): Broken proxy-arp on vif
- T2180 (bug): get_config_dict should be independent of CLI edit level
- T2053 (default): Update vyos-load-config.py for version string syntax change
- T2052 (default): Update vyos-merge-config.py for version string syntax change
- T2144 (default): vyos-build: docker: selection of text in the terminal still selects it in vim (mouse isn't completely disabled)

3.1.651 2020-03-30

- T2176 (default): 'WiFiIf' object has no attribute 'set_state'
- T2029 (feature): Switch to new syntax for config file component versions

3.1.652 2020-03-29

- T2178 (bug): VRF interface don't get removed when VRF is deleted
- T2170 (feature): Add ability to create static route from default to VRF
- T1831 (feature): Denest IPv6 router-advert from Interfaces to general service

3.1.653 2020-03-28

- T2167 (bug): vyos.ifconfig.get_mac() broken
- T2151 (default): wireless: can't delete interface present in config but not present in system
- T1988 (feature): Migrate wirelessmodem to new XML/Python style interface

3.1.654 2020-03-27

- T2164 (bug): Package libstrongswan-standard-plugins missing from image
- T2105 (bug): wireless: not possible to disabled wlan0
- T2169 (default): Remove redundant use of show_config in vyos-merge-config

3.1.655 2020-03-26

- T2162 (default): migration script for router-advert sets link-mtu 0 on bridge interfaces
- T1735 (bug): Issue in "show vpn ipsec/ike sa" output with ipsec encryption algorithm aes128gcm128/aes256gcm128/chacha etc

3.1.656 2020-03-25

- T2148 (default): openvpn: setting "server client" config without "server client ip" results in ValueError: '' does not appear to be an IPv4 or IPv6 address
- T2146 (default): openvpn: "delete server client" doesn't delete the corresponding ccd configs

3.1.657 2020-03-24

- T2157 (default): Organize service https listen-address/listen-port/server-name under 'virtual-host' node
- T1845 (bug): syslog host no longer accepts a port

3.1.658 2020-03-22

- T2150 (feature): SSTP ssl certificates can only be stored in /config/user-data/sstp
- T2149 (feature): Update Linux Kernel to v4.19.112
- T476 (enhancment): Update the base system to Debian 10 (Buster)

3.1.659 2020-03-21

- T2142 (bug): vyos-build: Add required packages and step to build-GCE-image script
- T1870 (feature): Extend Pipeline scripts to support PullRequests

3.1.660 2020-03-20

- T2006 (bug): SSTP RADIUS CLI accepts invalid values
- T2140 (default): openvpn: tls file check function checkCertHeader returns True even when no match is found
- T2007 (feature): SSTP accepts client MTU up to 16384 bytes
- T2008 (feature): Adjustment of SSTP CLI to be more consistent to the rest of VyOS

3.1.661 2020-03-19

- T2135 (bug): Login banner missing spacing now
- T2132 (feature): Document kernel boot parameter 'vyos-config-debug'
- T1744 (default): Config load fails in ConfigTree with ValueError: Failed to parse config: lexing: empty token

3.1.662 2020-03-17

- T2134 (bug): VXLAN: *NameError: name 'config' is not defined*

3.1.663 2020-03-16

- T2131 (feature): Improve syslog remote host CLI definition

3.1.664 2020-03-15

- T2122 (feature): Update Intel out-of-tree drivers to latest version(s)
- T2121 (feature): Update Linux Kernel to v4.19.109
- T2119 (bug): Error on boot when removing ethernet interface from VM

3.1.665 2020-03-14

- T834 (feature): New L2TP server implementation based on accel-ppp

3.1.666 2020-03-13

- T1622 (default): Add failsafe and back trace to boot config loader

3.1.667 2020-03-11

- T1961 (bug): VXLAN - fails to commit due to non-existent variable, broken MTU
- T2084 (default): conntrack-tools package build error for current/equuleus

3.1.668 2020-03-10

- T1331 (bug): DNS stops working

3.1.669 2020-03-09

- T2111 (feature): VRF add route leaking support
- T2109 (bug): Ping by name broken in VyOS 1.3-rolling-202003080217
- T2065 (bug): VyOS 1.3 Don't set daemon in openvpn-{intf}.conf file
- T31 (feature): Add VRF support

3.1.670 2020-03-08

- T1954 (bug): Having *system login radius* configured causes exponentially long boot times
- T1760 (bug): RADIUS shared secret is not redacted from "show configuration" op mode command

3.1.671 2020-03-07

- T2107 (bug): Wireless interfaces do not work in station mode without security

3.1.672 2020-03-05

- T2074 (bug): VyOS docker container: Cannot configure ethernet interface

3.1.673 2020-03-04

- T2098 (bug): Wrong call to cli-shell-api in generated op-mode templates for path completion helper

3.1.674 2020-03-03

- T2095 (bug): Copy command errors out

3.1.675 2020-03-01

- T2082 (bug): WireGuard broken after merging T2057
- T2089 (feature): RADIUS: do not query servers when commit is running started from a non RADIUS user
- T2086 (feature): Move sudo session open/close log entries to auth.log

3.1.676 2020-02-29

- T2046 (feature): allowing sub-classes of Interface to redefine how the interface is created

3.1.677 2020-02-28

- T2083 (default): vyos-build: build-packages fails at mdns-repeater due to wrong branch
- T2080 (default): traffic-policy shaper error when setting bandwidth

3.1.678 2020-02-27

- T2075 (feature): Add support for OpenVPN tls-crypt file option
- T2068 (feature): Update Linux Kernel to v4.19.105
- T1703 (default): Macvlan PPPoE support
- T2078 (feature): Kernel: remove unused RAID functions 5,6,10,jbod,dm

3.1.679 2020-02-25

- T2070 (feature): Rewrite (dis-)connect op-mode commands in XML and Python
- T2071 (feature): Add possibility to temporary disable a RADIUS server used for system login

3.1.680 2020-02-23

- T2055 (feature): Remove IPv6 router-advert options for PPPoE
- T1318 (feature): PPPoE client CLI redesign

3.1.681 2020-02-22

- T2063 (feature): vyos-salt-minion package is missing from vyos-world

3.1.682 2020-02-20

- T1969 (default): OSPF with WireGuard cause Route Inactive

3.1.683 2020-02-18

- T2034 (default): Removal of interfaces loopback lo removed 127.0.0.1 and ::1

3.1.684 2020-02-17

- T2047 (feature): Update Linux Kernel to v4.19.104
- T2048 (bug): ISO boot fails when wireless adapter is present

3.1.685 2020-02-16

- T2043 (bug): Bond VLANs can't be extended on the fly
- T2030 (bug): Bond doesn't survive reboot
- T1992 (bug): Adding vlan on a bond resets all BGP connections on same bond
- T1908 (feature): Add zone option for Cloudflare DDNS
- T1246 (bug): VyOS 1.2.0 "openvpn-options" configuration does not allow quotes in values

3.1.686 2020-02-15

- T2042 (bug): Error on reboot after deleting "service snmp" and not "service lldp snmp enable"
- T2041 (bug): Adding non existent bond interface raises exception

3.1.687 2020-02-14

- T2039 (bug): Wrong system type displayed in show version
- T2040 (bug): vyos-http-api-server should reload Config in all routes

3.1.688 2020-02-13

- T2033 (feature): Drop vyos-replace package
- T1635 (feature): Rewrite interface pseudo-ethernet in new XML/Python style

3.1.689 2020-02-10

- T2024 (feature): Migrate "system login banner" to XML/Python

3.1.690 2020-02-09

- T2022 (bug): When RADIUS config is active, local logins won't work
- T2020 (default): Unable to log in after upgrade to 1.3-rolling-202002080217
- T1931 (bug): Enabling SNMP commit error

3.1.691 2020-02-05

- T1948 (bug): RADIUS login broken in 1.3
- T1990 (feature): Migrate "system login" to XML/Python representation
- T1585 (default): Add letsencrypt/certbot support for 'service https'

3.1.692 2020-02-04

- T1965 (bug): VyOS-1.3: ping no longer supports specifying interface or source

3.1.693 2020-02-02

- T2011 (feature): Update Linux Kernel to v4.19.101
- T640 (bug): Images no longer work when built without "recommended" packages

3.1.694 2020-02-01

- T2009 (bug): Ethernet Interface always stays down
- T1989 (bug): conf.get_config_dict() throws exception

3.1.695 2020-01-31

- T1768 (bug): PPtP - vyos.config rewrite
- T2002 (bug): VLAN interfaces try to be enabled even if parent interface is A/D

3.1.696 2020-01-30

- T1994 (default): lldpd not bound to specified interfaces - Fix jinja template
- T1896 (enhancment): Remove LLDP-MED civic_based location information
- T1724 (feature): wireguard - add endpoint check in verify()

3.1.697 2020-01-29

- T1996 (feature): Update Linux Kernel to 4.19.99
- T1862 (default): Use regex pattern s+ to split strings on whitespace in Python 3.7
- T1755 (bug): Python KeyError exceptions raised with 'show vpn ipsec sa' command under use of certain IPSEC cipher suites
- T1747 (bug): L2TP breaks after upgrading to VyOS 1.2-rolling-201910180117 [issue report and proposed solution]
- T1664 (bug): Ipoe with bond per vlan don't work
- T1895 (feature): There is not restriction on selection of syslog facility
- T1670 (feature): OpenVPN option for tls-auth

3.1.698 2020-01-26

- T1937 (bug): snmpd throwing a tremendous amount of errors
- T1767 (bug): IPoE - vyos.config rewrite
- T1765 (bug): wireguard - vyos.config rewrite

3.1.699 2020-01-24

- T1975 (bug): OpenVPN tap devices won't come up automatically

3.1.700 2020-01-23

- T1766 (bug): service-pppoe - vyos.config rewrite

3.1.701 2020-01-21

- T1784 (bug): DMVPN with IPSec does not work in HUB mode
- T1977 (bug): webproxy error on fresh install

3.1.702 2020-01-18

- T1830 (feature): 1.3-rolling boots to GRUB prompt post-install on UEFI systems
- T1940 (bug): EFI Fresh Install fails to boot, 4K Sector Drives Fail to boot EFI

3.1.703 2020-01-16

- T1880 (default): "A stop job is running for live-tools - System Support Scripts" hangs, times out when shutting down equuleus live iso

3.1.704 2020-01-15

- T1959 (bug): Error message when adding IPSec VPN

3.1.705 2020-01-09

- T1955 (feature): snmp - cli config val_help missing
- T1813 (bug): error in generated /etc/hosts file

3.1.706 2020-01-08

- T1946 (bug): Recovery ifname for PPtP remote-access

3.1.707 2020-01-03

- T1939 (feature): Provide abstraction for interface "ip" options

3.1.708 2020-01-01

- T1779 (bug): Tunnel interfaces aren't suggested as being available for bridging

3.1.709 2019-12-31

- T1654 (bug): sFlow: multiple "sflow server" not work, and "disable-imt" could break configuration
- T1923 (feature): Migrate L2TPv3 interface to XML/Python

3.1.710 2019-12-30

- T1920 (bug): beep: Error: Running under sudo, which is not supported for security reasons.
- T1918 (bug): l2tp / ipsec config broken in latest daily
- T1897 (bug): IPSec - 1.2 to 1.3 migration failed
- T1921 (bug): snmp: VyOS options no longer recognized
- T1922 (feature): Add VXLAN IPv6 support
- T1919 (feature): Migrate "system options" to XML/Python representation

3.1.711 2019-12-28

- T1916 (feature): Update Linux Kernel to v4.19.91
- T1915 (bug): Remove "system ipv6 blacklist" option
- T1912 (feature): Migrate "system (ip|ipv6)" to XML/Python representation

3.1.712 2019-12-27

- T1910 (bug): Invalid parmissions on latest 1.3 rolling ISO images

3.1.713 2019-12-26

- T1794 (bug): Interface description can't contain a colon
- T1906 (feature): Migrate "system time-zone" configuration to XML/Python

3.1.714 2019-12-23

- T1898 (enhancment): Support multiple IPv4/IPv6 LLDP management addresses
- T1878 (bug): accel-ppp: pppoe single-session option implementation

3.1.715 2019-12-22

- T393 (enhancment): Migrate vyatta-lldpd to vyos-1x

3.1.716 2019-12-20

- T1892 (default): vyos-build: Do not install recommends in docker image [enhancement]
- T1411 (enhancment): equuleus: buster: vyatta-ravpn: libfreeradius-client2 is missing in buster

3.1.717 2019-12-19

- T1873 (default): DHCP server fails to start due to a change in isc-dhcp-server init scripts

3.1.718 2019-12-18

- T1889 (bug): Error building docker build image
- T1132 (default): Build on Debian Buster

3.1.719 2019-12-17

- T1886 (feature): Update Linux Kernel to v4.19.89
- T1887 (feature): Update WireGuard to Debian release 0.0.20191212-1

3.1.720 2019-12-13

- T1861 (default): hosts lost after modified static-host-mapping

3.1.721 2019-12-10

- T1843 (feature): Add GCC preprocessor support for XML files

3.1.722 2019-12-08

- T1566 (feature): Extend L2TP/IPSec server with IPv6

3.1.723 2019-12-07

- T1714 (bug): Disable DHCP Nameservers Not Working

3.1.724 2019-12-06

- T1860 (feature): Update WireGuard to Debian release 0.0.20191127-2
- T1859 (feature): Update Linux Kernel to v4.19.88
- T1854 (bug): Dynamic DNS configuration cannot be deleted
- T1849 (bug): DHCPv6 client does not start
- T1169 (bug): LLDP potentially broken
- T586 (bug): Cannot add ethernet vif-s vif-c interface to bridge-group

3.1.725 2019-12-05

- T1847 (bug): set_level incorrectly handles path given as empty string

3.1.726 2019-12-04

- T1787 (default): Failed config migration from V1.2.3 to 1.2-rolling-201911030217
- T1212 (bug): IPSec Tunnel to Cisco ASA drops reliably after 4.2GB transferred
- T1704 (feature): OpenVPN - Add support for ncp-ciphers

3.1.727 2019-12-03

- T1782 (bug): pppoe0: showing as "Coming up"
- T1801 (bug): Unescaped backslashes in config values cause configuration failure

3.1.728 2019-12-02

- T1840 (bug): PPPoE doesn't not rename pppX to pppoeX

3.1.729 2019-11-25

- T1824 (bug): Permission denied: '/opt/vyatta/etc/config/vyos-migrate.log'

3.1.730 2019-11-24

- T1673 (bug): vif bridge-group not migrated to bridge member interface
- T1799 (feature): Add support for GENEVE (Generic Network Virtualization Encapsulation)

3.1.731 2019-11-23

- T1627 (feature): Rewrite wireless interface in new style XML syntax

3.1.732 2019-11-21

- T1818 (default): Print name of migration script on failure
- T1814 (default): Add log of migration scripts run during config migration

3.1.733 2019-11-14

- T1710 (default): [equuleus] buster: add patch to fix live-build missing key error
- T1804 (default): Add python3-psutil to docker image
- T1736 (default): Decide on best practice for patching live-team packages for VyOS build system
- T1424 (default): Rewrite the config load script

3.1.734 2019-11-11

- T1793 (feature): Editing description on an interface causes BGP sessions to reset on commit

3.1.735 2019-11-10

- T1791 (feature): Update Linux Kernel to 4.19.82

3.1.736 2019-11-08

- T1789 (bug): ddclient not working with generated RFC2136 / nsupdate config

3.1.737 2019-11-03

- T1777 (bug): Bonding interface MAC address mismatch after reboot
- T1752 (bug): PPPoE does not automatically start on boot

3.1.738 2019-11-02

- T1783 (bug): Interface can't unpin from bridge

3.1.739 2019-10-22

- T1756 (feature): Modify output to be more useful - Wireguard

3.1.740 2019-10-21

- T1741 (feature): Add system wide proxy setting

3.1.741 2019-10-19

- T1746 (bug): 201910180117 fails startup with 'Permission Denied' errors
- T1743 (default): equuleus: remove references to SSH key type "rsa1" deprecated in Debian Buster

3.1.742 2019-10-18

- T1712 (default): DHCP client sometimes doesn't start
- T1604 (enhancment): equuleus: buster: vbash: tab completion breaks

3.1.743 2019-10-11

- T1723 (bug): wireguard - Interface wg01 could not be brought up in time

3.1.744 2019-10-09

- T1719 (feature): ssh deprecated options
- T1718 (bug): ISO check in /opt/vyatta/sbin/install-image faulty
- T1682 (feature): Migrate to new Jenkins Pipeline script

3.1.745 2019-10-08

- T1717 (bug): disable multiple daemons to autostart at boot

3.1.746 2019-10-06

- T1713 (feature): Remove deprecated packages no longer required after migration to Accel-PPP

3.1.747 2019-10-03

- T1689 (feature): "reset openvpn" op-mode command should terminate and restart OpenVPN process

3.1.748 2019-10-01

- T1706 (bug): wireguard broken in latest rolling

3.1.749 2019-09-30

- T1688 (feature): OpenVPN - Add new cipher aes-(128|192|256)-gcm

3.1.750 2019-09-28

- T1696 (bug): NTP - Tests fail when building vyos-1x
- T1512 (bug): vyos 1.2 openvpn client names with spaces created incorrectly

3.1.751 2019-09-27

- T1681 (feature): cleanup wireguard code since tagnodes are now visible
- T1695 (bug): Syntax error in interface-dummy.py

3.1.752 2019-09-26

- T1692 (bug): ipoe-server verify function error
- T1691 (bug): OpenVPN - Commiting config when OpenVPN peer/server not available makes commit hang
- T1690 (feature): restart op-mode commands for 'service (pppoe|ipoe)-server'

3.1.753 2019-09-25

- T1672 (bug): Wireguard keys not automatically moved

3.1.754 2019-09-23

- T1679 (bug): during bootup: invalid literal for int() with base 10
- T1680 (feature): DHCP client does not release IP address on exit/deletion

3.1.755 2019-09-21

- T1676 (default): [equuleus] buster: update GRUB boot parameters during upgrade
- T1637 (feature): Rewrite ethernet interface in new style XML syntax
- T1675 (feature): OpenVPN - Specify minimum TLS version

3.1.756 2019-09-20

- T1602 (default): equuleus: buster: add live build apt options for choosing vyos packages

3.1.757 2019-09-19

- T1666 (feature): Deleting a bond will place member interfaces into A/D state

3.1.758 2019-09-17

- T239 (bug): Improve documentation for the firewall all-ping setting

3.1.759 2019-09-16

- T1040 (default): rc.local is executed too early

3.1.760 2019-09-15

- T1662 (default): openvpn: 'show openvpn client' error
- T1661 (default): openvpn: wrong checking for existence cert files
- T1630 (bug): OpenVPN after changing it from root to nobody (unprivileged user) cant add routes

3.1.761 2019-09-13

- T1660 (bug): Bonding dont't work on VyOS 1.2-rolling-201909120338
- T1655 (enhancment): equuleus: buster: arm: vyos-accel-ppp build failes because of filename hardcoded as x86_64 in debian/rules

3.1.762 2019-09-12

- T1572 (feature): Wireguard keyPair per interface
- T1545 (bug): IPSEC vti issue

3.1.763 2019-09-10

- T1650 (feature): implement wireguard default key removal
- T1649 (feature): feature documentation different keypairs per interface
- T1648 (feature): add cli command 'delete wireguard named-key <key>'

3.1.764 2019-09-09

- T1639 (bug): wireguard pubkey change error

3.1.765 2019-09-07

- T1640 (feature): Update Linux Kernel to v4.19.70

3.1.766 2019-09-06

- T1624 (bug): Failed to set up config session
- T1636 (feature): Rewrite VXLAN in new style XML/Python
- T1479 (bug): libvyosconfig error reporting doesn't include line numbers
- T808 (feature): replace lighthttpd with nginx
- T1478 (bug): libvyosconfig parser does not support escaped quotes inside single-quoted strings

3.1.767 2019-09-04

- T1632 (bug): OpenVPN 'push' options with quotes
- T1631 (bug): Multiple push-route options cause error generating openvpn configuration
- T1557 (feature): Create generic abstraction for configuring interfaces e.g. IP address
- T1628 (feature): Adopt WireGuard configuration script to new vyos.ifconfig class
- T1614 (feature): Rewrite bonding interface in new style XML syntax

3.1.768 2019-09-02

- T1621 (default): Rewrite the rest of trivial vyatta-op commands to new syntax

3.1.769 2019-08-31

- T1456 (bug): Port group cannot be configured if the same port is configured as standalone and inside a range

3.1.770 2019-08-28

- T1615 (feature): After migration to pyroute2 the address DHCP statement is no longer covered

3.1.771 2019-08-27

- T1617 (default): OpenVPN push route failure
- T1250 (bug): FRR not setting default gateway from DHCP

3.1.772 2019-08-26

- T1591 (bug): OpenVPN "run show openvpn client status" does not work
- T1608 (feature): bridge: Bridge adding non existing interfaces is allowed but does not work
- T1548 (feature): Rewrite OpenVPN interface/op-commands in new style XML/Python
- T1607 (default): Convert 'reset conntrack' and 'reset ip[v6] cache' operations from vyatta-op to new syntax

3.1.773 2019-08-25

- T1611 (default): Migration to latest rolling fails with vyos.configtree.ConfigTreeError: Path [b'interfaces bridge br0 igmp-snooping querier'] doesn't exist

3.1.774 2019-08-23

- T1606 (bug): Rolling release no longer boots after adding hostname daemon

3.1.775 2019-08-21

- T1601 (feature): Rewrite loopback interface type with new style XML/Python interface
- T1596 (default): Convert 'telnet' and 'traceroute' vyatta-op commands to new syntax

3.1.776 2019-08-20

- T1595 (feature): Migrate deprecated "service dns forwarding listen-on" to listen-address

3.1.777 2019-08-19

- T1580 (feature): Rewrite dummy interface type with new style XML/Python interface
- T1590 (default): Convert 'show system' operations from vyatta-op to python/xml syntax

3.1.778 2019-08-17

- T1592 (feature): Update Linux Kernel to v4.19.67

3.1.779 2019-08-15

- T1584 (default): equuleus: buster: add consistent grub options for predictable interface names

3.1.780 2019-08-13

- T1556 (feature): Rewrite Bridge in new style XML syntax

3.1.781 2019-08-09

- T1569 (feature): interfaceconfig class documetation

3.1.782 2019-08-05

- T1562 (feature): Change version scheme on current branch used for rolling releases

3.1.783 2019-08-04

- T1561 (bug): VyOS rolling ISO cluttered with vyatta-ravpn Git Repo

3.1.784 2019-08-02

- T853 (feature): Add SSTP server support
- T742 (feature): Replace poptop and xl2tpd with accel-ppp

3.1.785 2019-08-01

- T1544 (feature): L2TP documentation

3.1.786 2019-07-31

- T1552 (feature): accel-ppp: SSTP documentation
- T1553 (default): equuleus: buster: add 'noautologin' to boot parameters

3.1.787 2019-07-29

- T1532 (default): [equuleus] buster: GPG error on vyos package repository

3.1.788 2019-07-28

- T1547 (feature): accel-ppp/L2TP restructure CLI
- T1546 (bug): accel-ppp/L2TP radius-source address is not honored

3.1.789 2019-07-23

- T1533 (bug): Rolling builds broken!
- T1489 (feature): Add vlan_mon usage at Accel

3.1.790 2019-07-22

- T1435 (enhancment): Make ip-address [OPTIONAL] (in dhcp-server -> static-mapping) to cope with "unfriendly" client-hostnames of IoT-Devices

3.1.791 2019-07-21

- T823 (feature): Rewrite DHCP op mode in the new style

3.1.792 2019-07-18

- T1497 (bug): "set system name-server" generates invalid/incorrect resolv.conf
- T533 (feature): Support for PPPoE MTU greater than 1492

3.1.793 2019-07-08

- T1510 (feature): [IPoE] vlan-mon option implementation
- T1508 (feature): [pppoe] migration script for service pppoe-server interface
- T1494 (feature): accel-ppp: IPoE update documentation
- T989 (feature): Add support for IPoE server

3.1.794 2019-07-03

- T1502 (feature): Add build sanity checking tools to the dev builds

3.1.795 2019-07-02

- T1099 (default): Openvpn: use config files instead of one long command.
- T1495 (feature): accel-ppp: IPoE implement IPv6 PD

3.1.796 2019-07-01

- T1498 (bug): Nameservers are not propagated into resolv.conf

3.1.797 2019-06-24

- T1482 (feature): Add OpenVPN SHA384 hashing algorithm

3.1.798 2019-06-23

- T1476 (bug): Update PowerDNS recursor to 4.2 series

3.1.799 2019-06-22

- T1313 (feature): Add support for reusable build flavours
- T1202 (bug): Add *hvinfo* to the packages directory

3.1.800 2019-06-20

- T1413 (enhancment): equuleus: buster: vyos-xe-guest-utilities is not installable and breaks live-build
- T1412 (enhancment): equuleus: buster: vyos-netplug is not installable and breaks live-build

3.1.801 2019-06-19

- T1334 (feature): Migration script runner rewrite
- T1327 (bug): Set the serial console speed to 115200 by default

3.1.802 2019-06-18

- T1451 (bug): Intel e1000e driver missing in lates rolling release

3.1.803 2019-06-17

- T1408 (feature): pppoe-server - implement local-ipv6 for pure IPv6 based deployments

3.1.804 2019-06-12

- T1397 (default): Rewrite the config merge script

3.1.805 2019-06-05

- T1426 (default): Update the script that checks conntrack hash-size on reboot

3.1.806 2019-06-03

- T1423 (default): When merging remote config files, create known_hosts file if not present.

3.1.807 2019-05-28

- T1410 (feature): Upgrade Linux Kernel to 4.19.46

3.1.808 2019-05-26

- T1404 (feature): Update iproute2 package to 4.19

3.1.809 2019-05-24

- T1407 (bug): pppoe IPv6 PD documention by practical example

3.1.810 2019-05-23

- T1402 (feature): Update Linux Kernel to 4.19.45

3.1.811 2019-05-22

- T1399 (bug): accel-ppp kernel modules missing in rolling build 20190522
- T1393 (bug): pppoe IPv6 pool doesn't work

3.1.812 2019-05-21

- T592 (bug): lldpcli: unknown command from argument 1: #

3.1.813 2019-05-16

- T1267 (feature): FRR: Add interface name for static routes
- T1148 (bug): epa2 BGP peers initiate before config is fully loaded, routes leak.

3.1.814 2019-05-06

- T1368 (feature): Enable MPLS support in Linux Kernel

3.1.815 2019-05-04

- T1365 (bug): Cannot configure syslog on 1.2.0-rolling+201904260337

3.1.816 2019-04-29

- T1352 (feature): vyos-documentaion: accel-pppoe adding CIDR based IP pool option

3.1.817 2019-04-21

- T1348 (feature): Upgrade WireGuard to 0.0.20190406-1
- T1347 (feature): Upgrade Linux Kernel to 4.19.36

3.1.818 2019-04-20

- T1344 (feature): Unclutter "system login radius" configuration nodes

3.1.819 2019-04-19

- T1325 (default): GRE tunnel to Cisco router fails in 1.2.0 - works in 1.1.8

3.1.820 2019-04-16

- T1184 (feature): wireguard - extend documentation with the show interface wireguard commands

3.1.821 2019-04-15

- T1260 (feature): VICI-based implementation of "run show vpn ipsec sa"
- T1248 (default): Add a function for copying nodes to the vyos.configtree library

3.1.822 2019-04-05

- T1324 (feature): update documtation for 'set system login user level'

3.1.823 2019-04-04

- T1323 (feature): migrate operator accounts to admin accounts and remove the option to setup an operator account

3.1.824 2019-03-20

- T405 (feature): Add binaries for lcdproc

3.1.825 2019-03-12

- T1284 (feature): accel-ppp: pptp implementation documention
- T833 (feature): New PPTP server implementation based on accel-ppp

3.1.826 2019-02-22

- T1257 (bug): implement 'set system static-host-mapping' in host_name.py and remove old function calls

3.1.827 2019-02-21

- T1214 (bug): Add *ipaddrcheck* to the packages directory

3.1.828 2019-02-10

- T1154 (default): use of local cache to build iso

3.1.829 2019-02-09

- T1236 (feature): Update Linux Kernel

3.2 1.2.6-S1

1.2.6-S1 is a security release release made in September 2020.

3.2.1 Resolved issues

VyOS 1.2.6 release was found to be suspectible to CVE-2020-10995. It's a low- impact vulnerability in the PowerDNS recursor that allows an attacker to cause performance degradation via a specially crafted authoritative DNS server reply.

- T2899 remote syslog server migration error on update

3.3 1.2.6

1.2.6 is a maintenance release made in September 2020.

3.3.1 Resolved issues

- T103 DHCP server prepends shared network name to hostnames
- T125 Missing PPPoE interfaces in l2tp configuration
- T1194 cronjob is being setup even if not saved
- T1205 module pcspkr missing
- T1219 Redundant active-active configuration, asymmetric routing and conntrack-sync cache
- T1220 Show transceiver information from plugin modules, e.g SFP+, QSFP
- T1221 BGP - Default route injection is not processed by the specific route-map
- T1241 Remove of policy route throws CLI error
- T1291 Under certain conditions the VTI will stay forever down
- T1463 Missing command *show ip bgp scan* appears in command completion
- T1575 *show snmp mib ifmib* crashes with IndexError
- T1699 Default net.ipv6.route.max_size 32768 is too low
- T1729 PIM (Protocol Independent Multicast) implementation
- T1901 Semicolon in values is interpreted as a part of the shell command by validators
- T1934 Change default hostname when deploy from OVA without params.
- T1938 syslog doesn't start automatically
- T1949 Multihop IPv6 BFD is unconfigurable
- T1953 DDNS service name validation rejects valid service names
- T1956 PPPoE server: support PADO-delay
- T1973 Allow route-map to match on BGP local preference value
- T1974 Allow route-map to set administrative distance
- T1982 Increase rotation for atop.acct
- T1983 Expose route-map when BGP routes are programmed in to FIB
- T1985 pppoe: Enable ipv6 modules without configured ipv6 pools
- T2000 strongSwan does not install routes to table 220 in certain cases
- T2021 OSPFv3 doesn't support decimal area syntax
- T2062 Wrong dhcp-server static route subnet bytes
- T2091 swanctl.conf file is not generated properly is more than one IPsec profile is used
- T2131 Improve syslog remote host CLI definition
- T2224 Update Linux Kernel to v4.19.114
- T2286 IPoE server vulnerability

- T2303 Unable to delete the image version that came from OVA
- T2305 Add release name to "show version" command
- T2311 Statically configured name servers may not take precedence over ones from DHCP
- T2327 Unable to create syslog server entry with different port
- T2332 Backport node option for a syslog server
- T2342 Bridge l2tpv3 + ethX errors
- T2344 PPPoE server client static IP assignment silently fails
- T2385 salt-minion: improve completion helpers
- T2389 BGP community-list unknown command
- T2398 op-mode "dhcp client leases interface" completion helper misses interfaces
- T2402 Live ISO should warn when configuring that changes won't persist
- T2443 NHRP: Add debugging information to syslog
- T2448 *monitor protocol bgp* subcommands fail with 'command incomplete'
- T2458 Update FRR to 7.3.1
- T2476 Bond member description change leads to network outage
- T2478 login radius: use NAS-IP-Address if defined source address
- T2482 Update PowerDNS recursor to 4.3.1 for CVE-2020-10995
- T2517 vyos-container: link_filter: No such file or directory
- T2526 Wake-On-Lan CLI implementation
- T2528 "update dns dynamic" throws FileNotFoundError excepton
- T2536 "show log dns forwarding" still refers to dnsmasq
- T2538 Update Intel NIC drivers to recent release (preparation for Kernel >=5.4)
- T2545 Show physical device offloading capabilities for specified ethernet interface
- T2563 Wrong interface binding for Dell VEP 1445
- T2605 SNMP service is not disabled by default
- T2625 Provide generic Library for package builds
- T2686 FRR: BGP: large-community configuration is not applied properly after upgrading FRR to 7.3.x series
- T2701 *vpn ipsec pfs enable* doesn't work with IKE groups
- T2728 Protocol option ignored for IPSec peers in transport mode
- T2734 WireGuard: fwmark CLI definition is inconsistent
- T2757 "show system image version" contains additional new-line character breaking output
- T2797 Update Linux Kernel to v4.19.139
- T2822 Update Linux Kernel to v4.19.141
- T2829 PPPoE server: mppe setting is implemented as node instead of leafNode
- T2831 Update Linux Kernel to v4.19.142
- T2852 rename dynamic dns interface breaks ddclient.cache permissions

- T2853 Intel QAT acceleration does not work

3.4 1.2.5

1.2.5 is a maintenance release made in April 2020.

3.4.1 Resolved issues

- T1020 OSPF Stops distributing default route after a while
- T1228 pppoe default-route force option not working (Rel 1.2.0-rc11)
- T1301 bgp peer-groups don't work when "no-ipv4-unicast" is enabled.
- T1341 Adding rate-limiter for pppoe server users
- T1376 Incorrect DHCP lease counting
- T1392 Large firewall rulesets cause the system to lose configuration and crash at startup
- T1416 2 dhcp server run in failover mode can't sync hostname with each other
- T1452 accel-pppoe - add vendor option to shaper
- T1490 BGP configuration (is lost|not applied) when updating 1.1.8 -> 1.2.1
- T1780 Adding ipsec ike closeaction
- T1803 Unbind NTP while it's not requested…
- T1821 "authentication mode radius" has no effect for PPPoE server
- T1827 Increase default gc_thresh
- T1828 Missing completion helper for "set system syslog host 192.0.2.1 facility all protocol"
- T1832 radvd adding feature DNSSL branch.example.com example.com to existing package
- T1837 PPPoE unrecognized option 'replacedefaultroute'
- T1851 wireguard - changing the pubkey on an existing peer seems to destroy the running config.
- T1858 l2tp: Delete depricated outside-nexthop and add gateway-address
- T1864 Lower IPSec DPD timeout lower limit from 10s -> 2s
- T1879 Extend Dynamic DNS XML definition value help strings and validators
- T1881 Execute permissions are removed from custom SNMP scripts at commit time
- T1884 Keeping VRRP transition-script native behaviour and adding stop-script
- T1891 Router announcements broken on boot
- T1900 Enable SNMP for VRRP.
- T1902 Add redistribute non main table in bgp
- T1909 Incorrect behaviour of static routes with overlapping networks
- T1913 "system ipv6 blacklist" command has no effect
- T1914 IPv6 multipath hash policy does not apply
- T1917 Update WireGuard to Debian release 0.0.20191219-1

- T1934 Change default hostname when deploy from OVA without params.
- T1935 NIC identification and usage problem in Hyper-V environments
- T1936 pppoe-server CLI control features
- T1964 SNMP Script-extensions allows names with spaces, but commit fails
- T1967 BGP parameter "enforce-first-as" does not work anymore
- T1970 Correct adding interfaces on boot
- T1971 Missing modules in initrd.img for PXE boot
- T1998 Update FRR to 7.3
- T2001 Error when router reboot
- T2032 Monitor bandwidth bits
- T2059 Set source-validation on bond vif don't work
- T2066 PPPoE interface can be created multiple times - last wins
- T2069 PPPoE-client does not works with service-name option
- T2077 ISO build from crux branch is failing
- T2079 Update Linux Kernel to v4.19.106
- T2087 Add maxfail 0 option to pppoe configuration.
- T2100 BGP route adverisement wih checks rib
- T2120 "reset vpn ipsec-peer" doesn't work with named peers
- T2197 Cant add vif-s interface into a bridge
- T2228 WireGuard does not allow ports < 1024 to be used
- T2252 HTTP API add system image can return '504 Gateway Time-out'
- T2272 Set system flow-accounting disable-imt has syntax error
- T2276 PPPoE server vulnerability

3.5 1.2.4

1.2.4 is a maintenance release made in December 2019.

3.5.1 Resolved issues

- T258 Can not configure wan load-balancing on vyos-1.2
- T818 SNMP v3 - remove required engineid from user node
- T1030 Upgrade ddclient from 3.8.2 to 3.9. (support Cloudflare API v4)
- T1183 BFD Support via FRR
- T1299 Allow SNMPd to be extended with custom scripts
- T1351 accel-pppoe adding CIDR based IP pool option
- T1391 In route-map set community additive

- T1394 syslog systemd and host_name.py race condition
- T1401 Copying files with the FTP protocol fails if the passwor contains special characters
- T1421 OpenVPN client push-route stopped working, needs added quotes to fix
- T1430 Add options for custom DHCP client-id and hostname
- T1447 Python subprocess called without import in host_name.py
- T1470 improve output of "show dhcpv6 server leases"
- T1485 Enable 'AdvIntervalOpt' option in for radvd.conf
- T1496 Separate rolling release and LTS kernel builds
- T1560 "set load-balancing wan rule 0" causes segfault and prevent load balancing from starting
- T1568 strip-private command improvement for additional masking o IPv6 and MAC address
- T1578 completion offers "show table", but show table does not exist
- T1593 Support ip6gre
- T1597 /usr/sbin/rsyslogd after deleting "system syslog"
- T1638 vyos-hostsd not setting system domain name
- T1678 hostfile-update missing line feed
- T1694 NTPd: Do not listen on all interfaces by default
- T1701 Delete domain-name and domain-search won't work
- T1705 High CPU usage by bgpd when snmp is active
- T1707 DHCP static mapping and exclude address not working
- T1708 Update Rolling Release Kernel to 4.19.76
- T1709 Update WireGuard to 0.0.20190913
- T1716 Update Intel NIC drivers to recent versions
- T1726 Update Linux Firmware binaries to a more recen version 2019-03-14 -> 2019-10-07
- T1728 Update Linux Kernel to 4.19.79
- T1737 SNMP tab completion missing
- T1738 Copy SNMP configuration from node to node raises exception
- T1740 Broken OSPFv2 virtual-link authentication
- T1742 NHRP unable to commit.
- T1745 dhcp-server commit fails with "DHCP range stop address must be greater or equal to the range start address y!" when static mapping has same IP as range stop
- T1749 numeric validator doesn't support multiple ranges
- T1769 Remove complex SNMPv3 Transport Security Model (TSM)
- T1772 <regex> constraints in XML are partially broken
- T1778 Kilobits/Megabits difference in configuration Vyos/FRR
- T1780 Adding ipsec ike closeaction
- T1786 disable-dhcp-nameservers is missed in current host_name.p implementation

- T1788 Intel QAT (QuickAssist Technology) implementation
- T1792 Update WireGuard to Debian release 0.0.20191012-1
- T1800 Update Linux Kernel to v4.19.84
- T1809 Wireless: SSID scan does not work in AP mode
- T1811 Upgrade from 1.1.8: Config file migratio failed: module=l2tp
- T1812 DHCP: hostnames of clients not resolving afte update v1.2.3 -> 1.2-rolling
- T1819 Reboot kills SNMPv3 configuration
- T1822 Priority inversion wireless interface dhcpv6
- T1825 Improve DHCP configuration error message
- T1836 import-conf-mode-commands in vyos-1x/scripts fails to create an xml
- T1839 LLDP shows "VyOS unknown" instead of "VyOS"
- T1841 PPP ipv6-up.d direcotry missing
- T1893 igmp-proxy: Do not allow adding unknown interface
- T1903 Implementation udev predefined interface naming
- T1904 update eth1 and eth2 link files for the vep4600

3.6 1.2.3

1.2.3 is a maintenance and feature backport release made in September 2019.

3.6.1 New features

- HTTP API
- T1524 "set service dns forwarding allow-from <IPv4 net|IPv6 net>" option for limiting queries to specific client networks
- T1503 Functions for checking if a commit is in progress
- T1543 "set system contig-mangement commit-archive source-address" option
- T1554 Intel NIC drivers now support receive side scaling and multiqueue

3.6.2 Resolved issues

- T1209 OSPF max-metric values over 100 no longer causes commit errors
- T1333 Fixes issue with DNS forwarding not performing recursive lookups on domain specific forwarders
- T1362 Special characters in VRRP passwords are handled correctly
- T1377 BGP weight is applied properly
- T1420 Fixed permission for log files
- T1425 Wireguard interfaces now support /31 addresses
- T1428 Wireguard correctly handles firewall marks

- T1439 DHCPv6 static mappings now work correctly
- T1450 Flood ping commands now works correctly
- T1460 Op mode "show firewall" commands now support counters longer than 8 digits (T1460)
- T1465 Fixed priority inversion in VTI commands
- T1468 Fixed remote-as check in the BGP route-reflector-client option
- T1472 It's now possible to re-create VRRP groups with RFC compatibility mode enabled
- T1527 Fixed a typo in DHCPv6 server help strings
- T1529 Unnumbered BGP peers now support VLAN interfaces
- T1530 Fixed "set system syslog global archive file" command
- T1531 Multiple fixes in cluster configuration scripts
- T1537 Fixed missing help text for "service dns"
- T1541 Fixed input validation in DHCPv6 relay options
- T1551 It's now possible to create a QinQ interface and a firewall assigned to it in one commit
- T1559 URL filtering now uses correct rule database path and works again
- T1579 "show log vpn ipsec" command works again
- T1576 "show arp interface <intf>" command works again
- T1605 Fixed regression in L2TP/IPsec server
- T1613 Netflow/sFlow captures IPv6 traffic correctly
- T1616 "renew dhcpv6" command now works from op mode
- T1642 BGP remove-private-as option iBGP vs eBGP check works correctly now
- T1540, T1360, T1264, T1623 Multiple improvements in name servers and hosts configuration handling

3.6.3 Internals

`/etc/resolv.conf` and `/etc/hosts` files are now managed by the *vyos-hostsd* service that listens on a ZMQ socket for update messages.

3.7 1.2.2

1.2.2 is a maintenance release made in July 2019.

3.7.1 New features

- Options for per-interface MSS clamping.
- BGP extended next-hop capability
- Relaxed BGP multipath option
- Internal and external options for "remote-as" (accept any AS as long as it's the same to this router or different, respectively)
- "Unnumbered" (interface-based) BGP peers
- BGP no-prepend option
- Additive BGP community option
- OSPFv3 network type option
- Custom arguments for VRRP scripts
- A script for querying values from config files

3.7.2 Resolved issues

- Linux kernel 4.19.54, including a fix for the TCP SACK vulnerability
- T1371 VRRP health-check scripts now can use arguments
- T1497 DNS server addresses coming from a DHCP server are now correctly propagated to resolv.conf
- T1469 Domain-specific name servers in DNS forwarding are now used for recursive queries
- T1433 `run show dhcpv6 server leases` now display leases correctly
- T1461 Deleting `firewall options` node no longer causes errors
- T1458 Correct hostname is sent to remote syslog again
- T1438 Board serial number from DMI is correctly displayed in `show version`
- T1358, T1355, T1294 Multiple corrections in remote syslog config
- T1255 Fixed missing newline in `/etc/hosts`
- T1174 `system domain-name` is correctly included in `/etc/resolv.conf`
- T1465 Fixed priority inversion in `interfaces vti vtiX ip` settings
- T1446 Fixed errors when installing with RAID1 on UEFI machines
- T1387 Fixed an error on disabling an interfaces that has no address
- T1367 Fixed deleting VLAN interface with non-default MTU
- T1505 vyos.config `return_effective_values()` function now correctly returns a list rather than a string

3.8 1.2.1

VyOS 1.2.1 is a maintenance release made in April 2019.

3.8.1 Resolved issues

- Package updates: kernel 4.19.32, open-vm-tools 10.3, latest Intel NIC drivers
- T1326 The kernel now includes drivers for various USB serial adapters, which allows people to add a serial console to a machine without onboard RS232, or connect to something else from the router
- The collection of network card firmware is now much more extensive
- T1271 VRRP now correctly uses a virtual rather than physical MAC addresses in the RFC-compliant mode
- T1330 DHCP WPAD URL option works correctly again
- T1312 Many to many NAT rules now can use source/destination and translation networks of non-matching size. If 1:1 network bits translation is desired, it's now users responsibility to check if prefix length matches.
- T1290 IPv6 network prefix translation is fixed
- T1308 Non-alphanumeric characters such as > can now be safely used in PPPoE passwords
- T1305 `show | commands` no longer fails when a config section ends with a leaf node such as `timezone` in `show system | commands`
- T1235 `show | commands` correctly works in config mode now
- T1298 VTI is now compatible with the DHCP-interface IPsec option
- T1277 `show dhcp server statistics` command was broken in latest Crux
- T1261 An issue with TFTP server refusing to listen on addresses other than loopback was fixed
- T1224 Template issue that might cause UDP broadcast relay fail to start is fixed
- T1067 VXLAN value validation is improved
- T1211 Blank hostnames in DHCP updates no longer can crash DNS forwarding
- T1322 Correct configuration is now generated for DHCPv6 relays with more than one upstream interface
- T1234 `relay-agents-packets` option works correctly now
- T1231 Dynamic DNS data is now cleaned on configuration change
- T1282 Remote Syslog can now use a fully qualified domain name
- T1279 ACPI power off works again
- T1247 Negation in WAN load balancing rules works again
- T1218 FRR staticd now starts on boot correctly
- T1296 The installer now correctly detects SD card devices
- T1225 Wireguard peers can be disabled now
- T1217 The issue with Wireguard interfaces impossible to delete is fixed
- T1160 Unintended IPv6 access is fixed in SNMP configuration
- T1060 It's now possible to exclude hosts from the transparent web proxy
- T484 An issue with rules impossible to delete from the zone-based firewall is fixed

CHAPTER

FOUR

INSTALLATION AND IMAGE MANAGEMENT

4.1 Installation

VyOS installation requires a downloaded VyOS .iso file. That file is a live install image that lets you boot a live VyOS. From the live system, you can proceed to a permanent installation on a hard drive or any other type of storage.

Table 1: Comparison of VyOS image releases

Release Type	Description	Release Cycle	Intended Use	Access to Images	Access to Source
Nightly (Current)	Automatically built from the current branch. Always up to date with cutting edge development but guaranteed to contain bugs.	Every night	Developing VyOS, testing new features, experimenting.	Everyone	Everyone
Nightly (Beta)	Automatically built from the development branch and released alongside snapshots. Most likely contains bugs.	Every night	Developing and testing the latest major version under development.	Everyone	Everyone
Snapshot	A particularly stable release frozen from nightly each month after manual testing. Still contains experimental code.	Every month until RC comes out	Home labs and simple networks that call for new features.	Everyone	Everyone
Release Candidate	Rather stable. All development focuses on testing and hunting down remaining bugs following the feature freeze.	Irregularly until EPA comes out	Labs, small offices and non-critical production systems backed by a high-availability setup.	Everyone	Everyone
Early Production Access	Highly stable with no known bugs. Needs to be tested repeatedly under different conditions before it can become the final release.	Irregularly until LTS comes out	Non-critical production environments, preparing for the LTS release.	Everyone	Everyone
Long-Term Support	Guaranteed to be stable and carefully maintained for several years after the release. No features are introduced but security updates are released in a timely manner.	Every major version	Large-scale enterprise networks, internet service providers, critical production environments that call for minimum downtime.	Subscribers, contributors, non-profits, emergency services, academic institutions	Everyone

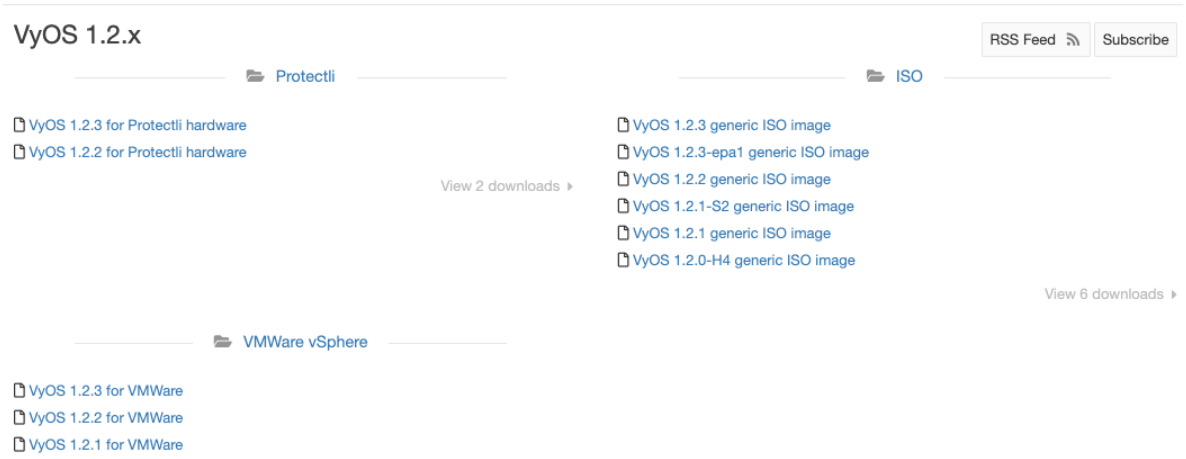
4.1.1 Hardware requirements

The minimum system requirements are 512 MiB RAM and 2 GiB storage. Depending on your use, you might need additional RAM and CPU resources e.g. when having multiple BGP full tables in your system.

4.1.2 Download

Registered Subscribers

Registered subscribers can log into https://support.vyos.io/ to access a variety of different downloads via the "Downloads" link. These downloads include LTS (Long-Term Support), the associated hot-fix releases, early public access releases, pre-built VM images, as well as device specific installation ISOs.



Building from source

Non-subscribers can always get the LTS release by building it from source. Instructions can be found in the *Build VyOS* section of this manual. VyOS source code repository is available for everyone at https://github.com/vyos/vyos-build.

Rolling Release

Everyone can download bleeding-edge VyOS rolling images from: https://downloads.vyos.io/

Note: Rolling releases contain all the latest enhancements and fixes. This means that there will be new bugs of course. If you think you hit a bug please follow the guide at *Bug Report/Issue*. We depend on your feedback to improve VyOS!

The following link will always fetch the most recent VyOS build for AMD64 systems from the current branch: https://downloads.vyos.io/rolling/current/amd64/vyos-rolling-latest.iso

Download Verification

LTS images are signed by the VyOS lead package-maintainer private key. With the official public key, the authenticity of the package can be verified. GPG (GNU Privacy Guard) is used for verification.

Note: This subsection only applies to LTS images, for Rolling images please jump to *Live installation*.

Preparing for the verification

First, install GPG or another OpenPGP implementation. On most GNU+Linux distributions it is installed by default as package managers use it to verify package signatures. If not pre-installed, it will need to be downloaded and installed.

The official VyOS public key can be retrieved in a number of ways. Skip to *GPG verification* if the key is already present.

It can be retrieved directly from a key server:

```
gpg --recv-keys FD220285A0FE6D7E
```

Or it can be accessed via a web browser:

https://pgp.mit.edu/pks/lookup?op=get&search=0xFD220285A0FE6D7E

Or from the following block:

```
-----BEGIN PGP PUBLIC KEY BLOCK-----
Version: GnuPG v1.4.12 (GNU/Linux)

mQINBFXKsiIBEACyid9PR/v56pSRG8VgQyRwvzoI7rLErZ8BCQA2WFxA6+zNy+6G
+0E/6XAOzE+VHli+wtJpiVJwAh+wWuqzOmv9css2fdJxpMW87pJAS2i3EVVVf6ab
wU848JYLGzc9y7gZrnT1m2fNh4MXkZBNDp780WpOZx8roZq5X+j+Y5hk5KcLiBn/
lh9Zoh8yzrWDSXQsz0BGoAbVnLUEWyo0tcRcHuC0eLx6oNG/IHvd/+kxWB1uULHU
SlB/6vcx56lLqgzywkmhP01050ZDyTqrFRIfrvw6gLQaWlgR3lB93txvF/sz87Il
VblV7e6HEyVUQxedDS8ikOyzdb5r9a6Zt/j8ZPSntFNM6OcKAI7U1nDD3FVOhlVn
7lhUiNc+/qjC+pR9CrZjr/BTWE7Zpi6/kzeH4eAkfjyALj18oC5udJDjXE5daTL3
k9difHf74VkZm29Cy9M3zPckOZpsGiBl8YQsf+RXSBMDVYRKZ1BNNLDofm4ZGijK
mriXcaY+VIeVB26J8m8y0zN4/ZdioJXRcy72c1KusRt8e/TsqtC9UFK05YpzRm5R
/nwxDFYb7EdY/vHUFOmfwXLaRvyZtRJ9LwvRUAqgRbbRZg3ET/tn6JZk8hqx3e1M
IxuskOB19t5vWyAo/TLGIFw44SErrq9jnpqgclTSRgFjcjHEm061r4vjoQARAQAB
tDZWeU9TIE1haW50YWluZXJzIChWeU9TIFJlbGVhc2UpIDxtYWludGFpbmVyc0B2
eW9zLm5ldD6JAjgEEwECACIFAlXKsiICGwMGCwkIBwMCBhUIAgkKCwQWAgMBAh4B
AheAAAoJEP0iAoWg/m1+xbgP+QEDYZi5dA4IPY+vU1L95Bavju2m2o35TSUDPg5B
jfAGuhbsNUceU+l/yUlxjpKEmvshyW3GHR5QzUaKGup/ZDBo1CBxZNhpSlFida2E
KAYTx4vHk3MRXcntiAj/hIJwRtzCUp5UQIqHoU8dmHoHOkKEP+zhJuR6E2s+WwDr
nTwE6eRa0g/AHY+chj2Je6flpPm2CKoTfUE7a2yBBU3wPq3rGtsQgVxPAxHRZz7A
w4AjH3NM1Uo3etuiDnGkJAuoKKb1J4X3w2QlbwlR4cODLKhJXHIufwaGtRwEin9S
1l2bL8V3gy2Hv3D2t9TQZuR5NUHsibJRXLSa8WnSCcc6Bij5aqfdpYB+YvKH/rIm
GvYPmLZDfKGkx0JE4/qtfFjiPJ5VE7BxNyliEw/rnQsxWAGPqLlL61SD8w5jGkw3
CinwO3sccTVcPz9b6A1RsbBVhTJJX5lcPn1lkOEVwQ7l8bRhOKCMe0P53qEDcLCd
KcXNnAFbVes9u+kfUQ4oxS0G2JS9ISVNmune+uv+JR7KqSdOuRYlyXA9uTjgWz4y
Cs7RS+CpkJFqrqOtS1rmuDW9Ea4PA8ygGlisM5d/AlVkniHz/2JYtgetiLCj9mfE
MzQpgnldNSPumKqJ3wwmCNisE+lXQ5UXCaoaeqF/qX1ykybQn41LQ+0xT5Uvy7sL
9IwGuQINBFXKsiIBEACg2mP3QYkXdgWTK5JyTGyttE6bDC9uqsK8dc1J66Tjd5Ly
Be0amO+88GHXa0o5Smwk2QNoxsRR41G/D/eAeGsuOEYnePROEr3tcLnDjo4KLgQ+
H69zRPn77sdP3A34Jgp+QIzByJWM7Cnim31quQP3qal2QdpGJcT/jDJWdticN76a
Biaz+HN13LyvZM+DWhUDttbjAJc+TEwF9YzIrU+3AzkTRDWkRh4kNIQxjlpNzvho
9V75riVqg2vtgPwttPEhOLb0oMzy4ADdfezrfVvvMb4M4kY9npu4MlSkNTM97F/I
QKy90JuSUIjE05AO+PDXJF4Fd5dcpmukLV/2nV0WM2LAERpJUuAgkZN6pNUFVISR
+nSfgR7wvqeDY9NigHrJqJbSEgaBUs6RTk5hait2wnNKLJajlu3aQ2/QfRT/kG3h
ClKUz3Ju7NCURmFE6mfsdsVrlIsEjHr/dPbXRswXgC9FLlXpWgAEDYi9Wdxxz8o9
JDWrVYdKRGG+OpLFh8AP6QL3YnZF+p1oxGUQ5ugXauAJ9YS55pbzaUFP8oOO2P1Q
BeYnKRs1GcMI8KWtE/fze9C9gZ7Dqju7ZFEyllM4v3lzjhT8muMSAhw41J22mSx6
VRkQVRIAvPDFES45IbB6EEGhDDg4pD2az8Q7i7Uc6/olEmpVONSOZEEPsQe/2wAR
```

(continues on next page)

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```
AQABiQIfBBgBAgAJBQJVyrIiAhsMAAoJEP0iAoWg/m1+niUQAKTxwJ9PTAfB+XDk
3qH3n+T49O2wP3fhBI0EGhJp9Xbx29G7qfEeqcQm69/qSq2/0HQOc+w/g8yy71jA
6rPuozCraoN7Im09rQ2NqIhPK/1w5ZvgNVC0NtcMigX9MiSARePKygAHOPHtrhyO
rJQyu8E3cV3VRT4qhqIqXs8Ydc9vL3ZrJbhcHQuSLdZxM1k+DahCJgwWabDCUizm
sVP3epAP19FP8sNtHi0P1LC0kq6/0qJot+4iBiRwXMervCD5ExdOm2ugvSgghdYN
BikFHvmsCxbZAQjykQ6TMn+vkmcEz4fGAn4L7Nx4paKEtXaAFO8TJmFjOlGUthEm
CtHDKjCTh9WV4pwG2WnXuACjnJcs6LcK377EjWU25H4y1ff+NDIUg/DWfSS85iIc
UgkOlQO6HJy0O96L5uxn7VJpXNYFa20lpfTVZv7uu3BC3RW/FyOYsGtSiUKYq6cb
CMxGTfFxGeynwIlPRlH68BqH6ctR/mVdo+5UIWsChSnNd1GreIEI6p2nBk3mc7jZ
7pTEHpjarwOjs/S/lK+vLW53CSFimmW4lw3MwqiyAkxl0tHAT7QMHH9Rgw2HF/g6
XD76fpFdMT856dsuf+j2uuJFlFe5B1fERBzeU18MxML0VpDmGFEaxxypfACeI/iu
8vzPzaWHhkOkU8/J/Ci7+vNtUOZb
=Ld8S
-----END PGP PUBLIC KEY BLOCK-----
```

Store the key in a new text file and import it into GPG via: `gpg --import file_with_the_public_key`

The import can be verified with:

```
$ gpg --list-keys
...
pub   rsa4096 2015-08-12 [SC]
    0694A9230F5139BF834BA458FD220285A0FE6D7E
uid           [ unknown] VyOS Maintainers (VyOS Release) <maintainers@vyos.net>
sub   rsa4096 2015-08-12 [E]
```

GPG verification

With the public key imported, the signature for the desired image needs to be downloaded.

Note: The signature can be downloaded by appending *.asc* to the URL of the downloaded VyOS image. That small *.asc* file is the signature for the associated image.

Finally, verify the authenticity of the downloaded image:

```
$ gpg2 --verify vyos-1.2.1-amd64.iso.asc  vyos-1.2.1-amd64.iso
gpg: Signature made So 14 Apr 12:58:07 2019 CEST
gpg:                using RSA key FD220285A0FE6D7E
gpg: Good signature from "VyOS Maintainers (VyOS Release) <maintainers@vyos.net>"␣
↪[unknown]
Primary key fingerprint: 0694 A923 0F51 39BF 834B  A458 FD22 0285 A0FE 6D7E
```

Minisign verification

Currently we are using GPG for release signing (pretty much like everyone else).

Popularity of GPG for release signing comes from the fact that many people already had it installed for email encryption/signing. Inside a VyOS image, signature checking is the only reason to have it installed. However, it still comes with all the features no one needs, such as support for multiple outdated cipher suits and ability to embed a photo in the key file. More importantly, web of trust, the basic premise of PGP, is never used in release signing context. Once you have a knowingly authentic image, authenticity of upgrades is checked using a key that comes in the image, and to get their first image people never rely on keyservers either.

Another point is that we are using RSA now, which requires absurdly large keys to be secure.

In 2015, OpenBSD introduced signify. An alternative implementation of the same protocol is minisign, which is also available for Windows and macOS, and in most GNU/Linux distros it's in the repositories now.

Its installed size (complete with libsodium) is less than that of GPG binary alone (not including libgcrypt and some other libs, which I think we only use for GPG). Since it uses elliptic curves, it gets away with much smaller keys, and it doesn't include as much metadata to begin with.

Another issue of GPG is that it creates a /root/.gnupg directory just for release checking. The dir is small so the fact that it's never used again is an aesthetic problem, but we've had that process fail in the past. But, small key size of the Ed25519 algorithm allows passing public keys in command line arguments, so verification process can be completely stateless:

T2108 switched the validation system to prefer minisign over GPG keys.

To verify a VyOS image starting off with VyOS 1.3.0-rc6 you can run:

```
$ minisign -V -P RWTR1ty93Oyontk6caB9WqmiQC4fgeyd/ejgRxCRGd2MQej7nqebHneP -m vyos-1.3.0-
↪rc6-amd64.iso vyos-1.3.0-rc6-amd64.iso.minisig
Signature and comment signature verified
Trusted comment: timestamp:1629997936   file:vyos-1.3.0-rc6-amd64.iso
```

During an image upgrade VyOS performas the following command:

```
$ minisign -V -p /usr/share/vyos/keys/vyos-release.minisign.pub -m vyos-1.3.0-rc6-amd64.
↪iso vyos-1.3.0-rc6-amd64.iso.minisig
Signature and comment signature verified
Trusted comment: timestamp:1629997936   file:vyos-1.3.0-rc6-amd64.iso
```

4.1.3 Live installation

Note: A permanent VyOS installation always requires to go first through a live installation.

VyOS, as other GNU+Linux distributions, can be tested without installing it in your hard drive. **With your downloaded VyOS .iso file you can create a bootable USB drive that will let you boot into a fully functional VyOS system**. Once you have tested it, you can either decide to begin a *Permanent installation* in your hard drive or power your system off, remove the USB drive, and leave everything as it was.

If you have a GNU+Linux system, you can create your VyOS bootable USB stick with with the `dd` command:

1. Open your terminal emulator.
2. Find out the device name of your USB drive (you can use the `lsblk` command)

3. Unmount the USB drive. Replace X in the example below with the letter of your device and keep the asterisk (wildcard) to unmount all partitions.

```
$ umount /dev/sdX*
```

4. Write the image (your VyOS .iso file) to the USB drive. Note that here you want to use the device name (e.g. /dev/sdb), not the partition name (e.g. /dev/sdb1).

   Warning: This will destroy all data on the USB drive!

```
# dd if=/path/to/vyos.iso of=/dev/sdX bs=8M; sync
```

5. Wait until you get the outcome (bytes copied). Be patient, in some computers it might take more than one minute.
6. Once `dd` has finished, pull the USB drive out and plug it into the powered-off computer where you want to install (or test) VyOS.
7. Power the computer on, making sure it boots from the USB drive (you might need to select booting device or change booting settings).
8. Once VyOS is completely loaded, enter the default credentials (login: vyos, password: vyos).

If you find difficulties with this method, prefer to use a GUI program, or have a different operating system, there are other programs you can use to create a bootable USB drive, like balenaEtcher (for GNU/Linux, macOS and Windows), Rufus (for Windows) and many others. You can follow their instructions to create a bootable USB drive from an .iso file.

Hint: The default username and password for the live system is *vyos*.

4.1.4 Permanent installation

Note: Before a permanent installation, VyOS requires a *Live installation*.

Unlike general purpose Linux distributions, VyOS uses "image installation" that mimics the user experience of traditional hardware routers and allows keeping multiple VyOS versions installed simultaneously. This makes it possible to switch to a previous version if something breaks or miss-behaves after an image upgrade.

Every version is contained in its own squashfs image that is mounted in a union filesystem together with a directory for mutable data such as configurations, keys, or custom scripts.

Note: Older versions (prior to VyOS 1.1) used to support non-image installation (`install system` command). Support for this has been removed from VyOS 1.2 and newer releases. Older releases can still be upgraded via the general `add system image <image_path>` upgrade command (consult *Image Management* for further information).

In order to proceed with a permanent installation:

1. Log into the VyOS live system (use the default credentials: vyos, vyos)
2. Run the `install image` command and follow the wizard:

```
vyos@vyos:~$ install image
Welcome to the VyOS install program.  This script
will walk you through the process of installing the
VyOS image to a local hard drive.
Would you like to continue? (Yes/No) [Yes]: Yes
Probing drives: OK
Looking for pre-existing RAID groups...none found.
The VyOS image will require a minimum 2000MB root.
Would you like me to try to partition a drive automatically
or would you rather partition it manually with parted?  If
you have already setup your partitions, you may skip this step

Partition (Auto/Parted/Skip) [Auto]:

I found the following drives on your system:
 sda    4294MB

Install the image on? [sda]:

This will destroy all data on /dev/sda.
Continue? (Yes/No) [No]: Yes

How big of a root partition should I create? (2000MB - 4294MB) [4294]MB:

Creating filesystem on /dev/sda1: OK
Done!
Mounting /dev/sda1...
What would you like to name this image? [1.2.0-rolling+201809210337]:
OK.  This image will be named: 1.2.0-rolling+201809210337
Copying squashfs image...
Copying kernel and initrd images...
Done!
I found the following configuration files:
    /opt/vyatta/etc/config.boot.default
Which one should I copy to sda? [/opt/vyatta/etc/config.boot.default]:

Copying /opt/vyatta/etc/config.boot.default to sda.
Enter password for administrator account
Enter password for user 'vyos':
Retype password for user 'vyos':
I need to install the GRUB boot loader.
I found the following drives on your system:
 sda    4294MB

Which drive should GRUB modify the boot partition on? [sda]:

Setting up grub: OK
Done!
```

3. After the installation is completed, remove the live USB stick or CD.
4. Reboot the system.

```
vyos@vyos:~$ reboot
Proceed with reboot? (Yes/No) [No] Yes
```

You will boot now into a permanent VyOS system.

4.1.5 PXE Boot

VyOS can also be installed through PXE. This is a more complex installation method that allows deploying VyOS through the network.

Requirements

- Clients (where VyOS is to be installed) with a PXE-enabled NIC
- *DHCP Server*
- *TFTP Server*
- Webserver (HTTP) - optional, but we will use it to speed up installation
- VyOS ISO image to be installed (do not use images prior to VyOS 1.2.3)
- Files *pxelinux.0* and *ldlinux.c32* from the Syslinux distribution

Configuration

Step 1: DHCP

Configure a DHCP server to provide the client with:

- An IP address
- The TFTP server address (DHCP option 66). Sometimes referred as *boot server*
- The *bootfile name* (DHCP option 67), which is *pxelinux.0*

In this example we configured an existent VyOS as the DHCP server:

```
vyos@vyos# show service dhcp-server
 shared-network-name mydhcp {
     subnet 192.168.1.0/24 {
         bootfile-name pxelinux.0
         bootfile-server 192.168.1.50
         default-router 192.168.1.50
         range 0 {
             start 192.168.1.70
             stop 192.168.1.100
         }
     }
 }
```

Step 2: TFTP

Configure a TFTP server so that it serves the following:

- The *pxelinux.0* file from the Syslinux distribution
- The *ldlinux.c32* file from the Syslinux distribution
- The kernel of the VyOS software you want to deploy. That is the *vmlinuz* file inside the */live* directory of the extracted contents from the ISO file.
- The initial ramdisk of the VyOS ISO you want to deploy. That is the *initrd.img* file inside the */live* directory of the extracted contents from the ISO file. Do not use an empty (0 bytes) initrd.img file you might find, the correct file may have a longer name.
- A directory named pxelinux.cfg which must contain the configuration file. We will use the configuration file shown below, which we named default.

In the example we configured our existent VyOS as the TFTP server too:

```
vyos@vyos# show service tftp-server
 directory /config/tftpboot
 listen-address 192.168.1.50
```

Example of the contents of the TFTP server:

```
vyos@vyos# ls -hal /config/tftpboot/
total 29M
drwxr-sr-x 3 tftp tftp      4.0K Oct 14 00:23 .
drwxrwsr-x 9 root vyattacfg 4.0K Oct 18 00:05 ..
-r--r--r-- 1 root vyattacfg  25M Oct 13 23:24 initrd.img-4.19.54-amd64-vyos
-rwxr-xr-x 1 root vyattacfg 120K Oct 13 23:44 ldlinux.c32
-rw-r--r-- 1 root vyattacfg  46K Oct 13 23:24 pxelinux.0
drwxr-xr-x 2 root vyattacfg 4.0K Oct 14 01:10 pxelinux.cfg
-r--r--r-- 1 root vyattacfg 3.7M Oct 13 23:24 vmlinuz

vyos@vyos# ls -hal /config/tftpboot/pxelinux.cfg
total 12K
drwxr-xr-x 2 root vyattacfg 4.0K Oct 14 01:10 .
drwxr-sr-x 3 tftp tftp      4.0K Oct 14 00:23 ..
-rw-r--r-- 1 root root       191 Oct 14 01:10 default
```

Example of simple (no menu) configuration file:

```
vyos@vyos# cat /config/tftpboot/pxelinux.cfg/default
DEFAULT VyOS123

LABEL VyOS123
 KERNEL vmlinuz
 APPEND initrd=initrd.img-4.19.54-amd64-vyos boot=live nopersistence noautologin␣
↪nonetworking fetch=http://address:8000/filesystem.squashfs
```

Step 3: HTTP

We also need to provide the *filesystem.squashfs* file. That is a heavy file and TFTP is slow, so you could send it through HTTP to speed up the transfer. That is how it is done in our example, you can find that in the configuration file above.

First run a web server - you can use a simple one like Python's SimpleHTTPServer and start serving the *filesystem.squashfs* file. The file can be found inside the */live* directory of the extracted contents of the ISO file.

Second, edit the configuration file of the *Step 2: TFTP* so that it shows the correct URL at `fetch=http://<address_of_your_HTTP_server>/filesystem.squashfs`.

Note: Do not change the name of the *filesystem.squashfs* file. If you are working with different versions, you can create different directories instead.

And **third**, restart the TFTP service. If you are using VyOS as your TFTP Server, you can restart the service with `sudo service tftpd-hpa restart`.

Note: Make sure the available directories and files in both TFTP and HTTP server have the right permissions to be accessed from the booting clients.

Client Boot

Finally, turn on your PXE-enabled client or clients. They will automatically get an IP address from the DHCP server and start booting into VyOS live from the files automatically taken from the TFTP and HTTP servers.

Once finished you will be able to proceed with the `install image` command as in a regular VyOS installation.

4.1.6 Known Issues

This is a list of known issues that can arise during installation.

Black screen on install

GRUB attempts to redirect all output to a serial port for ease of installation on headless hosts. This appears to cause an hard lockup on some hardware that lacks a serial port, with the result being a black screen after selecting the *Live system* option from the installation image.

The workaround is to type *e* when the boot menu appears and edit the GRUB boot options. Specifically, remove the:

console=ttyS0,115200

option, and type CTRL-X to boot.

Installation can then continue as outlined above.

4.2 Running VyOS in Virtual Environments

4.2.1 Running on Libvirt Qemu/KVM

Libvirt is an open-source API, daemon and management tool for managing platform virtualization. There are several ways to deploy VyOS on libvirt kvm. Use Virt-manager and native CLI. In an example we will be use use 4 gigabytes of memory, 2 cores CPU and default network virbr0.

CLI

Deploy from ISO

Create VM name `vyos_r1`. You must specify the path to the `ISO` image, the disk `qcow2` will be created automatically. The `default` network is the virtual network (type Virtio) created by the hypervisor with NAT.

```
$ virt-install -n vyos_r1 \
  --ram 4096 \
  --vcpus 2 \
  --cdrom /var/lib/libvirt/images/vyos.iso \
  --os-variant debian10 \
  --network network=default \
  --graphics vnc \
  --hvm \
  --virt-type kvm \
  --disk path=/var/lib/libvirt/images/vyos_r1.qcow2,bus=virtio,size=8 \
  --noautoconsole
```

Connect to VM with command `virsh console vyos_r1`

```
$ virsh console vyos_r1

Connected to domain vyos_r1
Escape character is ^]

vyos login: vyos
Password:

vyos@vyos:~$ install image
```

After installation - exit from the console using the key combination `Ctrl + ]` and reboot the system.

Deploy from qcow2

The convenience of using KVM (Kernel-based Virtual Machine) images is that they don't need to be installed. Download predefined VyOS.qcow2 image for `KVM`

```
curl --url link_to_vyos_kvm.qcow2 --output /var/lib/libvirt/images/vyos_kvm.qcow2
```

Create VM with `import` qcow2 disk option.

```
$ virt-install -n vyos_r2 \
   --ram 4096 \
   --vcpus 2 \
   --os-variant debian10 \
   --network network=default \
   --graphics vnc \
   --hvm \
   --virt-type kvm \
   --disk path=/var/lib/libvirt/images/vyos_kvm.qcow2,bus=virtio \
   --import \
   --noautoconsole
```

Connect to VM with command `virsh console vyos_r2`

```
$ virsh console vyos_r2

Connected to domain vyos_r2
Escape character is ^]

vyos login: vyos
Password:

vyos@vyos:~$
```

If your can not go to this screen

```
vyos login: vyos
Password:
```

Stayed in this stage. This is because the KVM console is chosen as the default boot option.

```
Connected to domain vyos_r2
Escape character is ^]
```

Open a secondary/parallel session and use this command to reboot the VM:

```
$ virsh reboot vyos_r2
```

Then go to the first session where you opened the console. Select `VyOS 1.3.x for QEMU (Serial console)` and press `Enter`

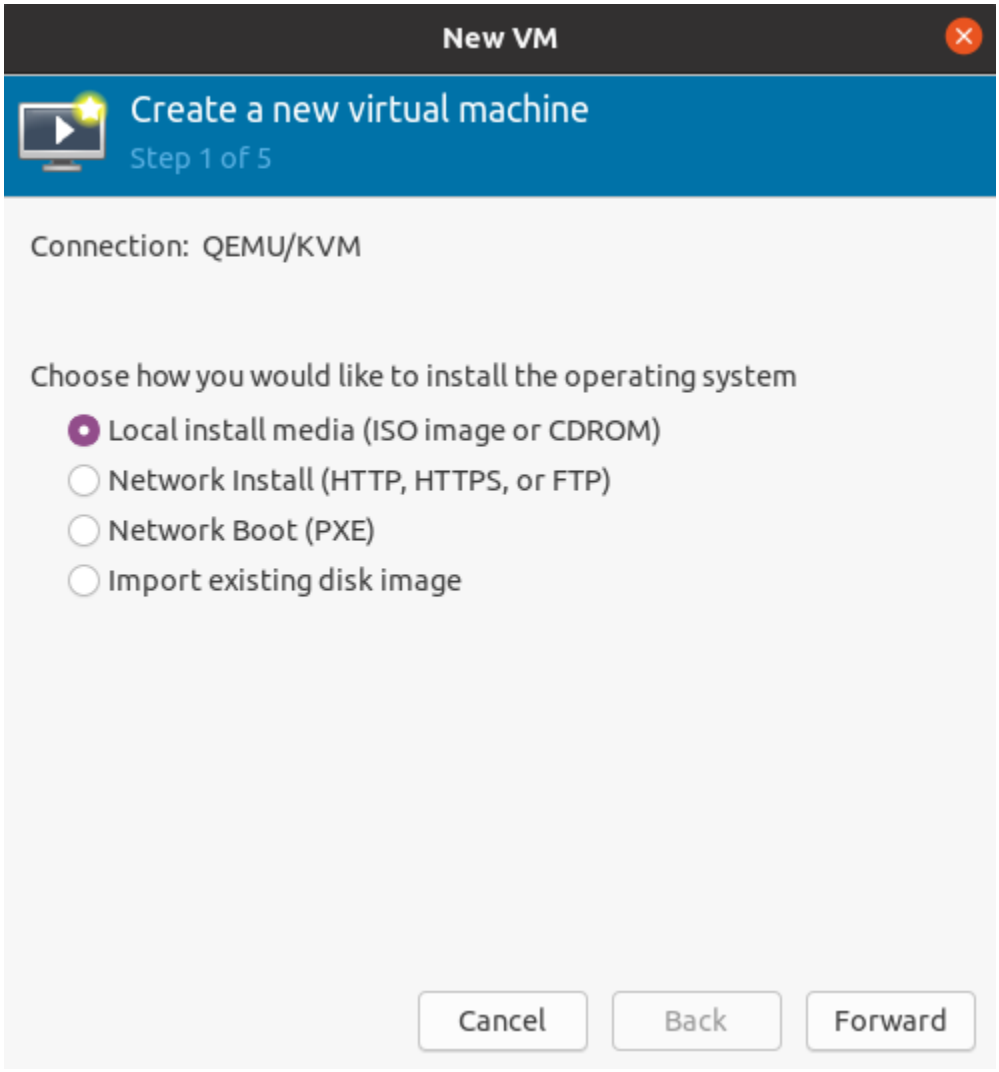
The system is fully operational.

Virt-manager

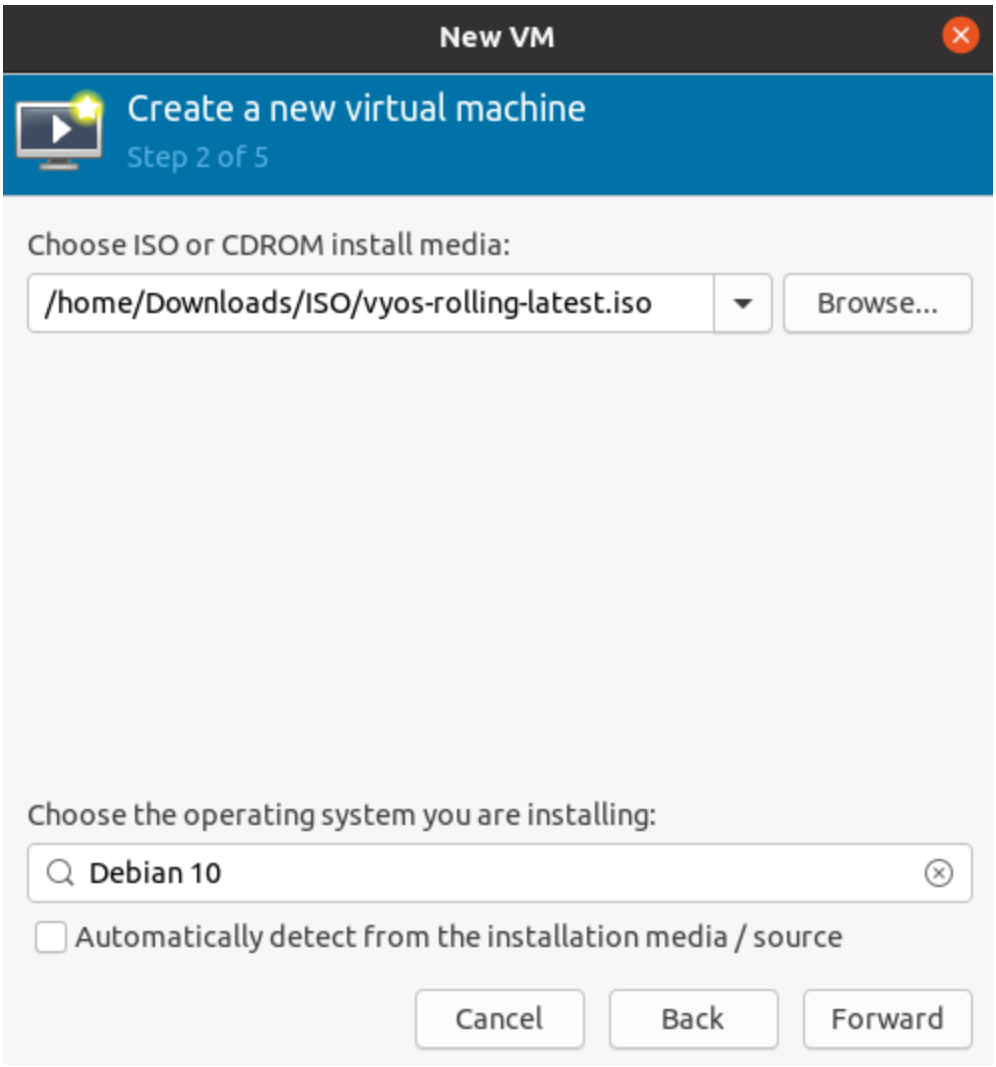
The virt-manager application is a desktop user interface for managing virtual machines through libvirt. On the linux open VMM (Virtual Machine Manager).

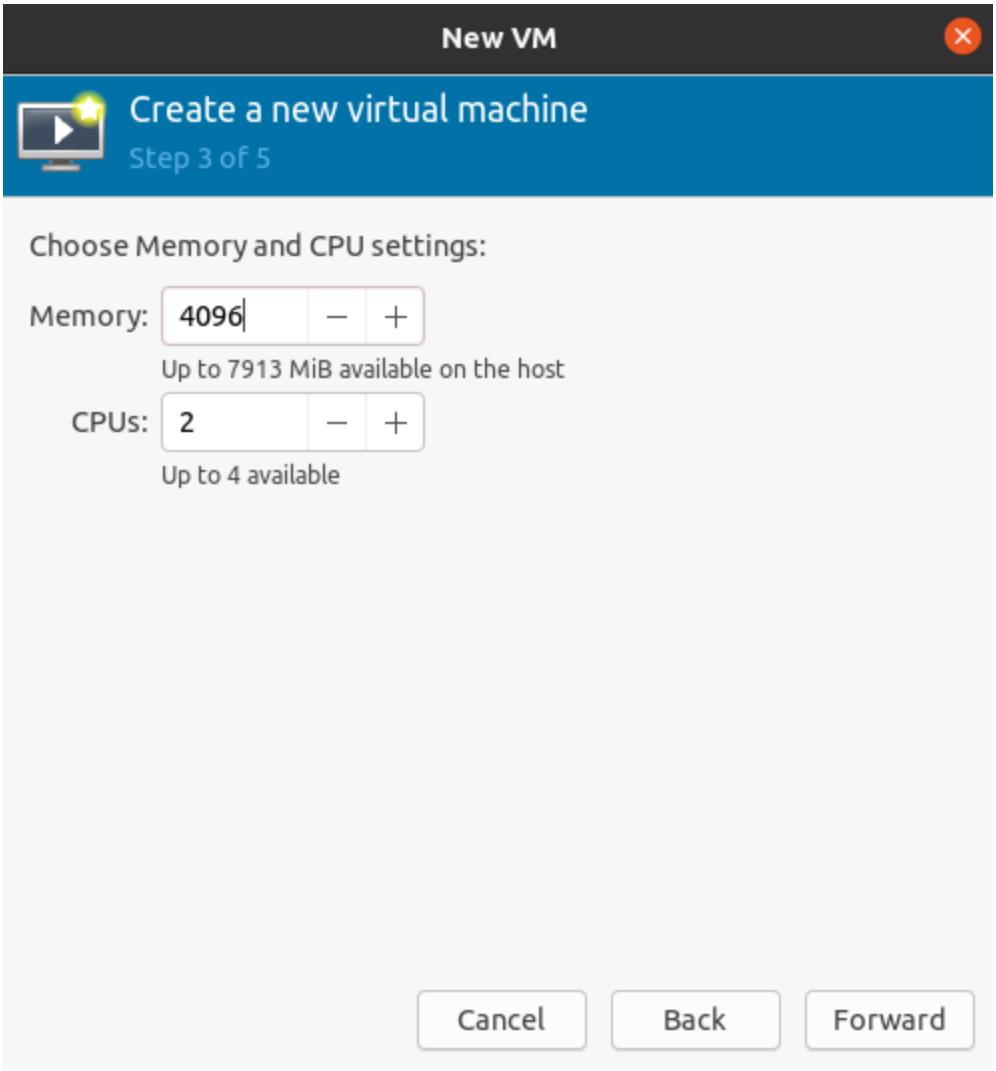
Deploy from ISO

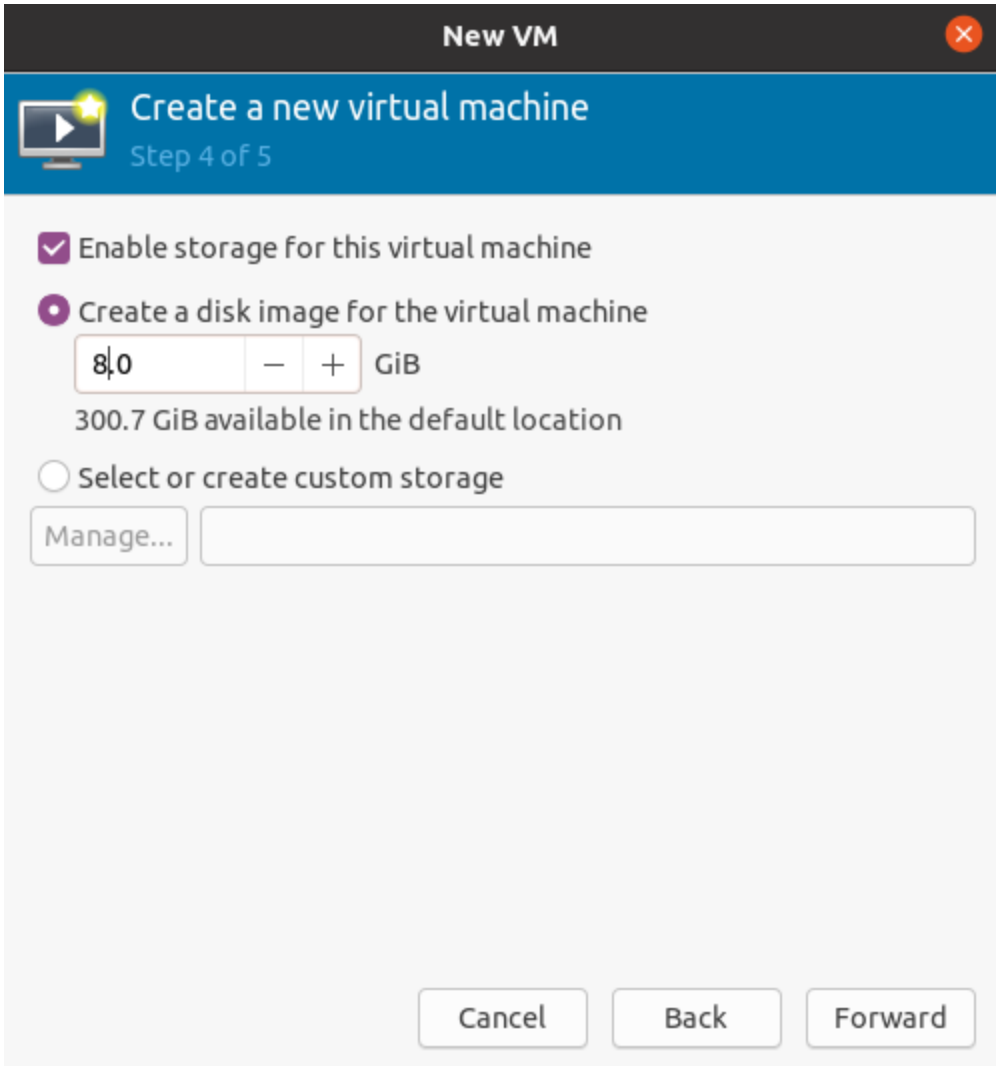
1. Open VMM and Create a new VM (Virtual Machine)
2. Choose `Local install media` (ISO)

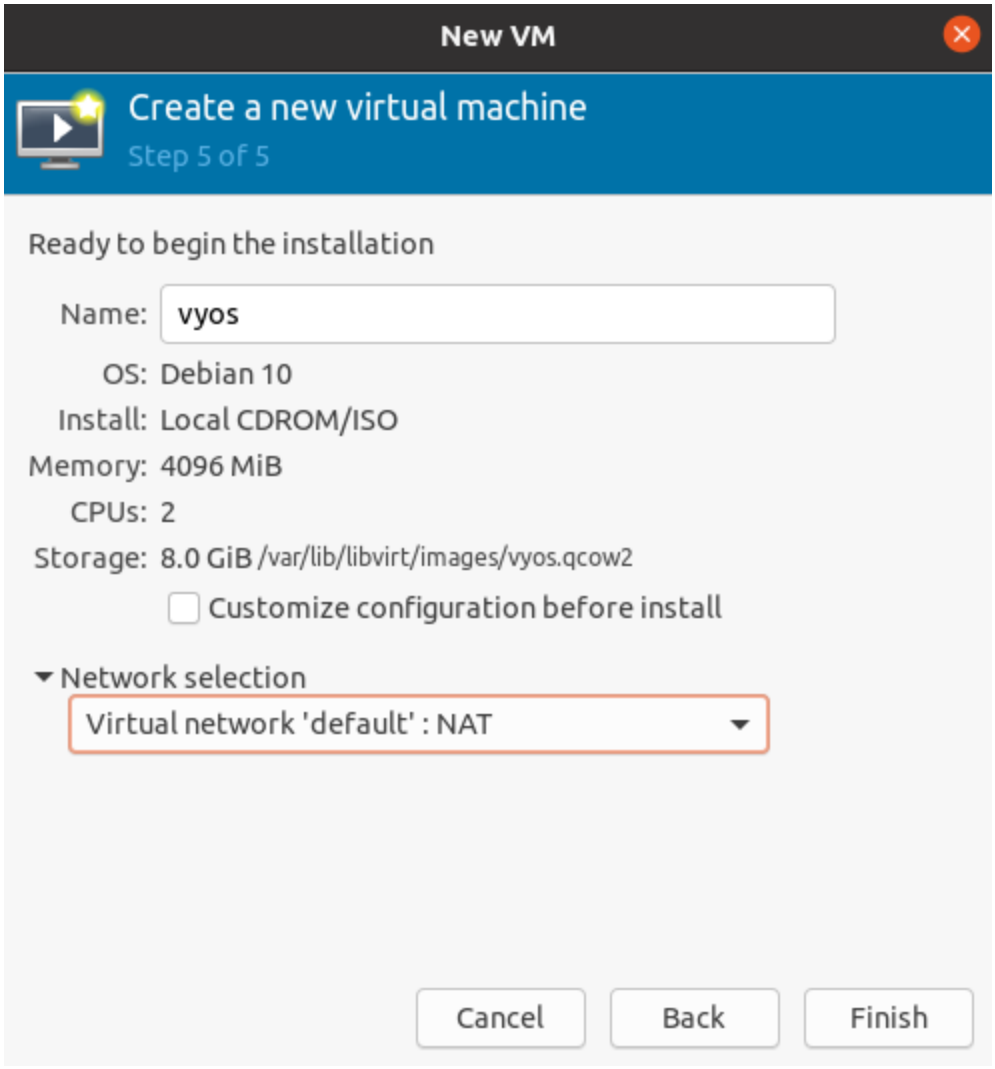


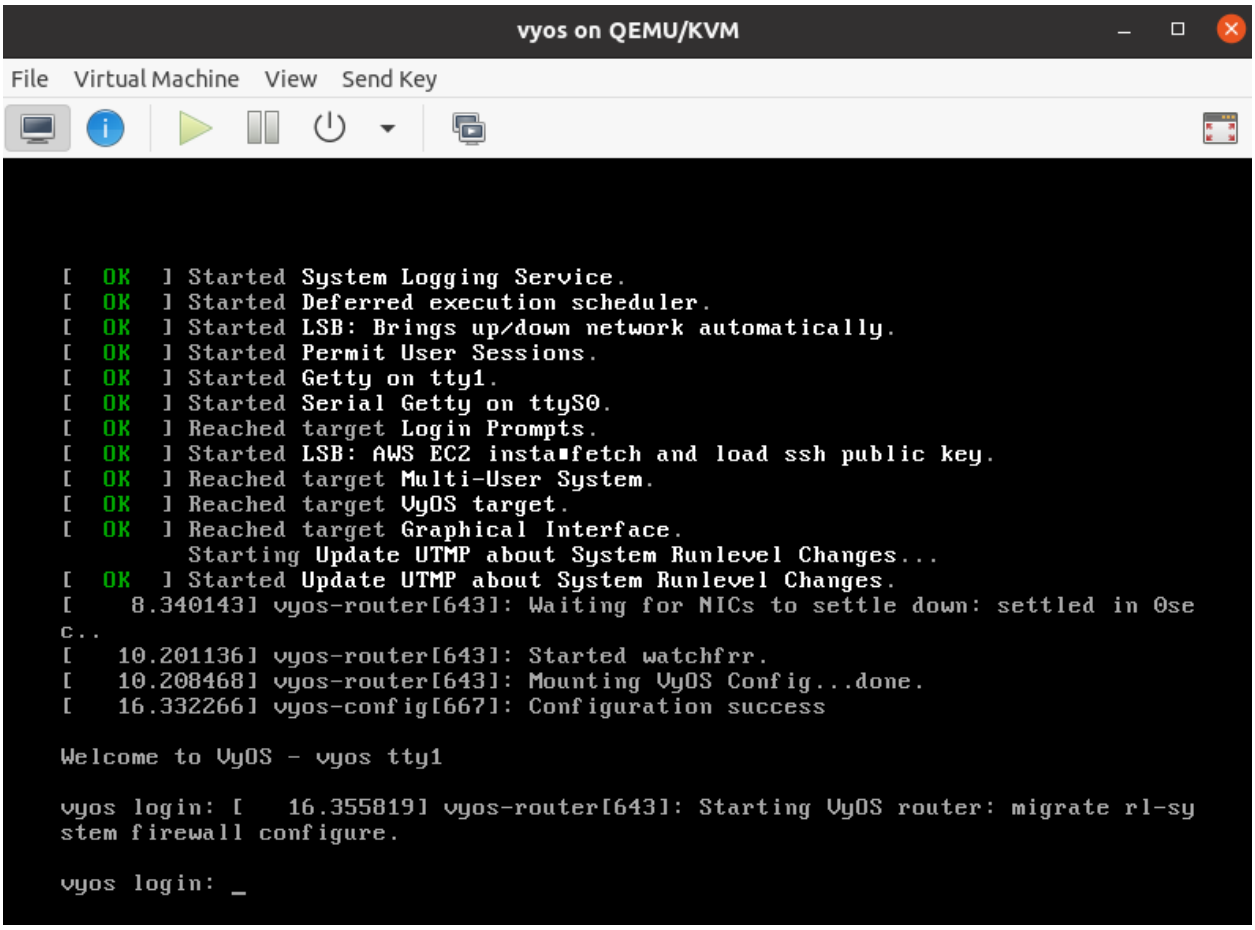
3. Choose path to iso vyos.iso. Operating System can be any Debian based.
4. Choose Memory and CPU
5. Disk size
6. Name of VM and network selection
7. Then you will be taken to the console.


New VM
Create a new virtual machine
Step 2 of 5
Choose ISO or CDROM install media:
/home/Downloads/ISO/vyos-rolling-latest.iso
Browse...
Choose the operating system you are installing:
Debian 10
Automatically detect from the installation media / source
Cancel
Back
Forward


New VM
Create a new virtual machine
Step 3 of 5
Choose Memory and CPU settings:
Memory:
4096
Up to 7913 MiB available on the host
CPUs:
2
Up to 4 available
Cancel
Back
Forward


New VM
Create a new virtual machine
Step 4 of 5
Enable storage for this virtual machine
Create a disk image for the virtual machine
8.0
GiB
300.7 GiB available in the default location
Select or create custom storage
Manage...
Cancel
Back
Forward


New VM
Create a new virtual machine
Step 5 of 5
Ready to begin the installation
Name: vyos
OS: Debian 10
Install: Local CDROM/ISO
Memory: 4096 MiB
CPUs: 2
Storage: 8.0 GiB /var/lib/libvirt/images/vyos.qcow2
Customize configuration before install
Network selection
Virtual network 'default' : NAT
Cancel
Back
Finish

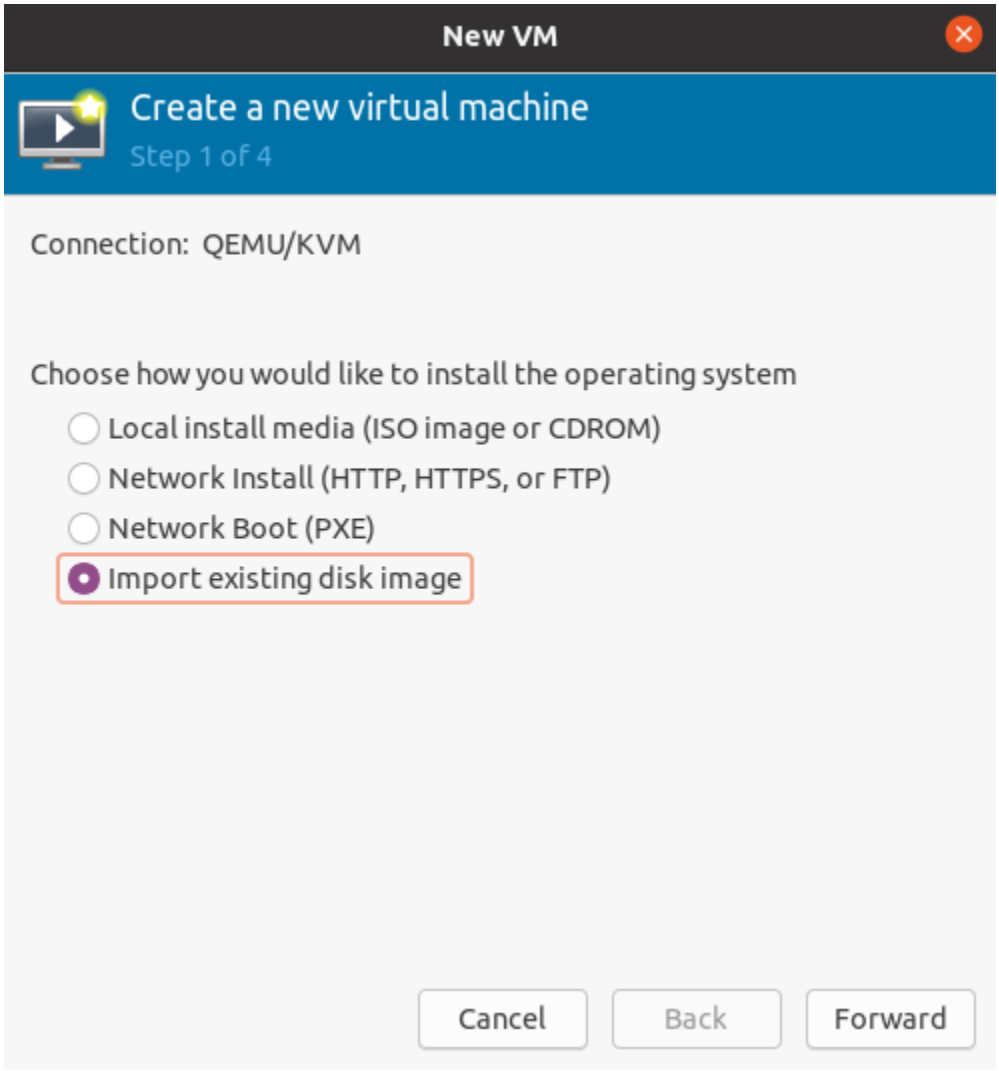

vyos on QEMU/KVM
File Virtual Machine View Send Key
[OK] Started System Logging Service.
[OK] Started Deferred execution scheduler.
[OK] Started LSB: Brings up/down network automatically.
[OK] Started Permit User Sessions.
[OK] Started Getty on tty1.
[OK] Started Serial Getty on ttyS0.
[OK] Reached target Login Prompts.
[OK] Started LSB: AWS EC2 insta▪fetch and load ssh public key.
[OK] Reached target Multi-User System.
[OK] Reached target VyOS target.
[OK] Reached target Graphical Interface.
Starting Update UTMP about System Runlevel Changes...
[OK] Started Update UTMP about System Runlevel Changes.
[8.340143] vyos-router[643]: Waiting for NICs to settle down: settled in 0sec..
[10.201136] vyos-router[643]: Started watchfrr.
[10.208468] vyos-router[643]: Mounting VyOS Config...done.
[16.332266] vyos-config[667]: Configuration success
Welcome to VyOS - vyos tty1
vyos login: [16.355819] vyos-router[643]: Starting VyOS router: migrate rl-system firewall configure.
vyos login: _

Deploy from qcow2

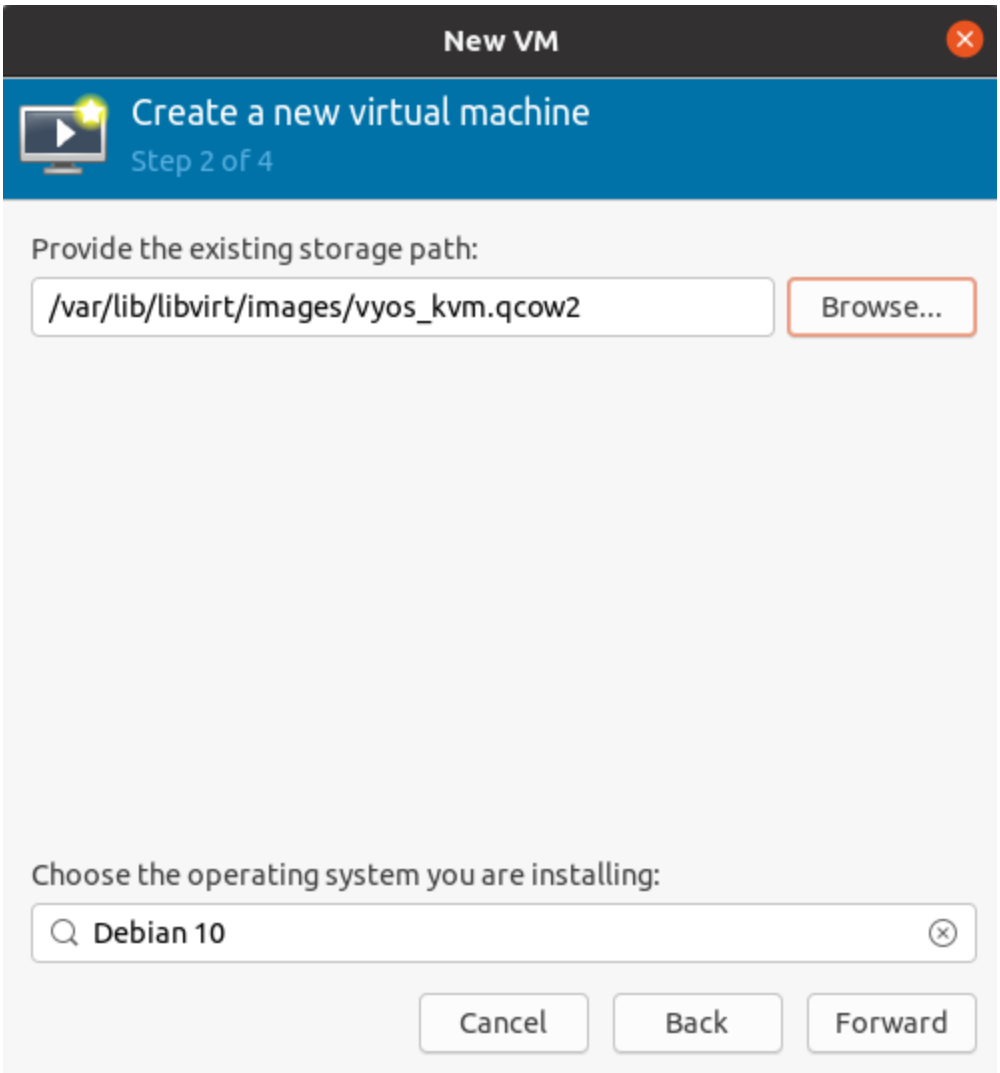
Download predefined VyOS.qcow2 image for `KVM`

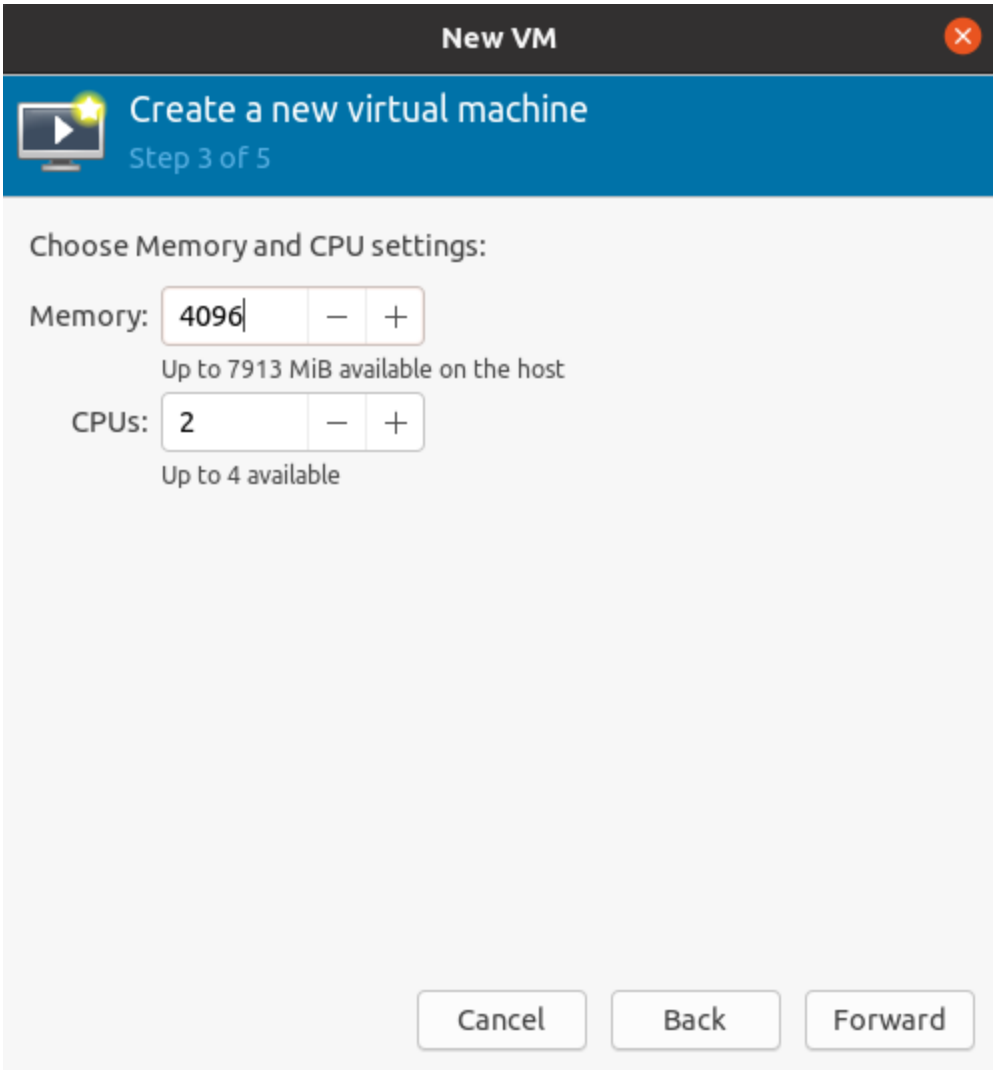
```
curl --url link_to_vyos_kvm.qcow2 --output /var/lib/libvirt/images/vyos_kvm.qcow2
```

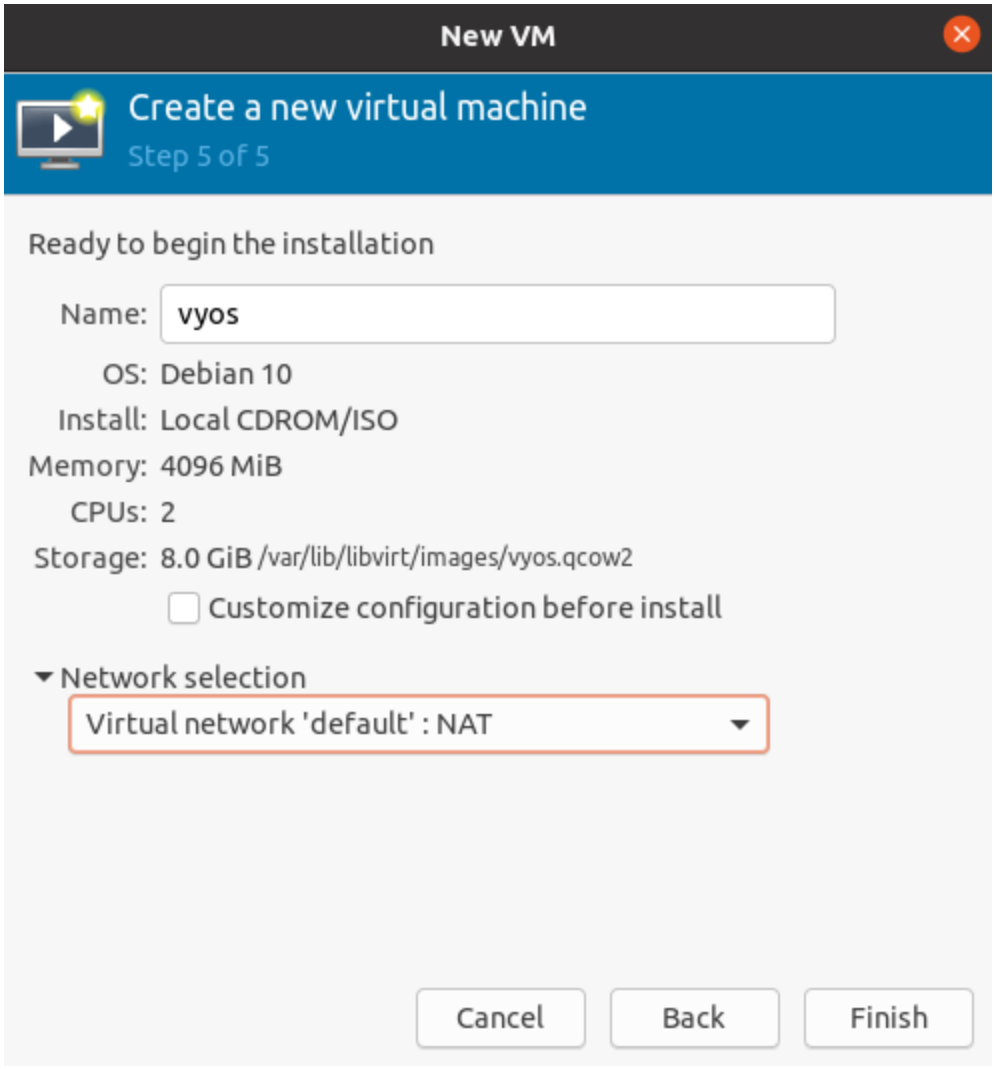
1. Open VMM and Create a new VM
2. Choose `Import existing disk` image

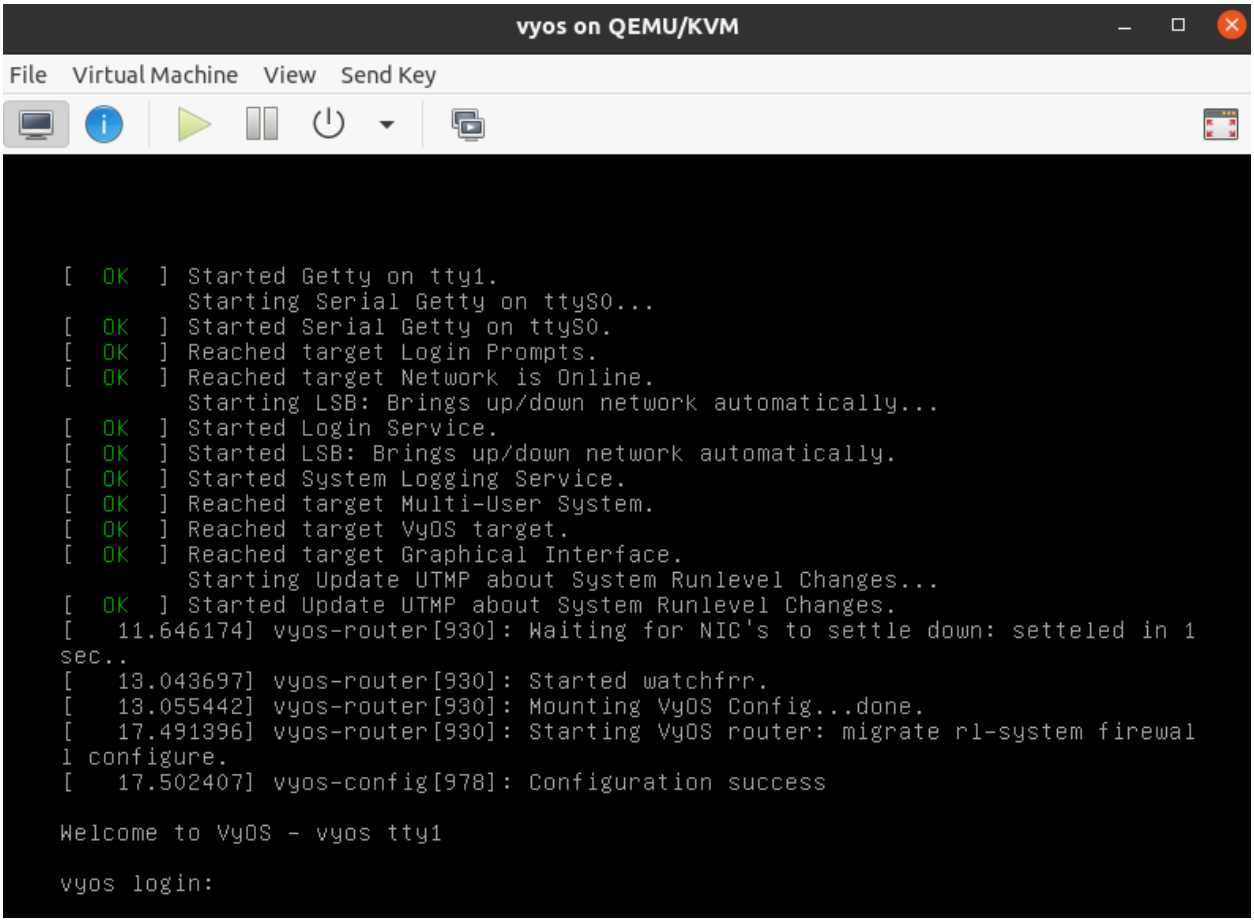


3. Choose the path to the image `vyos_kvm.qcow2` that was previously downloaded . Operation System can be any Debian based.
4. Choose Memory and CPU
5. Name of VM and network selection
6. Then you will be taken to the console.


New VM
Create a new virtual machine
Step 2 of 4
Provide the existing storage path:
/var/lib/libvirt/images/vyos_kvm.qcow2
Browse...
Choose the operating system you are installing:
Debian 10
Cancel
Back
Forward


New VM
Create a new virtual machine
Step 3 of 5
Choose Memory and CPU settings:
Memory:
4096
Up to 7913 MiB available on the host
CPUs:
2
Up to 4 available
Cancel
Back
Forward


New VM
Create a new virtual machine
Step 5 of 5
Ready to begin the installation
Name: vyos
OS: Debian 10
Install: Local CDROM/ISO
Memory: 4096 MiB
CPUs: 2
Storage: 8.0 GiB /var/lib/libvirt/images/vyos.qcow2
Customize configuration before install
Network selection
Virtual network 'default' : NAT
Cancel
Back
Finish


vyos on QEMU/KVM
File Virtual Machine View Send Key
[OK] Started Getty on tty1.
Starting Serial Getty on ttyS0...
[OK] Started Serial Getty on ttyS0.
[OK] Reached target Login Prompts.
[OK] Reached target Network is Online.
Starting LSB: Brings up/down network automatically...
[OK] Started Login Service.
[OK] Started LSB: Brings up/down network automatically.
[OK] Started System Logging Service.
[OK] Reached target Multi-User System.
[OK] Reached target VyOS target.
[OK] Reached target Graphical Interface.
Starting Update UTMP about System Runlevel Changes...
[OK] Started Update UTMP about System Runlevel Changes.
[11.646174] vyos-router[930]: Waiting for NIC's to settle down: setteled in 1 sec..
[13.043697] vyos-router[930]: Started watchfrr.
[13.055442] vyos-router[930]: Mounting VyOS Config...done.
[17.491396] vyos-router[930]: Starting VyOS router: migrate rl-system firewall configure.
[17.502407] vyos-config[978]: Configuration success
Welcome to VyOS - vyos tty1
vyos login:

4.2.2 Proxmox

References

https://www.proxmox.com/en/proxmox-ve

4.2.3 Running on VMware ESXi

ESXi 5.5 or later

.ova files are available for supporting users, and a VyOS can also be stood up using a generic Linux instance, and attaching the bootable ISO file and installing from the ISO using the normal process around *install image*.

Note: There have been previous documented issues with GRE/IPSEC tunneling using the E1000 adapter on the VyOS guest, and use of the VMXNET3 has been advised.

Memory Contention Considerations

When the underlying ESXi host is approaching ~92% memory utilisation it will start the balloon process in a 'soft' state to start reclaiming memory from guest operating systems. This causes an artificial pressure using the vmmemctl driver on memory usage on the virtual guest. As VyOS by default does not have a swap file, this vmmemctl pressure is unable to force processes to move in memory data to the paging file, and blindly consumes memory forcing the virtual guest into a low memory state with no way to escape. The balloon can expand to 65% of guest allocated memory, so a VyOS guest running >35% of memory usage, can encounter an out of memory situation, and trigger the kernel oom_kill process. At this point a weighted lottery favouring memory hungry processes will be run with the unlucky winner being terminated by the kernel.

It is advised that VyOS routers are configured in a resource group with adequate memory reservations so that ballooning is not inflicted on virtual VyOS guests.

References

https://muralidba.blogspot.com/2018/03/how-does-linux-out-of-memory-oom-killer.html

4.2.4 Running on GNS3

Sometimes you may want to test VyOS in a lab environment. GNS3 is a network emulation software you might use for it.

This guide will provide the necessary steps for installing and setting up VyOS on GNS3.

Requirements

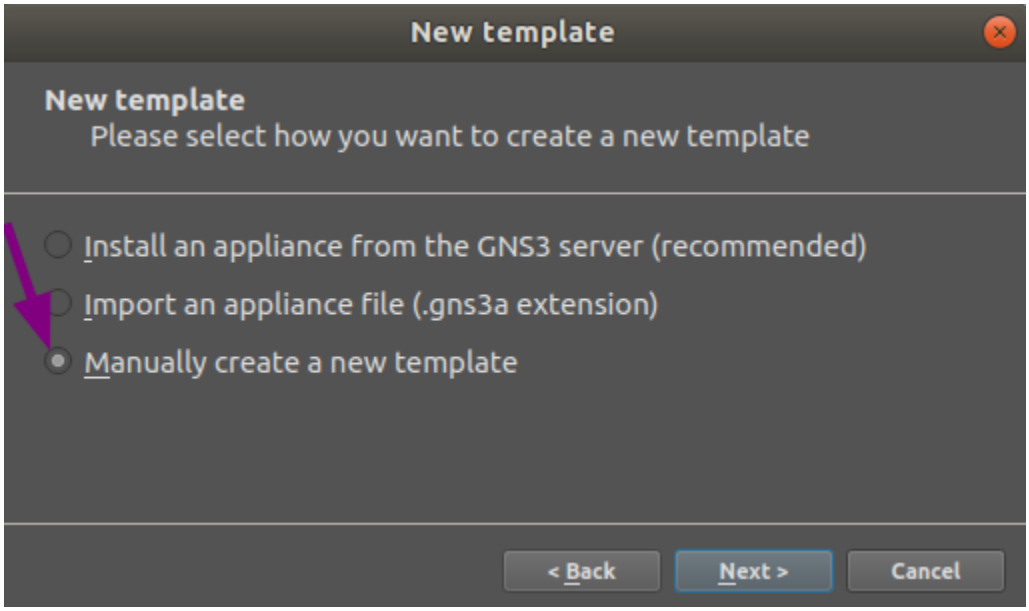
The following items are required:

- A VyOS installation image (.iso file). You can find how to get it on the *Installation* page
- A working GNS3 installation. For further information see the GNS3 documentation.

VM setup

First, a virtual machine (VM) for the VyOS installation must be created in GNS3.

Go to the GNS3 **File** menu, click **New template** and choose select **Manually create a new Template**.



Select **Quemu VMs** and then click on the `New` button.

Write a name for your VM, for instance "VyOS", and click `Next`.

Select **qemu-system-x86_64** as Quemu binary, then **512MB** of RAM and click `Next`.

Select **telnet** as your console type and click `Next`.

Select **New image** for the base disk image of your VM and click `Create`.

Use the defaults in the **Binary and format** window and click `Next`.

Use the defaults in the **Qcow2 options** window and click `Next`.

Set the disk size to 2000 MiB, and click `Finish` to end the **Quemu image creator**.

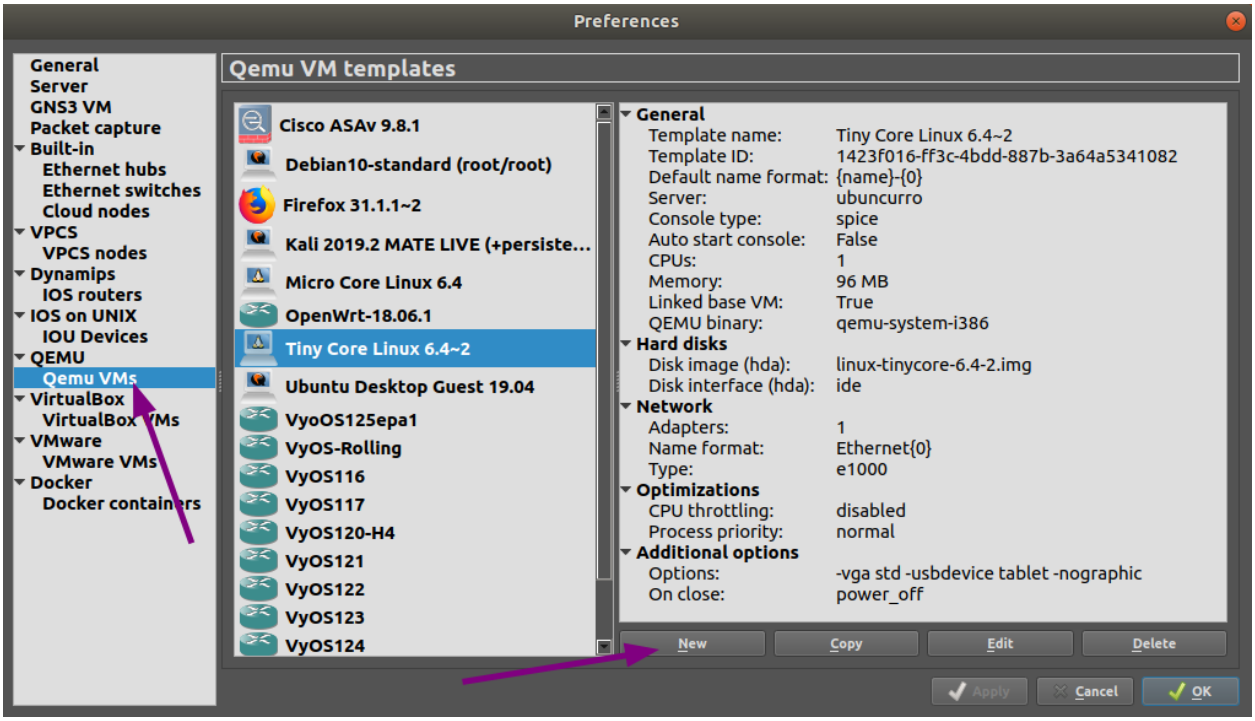
Click `Finish` to end the **New QEMU VM template** wizard.

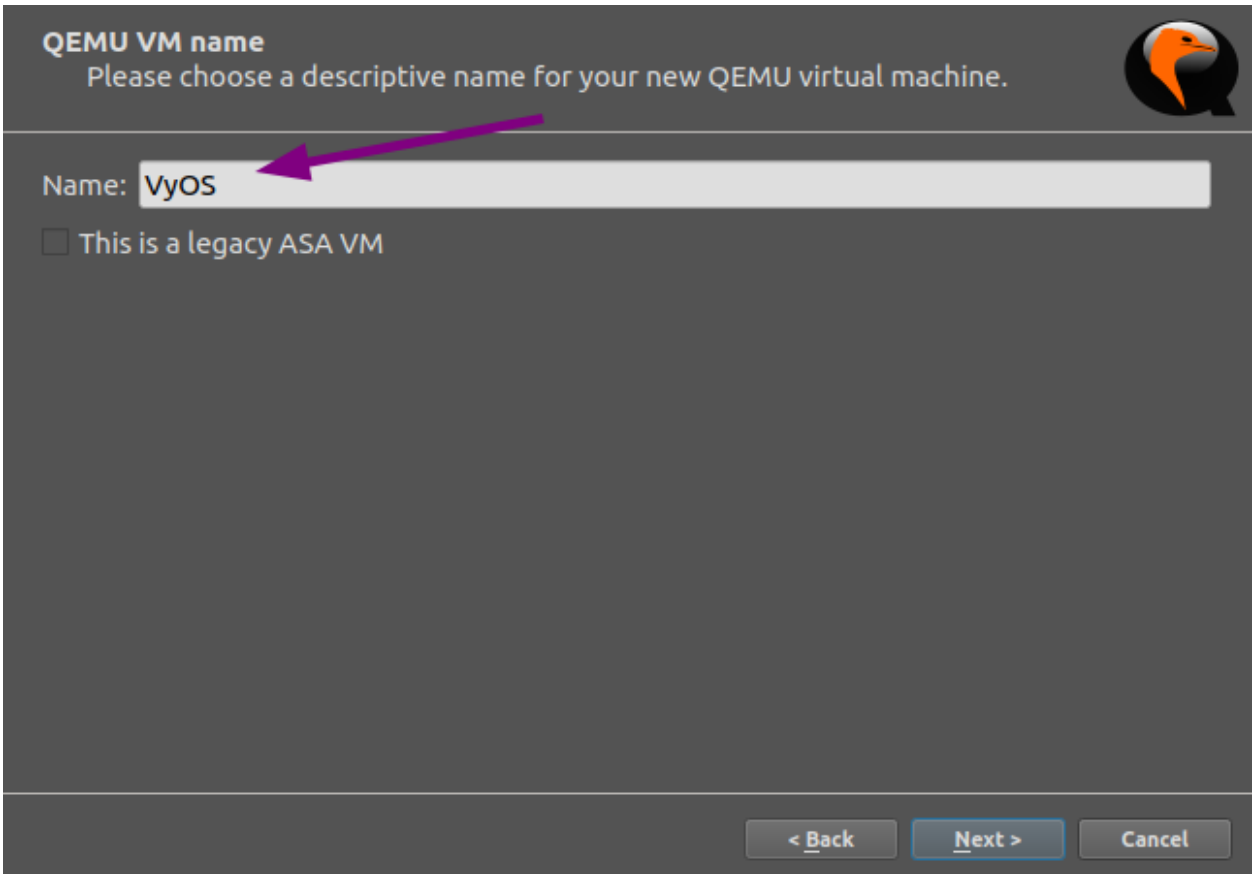
Now the VM settings have to be edited.

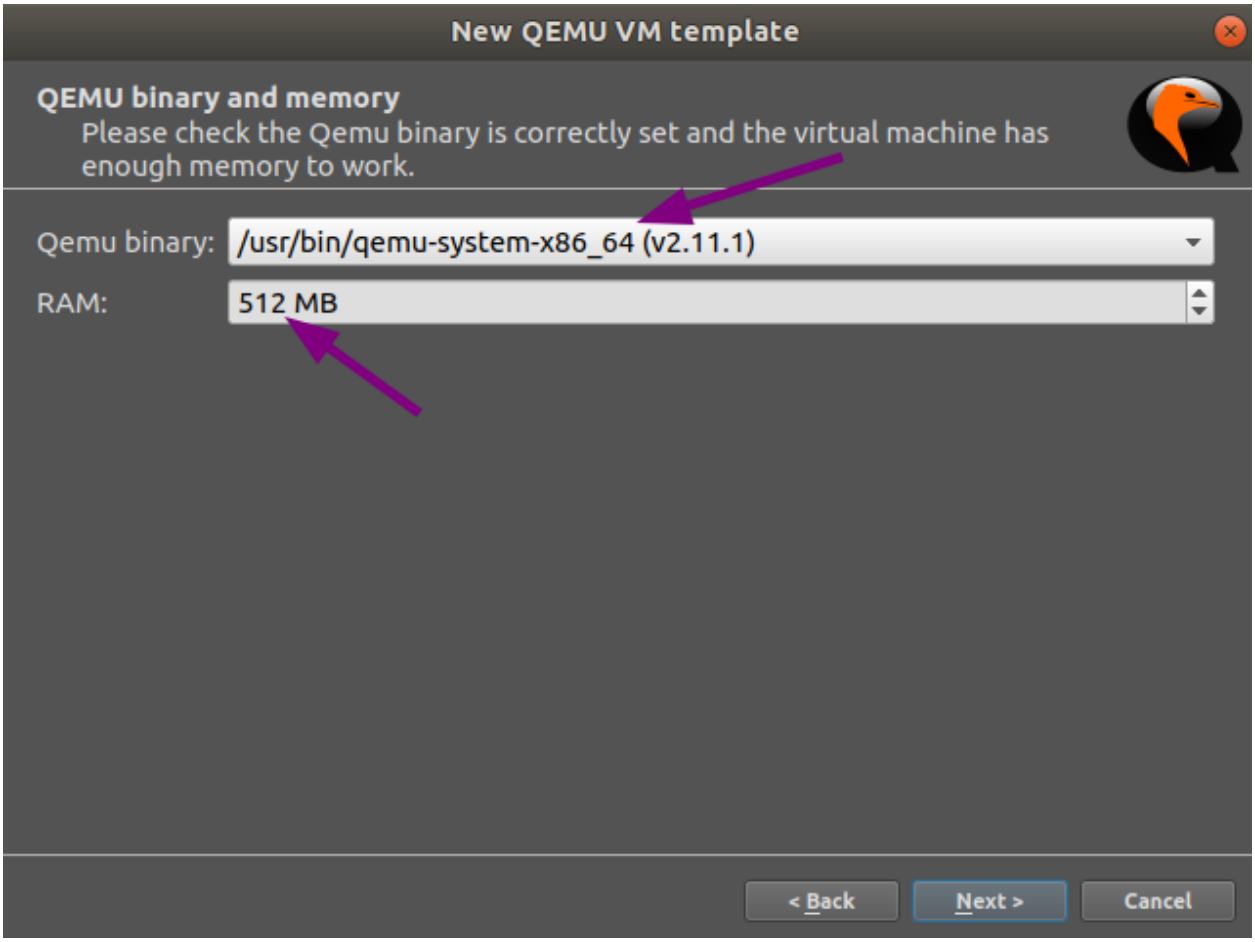
Being again at the **Preferences** window, having **Qemu VMs** selected and having our new VM selected, click the `Edit` button.

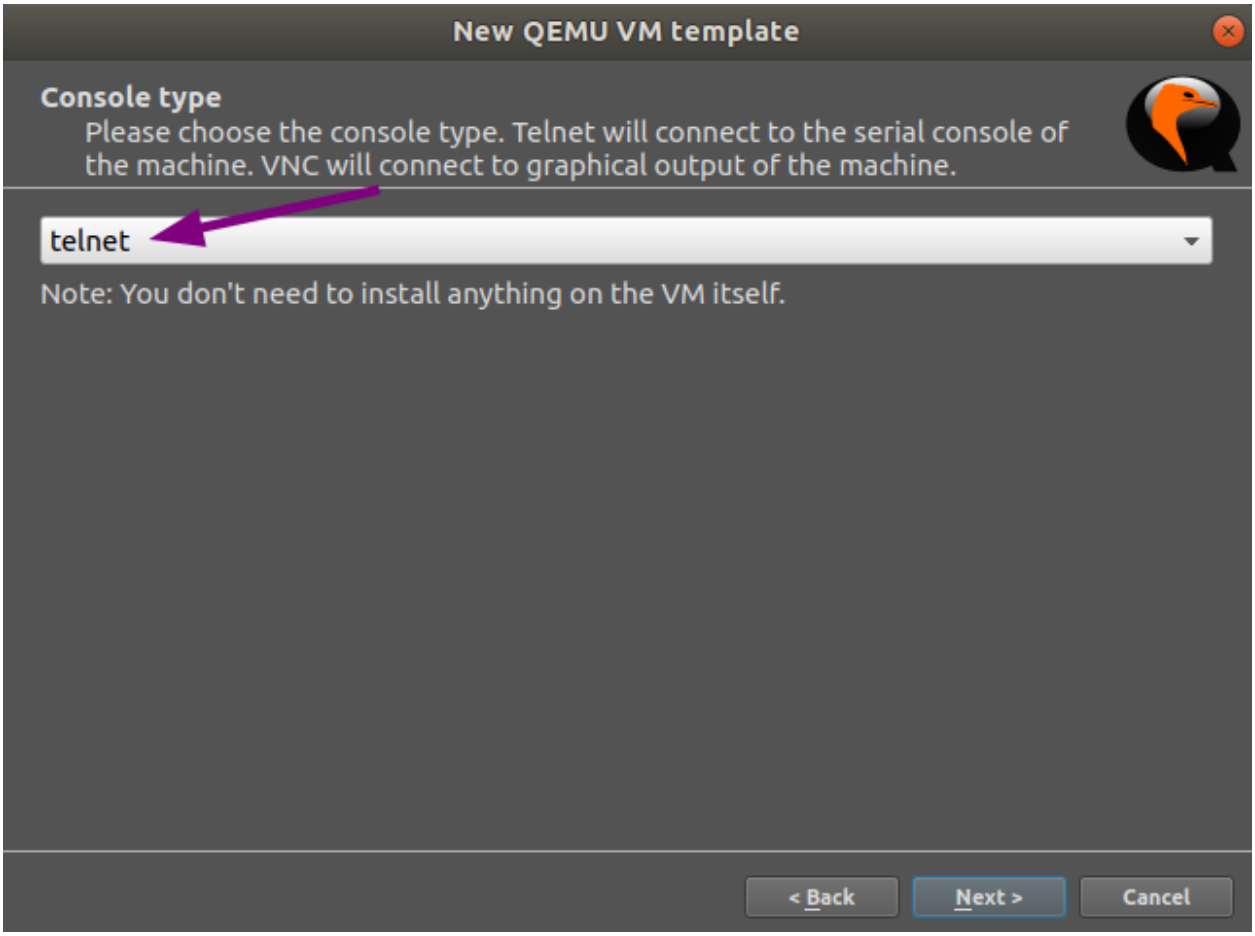
In the **General settings** tab of your **QEMU VM template configuration**, do the following:

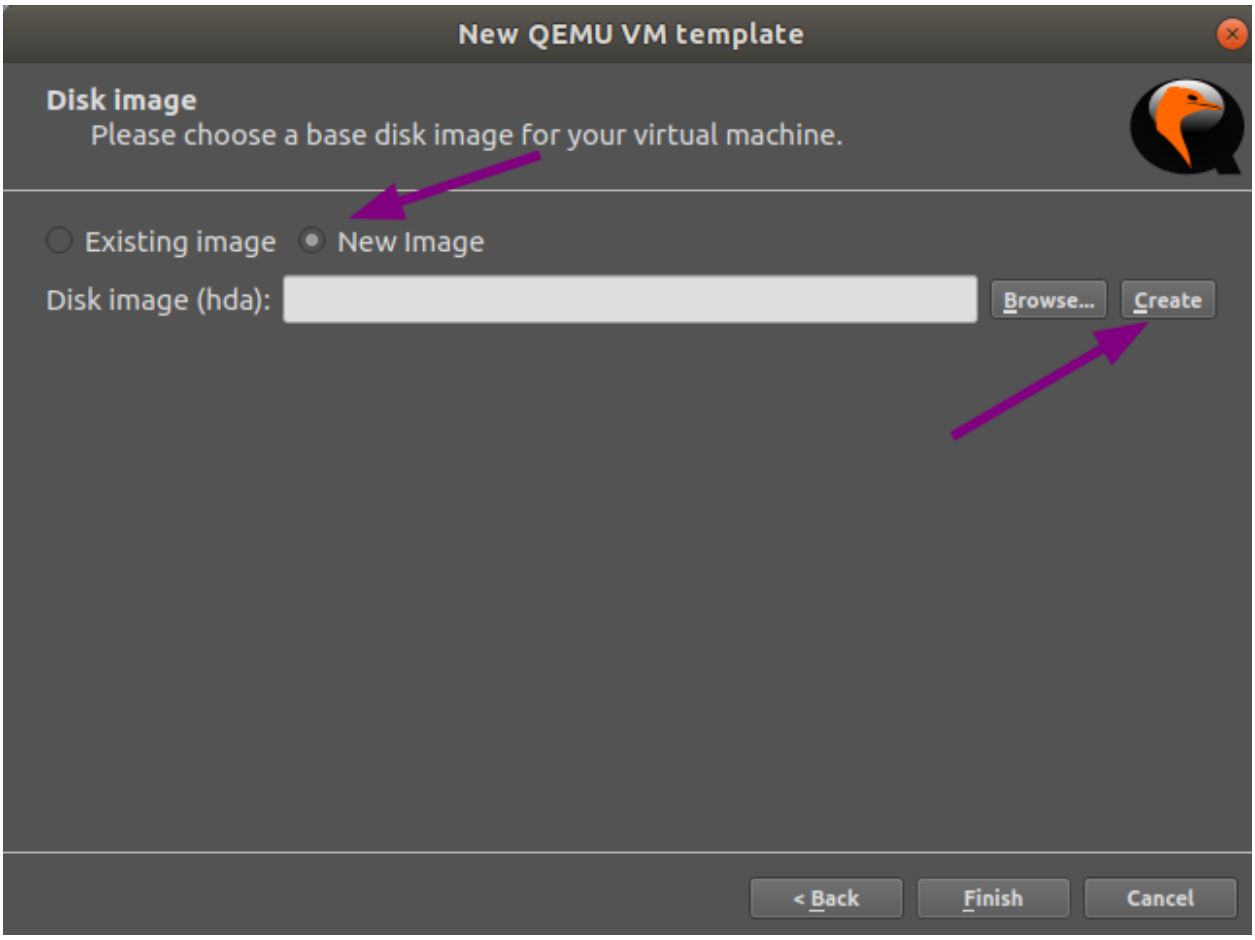
- Click on the `Browse...` button to choose the **Symbol** you want to have representing your VM.

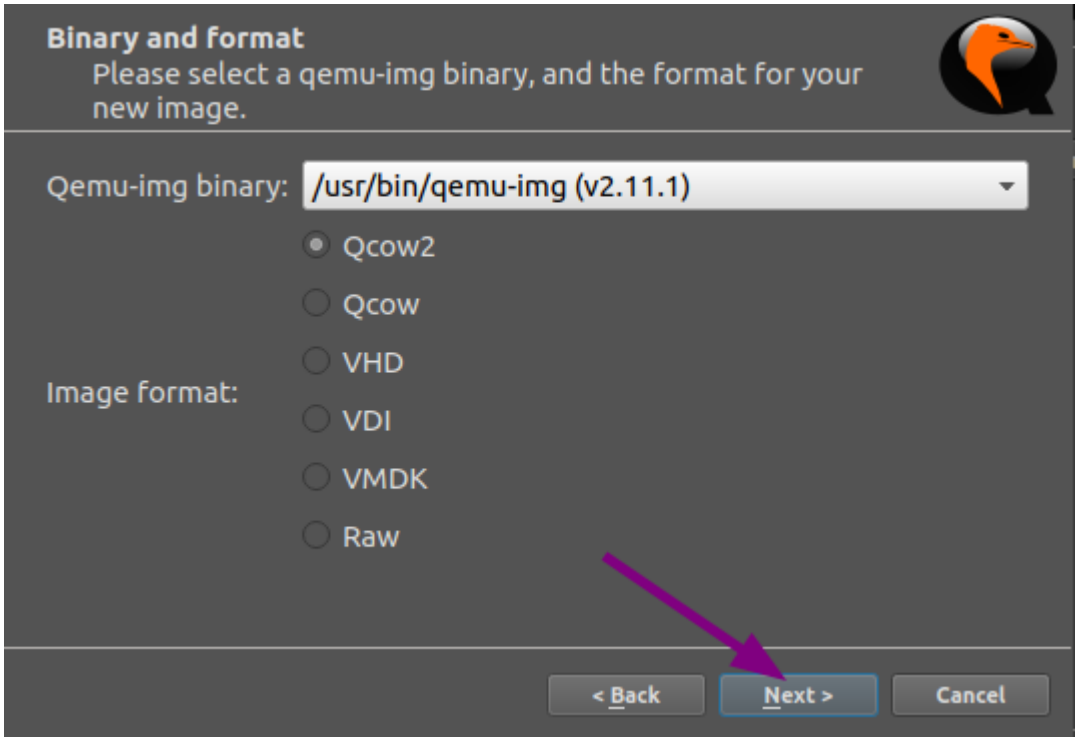

Preferences
General
Server
GNS3 VM
Packet capture
Built-in
Ethernet hubs
Ethernet switches
Cloud nodes
VPCS
VPCS nodes
Dynamips
IOS routers
IOS on UNIX
IOU Devices
QEMU
Qemu VMs
VirtualBox
VirtualBox VMs
VMware
VMware VMs
Docker
Docker containers
Qemu VM templates
Cisco ASAv 9.8.1
Debian10-standard (root/root)
Firefox 31.1.1~2
Kali 2019.2 MATE LIVE (+persiste...
Micro Core Linux 6.4
OpenWrt-18.06.1
Tiny Core Linux 6.4~2
Ubuntu Desktop Guest 19.04
VyoOS125epa1
VyOS-Rolling
VyOS116
VyOS117
VyOS120-H4
VyOS121
VyOS122
VyOS123
VyOS124
General
Template name: Tiny Core Linux 6.4~2
Template ID: 1423f016-ff3c-4bdd-887b-3a64a5341082
Default name format: {name}-{0}
Server: ubuncurro
Console type: spice
Auto start console: False
CPUs: 1
Memory: 96 MB
Linked base VM: True
QEMU binary: qemu-system-i386
Hard disks
Disk image (hda): linux-tinycore-6.4-2.img
Disk interface (hda): ide
Network
Adapters: 1
Name format: Ethernet{0}
Type: e1000
Optimizations
CPU throttling: disabled
Process priority: normal
Additional options
Options: -vga std -usbdevice tablet -nographic
On close: power_off
New
Copy
Edit
Delete
Apply
Cancel
OK

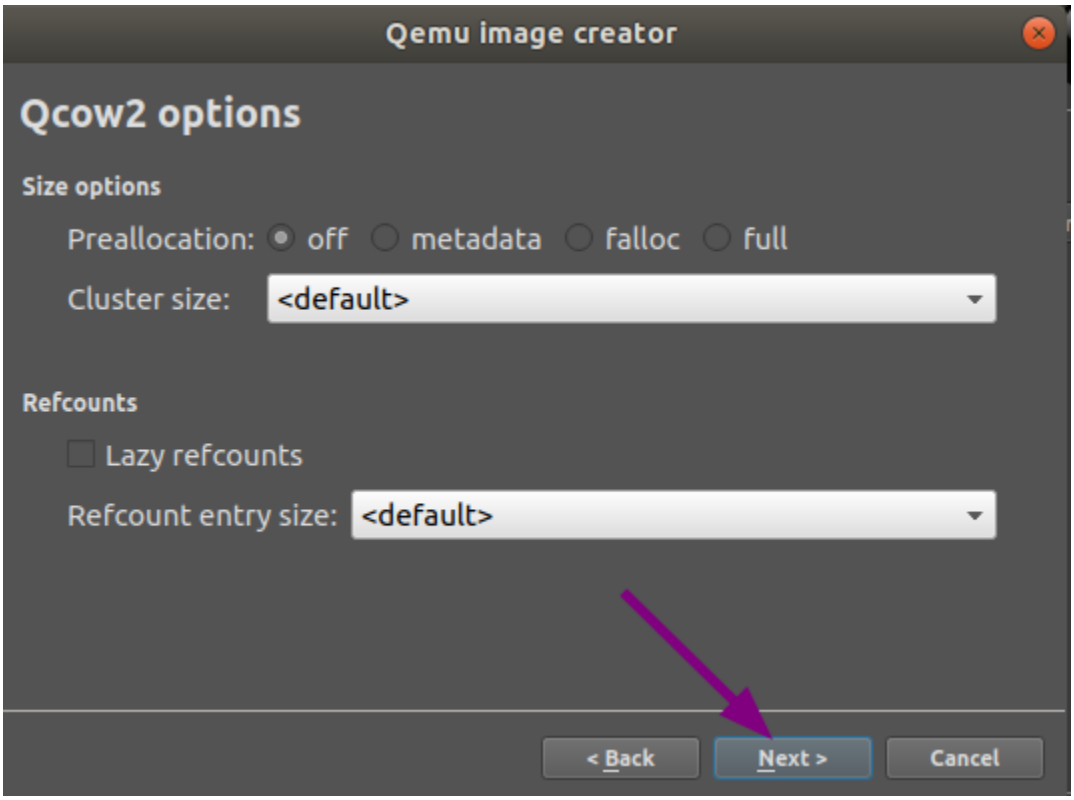

QEMU VM name
Please choose a descriptive name for your new QEMU virtual machine.
Name: VyOS
This is a legacy ASA VM
< Back
Next >
Cancel

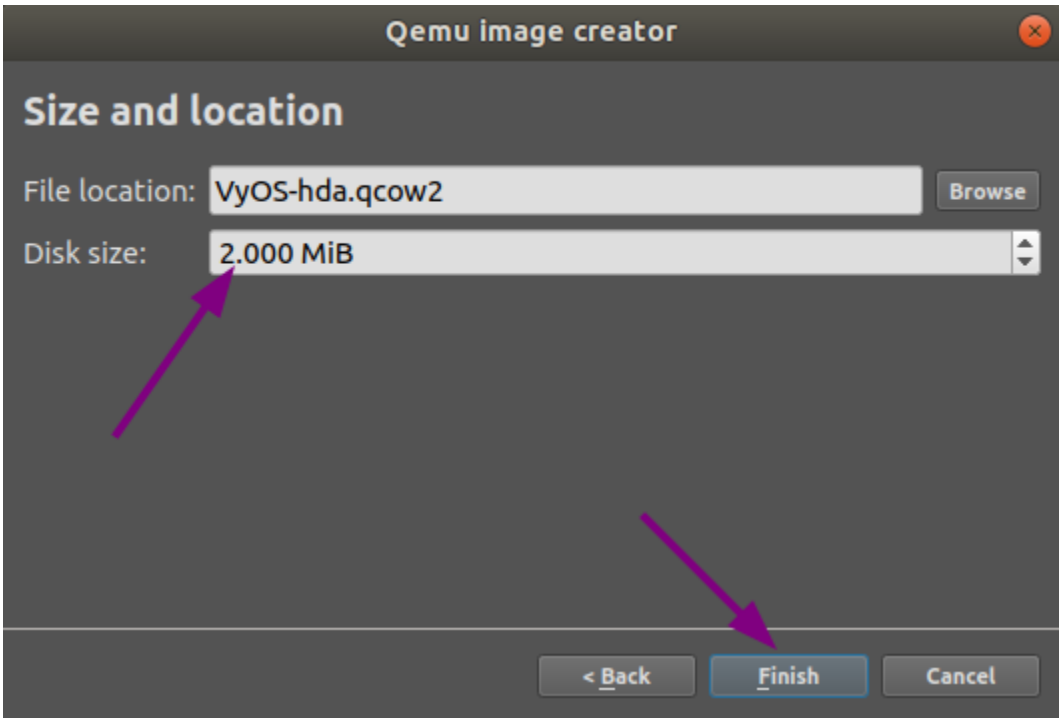

New QEMU VM template
QEMU binary and memory
Please check the Qemu binary is correctly set and the virtual machine has enough memory to work.
Qemu binary:
/usr/bin/qemu-system-x86_64 (v2.11.1)
RAM:
512 MB
< Back
Next >
Cancel

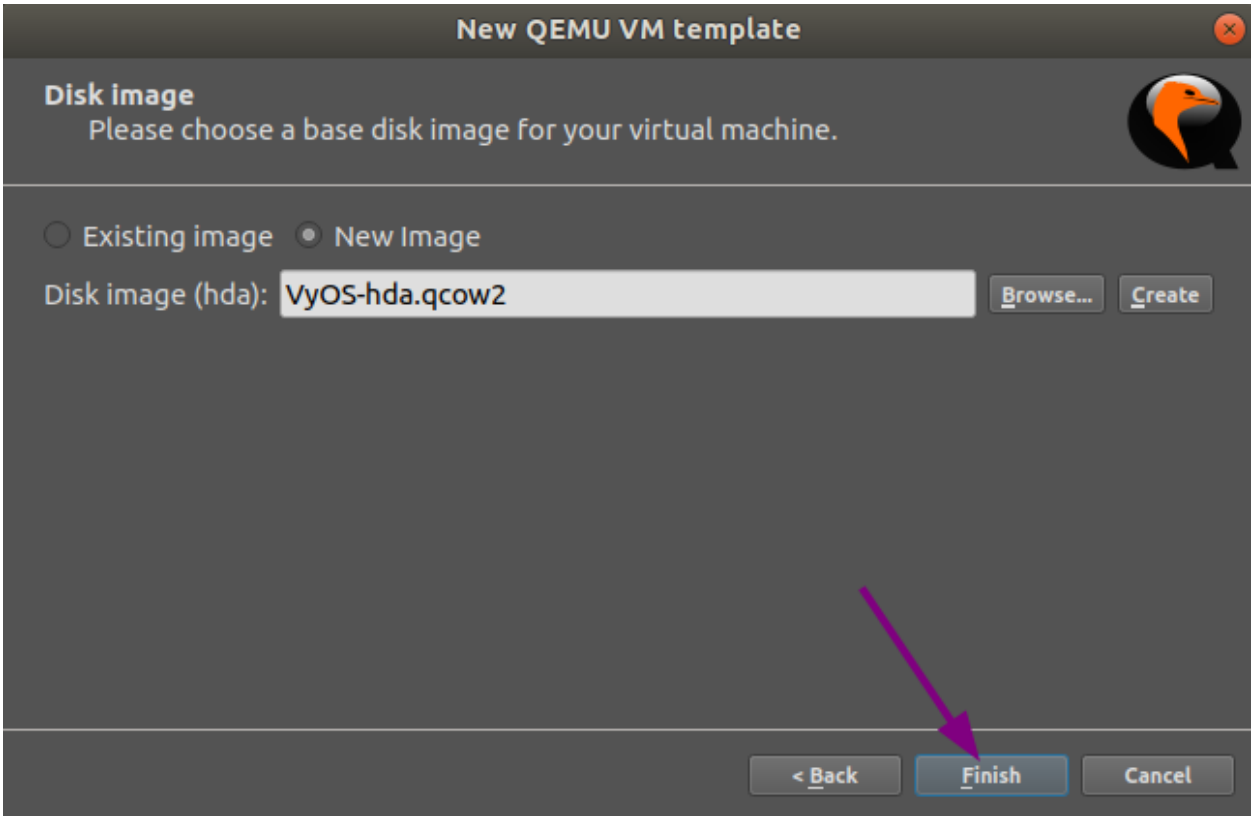

New QEMU VM template
Console type
Please choose the console type. Telnet will connect to the serial console of the machine. VNC will connect to graphical output of the machine.
telnet
Note: You don't need to install anything on the VM itself.
< Back
Next >
Cancel


New QEMU VM template
Disk image
Please choose a base disk image for your virtual machine.
Existing image
New Image
Disk image (hda):
Browse...
Create
< Back
Finish
Cancel


Binary and format
Please select a qemu-img binary, and the format for your new image.
Qemu-img binary:
/usr/bin/qemu-img (v2.11.1)
Image format:
Qcow2
Qcow
VHD
VDI
VMDK
Raw
< Back
Next >
Cancel


Qemu image creator
Qcow2 options
Size options
Preallocation: off metadata falloc full
Cluster size: <default>
Refcounts
Lazy refcounts
Refcount entry size: <default>
< Back
Next >
Cancel


Qemu image creator
Size and location
File location: VyOS-hda.qcow2
Browse
Disk size: 2.000 MiB
< Back
Finish
Cancel



- In **Category** select in which group you want to find your VM.
- Set the **Boot priority** to **CD/DVD-ROM**.

At the **HDD** tab, change the Disk interface to **sata** to speed up the boot process.

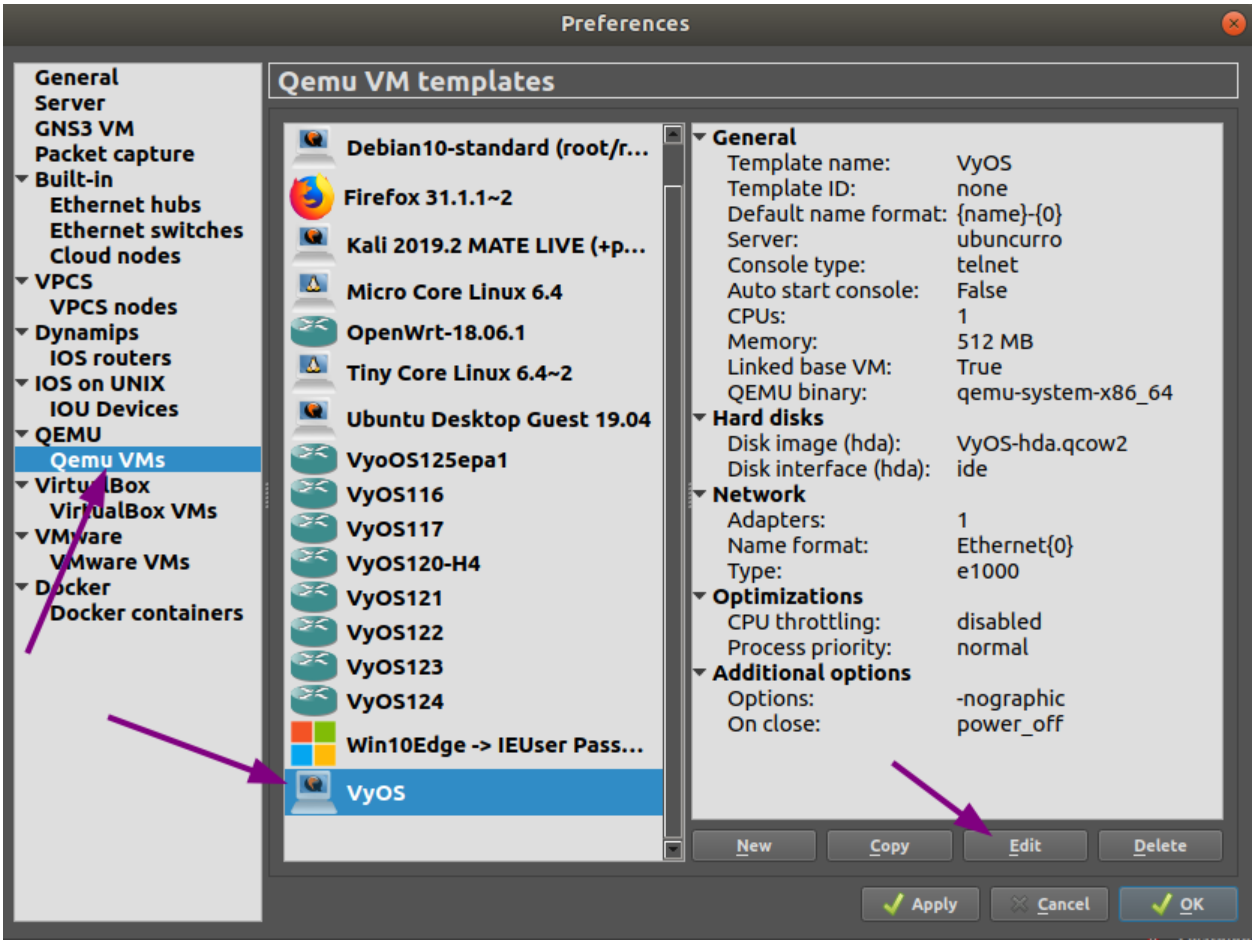
At the **CD/DVD** tab click on `Browse...` and locate the VyOS image you want to install.

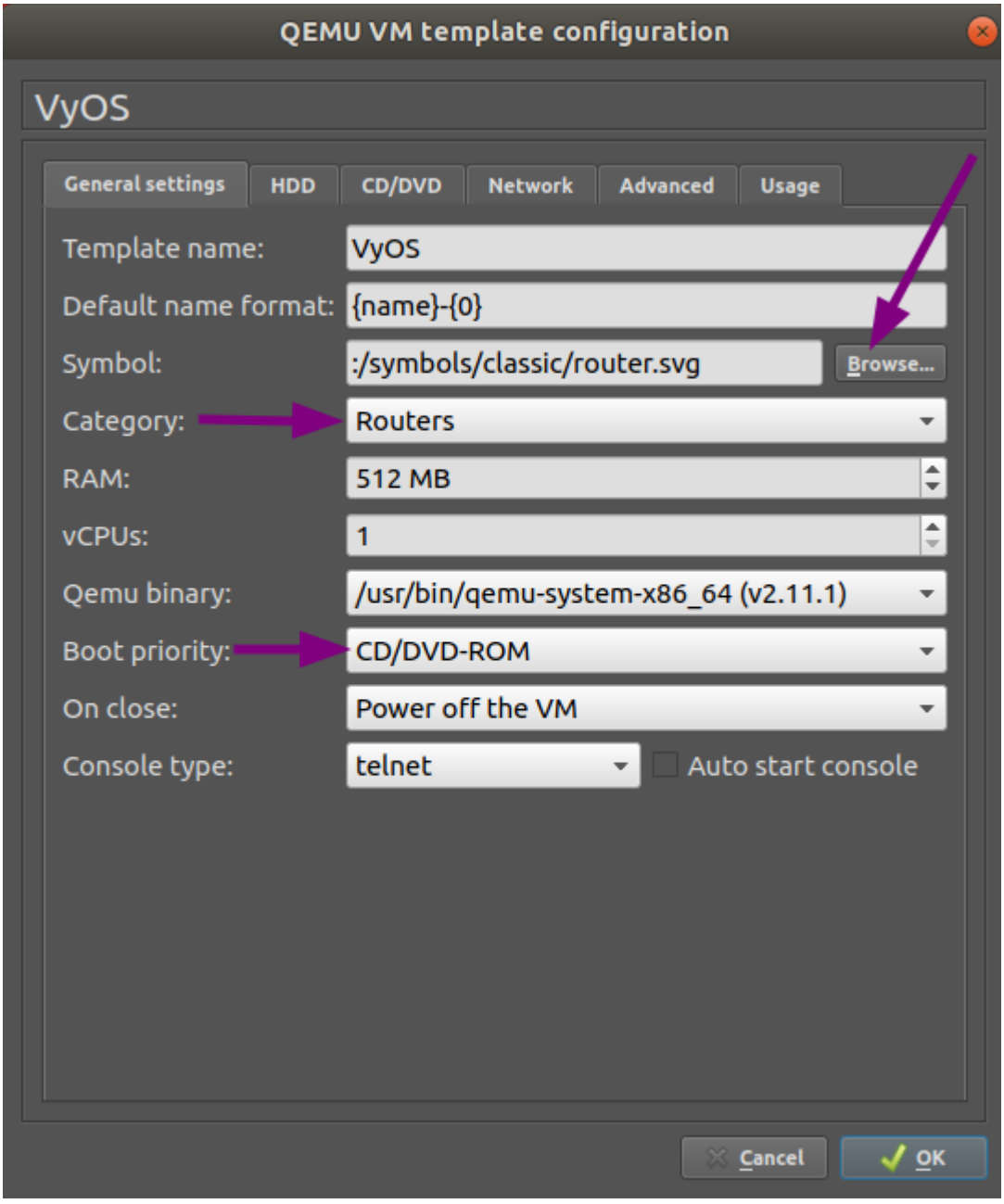
Note: You probably will want to accept to copy the .iso file to your default image directory when you are asked.

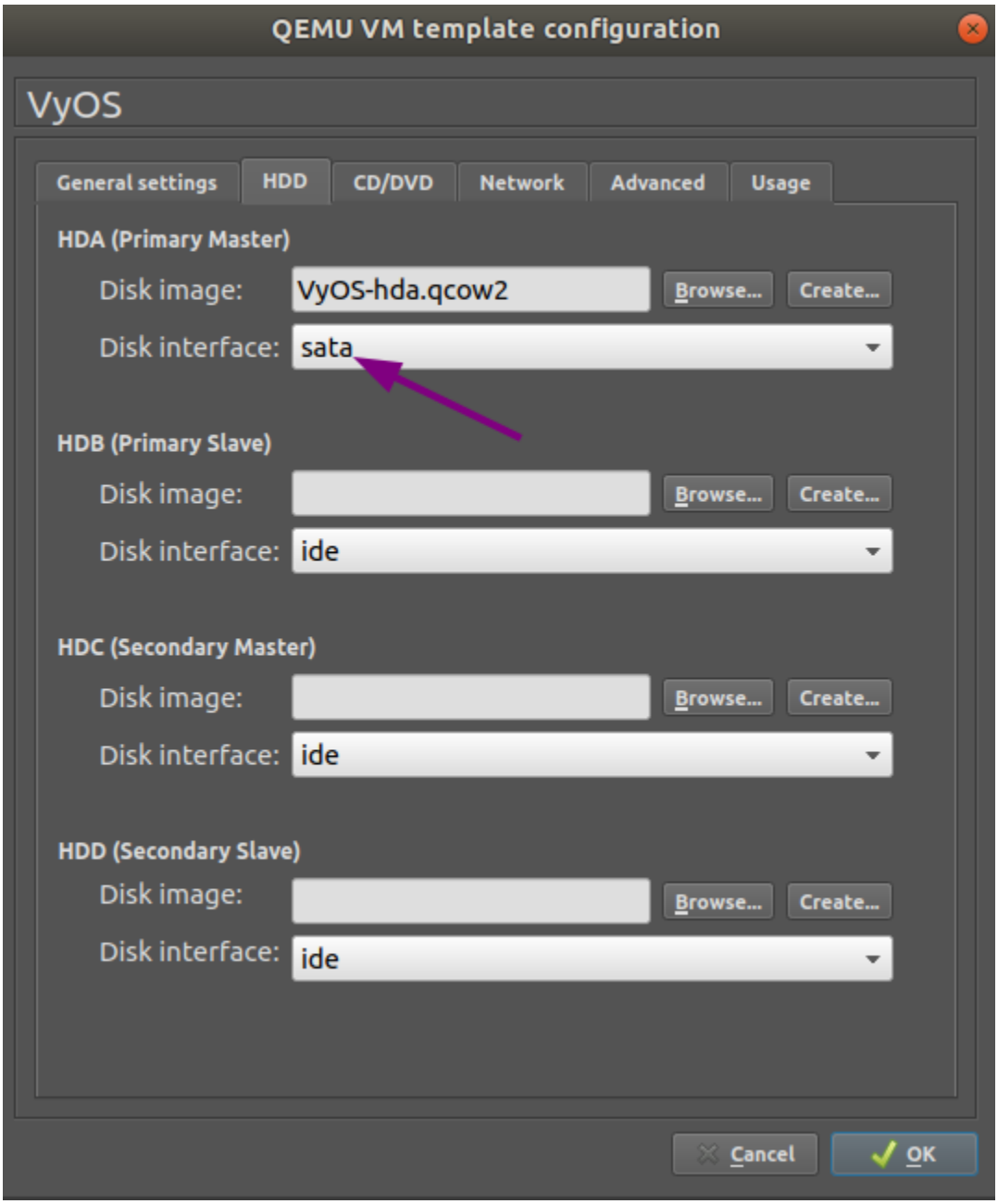
In the **Network** tab, set **0** as the number of adapters, set the **Name format** to **eth{0}** and the **Type** to **Paravirtualized Network I/O (virtio-net-pci)**.

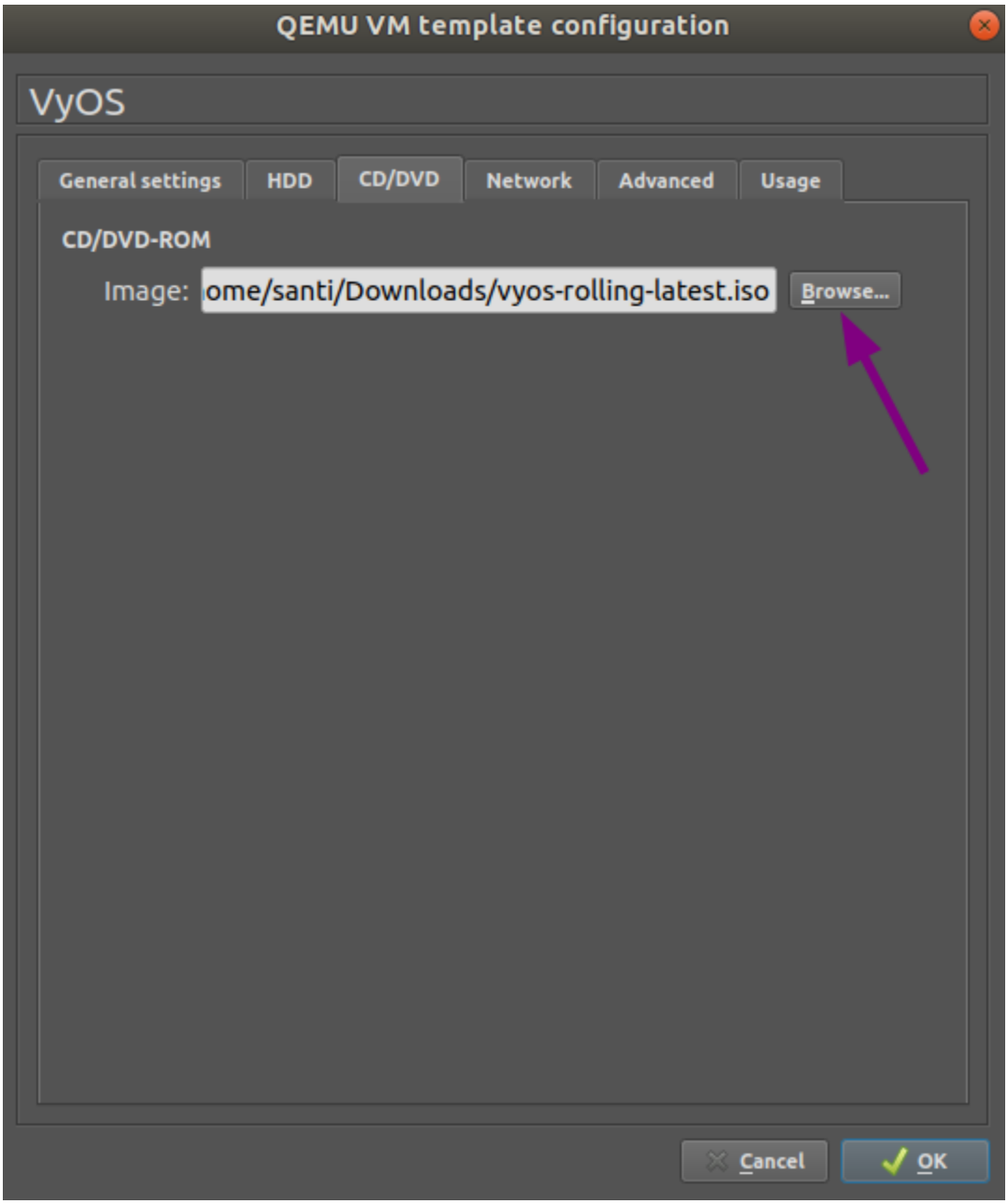
In the **Advanced** tab, unmark the checkbox **Use as a linked base VM** and click `OK`, which will save and close the **QEMU VM template configuration** window.

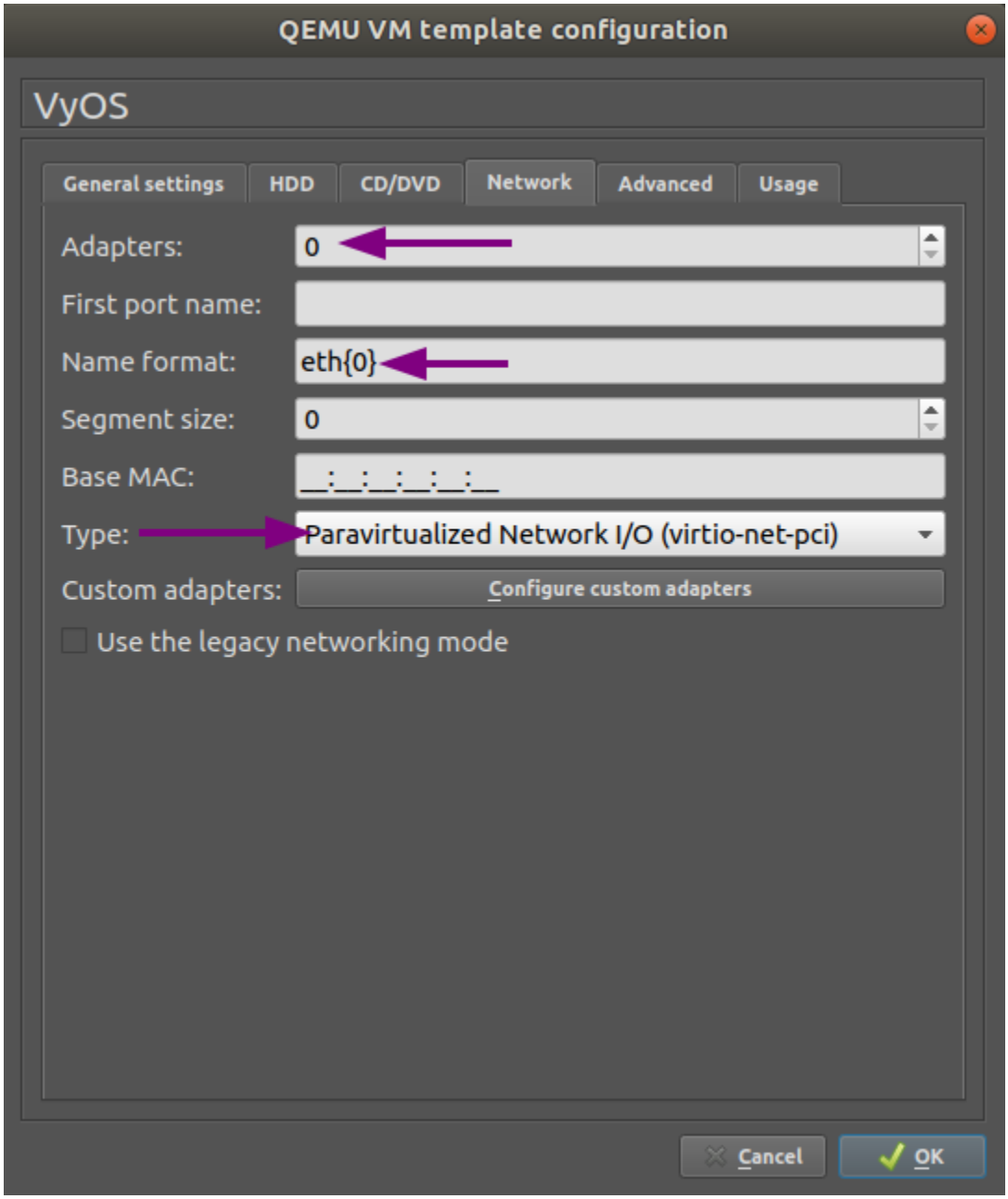
At the general **Preferences** window, click `OK` to save and close.

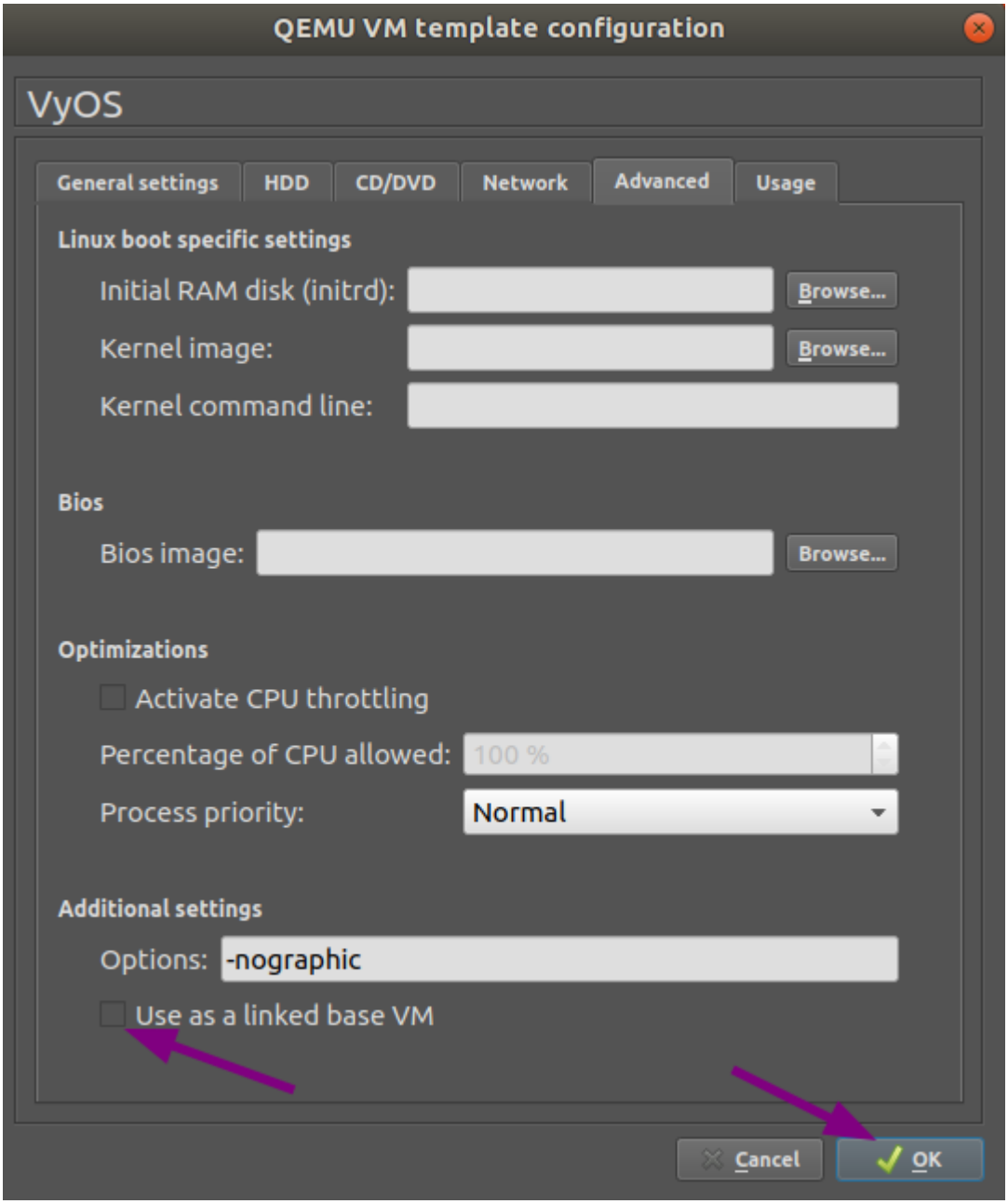

Preferences
General
Server
GNS3 VM
Packet capture
Built-in
Ethernet hubs
Ethernet switches
Cloud nodes
VPCS
VPCS nodes
Dynamips
IOS routers
IOS on UNIX
IOU Devices
QEMU
Qemu VMs
VirtualBox
VirtualBox VMs
VMware
VMware VMs
Docker
Docker containers
Qemu VM templates
Debian10-standard (root/r...
Firefox 31.1.1~2
Kali 2019.2 MATE LIVE (+p...
Micro Core Linux 6.4
OpenWrt-18.06.1
Tiny Core Linux 6.4~2
Ubuntu Desktop Guest 19.04
VyoOS125epa1
VyOS116
VyOS117
VyOS120-H4
VyOS121
VyOS122
VyOS123
VyOS124
Win10Edge -> IEUser Pass...
VyOS
General
Template name: VyOS
Template ID: none
Default name format: {name}-{0}
Server: ubuncurro
Console type: telnet
Auto start console: False
CPUs: 1
Memory: 512 MB
Linked base VM: True
QEMU binary: qemu-system-x86_64
Hard disks
Disk image (hda): VyOS-hda.qcow2
Disk interface (hda): ide
Network
Adapters: 1
Name format: Ethernet{0}
Type: e1000
Optimizations
CPU throttling: disabled
Process priority: normal
Additional options
Options: -nographic
On close: power_off
New
Copy
Edit
Delete
Apply
Cancel
OK

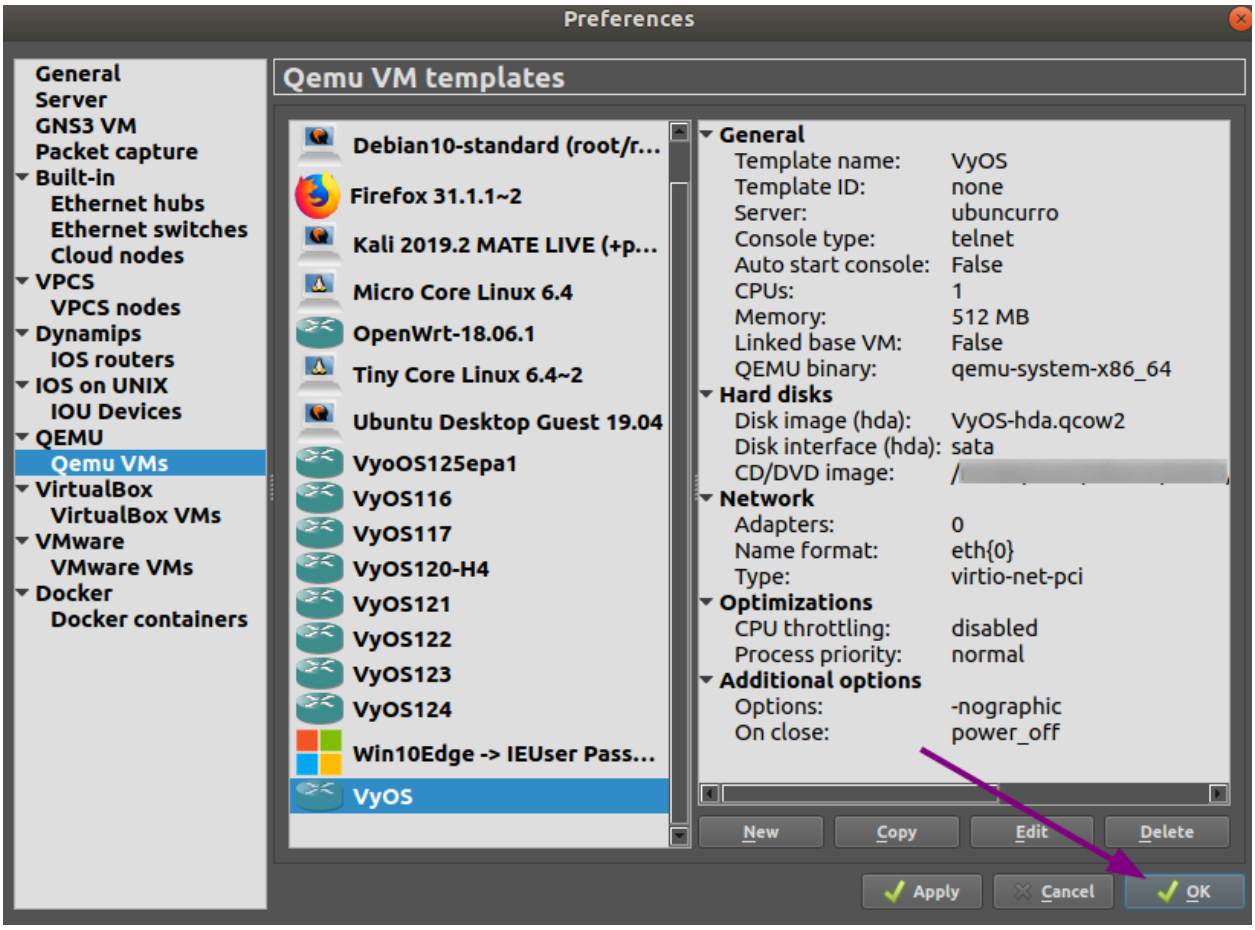

QEMU VM template configuration
VyOS
General settings
HDD
CD/DVD
Network
Advanced
Usage
Template name:
VyOS
Default name format:
{name}-{0}
Symbol:
:/symbols/classic/router.svg
Browse...
Category:
Routers
RAM:
512 MB
vCPUs:
1
Qemu binary:
/usr/bin/qemu-system-x86_64 (v2.11.1)
Boot priority:
CD/DVD-ROM
On close:
Power off the VM
Console type:
telnet
Auto start console
Cancel
OK


QEMU VM template configuration
VyOS
General settings
HDD
CD/DVD
Network
Advanced
Usage
HDA (Primary Master)
Disk image:
VyOS-hda.qcow2
Browse...
Create...
Disk interface:
sata
HDB (Primary Slave)
Disk image:
Browse...
Create...
Disk interface:
ide
HDC (Secondary Master)
Disk image:
Browse...
Create...
Disk interface:
ide
HDD (Secondary Slave)
Disk image:
Browse...
Create...
Disk interface:
ide
Cancel
OK


QEMU VM template configuration
VyOS
General settings
HDD
CD/DVD
Network
Advanced
Usage
CD/DVD-ROM
Image:
ome/santi/Downloads/vyos-rolling-latest.iso
Browse...
Cancel
OK


QEMU VM template configuration
VyOS
General settings
HDD
CD/DVD
Network
Advanced
Usage
Adapters:
0
First port name:
Name format:
eth{0}
Segment size:
0
Base MAC:
__:__:__:__:__:__
Type:
Paravirtualized Network I/O (virtio-net-pci)
Custom adapters:
Configure custom adapters
Use the legacy networking mode
Cancel
OK


QEMU VM template configuration
VyOS
General settings
HDD
CD/DVD
Network
Advanced
Usage
Linux boot specific settings
Initial RAM disk (initrd):
Browse...
Kernel image:
Browse...
Kernel command line:
Bios
Bios image:
Browse...
Optimizations
Activate CPU throttling
Percentage of CPU allowed:
100 %
Process priority:
Normal
Additional settings
Options:
-nographic
Use as a linked base VM
Cancel
OK


Preferences
General
Server
GNS3 VM
Packet capture
Built-in
Ethernet hubs
Ethernet switches
Cloud nodes
VPCS
VPCS nodes
Dynamips
IOS routers
IOS on UNIX
IOU Devices
QEMU
Qemu VMs
VirtualBox
VirtualBox VMs
VMware
VMware VMs
Docker
Docker containers
Qemu VM templates
Debian10-standard (root/r...
Firefox 31.1.1~2
Kali 2019.2 MATE LIVE (+p...
Micro Core Linux 6.4
OpenWrt-18.06.1
Tiny Core Linux 6.4~2
Ubuntu Desktop Guest 19.04
VyoOS125epa1
VyOS116
VyOS117
VyOS120-H4
VyOS121
VyOS122
VyOS123
VyOS124
Win10Edge -> IEUser Pass...
VyOS
General
Template name: VyOS
Template ID: none
Server: ubuncurro
Console type: telnet
Auto start console: False
CPUs: 1
Memory: 512 MB
Linked base VM: False
QEMU binary: qemu-system-x86_64
Hard disks
Disk image (hda): VyOS-hda.qcow2
Disk interface (hda): sata
CD/DVD image:
Network
Adapters: 0
Name format: eth{0}
Type: virtio-net-pci
Optimizations
CPU throttling: disabled
Process priority: normal
Additional options
Options: -nographic
On close: power_off
New
Copy
Edit
Delete
Apply
Cancel
OK

VyOS installation

- Create a new project.
- Drag the newly created VyOS VM into it.
- Start the VM.
- Open a console. The console should show the system booting. It will ask for the login credentials, you are at the VyOS live system.
- Install VyOS as normal (that is, using the `install image` command).
- After a successful installation, shutdown the VM with the `poweroff` command.
- **Delete the VM** from the GNS3 project.

The *VyOS-hda.qcow2* file now contains a working VyOS image and can be used as a template. But it still needs some fixes before we can deploy VyOS in our labs.

VyOS VM configuration

To turn the template into a working VyOS machine, further steps are necessary as outlined below:

General settings tab: Set the boot priority to **HDD**

CD/DVD tab: Unmount the installation image file by clearing the **Image** entry field.

Set the number of required network adapters, for example **4**.

Advanced settings tab: Mark the checkbox **Use as a linked base VM** and click `OK` to save the changes.

The VyOS VM is now ready to be deployed.

4.2.5 EVE-NG

References

https://www.eve-ng.net/

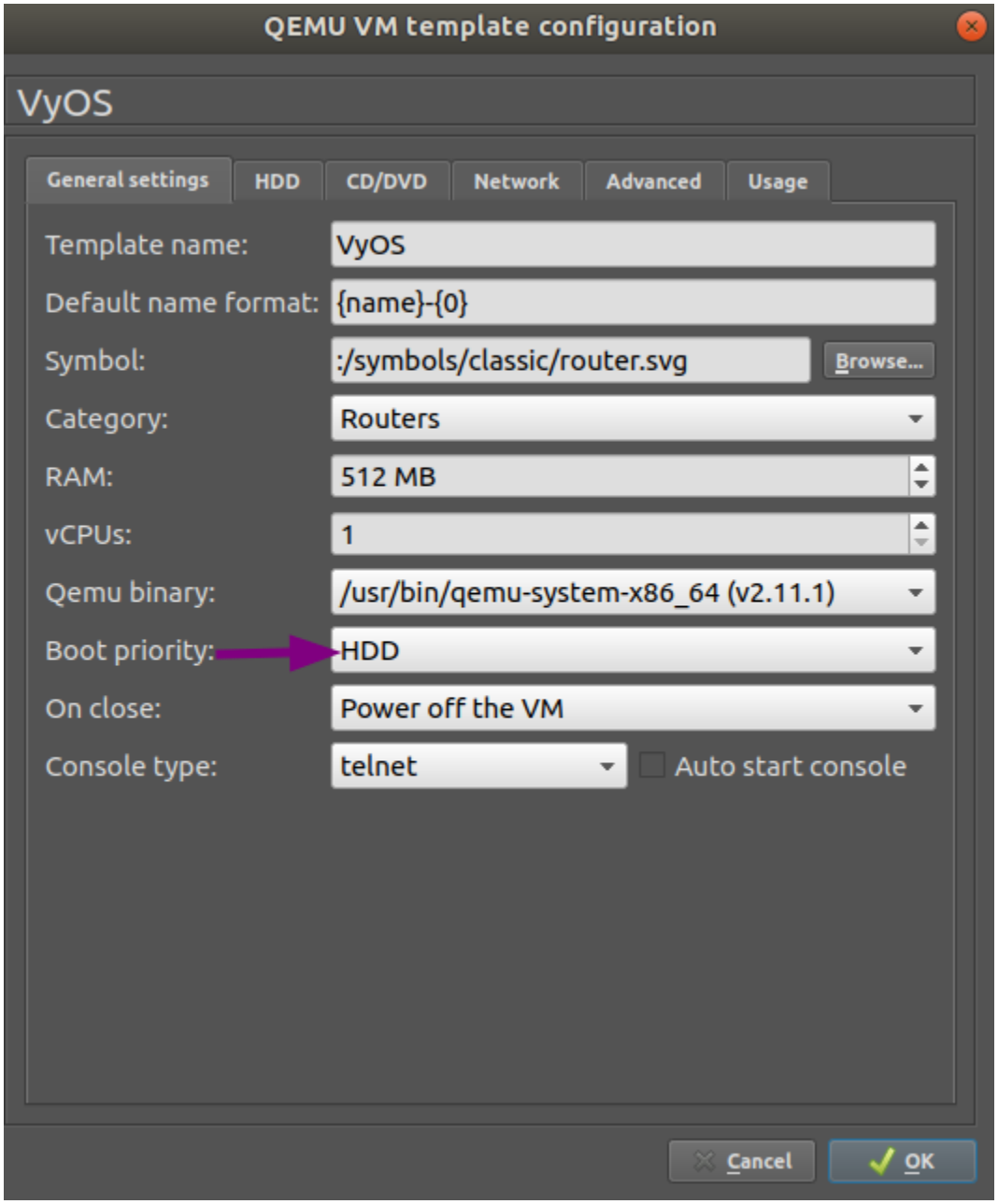
4.3 Running VyOS in Cloud Environments

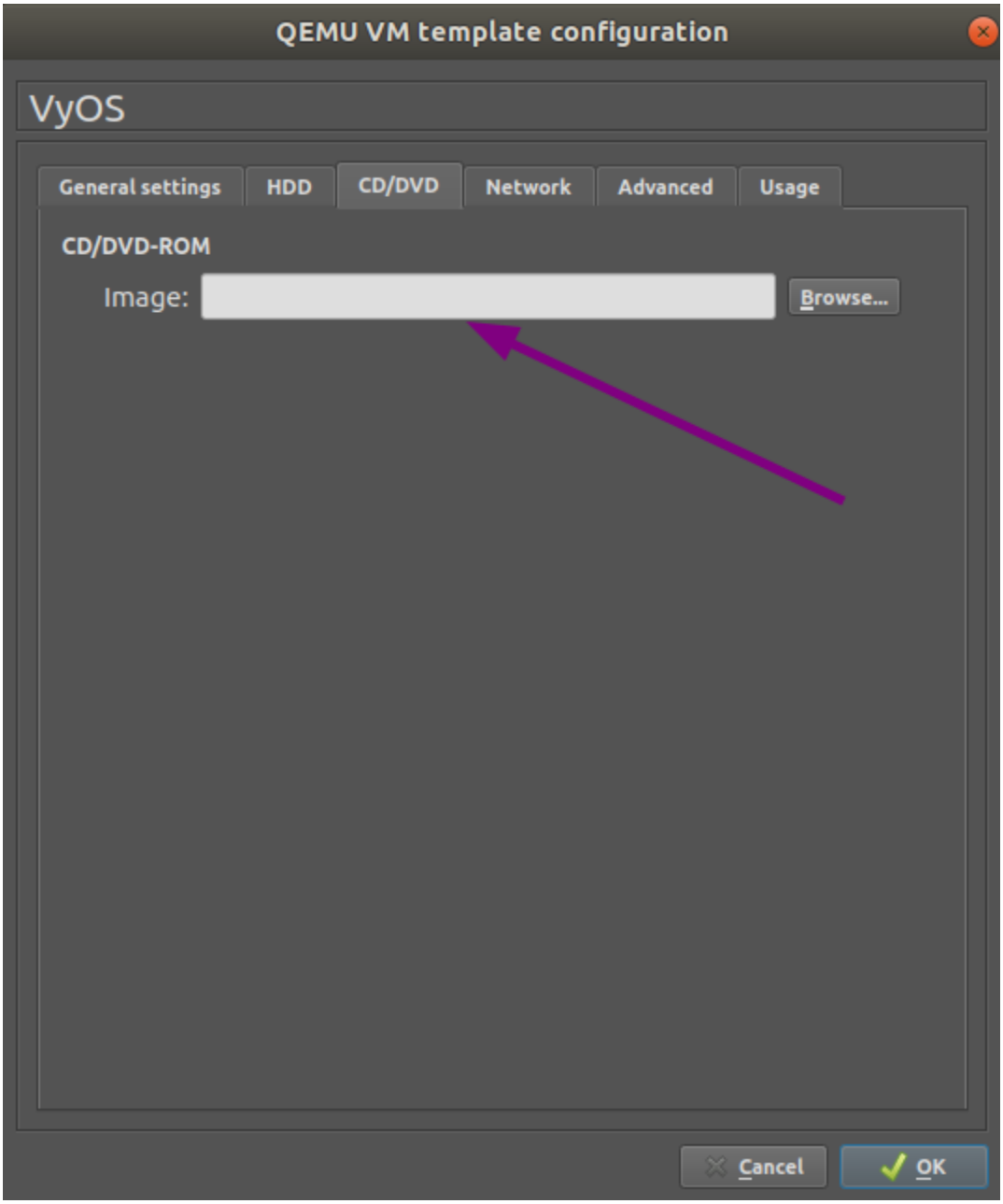
4.3.1 Amazon AWS

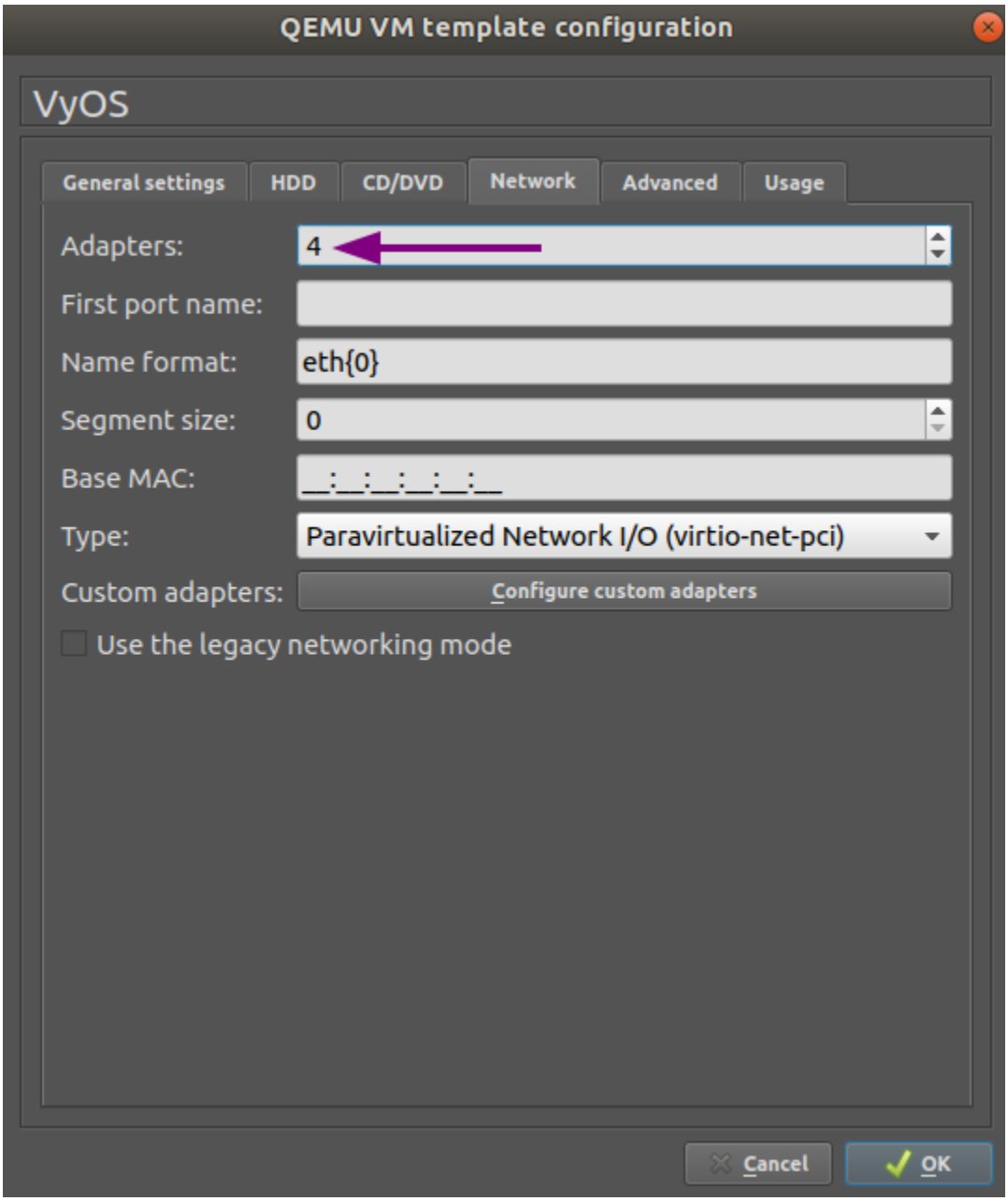
Deploy VM

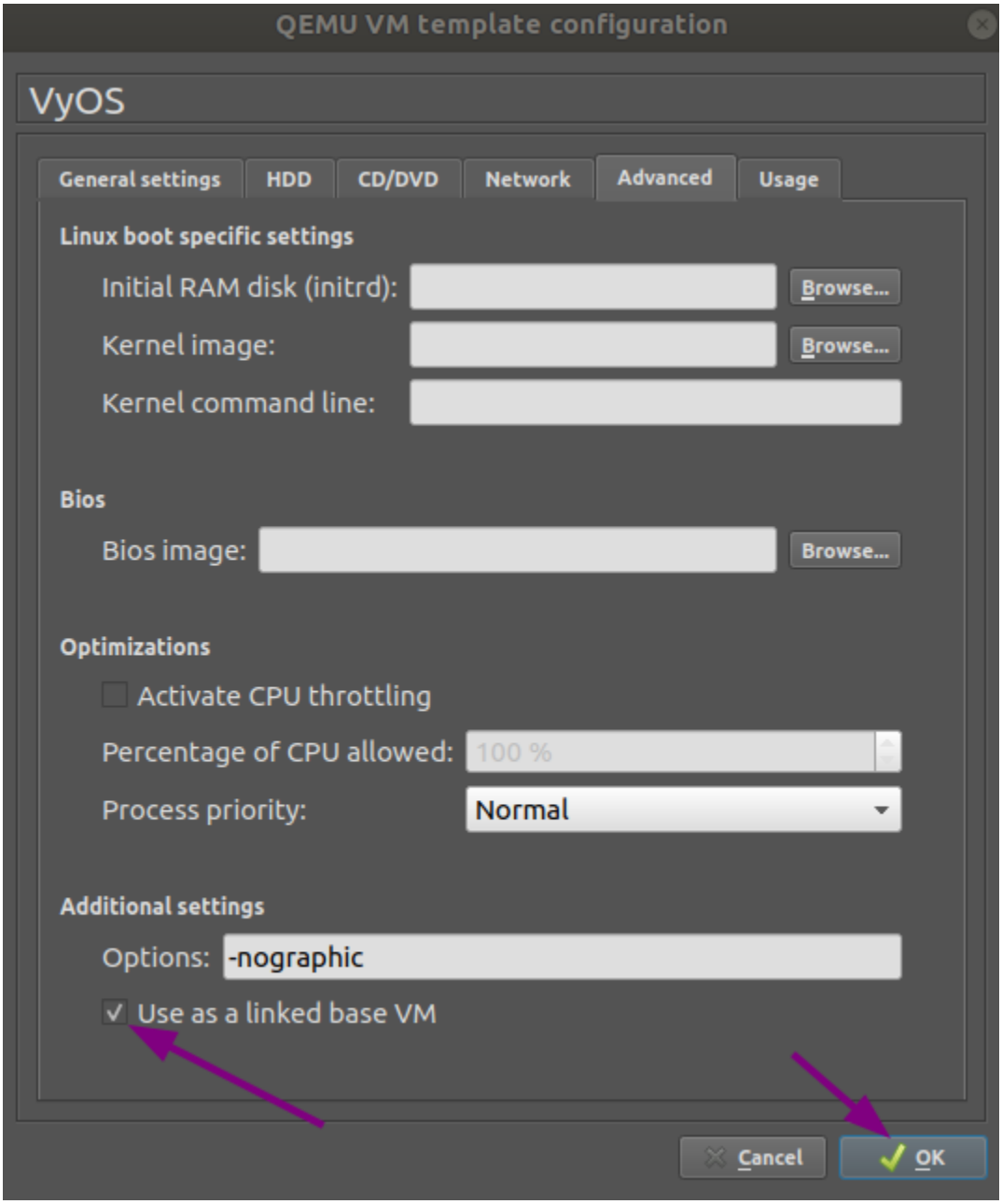
Deploy VyOS on Amazon AWS (Amazon Web Services)

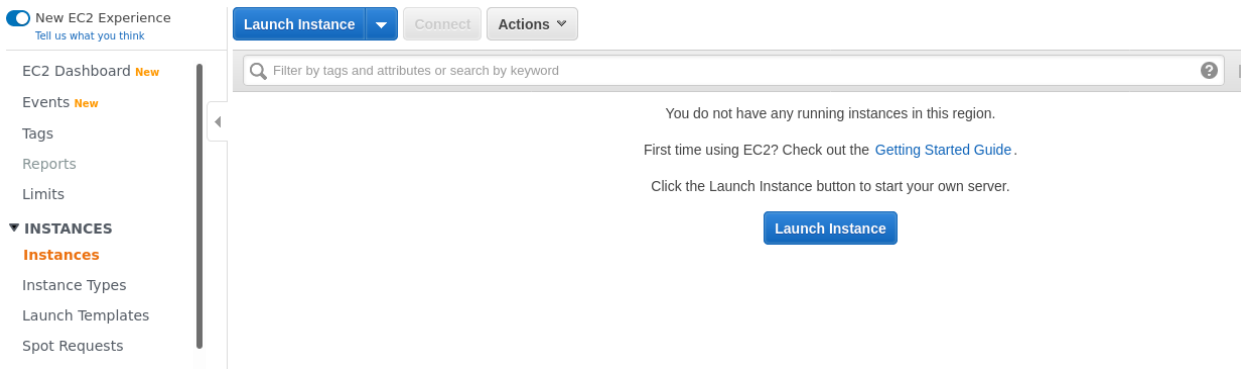
1. Click to `Instances` and `Launch Instance`
2. On the marketplace search "VyOS"
3. Choose the instance type. Minimum recommendation start from `m3.medium`
4. Configure instance for your requirements. Select number of instances / network / subnet
5. Additional storage. You can remove additional storage `/dev/sdb`. First root device will be `/dev/xvda`. You can skeep this step.

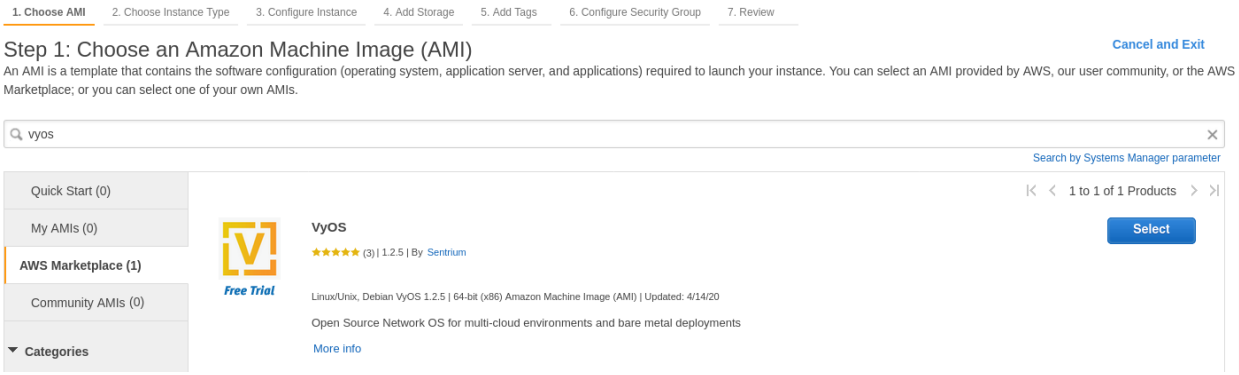

QEMU VM template configuration
VyOS
General settings
HDD
CD/DVD
Network
Advanced
Usage
Template name:
VyOS
Default name format:
{name}-{0}
Symbol:
:/symbols/classic/router.svg
Browse...
Category:
Routers
RAM:
512 MB
vCPUs:
1
Qemu binary:
/usr/bin/qemu-system-x86_64 (v2.11.1)
Boot priority:
HDD
On close:
Power off the VM
Console type:
telnet
Auto start console
Cancel
OK

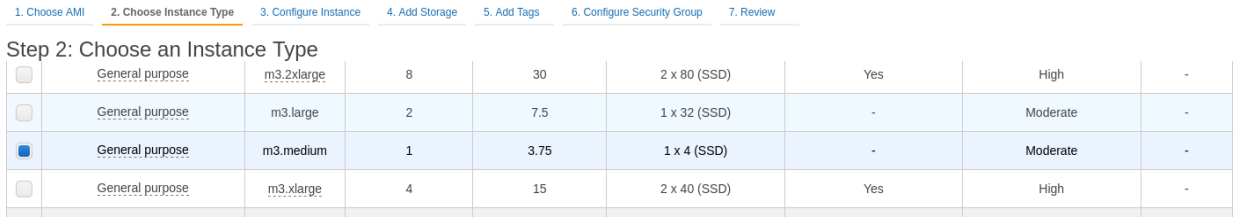

QEMU VM template configuration
VyOS
General settings
HDD
CD/DVD
Network
Advanced
Usage
CD/DVD-ROM
Image:
Browse...
Cancel
OK


QEMU VM template configuration
VyOS
General settings
HDD
CD/DVD
Network
Advanced
Usage
Adapters:
4
First port name:
Name format:
eth{0}
Segment size:
0
Base MAC:
__:__:__:__:__:__
Type:
Paravirtualized Network I/O (virtio-net-pci)
Custom adapters:
Configure custom adapters
Use the legacy networking mode
Cancel
OK

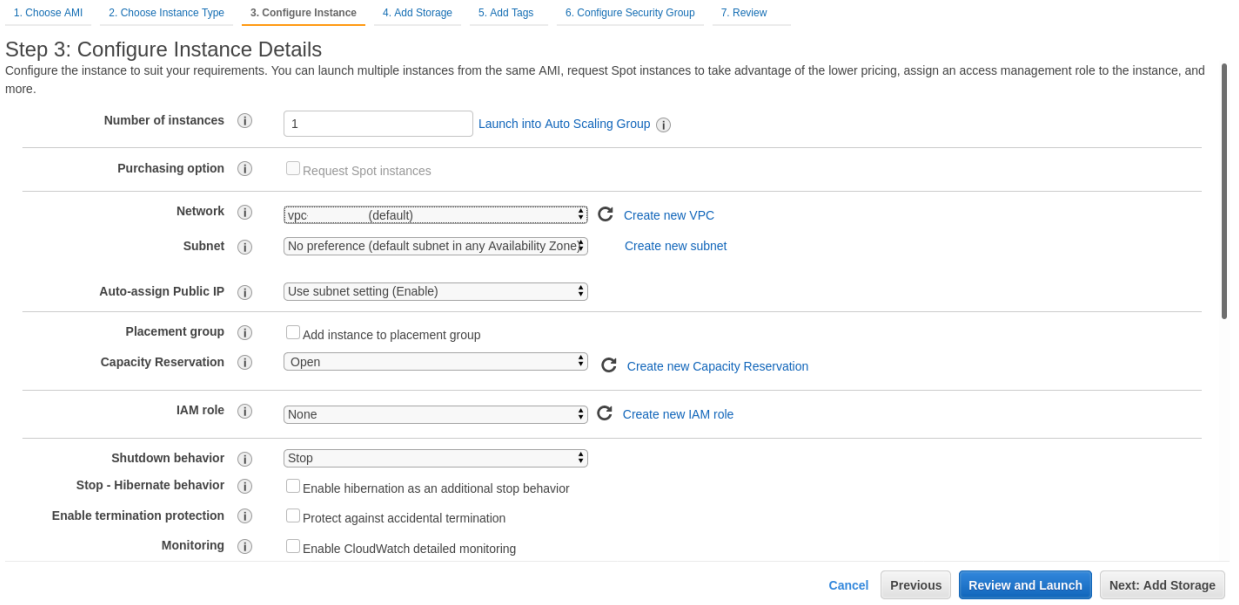

QEMU VM template configuration
VyOS
General settings
HDD
CD/DVD
Network
Advanced
Usage
Linux boot specific settings
Initial RAM disk (initrd):
Browse...
Kernel image:
Browse...
Kernel command line:
Bios
Bios image:
Browse...
Optimizations
Activate CPU throttling
Percentage of CPU allowed:
100 %
Process priority:
Normal
Additional settings
Options:
-nographic
Use as a linked base VM
Cancel
OK

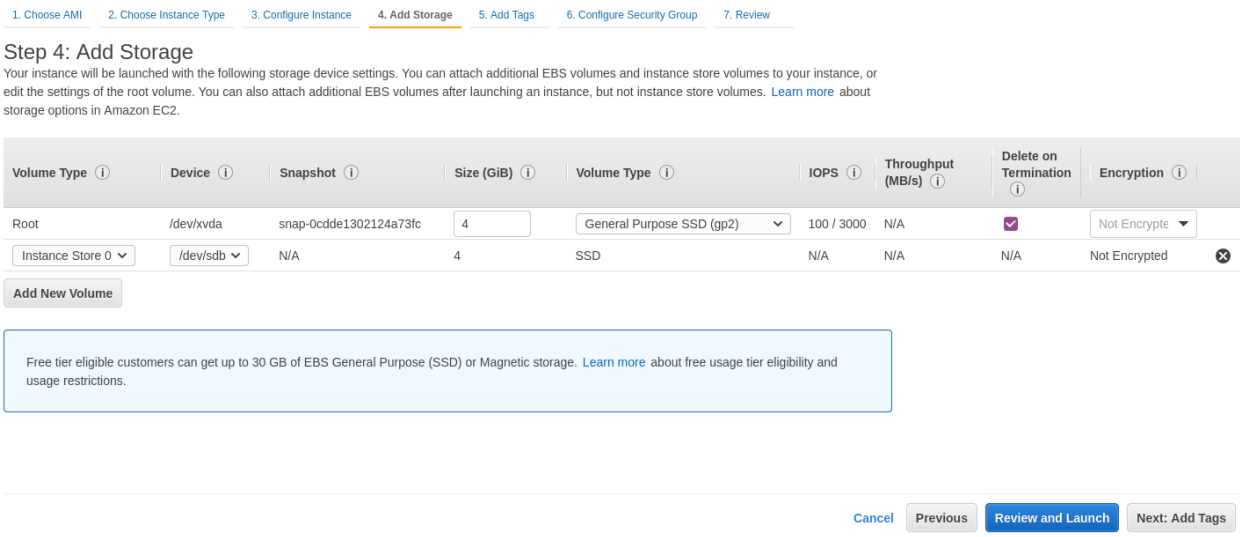

New EC2 Experience
Tell us what you think
EC2 Dashboard New
Events New
Tags
Reports
Limits
INSTANCES
Instances
Instance Types
Launch Templates
Spot Requests
Launch Instance
Connect
Actions
Filter by tags and attributes or search by keyword
You do not have any running instances in this region.
First time using EC2? Check out the Getting Started Guide.
Click the Launch Instance button to start your own server.
Launch Instance



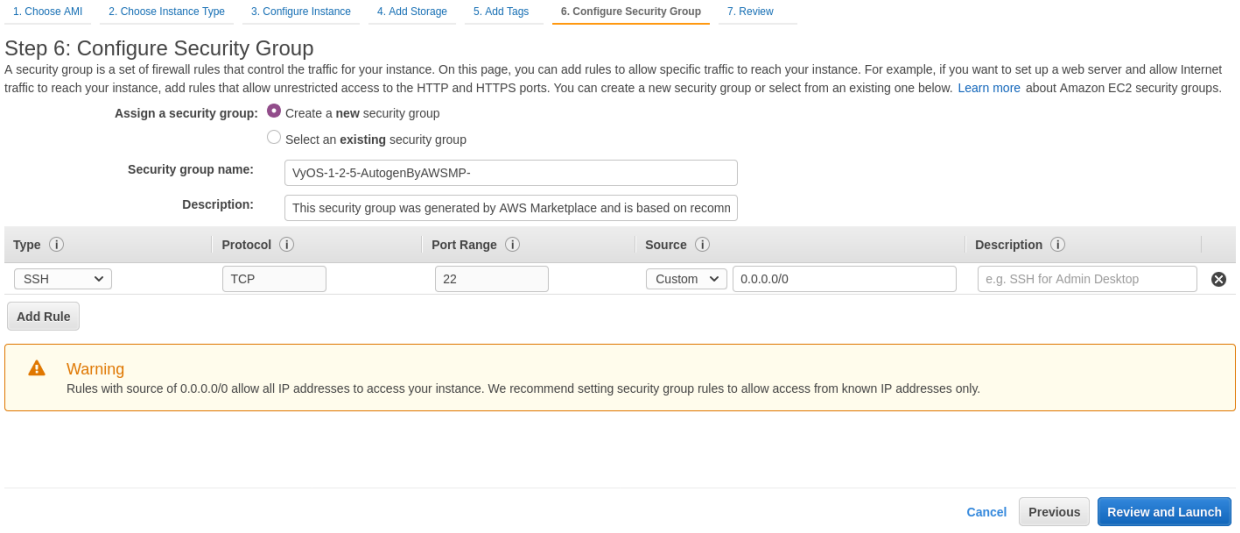


☐	General purpose	m3.2xlarge	8	30	2 x 80 (SSD)	Yes	High	-
☐	General purpose	m3.large	2	7.5	1 x 32 (SSD)	-	Moderate	-
☑	General purpose	m3.medium	1	3.75	1 x 4 (SSD)	-	Moderate	-
☐	General purpose	m3.xlarge	4	15	2 x 40 (SSD)	Yes	High	-



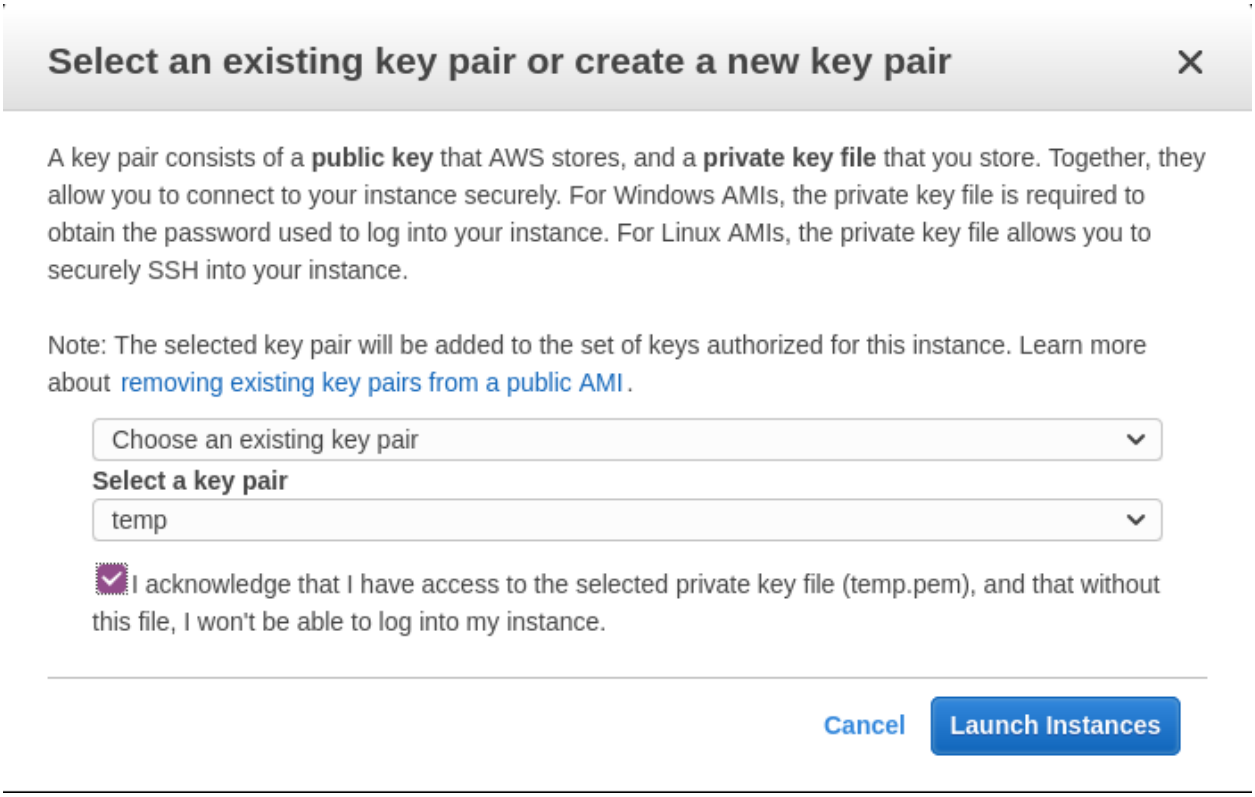


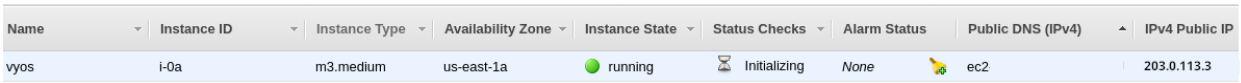
6. Configure Security Group. It's recommended that you configure ssh access only from certain address sources. Or permit any (by default).



7. Select SSH key pair and click `Launch Instances`
8. Find out your public IP address.
9. Connect to the instance by SSH key.

```
ssh -i ~/.ssh/amazon.pem vyos@203.0.113.3
vyos@ip-192-0-2-10:~$
```


Select an existing key pair or create a new key pair
A key pair consists of a public key that AWS stores, and a private key file that you store. Together, they allow you to connect to your instance securely. For Windows AMIs, the private key file is required to obtain the password used to log into your instance. For Linux AMIs, the private key file allows you to securely SSH into your instance.
Note: The selected key pair will be added to the set of keys authorized for this instance. Learn more about removing existing key pairs from a public AMI.
Choose an existing key pair
Select a key pair
temp
I acknowledge that I have access to the selected private key file (temp.pem), and that without this file, I won't be able to log into my instance.
Cancel
Launch Instances


Name
Instance ID
Instance Type
Availability Zone
Instance State
Status Checks
Alarm Status
Public DNS (IPv4)
IPv4 Public IP
vyos
i-0a
m3.medium
us-east-1a
running
Initializing
None
ec2
203.0.113.3

Amazon CloudWatch Agent Usage

To use Amazon CloudWatch Agent, configure it within the Amazon SSM Parameter Store. If you don't have a configuration yet, do *CloudWatch SSM Configuration creation*.

1. Create an IAM (Identity and Access Management) role for the EC2 (Elastic Compute Cloud) instance to access CloudWatch service, and name it CloudWatchAgentServerRole. The role should contain two default policies: CloudWatchAgentServerPolicy and AmazonSSMManagedInstanceCore.
2. Attach the created role to your VyOS EC2 instance.
3. Ensure that amazon-cloudwatch-agent package is installed.

```
$ sudo apt list --installed | grep amazon-cloudwatch-agent
```

Note: The amazon-cloudwatch-agent package is normally included in VyOS 1.3.3+ and 1.4+

---

3. Retreive an existing CloudWatch Agent configuration from the SSM (Systems Manager) Parameter Store.

```
$ sudo /opt/aws/amazon-cloudwatch-agent/bin/amazon-cloudwatch-agent-ctl -a␣
↪fetch-config -m ec2 -s -c ssm:<your-configuration-name>
```

This step also enables systemd service and runs it.

Note: The VyOS platform-specific scripts feature is under development. Thus, this step should be repeated manually after changing system image (*Update VyOS*)

CloudWatch SSM Configuration creation

Creating the Amazon Cloudwatch Agent Configuration in Amazon SSM Parameter Store.

1. Create an IAM role for your EC2 instance to access the CloudWatch service. Name it CloudWatchAgentAdminRole. The role should contain at two default policies: CloudWatchAgentAdminPolicy and AmazonSSMManagedInstanceCore.

Note: CloudWatchAgentServerRole is too permisive and should be used for single configuration creation and deployment. That's why after completion of step #3 higly recommended to replace instance CloudWatchAgentAdminRole role with CloudWatchAgentServerRole.

---

2. Run Cloudwatch configuration wizard.

```
$ sudo /opt/aws/amazon-cloudwatch-agent/bin/amazon-cloudwatch-agent-config-
↪wizard
```

3. When prompted, answer "yes" to the question "Do you want to store the config in the SSM parameter store?".

References

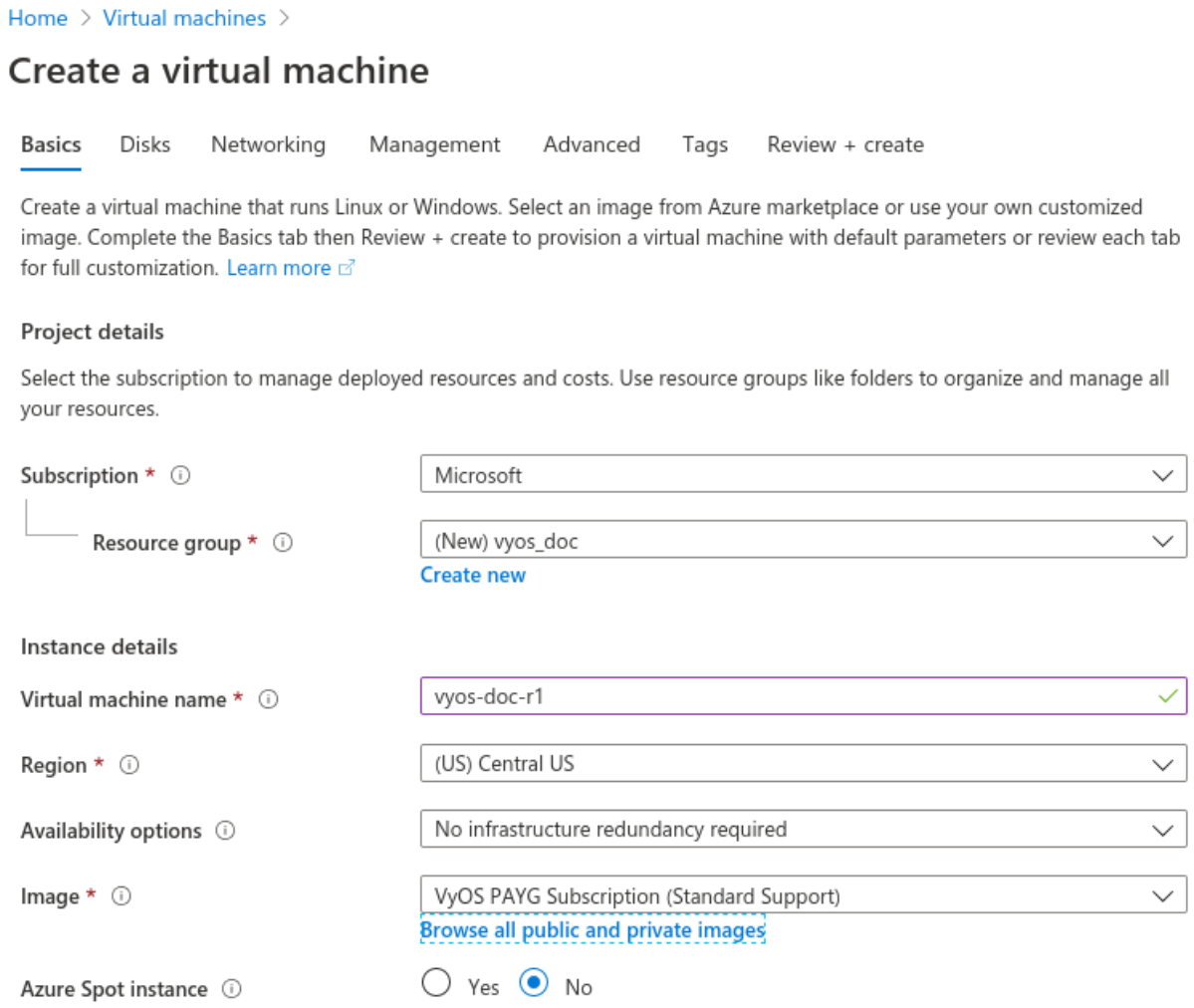
- https://console.aws.amazon.com/
- https://docs.aws.amazon.com/AmazonCloudWatch/latest/monitoring/create-iam-roles-for-cloudwatch-agent.html
- https://docs.aws.amazon.com/AmazonCloudWatch/latest/monitoring/install-CloudWatch-Agent-on-EC2-Instance-fleet.html

4.3.2 Azure

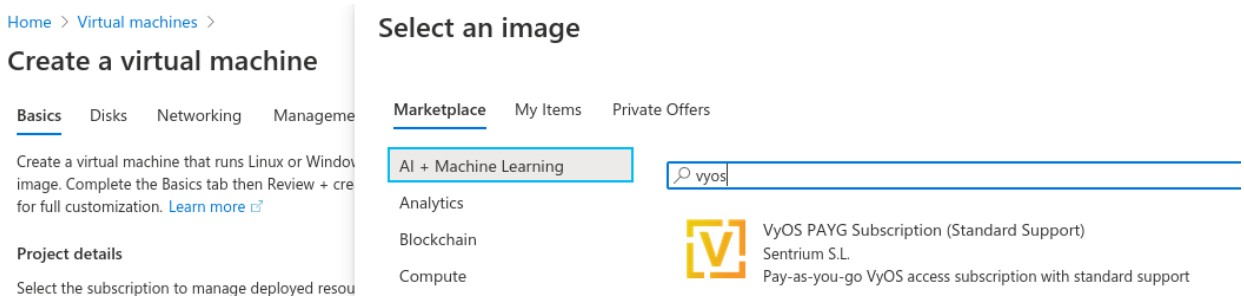
Deploy VM

Deploy VyOS on Azure.

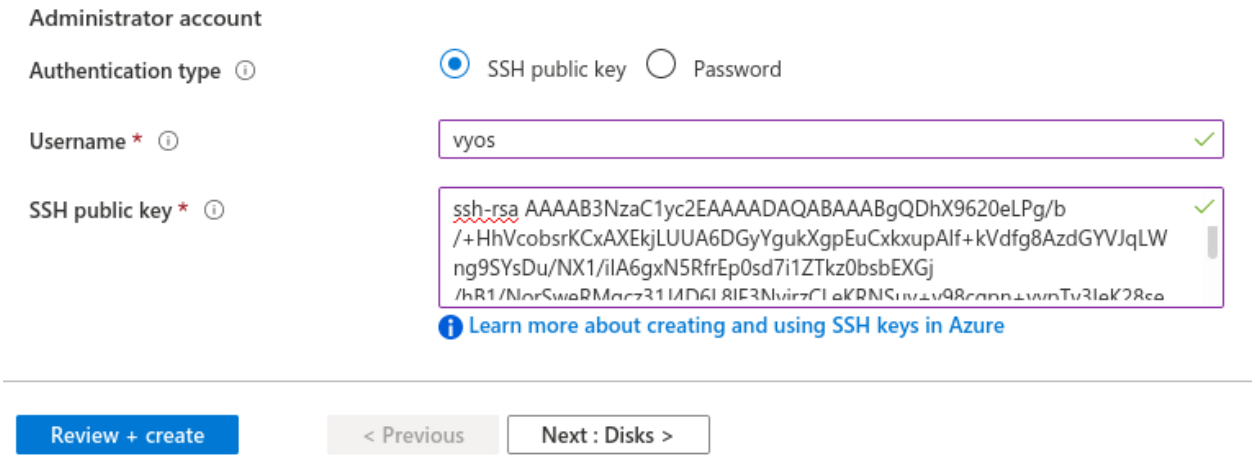
1. Go to the Azure services and Click to **Add new Virtual machine**
2. Choose vm name, resource group, region and click **Browse all public and private images**



3. On the marketplace search `VyOS` and choose the appropriate subscription



4. Generate new SSH key pair or use existing.



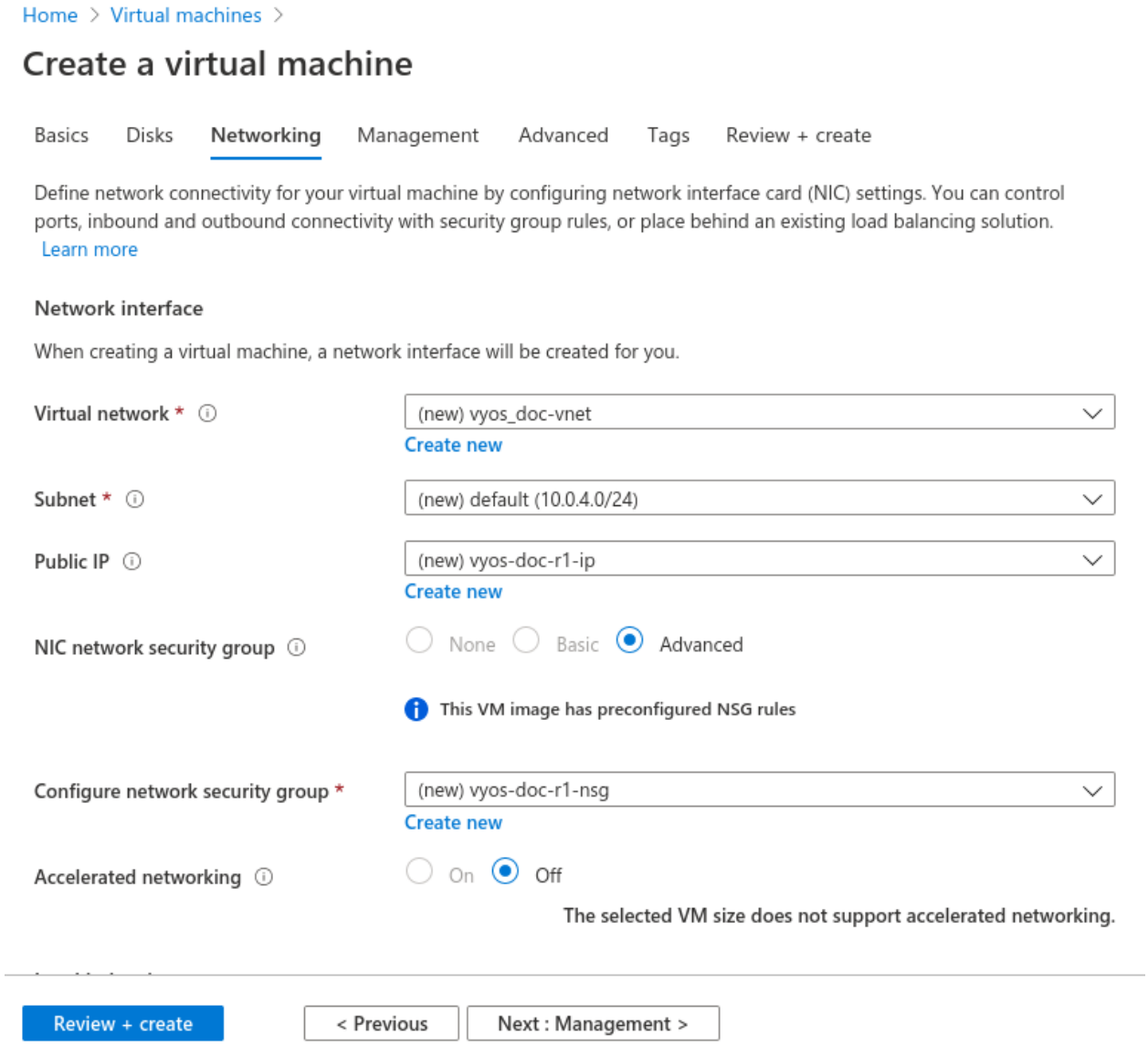
5. Define network, subnet, Public IP. Or it will be created by default.
6. Click `Review + create`. After a few seconds your deployment will be complete
7. Click to your new vm and find out your Public IP address.
8. Connect to the instance by SSH key.

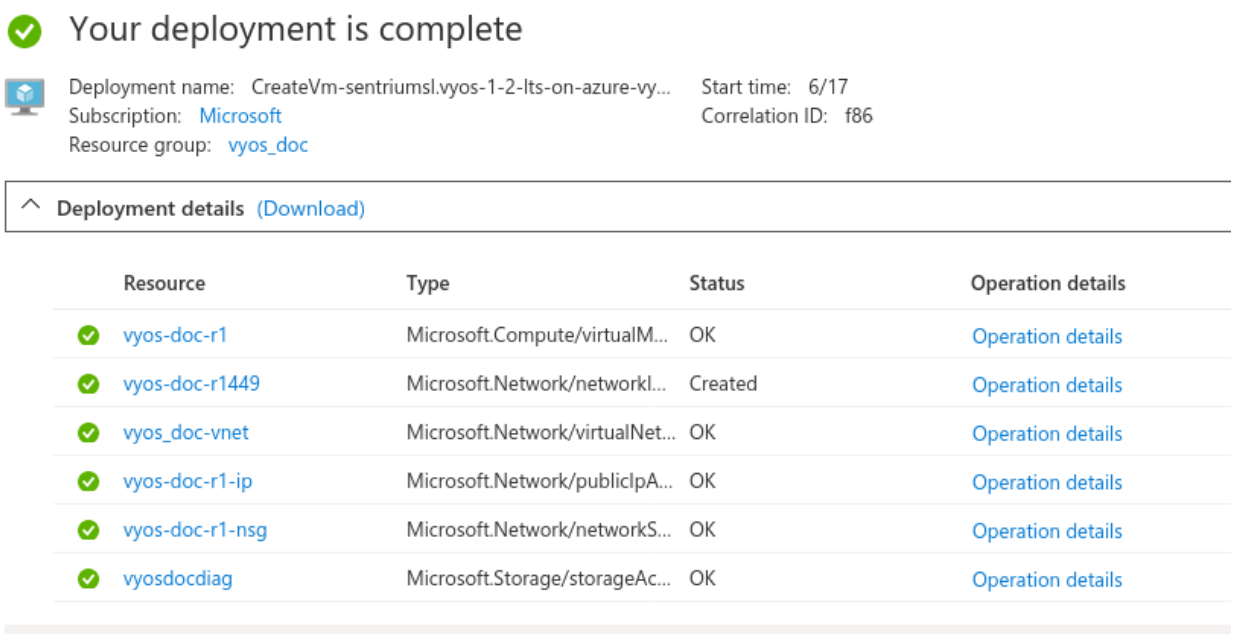
```
ssh -i ~/.ssh/vyos_azure vyos@203.0.113.3
vyos@vyos-doc-r1:~$
```

Add interface

If instance was deployed with one **eth0** `WAN` interface and want to add new one. To add new interface an example **eth1** `LAN` you need shutdown the instance. Attach the interface in the Azure portal and then start the instance.

Note: Azure does not allow you attach interface when the instance in the **Running** state.


Home > Virtual machines >
Create a virtual machine
Basics
Disks
Networking
Management
Advanced
Tags
Review + create
Define network connectivity for your virtual machine by configuring network interface card (NIC) settings. You can control ports, inbound and outbound connectivity with security group rules, or place behind an existing load balancing solution.
Learn more
Network interface
When creating a virtual machine, a network interface will be created for you.
Virtual network *
(new) vyos_doc-vnet
Create new
Subnet *
(new) default (10.0.4.0/24)
Public IP
(new) vyos-doc-r1-ip
Create new
NIC network security group
None
Basic
Advanced
This VM image has preconfigured NSG rules
Configure network security group *
(new) vyos-doc-r1-nsg
Create new
Accelerated networking
On
Off
The selected VM size does not support accelerated networking.
Review + create
< Previous
Next : Management >

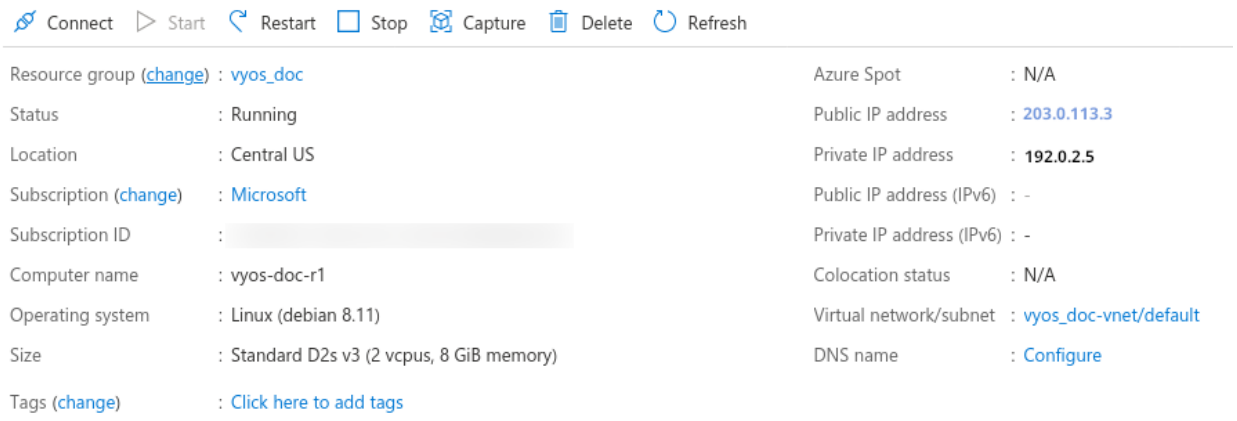


Your deployment is complete

Deployment name: CreateVm-sentriumsl.vyos-1-2-lts-on-azure-vy... Start time: 6/17
Subscription: Microsoft Correlation ID: f86
Resource group: vyos_doc

Deployment details (Download)

Resource	Type	Status	Operation details
vyos-doc-r1	Microsoft.Compute/virtualM...	OK	Operation details
vyos-doc-r1449	Microsoft.Network/networkI...	Created	Operation details
vyos_doc-vnet	Microsoft.Network/virtualNet...	OK	Operation details
vyos-doc-r1-ip	Microsoft.Network/publicIpA...	OK	Operation details
vyos-doc-r1-nsg	Microsoft.Network/networkS...	OK	Operation details
vyosdocdiag	Microsoft.Storage/storageAc...	OK	Operation details



Connect Start Restart Stop Capture Delete Refresh

Resource group (change)	: vyos_doc	Azure Spot	: N/A
Status	: Running	Public IP address	: 203.0.113.3
Location	: Central US	Private IP address	: 192.0.2.5
Subscription (change)	: Microsoft	Public IP address (IPv6)	: -
Subscription ID	:	Private IP address (IPv6)	: -
Computer name	: vyos-doc-r1	Colocation status	: N/A
Operating system	: Linux (debian 8.11)	Virtual network/subnet	: vyos_doc-vnet/default
Size	: Standard D2s v3 (2 vcpus, 8 GiB memory)	DNS name	: Configure
Tags (change)	: Click here to add tags		

Absorbing Routes

If using as a router, you will want your LAN interface to absorb some or all of the traffic from your VNET by using a route table applied to the subnet.

1. Create a route table and browse to **Configuration**
2. Add one or more routes for networks you want to pass through the VyOS VM. Next hop type **Virtual Appliance** with the **Next Hop Address** of the VyOS `LAN` interface.

Note: If you want to create a new default route for VMs on the subnet, use **Address Prefix** `0.0.0.0/0` Also note that if you want to use this as a typical edge device, you'll want masquerade NAT for the `WAN` interface.

Serial Console

Azure has a way to access the serial console of a VM, but this needs to be configured on the VyOS. It's there by default, but keep it in mind if you are replacing config.boot and rebooting: `set system console device ttyS0 speed '9600'`

References

https://azure.microsoft.com

4.3.3 Google Cloud Platform

Deploy VM

To deploy VyOS on GCP (Google Cloud Platform)

1. Generate SSH key pair type **ssh-rsa** from the host that will connect to VyOS.

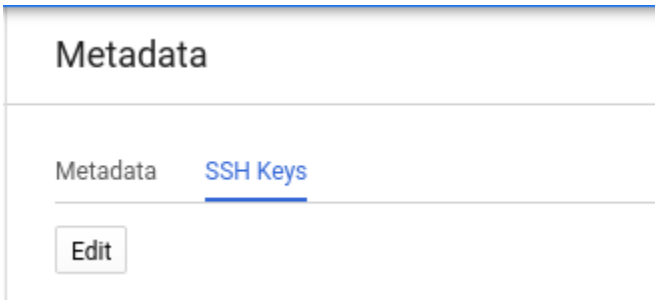
   Example:

   ```
   ssh-keygen -t rsa -f ~/.ssh/vyos_gcp -C "vyos@mypc"
   ```

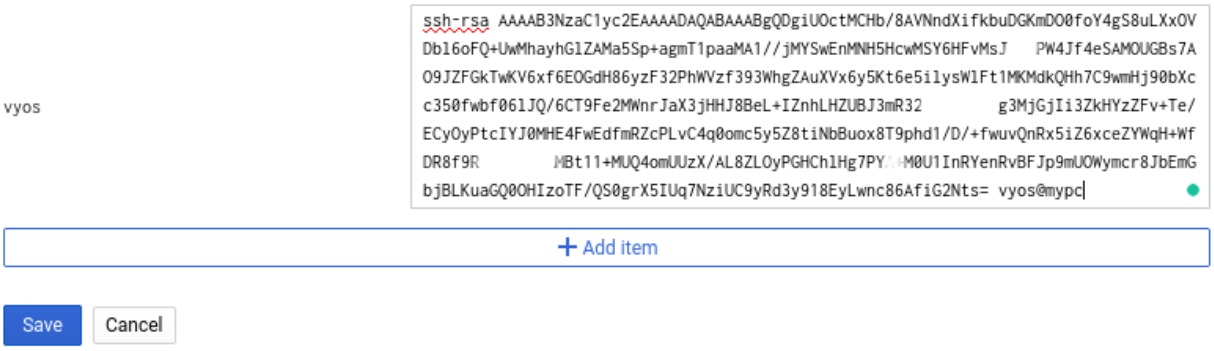
Note: In name "vyos@mypc" The first value must be "**vyos**". Because default user is vyos and google api uses this option.

---

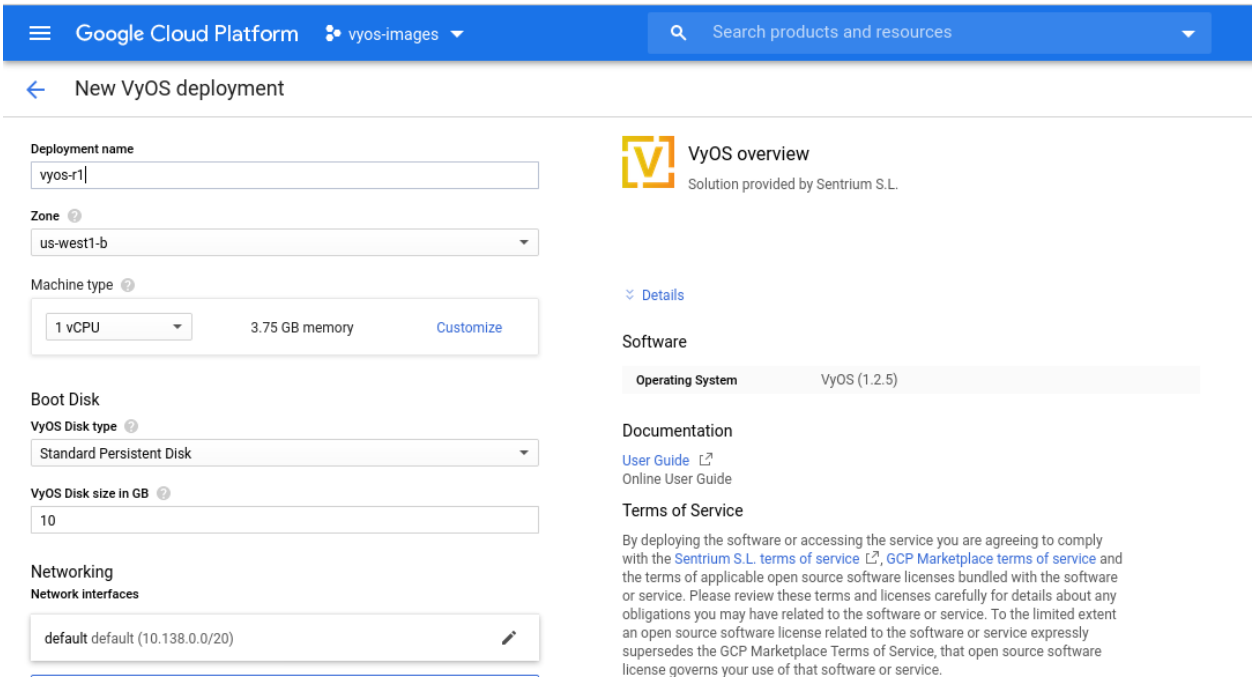
2. Open GCP console and navigate to the menu **Metadata**. Choose **SSH Keys** and click `edit`.



Click **Add item** and paste your public ssh key. Click `Save`.

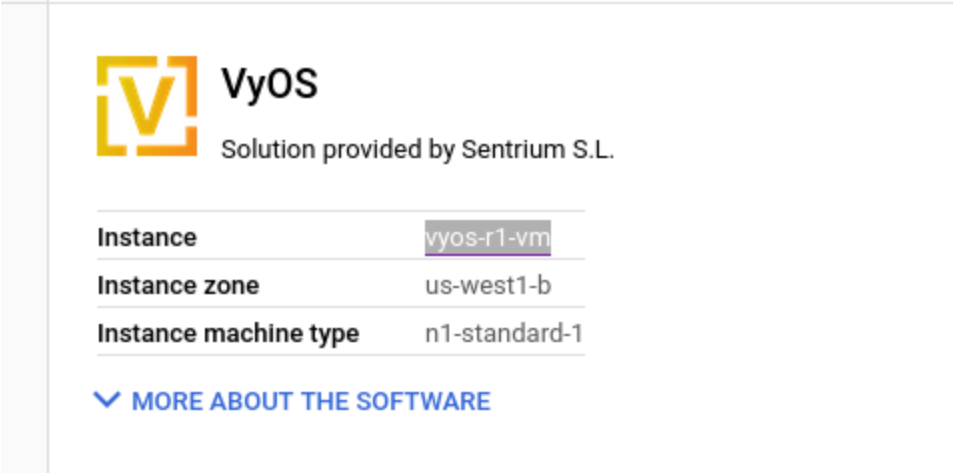


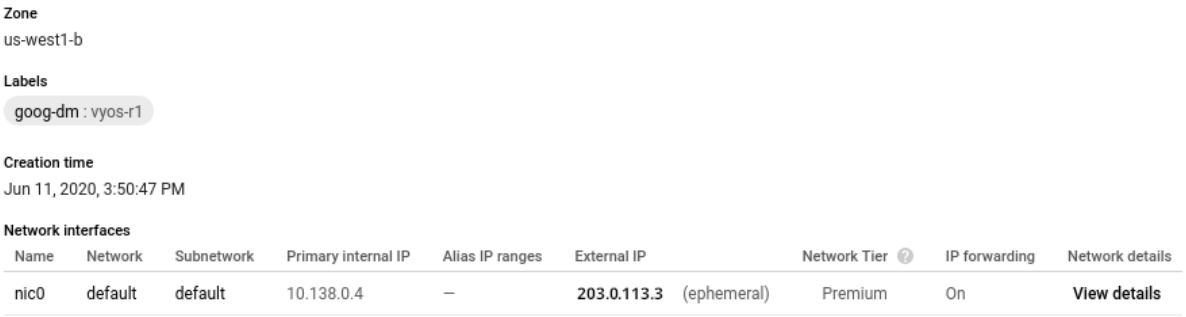
2. On marketplace search “VyOS”
3. Change Deployment name/Zone/Machine type and click `Deploy`



4. After few seconds click to `instance`
5. Find out your external IP address
6. Connect to the instance. SSH key was generated in the first step.

```
ssh -i ~/.ssh/vyos_gcp vyos@203.0.113.3
vyos@vyos-r1-vm:~$
```





References

https://console.cloud.google.com/

4.3.4 Oracle

References

https://www.oracle.com/cloud/

4.4 Running on Bare Metal

4.4.1 Supermicro A2SDi (Atom C3000)

I opted to get one of the new Intel Atom C3000 CPUs to spawn VyOS on it. Running VyOS on an UEFI only device is supported as of VyOS release 1.2.

Shopping Cart

- 1x Supermicro CSE-505-203B (19” 1U chassis, inkl. 200W PSU)
- 1x Supermicro MCP-260-00085-0B (I/O Shield for A2SDi-2C-HLN4F)
- 1x Supermicro A2SDi-2C-HLN4F (Intel Atom C3338, 2C/2T, 4MB cache, Quad LAN with Intel C3000 SoC 1GbE)
- 1x Crucial CT4G4DFS824A (4GB DDR4 RAM 2400 MT/s, PC4-19200)
- 1x SanDisk Ultra Fit 32GB (USB-A 3.0 SDCZ43-032G-G46 mass storage for OS)
- 1x Supermicro MCP-320-81302-0B (optional FAN tray)

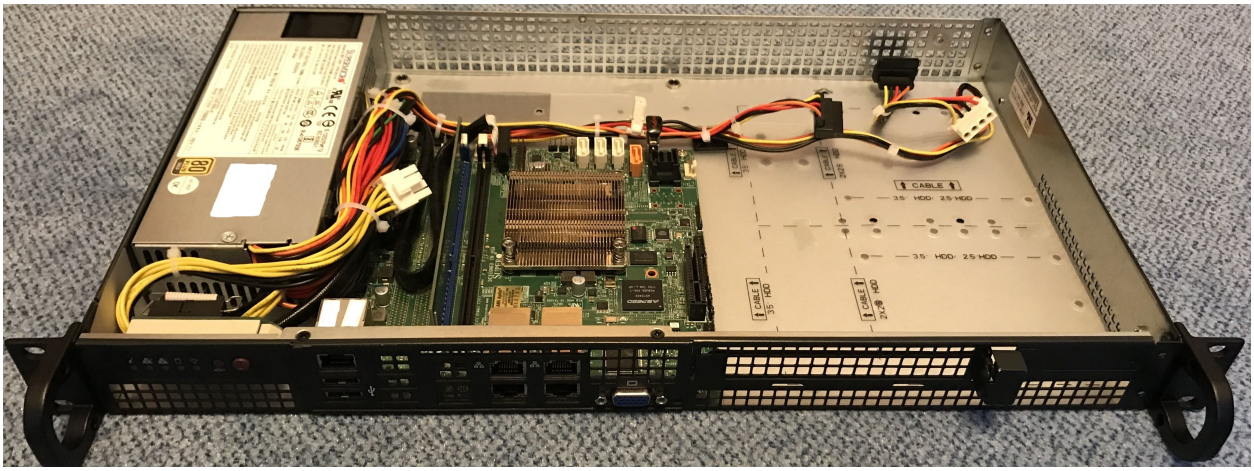
Optional (10GE)

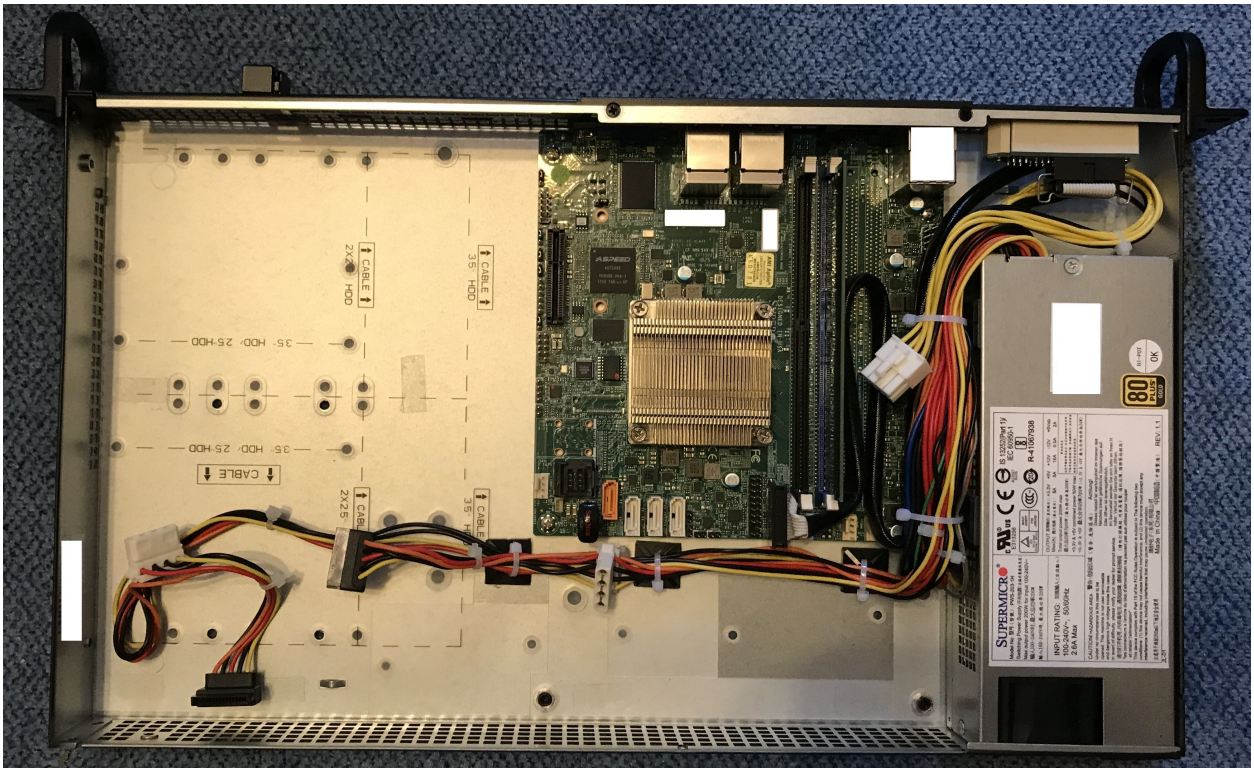
If you want to get additional ethernet ports or even 10GE connectivity the following optional parts will be required:

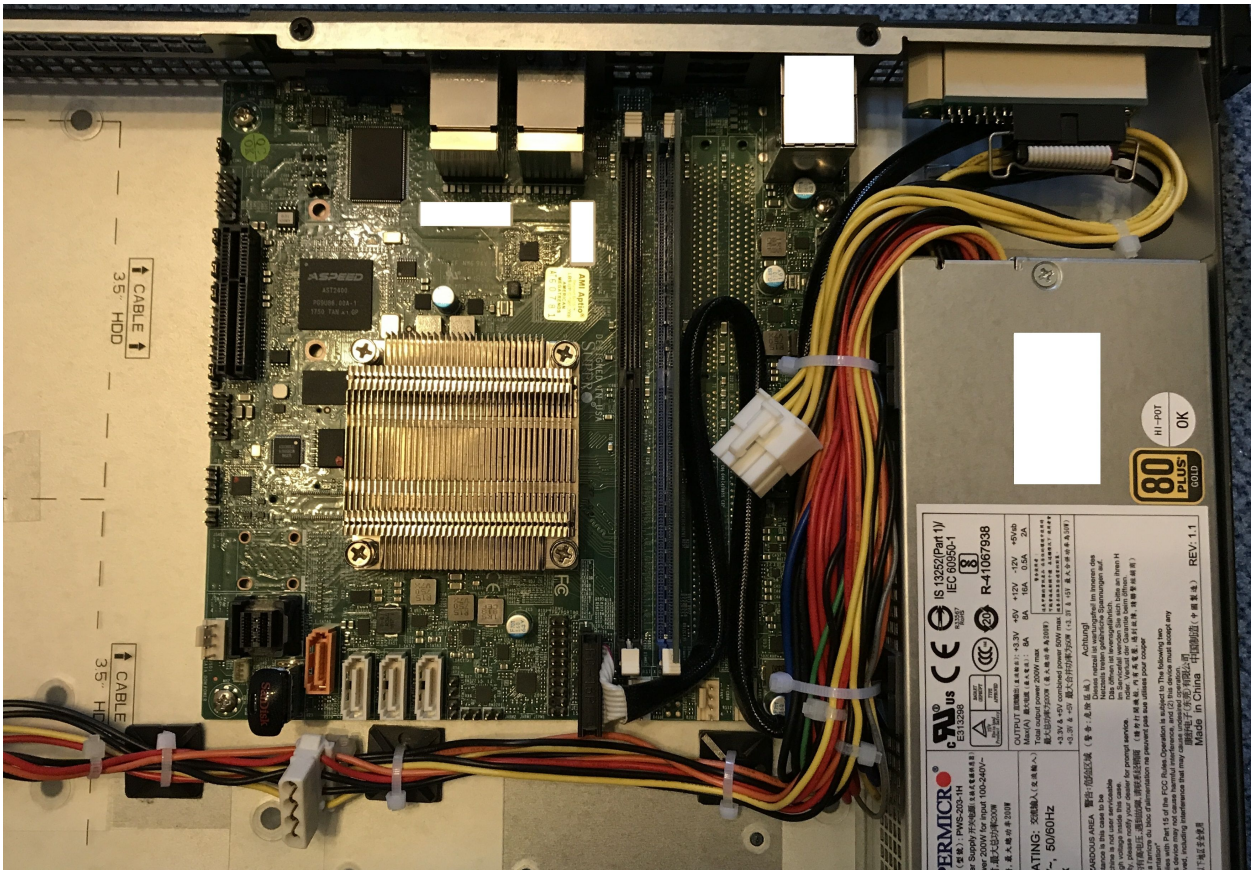
- 1x Supermicro RSC-RR1U-E8 (Riser Card)
- 1x Supermicro MCP-120-00063-0N (Riser Card Bracket)

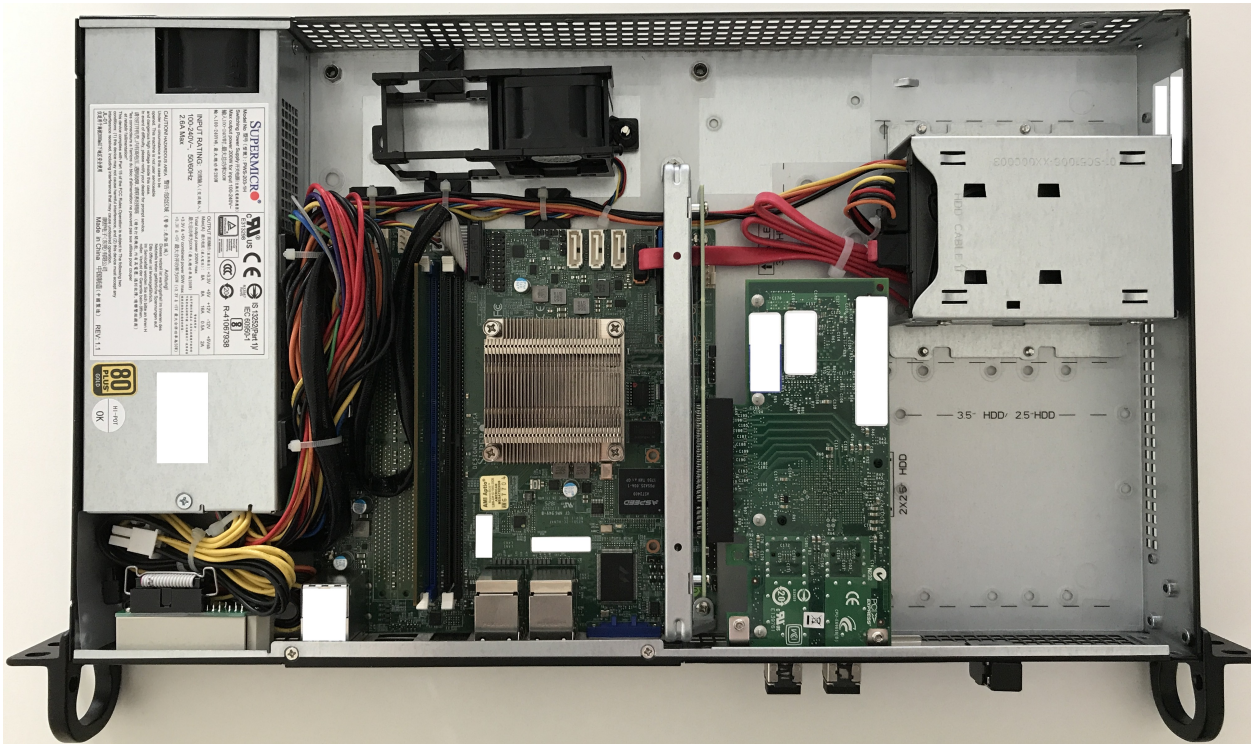
Latest VyOS rolling releases boot without any problem on this board. You also receive a nice IPMI interface realized with an ASPEED AST2400 BMC (no information about OpenBMC so far on this motherboard).

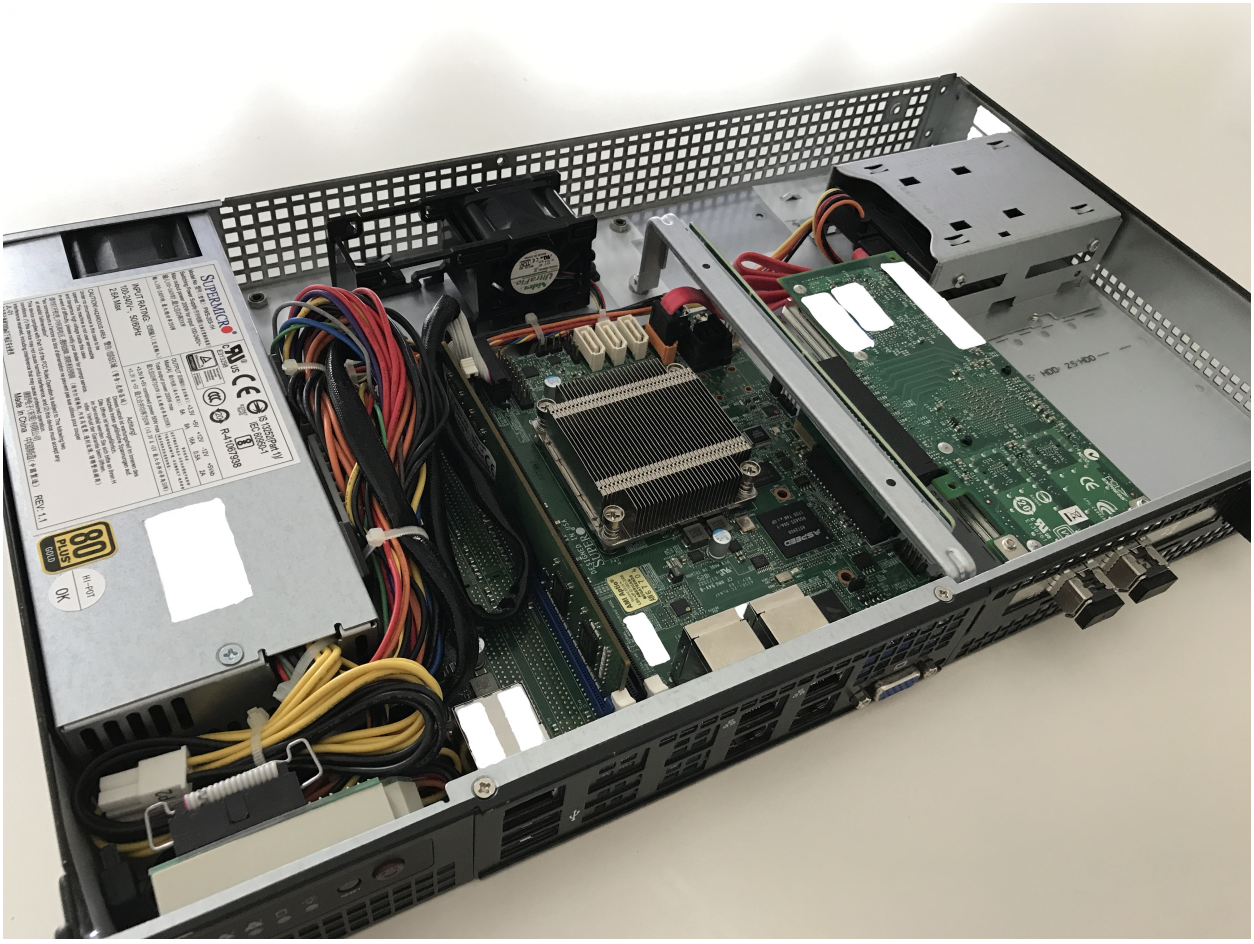
Pictures

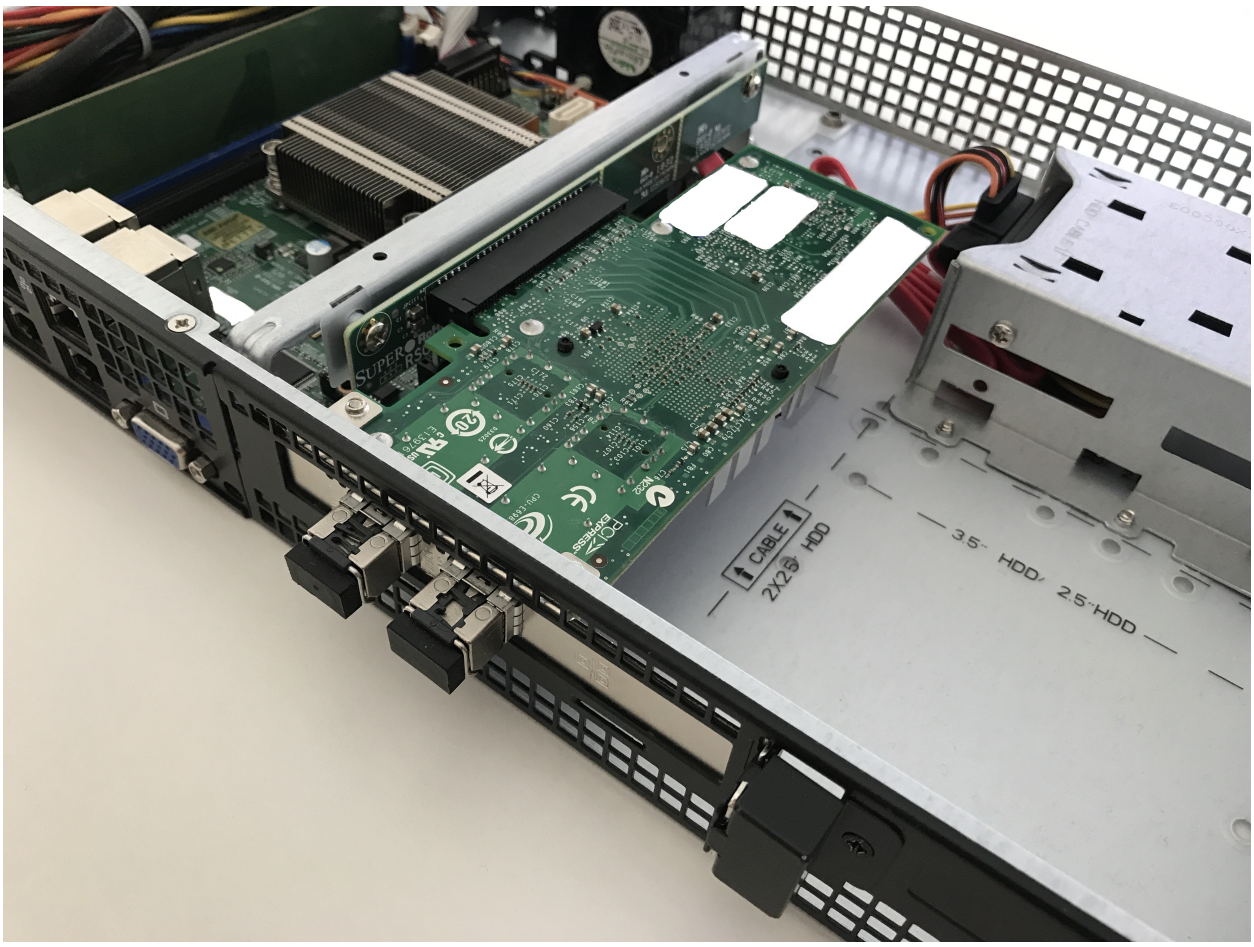





CABLE
3.5" HDD
CABLE
3.5" HDD
80 PLUS GOLD
HI-POT
OK
IS 13252(Part 1)/
IEC 60950-1
R-41067938
REV: 1.1
Made in China


SUPERMICRO
80 PLUS GOLD
HI-POT
OK
3.5" HDD/ 2.5" HDD
2X2.5" HDD


SUPERMICRO
80 PLUS
GOLD
HI-POT
OK


CABLE
2X2.5" HDD
3.5" HDD / 2.5" HDD

4.4.2 PC Engines APU4

As this platform seems to be quite common in terms of noise, cost, power and performance it makes sense to write a small installation manual.

This guide was developed using an APU4C4 board with the following specs:

- AMD Embedded G series GX-412TC, 1 GHz quad Jaguar core with 64 bit and AES-NI support, 32K data + 32K instruction cache per core, shared 2MB L2 cache.
- 4 GB DDR3-1333 DRAM, with optional ECC support
- About 6 to 10W of 12V DC power depending on CPU load
- 2 miniPCI express (one with SIM socket for 3G modem).
- 4 Gigabit Ethernet channels using Intel i211AT NICs

The board can be powered via 12V from the front or via a 5V onboard connector.

Shopping Cart

- 1x apu4c4 = 4 i211AT LAN / AMD GX-412TC CPU / 4 GB DRAM / dual SIM
- 1x Kingston SUV500MS/120G
- 1x VARIA Group Item 326745 19” dual rack for APU4

The 19” enclosure can accommodate up to two APU4 boards - there is a single and dual front cover.

Extension Modules

WiFi

Refer to *WLAN/WIFI - Wireless LAN* for additional information, below listed modules have been tested successfully on this Hardware platform:

- Compex WLE900VX mini-PCIe WiFi module, only supported in mPCIe slot 1.
- Intel Corporation AX200 mini-PCIe WiFi module, only supported in mPCIe slot 1. (see *Intel AX200*)

WWAN

Refer to *WWAN - Wireless Wide-Area-Network* for additional information, below listed modules have been tested successfully on this Hardware platform using VyOS 1.3 (equuleus):

- Sierra Wireless AirPrime MC7304 miniPCIe card (LTE)
- Sierra Wireless AirPrime MC7430 miniPCIe card (LTE)
- Sierra Wireless AirPrime MC7455 miniPCIe card (LTE)
- Sierra Wireless AirPrime MC7710 miniPCIe card (LTE)
- Huawei ME909u-521 miniPCIe card (LTE)

VyOS 1.2 (crux)

Depending on the VyOS versions you intend to install there is a difference in the serial port settings (T1327).

Create a bootable USB pendrive using e.g. Rufus on a Windows machine.

Connect serial port to a PC through null modem cable (RXD / TXD crossed over). Set terminal emulator to 115200 8N1.

```
PC Engines apu4
coreboot build 20171130
BIOS version v4.6.4
4080 MB ECC DRAM
SeaBIOS (version rel-1.11.0.1-0-g90da88d)

Press F10 key now for boot menu:

Select boot device:

1. ata0-0: KINGSTON SUV500MS120G ATA-11 Hard-Disk (111 GiBytes)
2. USB MSC Drive Generic Flash Disk 8.07
3. Payload [memtest]
4. Payload [setup]
```

Now boot from the `USB MSC Drive Generic Flash Disk 8.07` media by pressing `2`, the VyOS boot menu will appear, just wait 10 seconds or press `Enter` to continue.

```
lqqq
```

```
set system console device ttyS0 speed 115200
```

Note: Once you `commit` the above changes access to the serial interface is lost until you set your terminal emulator to 115200 8N1 again.

```
vyos@vyos# show system console
 device ttyS0 {
   speed 115200
 }
```

VyOS 1.2 (rolling)

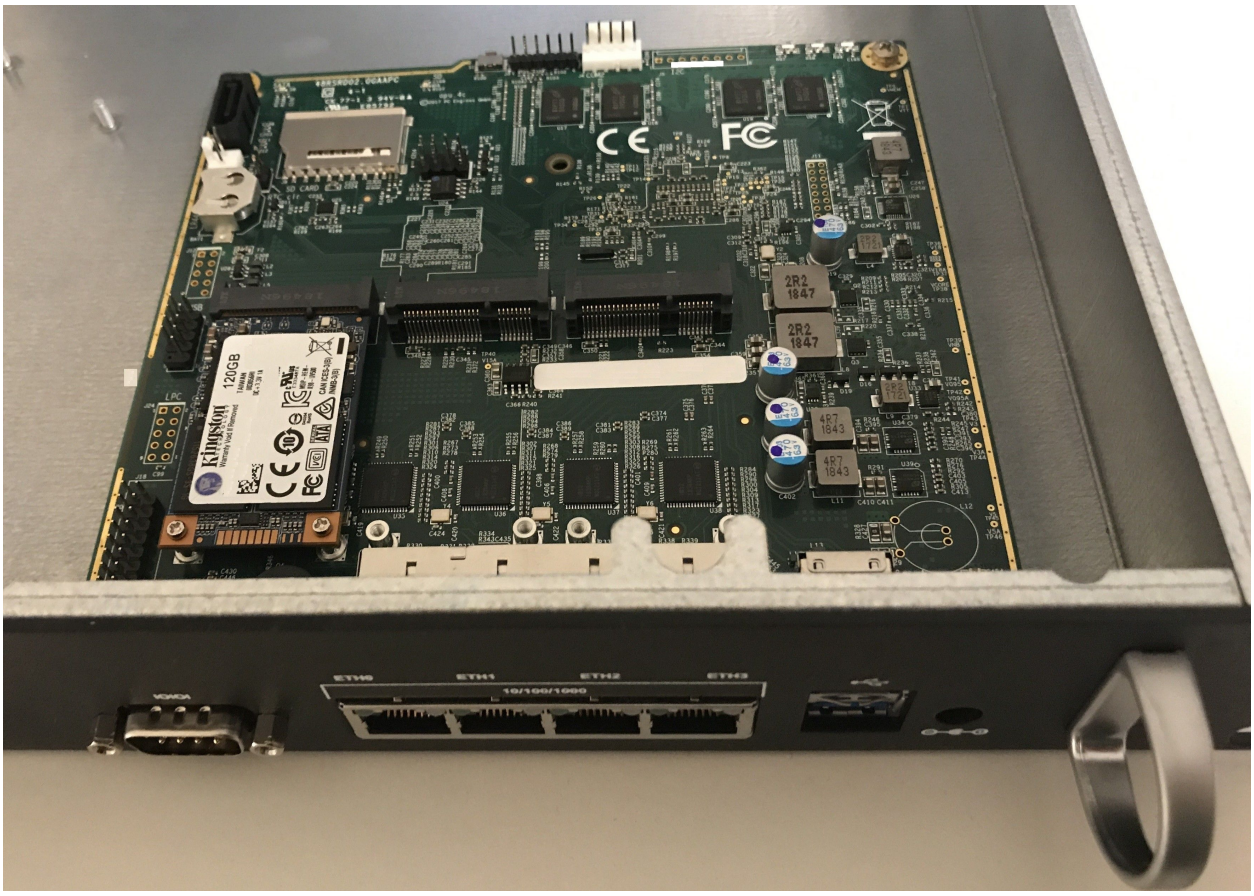
Installing the rolling release on an APU2 board does not require any change on the serial console from your host side as T1327 was successfully implemented.

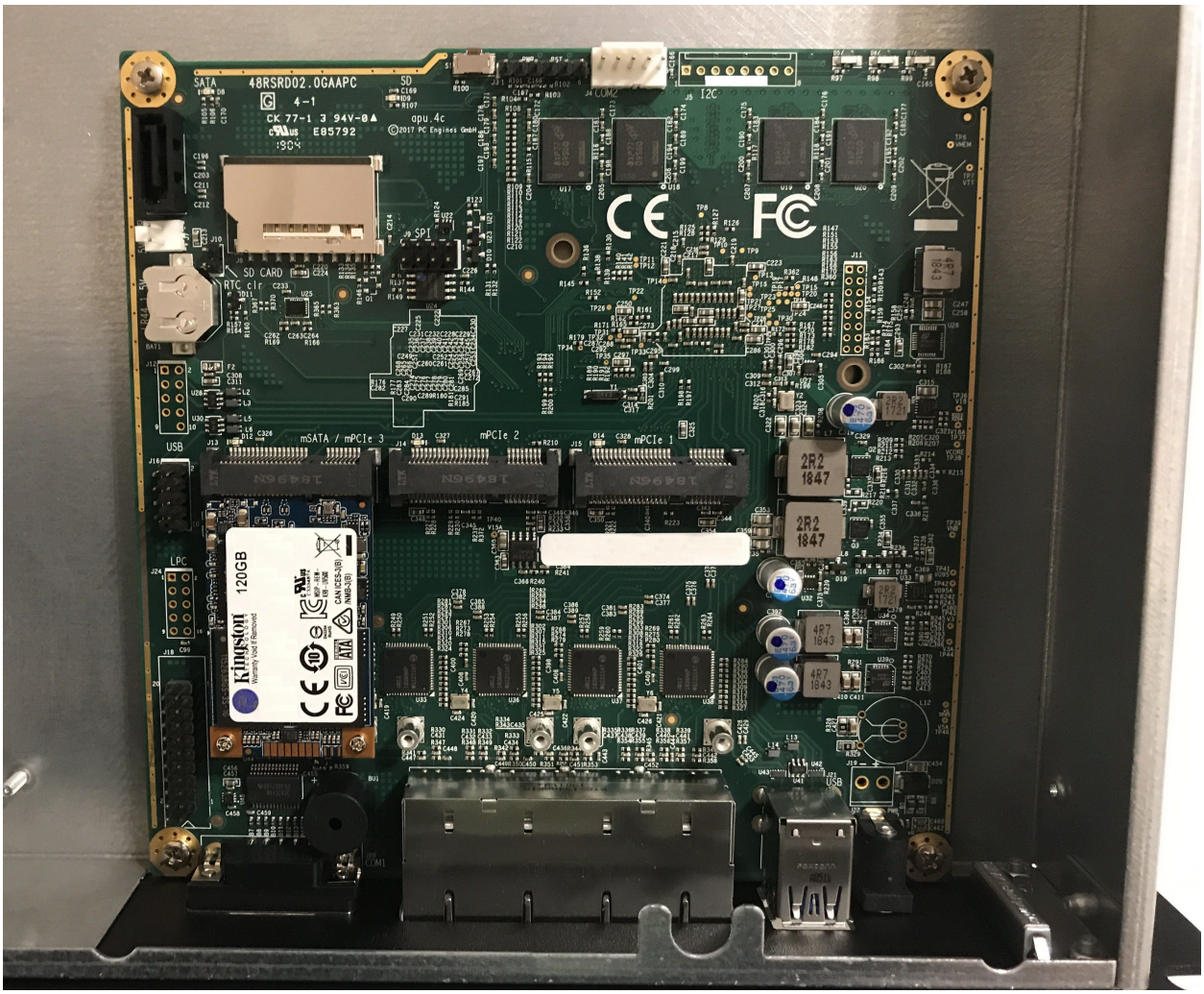
Simply proceed with a regular image installation as described in *Installation*.

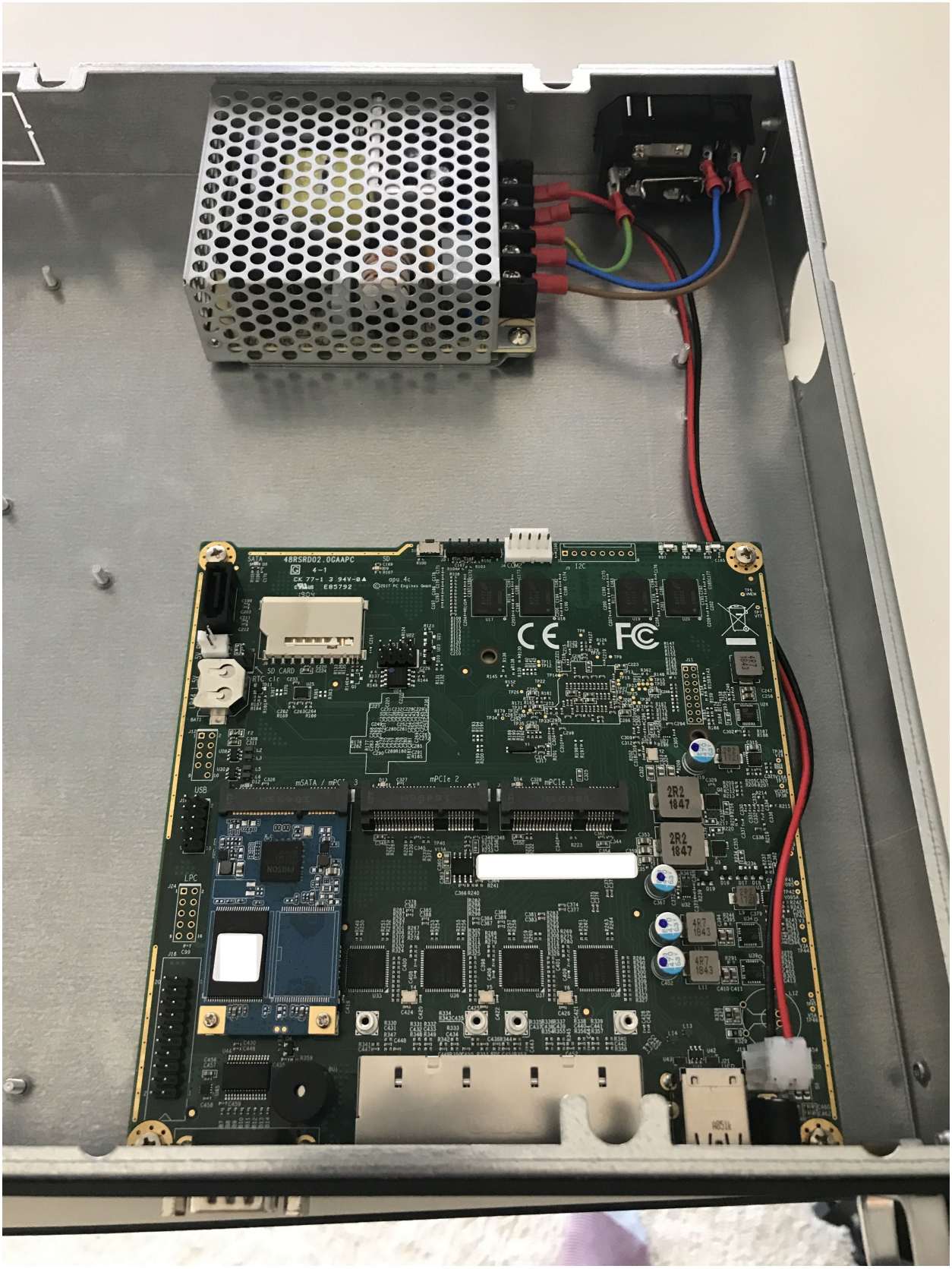
Pictures

Note: Both device types operate without any moving parts and emit zero noise.

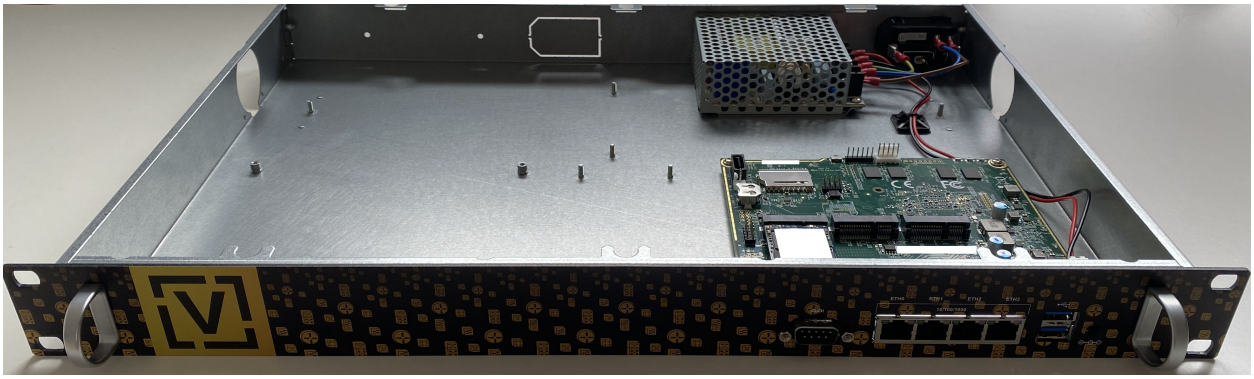
Rack Mount


Kingston
120GB
ETH0
ETH1
ETH2
ETH3
10/100/1000
VGA


SATA
48RSRD02.0GAAPC
SD
I2C
SD CARD
RTC clr
SPI
mSATA / mPCIe 3
mPCIe 2
mPCIe 1
USB
LPC
120GB
Kingston
2R2
1847
4R7
1843


SD CARD
mSATA / mPCIe 3
mPCIe 2
mPCIe 1
USB
LPC

VyOS custom print

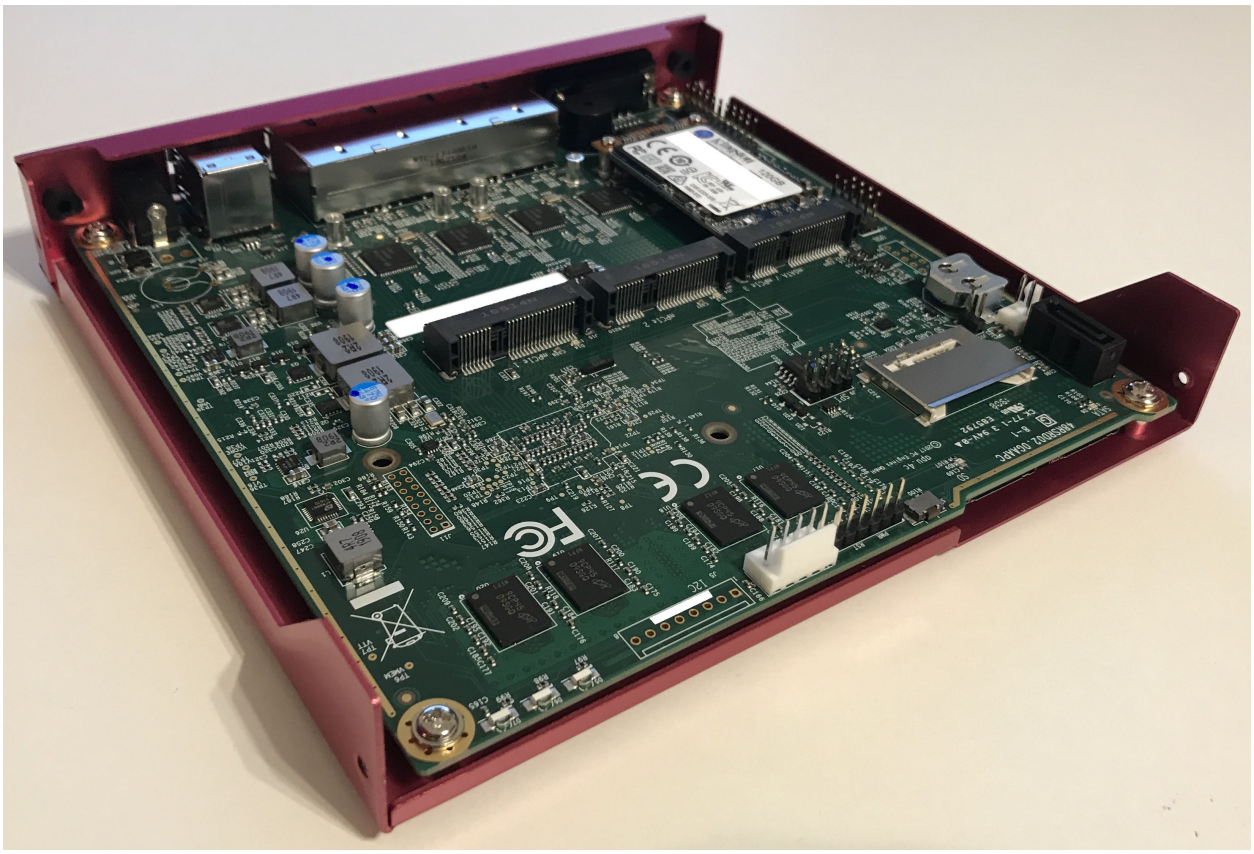


Desktop / Bench Top

4.4.3 Qotom Q355G4

The install on this Q355G4 box is pretty much plug and play. The port numbering the OS does might differ from the labels on the outside, but the UEFI firmware has a port blink test built in with MAC addresses so you can very quickly identify which is which. MAC labels are on the inside as well, and this test can be done from VyOS or plain Linux too. Default settings in the UEFI will make it boot, but depending on your installation wishes (i.e. storage type, boot type, console type) you might want to adjust them. This Qotom company seems to be the real OEM/ODM for many other relabelling companies like Protectli.

Kingston
120GB



Hardware

There are a number of other options, but they all seem to be close to Intel reference designs, with added features like more serial ports, more network interfaces and the likes. Because they don't deviate too much from standard designs all the hardware is well-supported by mainline. It accepts one LPDDR3 SO-DIMM, but chances are that if you need more than that, you'll also want something even beefier than an i5. There are options for antenna holes, and SIM slots, so you could in theory add an LTE/Cell modem (not tested so far).

The chassis is a U-shaped alu extrusion with removable I/O plates and removable bottom plate. Cooling is completely passive with a heatsink on the SoC with internal and external fins, a flat interface surface, thermal pad on top of that, which then directly attaches to the chassis, which has fins as well. It comes with mounting hardware and rubber feet, so you could place it like a desktop model or mount it on a VESA mount, or even wall mount it with the provided mounting plate. The closing plate doubles as internal 2.5" mounting place for an HDD or SSD, and comes supplied with a small SATA cable and SATA power cable.

Power supply is a 12VDC barrel jack, and included switching power supply, which is why SATA power regulation is on-board. Internally it has a NUC-board-style on-board 12V input header as well, the molex locking style.

There are WDT options and auto-boot on power enable, which is great for remote setups. Firmware is reasonably secure (no backdoors found, BootGuard is enabled in enforcement mode, which is good but also means no coreboot option), yet has most options available to configure (so it's not locked out like most firmwares are).

An external RS232 serial port is available, internally a GPIO header as well. It does have Realtek based audio on board for some reason, but you can disable that. Booting works on both USB2 and USB3 ports. Switching between serial BIOS mode and HDMI BIOS mode depends on what is connected at startup; it goes into serial mode if you disconnect HDMI and plug in serial, in all other cases it's HDMI mode.

4.4.4 Partaker i5

I believe this is actually the same hardware as the Protectli. I purchased it in June 2018. It came pre-loaded with pfSense.

Manufacturer product page.

Installation

- Write VyOS ISO to USB drive of some sort
- Plug in VGA, power, USB keyboard, and USB drive
- Press "SW" button on the front (this is the power button; I don't know what "SW" is supposed to mean).
- Begin rapidly pressing delete on the keyboard. The boot prompt is very quick, but with a few tries you should be able to get into the BIOS.
- Chipset > South Bridge > USB Configuration: set XHCI to Disabled and USB 2.0 (EHCI) to Enabled. Without doing this, the USB drive won't boot.
- Boot to the VyOS installer and install as usual.

Warning the interface labels on my device are backwards; the left-most "LAN4" port is eth0 and the right-most "LAN1" port is eth3.

4.4.5 Acrosser AND-J190N1

This microbox network appliance was build to create OpenVPN bridges. It can saturate a 100Mbps link. It is a small (serial console only) PC with 6 Gb LAN

You may have to add your own RAM and HDD/SSD. There is no VGA connector. But Acrosser provides a DB25 adapter for the VGA header on the motherboard (not used).

BIOS Settings:

First thing you want to do is getting a more user friendly console to configure BIOS. Default VT100 brings a lot of issues. Configure VT100+ instead.

For practical issues change speed from 115200 to 9600. 9600 is the default speed at which both linux kernel and VyOS will reconfigure the serial port when loading.

Connect to serial (115200bps). Power on the appliance and press Del in the console when requested to enter BIOS settings.

Advanced > Serial Port Console Redirection > Console Redirection Settings:

- Terminal Type : VT100+
- Bits per second : 9600

Save, reboot and change serial speed to 9600 on your client.

Some options have to be changed for VyOS to boot correctly. With XHCI enabled the installer can't access the USB key. Enable EHCI instead.

Reboot into BIOS, Chipset > South Bridge > USB Configuration:

- Disable XHCI
- Enable USB 2.0 (EHCI) Support

Install VyOS:

Create a VyOS bootable USB key. I used the 64-bit ISO (VyOS 1.1.7) and LinuxLive USB Creator.

I'm not sure if it helps the process but I changed default option to live-serial (line "default xxxx") on the USB key under syslinux/syslinux.cfg.

I connected the key to one black USB port on the back and powered on. The first VyOS screen has some readability issues. Press `Enter` to continue.

Then VyOS should boot and you can perform the `install image`

4.5 Update VyOS

New system images can be added using the `add system image` command. The command will extract the chosen image and will prompt you to use the current system configuration and SSH security keys, allowing for the new image to boot using the current configuration.

Note: Only LTS releases are PGP-signed.

`add system image <url | path> [vrf name] [username user [password pass]]`

Use this command to install a new system image. You can reach the image from the web (`http://`, `https://`) or from your local system, e.g. /tmp/vyos-1.2.3-amd64.iso.

The *add system image* command also supports installing new versions of VyOS through an optional given VRF. Also if URL in question requires authentication, you can specify an optional username and password via the commandline which will be passed as "Basic-Auth" to the server.

If there is not enough **free disk space available**, the installation will be canceled. To delete images use the `delete system image` command.

VyOS configuration is associated to each image, and **each image has a unique copy of its configuration**. This is different than a traditional network router where the configuration is shared across all images.

Note: If you have any personal files, like some scripts you created, and you don't want them to be lost during the upgrade, make sure those files are stored in `/config` as this directory is always copied to newer installed images.

You can access files from a previous installation and copy them to your current image if they were located in the `/config` directory. This can be done using the `copy` command. So, for instance, in order to copy `/config/config.boot` from VyOS 1.2.1 image, you would use the following command:

```
copy file 1.2.1://config/config.boot to /tmp/config.boot.1.2.1
```

4.5.1 Example

```
vyos@vyos:~$ add system image https://downloads.vyos.io/rolling/current/amd64/vyos-
↪rolling-latest.iso
Trying to fetch ISO file from https://downloads.vyos.io/rolling/current/amd64/vyos-
↪rolling-latest.iso
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100  338M  100  338M    0     0  3837k      0  0:01:30  0:01:30 --:--:-- 3929k
ISO download succeeded.
Checking for digital signature file...
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
  0     0    0     0    0     0      0      0 --:--:-- --:--:-- --:--:--     0
curl: (22) The requested URL returned error: 404 Not Found

Unable to fetch digital signature file.
Do you want to continue without signature check? (yes/no) [yes]
Checking MD5 checksums of files on the ISO image...OK.
Done!

What would you like to name this image? [vyos-1.3-rolling-201912201452]:

OK.  This image will be named: vyos-1.3-rolling-201912201452
```

Hint: The most up-do-date Rolling Release for AMD64 can be accessed using the following URL:

https://downloads.vyos.io/rolling/current/amd64/vyos-rolling-latest.iso

After reboot you might want to verify the version you are running with the `show version` command.

4.6 Image Management

The VyOS image-based installation is implemented by creating a directory for each image on the storage device selected during the install process.

The directory structure of the boot device:

```
/
/boot
/boot/grub
/boot/1.2.0-rolling+201810021347
```

The image directory contains the system kernel, a compressed image of the root filesystem for the OS, and a directory for persistent storage, such as configuration. On boot, the system will extract the OS image into memory and mount the appropriate live-rw sub-directories to provide persistent storage system configuration.

This process allows for a system to always boot to a known working state, as the OS image is fixed and non-persistent. It also allows for multiple releases of VyOS to be installed on the same storage device. The image can be selected manually at boot if needed, but the system will otherwise boot the image configured to be the default.

show system image

List all available system images which can be booted on the current system.

```
vyos@vyos:~$ show system image
The system currently has the following image(s) installed:

   1: 1.2.0-rolling+201810021347 (default boot)
   2: 1.2.0-rolling+201810021217
   3: 1.2.0-rolling+201809252218
```

delete system image [image-name]

Delete no longer needed images from the system. You can specify an optional image name to delete, the image name can be retrieved via a list of available images can be shown using the `show system image`.

```
vyos@vyos:~$ delete system image
The following image(s) can be deleted:

   1: 1.3-rolling-201912181733 (default boot) (running image)
   2: 1.3-rolling-201912180242
   3: 1.2.2
   4: 1.2.1

Select the image to delete: 2

Are you sure you want to delete the
"1.3-rolling-201912180242" image? (Yes/No) [No]: y
Deleting the "1.3-rolling-201912180242" image...
Done
```

show version

Show current system image version.

```
vyos@vyos:~$ show version
Version:          VyOS 1.3-rolling-201912181733
Built by:         autobuild@vyos.net
Built on:         Wed 18 Dec 2019 17:33 UTC
Build UUID:       bccde2c3-261c-49cc-b421-9b257204e06c
Build Commit ID:  f7ce0d8a692f2d

Architecture:     x86_64
Boot via:         installed image
System type:      bare metal

Hardware vendor:  VMware, Inc.
Hardware model:   VMware Virtual Platform
Hardware S/N:     VMware-42 1d 83 b9 fe c1 bd b2-7d 3d 49 db 94 18 f5 c9
Hardware UUID:    b9831d42-c1fe-b2bd-7d3d-49db9418f5c9

Copyright:        VyOS maintainers and contributors
```

4.6.1 System rollback

If you need to rollback to a previous image, you can easily do so. First check the available images through the `show system image` command and then select your image with the following command:

`set system image default-boot [image-name]`

Select the default boot image which will be started on the next boot of the system.

Then reboot the system.

Note: VyOS automatically associates the configuration to the image, so you don't need to worry about that. Each image has a unique copy of its configuration.

If you have access to the console, there is a another way to select your booting image: reboot and use the GRUB menu at startup.

4.7 Migrate from Vyatta Core

VyOS 1.x line aims to preserve backward compatibility and provide a safe upgrade path for existing Vyatta Core users. You may think of VyOS 1.0.0 as VC7.0.

4.7.1 Vyatta release compatibility

Vyatta Core releases from 6.5 to 6.6 should be 100% compatible.

Vyatta Core 6.4 and earlier may have incompatibilities. In Vyatta 6.5 the "modify" firewall was removed and replaced with the `set policy route` command family, old configs can not be automatically converted. You will have to adapt it to post-6.5 Vyatta syntax manually.

Note: Also, in Vyatta Core 6.5 remote access VPN interfaces have been renamed from `pppX` to `l2tpX` and `pptpX`. If you are using zone based firewalling in Vyatta Core pre-6.5 versions, make sure to change interface names in rules for remote access VPN.

4.7.2 Upgrade procedure

You just use `add system image`, as if it was a new VC release (see *Update VyOS* for additional information). The only thing you want to do is to verify the new images digital signature. You will have to add the public key manually once as it is not shipped the first time.

```
vyatta@vyatta:~$ wget http://wiki.vyos.net/so3group_maintainers.key
Connecting to vyos.net (x.x.x.x:80)
so3group_maintainers 100% |************************|  3125  --:--:-- ETA
vyatta@vyatta:~$ sudo apt-key add so3group_maintainers.key
OK
vyatta@vyatta:~$
```

For completion the key below corresponds to the key listed in the URL above.

```
-----BEGIN PGP PUBLIC KEY BLOCK-----
Version: GnuPG v1.4.12 (GNU/Linux)

mQINBFIIUZwBEADGl+wkZpYytQxd6LnjDZZScziBKYJbjInetYeS0SUrgpqnPkzL
2CiGfPczLwpYY0zWxpUhTvqjFsE5yDpgs0sPXIgUTFE1qfZQE+WD1I1EUM6sp/38
2xKQ9QaNc8oHuYINLYYmNYra6ZjIGtQP9WOX//IDYB3fhdwlmiW2z0hux2OnPWdh
hPZAmSrx5AiXFEEREJ1cAQyvYk7hgIRvM/rdQMUm+u4/z+S4mxCHE10KzlqOGhRv
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ZPbqbo8uuldZIRJRGnfx+vAR9812yo38NVZ/X0P/hkkrx+UeGVgpC/ao5XLRiOzL
7ZBMWLA6FVmZ7mkpqdzuMXX5548ApACm6EKErULIhTYDGDzFxA3cf6gr5VVi4usD
wglVs+FHuiLehmuuPTMoVcT2R6+Ht44hG3BmQmKzh/SSEa1g9gKgrhZrMdIyK4hu
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JuN485tcXxgQCadFZB0gcipQAvVf4b810HrY88g6FldfauHxiACOlXscZwARAQAB
tDBTTzMgR3JvdXAgTWFpbnRhaW5lcnMgPG1haW50YWluZXJzQHNvM2dyb3VwLm5l
dD6JAjgEEwECACIFAlIIUZwCGwMGCwkIBwMCBhUIAgkKCwQWAgMBAh4BAheAAAoJ
ELdE4lqkQubp8GsQAKntoRFG6bWX/4WPw7Vo7kIF5kWcmv3lVb0AQkacscWope7T
Iq0VcgpAycJue2bSS9LAsvNtpVkQmFawbwFjqB3CC5NbPNQ4Kf+gswKa+yaHwejo
7dkslAwxgXHe5g76DG7CVLMsMg6zVDFYuzeksPywls/OJBIpkuGqeXy9tAHjQzjA
SlZV3Gsx7azESjiVQ73EUBt2OXkwN4TN9TEHAnVsrNIXHwFl1VfFsSG1Q6uZDtkk
CB4DZJKN4RzCY2QSwMAqRRC2OXdwk5IAk8wwCGoFpp0UV6CO9YCeOaqJderEcBA4
MGHqdiPDIbH5wvckjZzFznU/Paz3MwPwBdtN+WSKvwf+JItSiUqm8Dy2Pl/1cnux
1g1I4WQlXUVaS/MDusqL7tbS8k5A5a2+YVMxShWH9BhXZwNXzEihl4sm8Hrg5SvZ
givJj2y93WoL69Wq0/86wkkH2xcrz4gsiUcQf5YXU/RHXOLnPR29/pg8TS0L7sST
dv0X23C2IpfqYoqN7YZ3K0Wczhi0yLPCrc27IczuHgjt/8ICda11xhB1t/pUbvnX
oksehaLp8O3uU8GyAsTfUgpijZFc/3jIadOl0L9NGUbYYgPzFeaZTa/njeEbz3wX
PZMn278sbL9UhupI5Hx7eREbKzV4VPVKz81ndKNMXyuJHXv2R0xou3nvuo1WuQIN
BFIIUZwBEADAhoYPDCSogG41Naq+wFkG+IPszqe0dW/UWg0xrZDT0UblwDSd4OGY
7FATMIhjOUyFxk6+XKA5CDCWP8Npkl0modTL59uVWNxU1vUKincc/j4ipHQeAhE6
fvZkrprvADD8TYIGesl/3EGNc7bzc5ZqX71hKPHG+autRtgFSOR2PSXD9MlJXIBb
RzHAXxlh72zvsGadcxLJm4pSWXitkR/5Wc3e0IippKdzGwZnCDpNmcBGtSTFgixP
JqyRZFVCPWs7jr/oQeZnq65wJp1KD2HvhhKHJfsPrnNjLSm1SQVh8hXzE9odcv6N
mJB7tNXywuROBt6a01ojBa9J3zuMYQj3iQl2MhxtHylKVBjr7NjZ4evZbLsRMxY1
hYk7sl+ZxCPFeOZ9D2ppU/CUDXCS095I1x+s+VuiUNf/3yd8ahCWDXVp9nsXyYjm
2pHIxb2F6r8Vd4AjlD2MQwszECS88INF3l/9ksIHEMKuuW+JAC9FiZ7k4IGcIltv
If/V2TgE6t6qoWIlmLhMTjOyJpwnokY1nIuXHH7yp+HsuqnYnf/dgLnt4czPLeHO
+TdIDHhUym0AKlCcbdgn0C6EJVTnA8BFgFjiIOMAeT0rhATg0W/cND8KQcX4V9wM
nHSEsgSEuP9H+67xuRx5Imuh5ntecrcuCYSNuOneUXWPThDKQPO9lQARAQABiQIf
BBgBAgAJBQJSCFGcAhsMAAoJELdE4lqkQubpc+0P/0IzUx8nTpF0/ii2TA0YCOgj
tviM6PRTVPrFcxijNeXiIMHZYrALYUvXxXGp1IZBP3IcOyuZNp2WLqF/f9a3cIr1
9b/LJPrwopGqV3K30lormk7hH0s3IXbhd0ZYWvRj+5kQ8TFRAFfPwjlItzjYJmYX
AGJmM9PxJID/4LgWSfQ/ZfNu7MJ7+2goQLu9b6x7UC1FlE4q1lcjBvHjVPM//S9G
lGAHaysyTjVu88W2wwBpBrO1MQnDvqFRddXPOIWp0jecBMUd4E0fB36yuStsXZT3
RN4V8vKRBYXuqHhiTwZeh153cHZk2EZBwz5A6DJubMaGdJTesHW5Qf2goph0pmjC
+XuXn8J6tc5nFDf8DP4AFVMtqa3Brj2fodWd0Zzxq3AVsbX144c1oqJUhO4t3+ie
8fD/6/jx4iuPCQTfyhHG+zGfyUb2LQ+OVLW1WYTxH5tzHaZUmZFdV2I1kuhuvZ1t
WRlmTnHZOnEb3+t8KCRWzRMfweTzXfRRKBC0/QpeX1r5pbaMHH8zF/J5PKmL0+jg
+DS8JSbSfv7Ke6rplf7lHYaDumAFZfxXuQkajzLZbX0E5Xu5BNz4Vq6LGBj7LDXL
gswIK8FFgZB+W8zwOqUV1vjIr9wkdLifXXezKpTeYpFDGLdfsK+uNAtGyvI61TDi
Pr6fWpIruuc7Gg9rUF0L
=VQTr
-----END PGP PUBLIC KEY BLOCK-----
```

Next add the VyOS image.

This example uses VyOS 1.0.0, however, it's better to install the latest release.

```
vyatta@vyatta:~$ show system image
The system currently has the following image(s) installed:
  1: VC6.6R1 (default boot) (running image)

vyatta@vyatta:~$ add system image https://downloads.vyos.io/release/legacy/1.0.0/vyos-1.
↪0.0-amd64.iso
 Trying to fetch ISO file from https://downloads.vyos.io/release/legacy/1.0.0/vyos-1.0.0-
↪amd64.iso
   % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                  Dload  Upload   Total   Spent    Left  Speed
 100  223M  100  223M    0     0   960k      0  0:03:57  0:03:57 --:--:--  657k
 ISO download succeeded.
 Checking for digital signature file...
   % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                  Dload  Upload   Total   Spent    Left  Speed
 100   836  100   836    0     0   4197      0 --:--:-- --:--:-- --:--:--  4287
 Found it.  Checking digital signature...
 gpg: directory `/root/.gnupg' created
 gpg: new configuration file `/root/.gnupg/gpg.conf' created
 gpg: WARNING: options in `/root/.gnupg/gpg.conf' are not yet active during this run
 gpg: keyring `/root/.gnupg/pubring.gpg' created
 gpg: Signature made Sun Dec 22 16:51:42 2013 GMT using RSA key ID A442E6E9
 gpg: /root/.gnupg/trustdb.gpg: trustdb created
 gpg: Good signature from "SO3 Group Maintainers <maintainers@so3group.net>"
 gpg: WARNING: This key is not certified with a trusted signature!
 gpg:          There is no indication that the signature belongs to the owner.
 Primary key fingerprint: DD5B B405 35E7 F6E3 4278  1ABF B744 E25A A442 E6E9
 Digital signature is valid.
 Checking MD5 checksums of files on the ISO image...OK.
 Done!

 What would you like to name this image? [1.0.0]: [return]
 OK.  This image will be named: 1.0.0
 Installing "1.0.0" image.
 Copying new release files...

 Would you like to save the current configuration
 directory and config file? (Yes/No) [Yes]: [return]
 Copying current configuration...

 Would you like to save the SSH host keys from your
 current configuration? (Yes/No) [Yes]: [return]
 Copying SSH keys...
 Setting up grub configuration...
 Done.

 vyatta@vyatta:~$ show system image
 The system currently has the following image(s) installed:

    1: 1.0.0 (default boot)
```

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```
   2: VC6.6R1 (running image)
```

Upon reboot, you should have a working installation of VyOS.

You can go back to your Vyatta install using the `set system image default-boot` command and selecting the your previous Vyatta Core image.

Note: Future releases of VyOS will break the direct upgrade path from Vyatta core. Please upgrade through an intermediate VyOS version e.g. VyOS 1.2. After this you can continue upgrading to newer releases once you bootet into VyOS 1.2 once.

CHAPTER

FIVE

QUICK START

This chapter will guide you on how to get up to speed quickly using your new VyOS system. It will show you a very basic configuration example that will provide a *NAT* gateway for a device with two network interfaces (*eth0* and *eth1*).

5.1 Configuration Mode

By default, VyOS is in operational mode, and the command prompt displays a *$*. To configure VyOS, you will need to enter configuration mode, resulting in the command prompt displaying a *#*, as demonstrated below:

```
vyos@vyos$ configure
vyos@vyos#
```

5.2 Commit and Save

After every configuration change, you need to apply the changes by using the following command:

```
commit
```

Once your configuration works as expected, you can save it permanently by using the following command:

```
save
```

5.3 Interface Configuration

- Your outside/WAN interface will be *eth0*. It will receive its interface address via DHCP.
- Your internal/LAN interface will be *eth1*. It will use a static IP address of *192.168.0.1/24*.

After switching to *Configuration Mode* issue the following commands:

```
set interfaces ethernet eth0 address dhcp
set interfaces ethernet eth0 description 'OUTSIDE'
set interfaces ethernet eth1 address '192.168.0.1/24'
set interfaces ethernet eth1 description 'INSIDE'
```

5.4 SSH Management

After switching to *Configuration Mode* issue the following commands, and your system will listen on every interface for incoming SSH connections. You might want to check the *SSH* chapter on how to listen on specific addresses only.

```
set service ssh port '22'
```

5.5 DHCP/DNS quick-start

The following settings will configure DHCP and DNS services on your internal/LAN network, where VyOS will act as the default gateway and DNS server.

- The default gateway and DNS recursor address will be *192.168.0.1/24*
- The address range *192.168.0.2/24 - 192.168.0.8/24* will be reserved for static assignments
- DHCP clients will be assigned IP addresses within the range of *192.168.0.9 - 192.168.0.254* and have a domain name of *internal-network*
- DHCP leases will hold for one day (86400 seconds)
- VyOS will serve as a full DNS recursor, replacing the need to utilize Google, Cloudflare, or other public DNS servers (which is good for privacy)
- Only hosts from your internal/LAN network can use the DNS recursor

```
set service dhcp-server shared-network-name LAN subnet 192.168.0.0/24 default-router
↪'192.168.0.1'
set service dhcp-server shared-network-name LAN subnet 192.168.0.0/24 name-server '192.
↪168.0.1'
set service dhcp-server shared-network-name LAN subnet 192.168.0.0/24 domain-name 'vyos.
↪net'
set service dhcp-server shared-network-name LAN subnet 192.168.0.0/24 lease '86400'
set service dhcp-server shared-network-name LAN subnet 192.168.0.0/24 range 0 start 192.
↪168.0.9
set service dhcp-server shared-network-name LAN subnet 192.168.0.0/24 range 0 stop '192.
↪168.0.254'

set service dns forwarding cache-size '0'
set service dns forwarding listen-address '192.168.0.1'
set service dns forwarding allow-from '192.168.0.0/24'
```

5.6 NAT

The following settings will configure *SNAT* rules for our internal/LAN network, allowing hosts to communicate through the outside/WAN network via IP masquerade.

```
set nat source rule 100 outbound-interface 'eth0'
set nat source rule 100 source address '192.168.0.0/24'
set nat source rule 100 translation address masquerade
```

5.7 Firewall

Add a set of firewall policies for our outside/WAN interface.

This configuration creates a proper stateful firewall that blocks all traffic which was not initiated from the internal/LAN side first.

```
set firewall name OUTSIDE-IN default-action 'drop'
set firewall name OUTSIDE-IN rule 10 action 'accept'
set firewall name OUTSIDE-IN rule 10 state established 'enable'
set firewall name OUTSIDE-IN rule 10 state related 'enable'

set firewall name OUTSIDE-LOCAL default-action 'drop'
set firewall name OUTSIDE-LOCAL rule 10 action 'accept'
set firewall name OUTSIDE-LOCAL rule 10 state established 'enable'
set firewall name OUTSIDE-LOCAL rule 10 state related 'enable'
set firewall name OUTSIDE-LOCAL rule 20 action 'accept'
set firewall name OUTSIDE-LOCAL rule 20 icmp type-name 'echo-request'
set firewall name OUTSIDE-LOCAL rule 20 protocol 'icmp'
set firewall name OUTSIDE-LOCAL rule 20 state new 'enable'
```

If you wanted to enable SSH access to your firewall from the outside/WAN interface, you could create some additional rules to allow that kind of traffic.

These rules allow SSH traffic and rate limit it to 4 requests per minute. This blocks brute-forcing attempts:

```
set firewall name OUTSIDE-LOCAL rule 30 action 'drop'
set firewall name OUTSIDE-LOCAL rule 30 destination port '22'
set firewall name OUTSIDE-LOCAL rule 30 protocol 'tcp'
set firewall name OUTSIDE-LOCAL rule 30 recent count '4'
set firewall name OUTSIDE-LOCAL rule 30 recent time '60'
set firewall name OUTSIDE-LOCAL rule 30 state new 'enable'

set firewall name OUTSIDE-LOCAL rule 31 action 'accept'
set firewall name OUTSIDE-LOCAL rule 31 destination port '22'
set firewall name OUTSIDE-LOCAL rule 31 protocol 'tcp'
set firewall name OUTSIDE-LOCAL rule 31 state new 'enable'
```

Apply the firewall policies:

```
set interfaces ethernet eth0 firewall in name 'OUTSIDE-IN'
set interfaces ethernet eth0 firewall local name 'OUTSIDE-LOCAL'
```

Commit changes, save the configuration, and exit configuration mode:

```
vyos@vyos# commit
vyos@vyos# save
Saving configuration to '/config/config.boot'...
Done
vyos@vyos# exit
vyos@vyos$
```

5.8 Hardening

Especially if you are allowing SSH remote access from the outside/WAN interface, there are a few additional configuration steps that should be taken.

Replace the default *vyos* system user:

```
set system login user myvyosuser authentication plaintext-password mysecurepassword
```

Set up *Key Based Authentication*:

```
set system login user myvyosuser authentication public-keys myusername@mydesktop type␣
↪ssh-rsa
set system login user myvyosuser authentication public-keys myusername@mydesktop key␣
↪contents_of_id_rsa.pub
```

Finally, try and SSH into the VyOS install as your new user. Once you have confirmed that your new user can access your router without a password, delete the original `vyos` user and completely disable password authentication for *SSH*:

```
delete system login user vyos
set service ssh disable-password-authentication
```

As above, commit your changes, save the configuration, and exit configuration mode:

```
vyos@vyos# commit
vyos@vyos# save
Saving configuration to '/config/config.boot'...
Done
vyos@vyos# exit
vyos@vyos$
```

You now should have a simple yet secure and functioning router to experiment with further. Enjoy!

CHAPTER

SIX

COMMAND LINE INTERFACE

The VyOS CLI (Command-Line Interface) comprises an operational and a configuration mode.

6.1 Operational Mode

Operational mode allows for commands to perform operational system tasks and view system and service status, while configuration mode allows for the modification of system configuration.

The CLI provides a built-in help system. In the CLI the ? key may be used to display available commands. The TAB key can be used to auto-complete commands and will present the help system upon a conflict or unknown value.

For example typing sh followed by the TAB key will complete to show. Pressing TAB a second time will display the possible sub-commands of the show command.

```
vyos@vyos:~$ s[tab]
set   show
```

Example showing possible show commands:

```
vyos@vyos:~$ show [tab]
Possible completions:
  arp           Show Address Resolution Protocol (ARP) information
  bridge        Show bridging information
  cluster       Show clustering information
  configuration Show running configuration
  conntrack     Show conntrack entries in the conntrack table
  conntrack-sync
                Show connection syncing information
  date          Show system date and time
  dhcp          Show Dynamic Host Configuration Protocol (DHCP) information
  dhcpv6        Show status related to DHCPv6
  disk          Show status of disk device
  dns           Show Domain Name Server (DNS) information
  file          Show files for a particular image
  firewall      Show firewall information
  flow-accounting
                Show flow accounting statistics
  hardware      Show system hardware details
  history       show command history
  host          Show host information
```

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```
  incoming      Show ethernet input-policy information
: q
```

You can scroll up with the keys [Shift]+[PageUp] and scroll down with [Shift]+[PageDown].

When the output of a command results in more lines than can be displayed on the terminal screen the output is paginated as indicated by a : prompt.

When viewing in page mode the following commands are available:

- q key can be used to cancel output
- space will scroll down one page
- b will scroll back one page
- return will scroll down one line
- up-arrow and down-arrow will scroll up or down one line at a time respectively
- left-arrow and right-arrow can be used to scroll left or right in the event that the output has lines which exceed the terminal size.

6.2 Configuration Mode

To enter configuration mode use the configure command:

```
vyos@vyos:~$ configure
[edit]
vyos@vyos:~#
```

Note: Prompt changes from $ to #. To exit configuration mode, type exit.

```
vyos@vyos:~# exit
exit
vyos@vyos:~$
```

See the configuration section of this document for more information on configuration mode.

CHAPTER

SEVEN

CONFIGURATION OVERVIEW

VyOS makes use of a unified configuration file for the entire system's configuration: `/config/config.boot`. This allows easy template creation, backup, and replication of system configuration. A system can thus also be easily cloned by simply copying the required configuration files.

7.1 Terminology

A VyOS system has three major types of configurations:

- **Active** or **running configuration** is the system configuration that is loaded and currently active (used by VyOS). Any change in the configuration will have to be committed to belong to the active/running configuration.
- **Working configuration** is the one that is currently being modified in configuration mode. Changes made to the working configuration do not go into effect until the changes are committed with the `commit` command. At which time the working configuration will become the active or running configuration.
- **Saved configuration** is the one saved to a file using the `save` command. It allows you to keep safe a configuration for future uses. There can be multiple configuration files. The default or "boot" configuration is saved and loaded from the file `/config/config.boot`.

7.1.1 Seeing and navigating the configuration

`show configuration`

View the current active configuration, also known as the running configuration, from the operational mode.

```
vyos@vyos:~$ show configuration
interfaces {
    ethernet eth0 {
        address dhcp
        hw-id 00:53:00:00:aa:01
    }
    loopback lo {
    }
}
service {
    ssh {
        port 22
    }
}
system {
```

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```
    config-management {
        commit-revisions 20
    }
    console {
        device ttyS0 {
            speed 9600
        }
    }
    login {
        user vyos {
            authentication {
                encrypted-password ****************
            }
            level admin
        }
    }
    ntp {
        server 0.pool.ntp.org {
        }
        server 1.pool.ntp.org {
        }
        server 2.pool.ntp.org {
        }
    }
    syslog {
        global {
            facility all {
                level notice
            }
            facility protocols {
                level debug
            }
        }
    }
}
```

By default, the configuration is displayed in a hierarchy like the above example, this is only one of the possible ways to display the configuration. When the configuration is generated and the device is configured, changes are added through a collection of `set` and `delete` commands.

show configuration commands

Get a collection of all the set commands required which led to the running configuration.

```
vyos@vyos:~$ show configuration commands
set interfaces ethernet eth0 address 'dhcp'
set interfaces ethernet eth0 hw-id '00:53:dd:44:3b:0f'
set interfaces loopback 'lo'
set service ssh port '22'
set system config-management commit-revisions '20'
set system console device ttyS0 speed '9600'
set system login user vyos authentication encrypted-password '$6$Vt68...QzF0'
set system login user vyos level 'admin'
```

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```
set system ntp server '0.pool.ntp.org'
set system ntp server '1.pool.ntp.org'
set system ntp server '2.pool.ntp.org'
set system syslog global facility all level 'notice'
set system syslog global facility protocols level 'debug'
```

Both these `show` commands should be executed when in operational mode, they do not work directly in configuration mode. There is a special way on how to *Access opmode from config mode*.

Hint: Use the `show configuration commands | strip-private` command when you want to hide private data. You may want to do so if you want to share your configuration on the forum.

---

show configuration json

View the current active configuration in JSON format.

```
{"interfaces": {"ethernet": {"eth0": {"address": ["192.0.2.11/24", "192.0.2.35/24"],
↪ "hw-id": "52:54:00:48:a0:c6"}, "eth1": {"address": ["203.0.113.1/24"], "hw-id":
↪"52:54:00:fc:50:0b"}}, "loopback": {"lo": {}}}, "protocols": {"static": {"route":
↪{"0.0.0.0/0": {"next-hop": {"192.0.2.254": {}}}}}}, "service": {"ssh": {"disable-
↪host-validation": {}}}, "system": {"config-management": {"commit-revisions": "100
↪"}, "console": {"device": {"ttyS0": {"speed": "115200"}}}, "host-name": "r11-vyos
↪", "login": {"user": {"vyos": {"authentication": {"encrypted-password": "$6$Vt68..
↪.F0", "plaintext-password": "", "public-keys": {"vyos@vyos": {"key": "AAAAxxx=",
↪"type": "ssh-rsa"}}}}}}, "name-server": ["203.0.113.254"], "ntp": {"server": {
↪"time1.vyos.net": {}, "time2.vyos.net": {}, "time3.vyos.net": {}}}, "syslog": {
↪"global": {"facility": {"all": {"level": "info"}, "protocols": {"level": "debug"}}
↪}}, "time-zone": "America/New_York"}}
```

show configuration json pretty

View the current active configuration in readable JSON format.

```
{
    "interfaces": {
        "ethernet": {
            "eth0": {
                "address": [
                    "192.0.2.11/24",
                    "192.0.2.35/24"
                ],
                "hw-id": "52:54:00:48:a0:c6"
            },
            "eth1": {
                "address": [
                    "203.0.113.1/24"
                ],
                "hw-id": "52:54:00:fc:50:0b"
            }
        },
        "loopback": {
            "lo": {}
```

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```
        }
    },
    "protocols": {
        "static": {
            "route": {
                "0.0.0.0/0": {
                    "next-hop": {
                        "192.0.2.254": {}
                    }
                }
            }
        }
    },
    "service": {
        "ssh": {
            "disable-host-validation": {}
        }
    },
    "system": {
        "config-management": {
            "commit-revisions": "100"
        },
        "console": {
            "device": {
                "ttyS0": {
                    "speed": "115200"
                }
            }
        },
        "host-name": "r11-vyos",
        "login": {
            "user": {
                "vyos": {
                    "authentication": {
                        "encrypted-password": "$6$Vt68...F0",
                        "plaintext-password": "",
                        "public-keys": {
                            "vyos@vyos": {
                                "key": "AAAAxxx=",
                                "type": "ssh-rsa"
                            }
                        }
                    }
                }
            }
        },
        "name-server": [
            "203.0.113.254"
        ],
        "ntp": {
            "server": {
                "time1.vyos.net": {},
```

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```
                "time2.vyos.net": {},
                "time3.vyos.net": {}
            }
        },
        "syslog": {
            "global": {
                "facility": {
                    "all": {
                        "level": "info"
                    },
                    "protocols": {
                        "level": "debug"
                    }
                }
            }
        },
        "time-zone": "America/New_York"
    }
}
```

The config mode

When entering the configuration mode you are navigating inside a tree structure, to enter configuration mode enter the command `configure` when in operational mode.

```
vyos@vyos$ configure
[edit]
vyos@vyos#
```

Note: When going into configuration mode, prompt changes from `$` to `#`.

All commands executed here are relative to the configuration level you have entered. You can do everything from the top level, but commands will be quite lengthy when manually typing them.

The current hierarchy level can be changed by the `edit` command.

```
[edit]
vyos@vyos# edit interfaces ethernet eth0

[edit interfaces ethernet eth0]
vyos@vyos#
```

You are now in a sublevel relative to `interfaces ethernet eth0`, all commands executed from this point on are relative to this sublevel. Use eithe the `top` or `exit` command to go back to the top of the hierarchy. You can also use the `up` command to move only one level up at a time.

show

The `show` command within configuration mode will show the working configuration indicating line changes with + for additions, > for replacements and - for deletions.

Example:

```
vyos@vyos:~$ configure
[edit]
vyos@vyos# show interfaces
 ethernet eth0 {
     description MY_OLD_DESCRIPTION
     disable
     hw-id 00:53:dd:44:3b:03
 }
 loopback lo {
 }
[edit]
vyos@vyos# set interfaces ethernet eth0 address dhcp
[edit]
vyos@vyos# set interfaces ethernet eth0 description MY_NEW_DESCRIPTION
[edit]
vyos@vyos# delete interfaces ethernet eth0 disable
[edit]
vyos@vyos# show interfaces
 ethernet eth0 {
+    address dhcp
>    description MY_NEW_DESCRIPTION
-    disable
     hw-id 00:53:dd:44:3b:03
 }
 loopback lo {
 }
```

It is also possible to display all *set* commands within configuration mode using `show | commands`

```
vyos@vyos# show interfaces ethernet eth0 | commands
set address dhcp
set hw-id 00:53:ad:44:3b:03
```

These commands are also relative to the level you are inside and only relevant configuration blocks will be displayed when entering a sub-level.

```
[edit interfaces ethernet eth0]
vyos@vyos# show
 address dhcp
 hw-id 00:53:ad:44:3b:03
```

Exiting from the configuration mode is done via the `exit` command from the top level, executing `exit` from within a sub-level takes you back to the top level.

```
[edit interfaces ethernet eth0]
vyos@vyos# exit
[edit]
vyos@vyos# exit
Warning: configuration changes have not been saved.
```

7.1.2 Editing the configuration

The configuration can be edited by the use of `set` and `delete` commands from within configuration mode.

`set`

Use this command to set the value of a parameter or to create a new element.

Configuration commands are flattened from the tree into 'one-liner' commands shown in `show configuration commands` from operation mode. Commands are relative to the level where they are executed and all redundant information from the current level is removed from the command entered.

```
[edit]
vyos@vyos# set interface ethernet eth0 address 192.0.2.100/24
```

```
[edit interfaces ethernet eth0]
vyos@vyos# set address 203.0.113.6/24
```

These two commands above are essentially the same, just executed from different levels in the hierarchy.

`delete`

To delete a configuration entry use the `delete` command, this also deletes all sub-levels under the current level you've specified in the `delete` command. Deleting an entry will also result in the element reverting back to its default value if one exists.

```
[edit interfaces ethernet eth0]
vyos@vyos# delete address 192.0.2.100/24
```

`commit`

Any change you do on the configuration, will not take effect until committed using the `commit` command in configuration mode.

```
vyos@vyos# commit
[edit]
vyos@vyos# exit
Warning: configuration changes have not been saved.
vyos@vyos:~$
```

`save`

Use this command to preserve configuration changes upon reboot. By default it is stored at */config/config.boot*. In the case you want to store the configuration file somewhere else, you can add a local path, a SCP address, a FTP address or a TFTP address.

```
vyos@vyos# save
Saving configuration to '/config/config.boot'...
Done
```

```
vyos@vyos# save [tab]
Possible completions:
  <Enter>       Save to system config file
  <file>        Save to file on local machine
  scp://<user>:<passwd>@<host>:/<file> Save to file on remote machine
  ftp://<user>:<passwd>@<host>/<file> Save to file on remote machine
  tftp://<host>/<file>      Save to file on remote machine
```

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```
vyos@vyos# save tftp://192.168.0.100/vyos-test.config.boot
Saving configuration to 'tftp://192.168.0.100/vyos-test.config.boot'...
############################################################################ 100.0%
Done
```

exit [discard]

Configuration mode can not be exited while uncommitted changes exist. To exit configuration mode without applying changes, the `exit discard` command must be used.

All changes in the working config will thus be lost.

```
vyos@vyos# exit
Cannot exit: configuration modified.
Use 'exit discard' to discard the changes and exit.
[edit]
vyos@vyos# exit discard
```

commit-confirm <minutes>

Use this command to temporarily commit your changes and set the number of minutes available for validation. `confirm` must be entered within those minutes, otherwise the system will reboot into the previous configuration. The default value is 10 minutes.

What if you are doing something dangerous? Suppose you want to setup a firewall, and you are not sure there are no mistakes that will lock you out of your system. You can use confirmed commit. If you issue the `commit-confirm` command, your changes will be commited, and if you don't issue the `confirm` command in 10 minutes, your system will reboot into previous config revision.

```
vyos@router# set interfaces ethernet eth0 firewall local name FromWorld
vyos@router# commit-confirm
commit confirm will be automatically reboot in 10 minutes unless confirmed
Proceed? [confirm]y
[edit]
vyos@router# confirm
[edit]
```

Note: A reboot because you did not enter `confirm` will not take you necessarily to the *saved configuration*, but to the point before the unfortunate commit.

---

copy

Copy a configuration element.

You can copy and remove configuration subtrees. Suppose you set up a firewall ruleset `FromWorld` with one rule that allows traffic from specific subnet. Now you want to setup a similar rule, but for different subnet. Change your edit level to `firewall name FromWorld` and use `copy rule 10 to rule 20`, then modify rule 20.

```
vyos@router# show firewall name FromWorld
 default-action drop
 rule 10 {
     action accept
     source {
         address 203.0.113.0/24
```

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```
     }
 }
[edit]
vyos@router# edit firewall name FromWorld
[edit firewall name FromWorld]
vyos@router# copy rule 10 to rule 20
[edit firewall name FromWorld]
vyos@router# set rule 20 source address 198.51.100.0/24
[edit firewall name FromWorld]
vyos@router# commit
[edit firewall name FromWorld]
```

rename

Rename a configuration element.

You can also rename config subtrees:

```
vyos@router# rename rule 10 to rule 5
[edit firewall name FromWorld]
vyos@router# commit
[edit firewall name FromWorld]
```

Note that `show` command respects your edit level and from this level you can view the modified firewall ruleset with just `show` with no parameters.

```
vyos@router# show
 default-action drop
 rule 5 {
     action accept
     source {
         address 203.0.113.0/24
     }
 }
 rule 20 {
     action accept
     source {
         address 198.51.100.0/24
     }
 }
```

comment <config node> "comment text"

Add comment as an annotation to a configuration node.

The `comment` command allows you to insert a comment above the <`config node`> configuration section. When shown, comments are enclosed with `/*` and `*/` as open/close delimiters. Comments need to be commited, just like other config changes.

To remove an existing comment from your current configuration, specify an empty string enclosed in double quote marks (`""`) as the comment text.

Example:

```
vyos@vyos# comment firewall all-ping "Yes I know this VyOS is cool"
vyos@vyos# commit
```

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```
vyos@vyos# show
 firewall {
     /* Yes I know this VyOS is cool */
     all-ping enable
     broadcast-ping disable
     ...
 }
```

Note: An important thing to note is that since the comment is added on top of the section, it will not appear if the `show <section>` command is used. With the above example, the *show firewall* command would return starting after the `firewall {` line, hiding the comment.

7.1.3 Access opmode from config mode

When inside configuration mode you are not directly able to execute operational commands.

run

Access to these commands are possible through the use of the `run [command]` command. From this command you will have access to everything accessible from operational mode.

Command completion and syntax help with ? and `[tab]` will also work.

```
[edit]
vyos@vyos# run show interfaces
Codes: S - State, L - Link, u - Up, D - Down, A - Admin Down
Interface        IP Address                        S/L  Description
---------        ----------                        ---  -----------
eth0             0.0.0.0/0                         u/u
```

7.1.4 Managing configurations

VyOS comes with an integrated versioning system for the system configuration. It automatically maintains a backup of every previous configuration which has been committed to the system. The configurations are versioned locally for rollback but they can also be stored on a remote host for archiving/backup reasons.

Local Archive

Revisions are stored on disk. You can view, compare and rollback them to any previous revisions if something goes wrong.

show system commit

View all existing revisions on the local system.

```
vyos@vyos:~$ show system commit
0   2015-03-30 08:53:03 by vyos via cli
1   2015-03-30 08:52:20 by vyos via cli
2   2015-03-26 21:26:01 by root via boot-config-loader
3   2015-03-26 20:43:18 by root via boot-config-loader
```

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```
4   2015-03-25 11:06:14 by root via boot-config-loader
5   2015-03-25 01:04:28 by root via boot-config-loader
6   2015-03-25 00:16:47 by vyos via cli
7   2015-03-24 23:43:45 by root via boot-config-loader
```

set system config-management commit-revisions <N>

You can specify the number of revisions stored on disk. N can be in the range of 0 - 65535. When the number of revisions exceeds the configured value, the oldest revision is removed. The default setting for this value is to store 100 revisions locally.

Compare configurations

VyOS lets you compare different configurations.

compare <saved | N> <M>

Use this command to spot what the differences are between different configurations.

```
vyos@vyos# compare [tab]
Possible completions:
  <Enter>  Compare working & active configurations
  saved            Compare working & saved configurations
  <N>              Compare working with revision N
  <N> <M>  Compare revision N with M
  Revisions:
    0         2013-12-17 20:01:37 root by boot-config-loader
    1         2013-12-13 15:59:31 root by boot-config-loader
    2         2013-12-12 21:56:22 vyos by cli
    3         2013-12-12 21:55:11 vyos by cli
    4         2013-12-12 21:27:54 vyos by cli
    5         2013-12-12 21:23:29 vyos by cli
    6         2013-12-12 21:13:59 root by boot-config-loader
    7         2013-12-12 16:25:19 vyos by cli
    8         2013-12-12 15:44:36 vyos by cli
    9         2013-12-12 15:42:07 root by boot-config-loader
    10   2013-12-12 15:42:06 root by init
```

The command `compare` allows you to compare different type of configurations. It also lets you compare different revisions through the `compare N M` command, where N and M are revision numbers. The output will describe how the configuration N is when compared to M indicating with a plus sign (+) the additional parts N has when compared to M, and indicating with a minus sign (-) the lacking parts N misses when compared to M.

```
vyos@vyos# compare 0 6
[edit interfaces]
+dummy dum1 {
+    address 10.189.0.1/31
+}
[edit interfaces ethernet eth0]
+vif 99 {
+    address 10.199.0.1/31
+}
-vif 900 {
```

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```
-    address 192.0.2.4/24
-}
```

show system commit diff <number>

Show commit revision difference.

The command above also lets you see the difference between two commits. By default the difference with the running config is shown.

```
vyos@router# run show system commit diff 4
[edit system]
+ipv6 {
+    disable-forwarding
+}
```

This means four commits ago we did `set system ipv6 disable-forwarding`.

Rollback Changes

You can rollback configuration changes using the rollback command. This will apply the selected revision and trigger a system reboot.

rollback <N>

Rollback to revision N (currently requires reboot)

```
vyos@vyos# compare 1
[edit system]
>host-name vyos-1
[edit]

vyos@vyos# rollback 1
Proceed with reboot? [confirm][y]
Broadcast message from root@vyos-1 (pts/0) (Tue Dec 17 21:07:45 2013):
The system is going down for reboot NOW!
```

Remote Archive

VyOS can upload the configuration to a remote location after each call to `commit`. You will have to set the commit-archive location. TFTP, FTP, SCP and SFTP servers are supported. Every time a `commit` is successfull the `config.boot` file will be copied to the defined destination(s). The filename used on the remote host will be `config.boot-hostname.YYYYMMDD_HHMMSS`.

set system config-management commit-archive location <URI>

Specify remote location of commit archive as any of the below URI (Uniform Resource Identifier)

- `scp://<user>:<passwd>@<host>:/<dir>`
- `sftp://<user>:<passwd>@<host>/<dir>`
- `ftp://<user>:<passwd>@<host>/<dir>`
- `tftp://<host>/<dir>`

Note: The number of revisions don't affect the commit-archive.

Note: You may find VyOS not allowing the secure connection because it cannot verify the legitimacy of the remote server. You can use the workaround below to quickly add the remote host's SSH fingerprint to your `~/.ssh/known_hosts` file:

```
vyos@vyos# ssh-keyscan <host> >> ~/.ssh/known_hosts
```

Saving and loading manually

You can use the `save` and `load` commands if you want to manually manage specific configuration files.

When using the *save* command, you can add a specific location where to store your configuration file. And, when needed it, you will be able to load it with the `load` command:

load <URI>

Use this command to load a configuration which will replace the running configuration. Define the location of the configuration file to be loaded. You can use a path to a local file, an SCP address, an SFTP address, an FTP address, an HTTP address, an HTTPS address or a TFTP address.

```
vyos@vyos# load
Possible completions:
  <Enter>                                 Load from system config file
  <file>                                  Load from file on local machine
  scp://<user>:<passwd>@<host>:/<file>    Load from file on remote machine
  sftp://<user>:<passwd>@<host>/<file>    Load from file on remote machine
  ftp://<user>:<passwd>@<host>/<file>     Load from file on remote machine
  http://<host>/<file>                    Load from file on remote machine
  https://<host>/<file>                   Load from file on remote machine
  tftp://<host>/<file>                    Load from file on remote machine
```

Restore Default

In the case you want to completely delete your configuration and restore the default one, you can enter the following command in configuration mode:

```
load /opt/vyatta/etc/config.boot.default
```

You will be asked if you want to continue. If you accept, you will have to use `commit` if you want to make the changes active.

Then you may want to `save` in order to delete the saved configuration too.

Note: If you are remotely connected, you will lose your connection. You may want to copy first the config, edit it to ensure connectivity, and load the edited config.

CHAPTER

EIGHT

CONFIGURATION GUIDE

The following structure respresent the cli structure.

8.1 Container

The VyOS container implementation is based on *Podman<https://podman.io/>* as a deamonless container engine.

8.1.1 Configuration

set container name <name> image

Sets the image name in the hub registry

```
set container name mysql-server image mysql:8.0
```

If a registry is not specified, Docker.io will be used as the container registry unless an alternative registry is specified using **set container registry <name>** or the registry is included in the image name

```
set container name mysql-server image quay.io/mysql:8.0
```

set container name <name> allow-host-networks

Allow host networking in a container. The network stack of the container is not isolated from the host and will use the host IP.

The following commands translate to "–net host" when the container is created

---

Note: **allow-host-networks** cannot be used with **network**

---

set container name <name> network <networkname>

Attaches user-defined network to a container. Only one network must be specified and must already exist.

set container name <name> network <networkname> address <address>

Optionally set a specific static IPv4 or IPv6 address for the container. This address must be within the named network prefix.

Note: The first IP in the container network is reserved by the engine and cannot be used

---

set container name <name> description <text>

Set a container description

set container name <name> environment <key> value <value>

Add custom environment variables. Multiple environment variables are allowed. The following commands translate to "-e key=value" when the container is created.

```
set container name mysql-server environment MYSQL_DATABASE value 'zabbix'
set container name mysql-server environment MYSQL_USER value 'zabbix'
set container name mysql-server environment MYSQL_PASSWORD value 'zabbix_pwd'
set container name mysql-server environment MYSQL_ROOT_PASSWORD value 'root_pwd'
```

set container name <name> port <portname> source <portnumber>

set container name <name> port <portname> destination <portnumber>

set container name <name> port <portname> protocol <tcp | udp>

Publish a port for the container.

```
set container name zabbix-web-nginx-mysql port http source 80
set container name zabbix-web-nginx-mysql port http destination 8080
set container name zabbix-web-nginx-mysql port http protocol tcp
```

set container name <name> volume <volumename> source <path>

set container name <name> volume <volumename> destination <path>

Mount a volume into the container

```
set container name coredns volume 'corefile' source /config/coredns/Corefile
set container name coredns volume 'corefile' destination /etc/Corefile
```

set container name <name> volume <volumename> mode <ro | rw>

Volume is either mounted as rw (read-write - default) or ro (read-only)

set container name <name> restart [no | on-failure | always]

Set the restart behavior of the container.

- **no**: Do not restart containers on exit
- **on-failure**: Restart containers when they exit with a non-zero exit code, retrying indefinitely (default)
- **always**: Restart containers when they exit, regardless of status, retrying indefinitely

set container name <name> memory <MB>

Constrain the memory available to the container.

Default is 512 MB. Use 0 MB for unlimited memory.

set container name <name> device <devicename> source <path>

set container name <name> device <devicename> destination <path>

Add a host device to the container.

container name <name> cap-add <text>

Set container capabilities or permissions.

- **net-admin**: Network operations (interface, firewall, routing tables)
- **net-bind-service**: Bind a socket to privileged ports (port numbers less than 1024)

- **net-raw**: Permission to create raw network sockets
- **setpcap**: Capability sets (from bounded or inherited set)
- **sys-admin**: Administation operations (quotactl, mount, sethostname, setdomainame)
- **sys-time**: Permission to set system clock

set container name <name> disable

Disable a container.

set container network <networkname>

Creates a named container network

set container registry <name>

Adds registry to list of unqualified-search-registries. By default, for any image that does not include the registry in the image name, Vyos will use docker.io as the container registry.

8.1.2 Operation Commands

add container image <containername>

Pull a new image for container

show container

Show the list of all active containers.

show container image

Show the local container images.

show container log <containername>

Show logs from a given container

show container network

Show a list available container networks

restart container <containername>

Restart a given container

update container image <containername>

Update container image

8.1.3 Example Configuration

For the sake of demonstration, example #1 in the official documentation to the declarative VyOS CLI syntax.

```
set container network zabbix-net prefix 172.20.0.0/16
set container network zabbix-net description 'Network for Zabbix component␣
↪containers'

set container name mysql-server image mysql:8.0
set container name mysql-server network zabbix-net
```

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```
set container name mysql-server environment 'MYSQL_DATABASE' value 'zabbix'
set container name mysql-server environment 'MYSQL_USER' value 'zabbix'
set container name mysql-server environment 'MYSQL_PASSWORD' value 'zabbix_pwd'
set container name mysql-server environment 'MYSQL_ROOT_PASSWORD' value 'root_
↪pwd'

set container name zabbix-java-gateway image zabbix/zabbix-java-gateway:alpine-
↪5.2-latest
set container name zabbix-java-gateway network zabbix-net

set container name zabbix-server-mysql image zabbix/zabbix-server-mysql:alpine-
↪5.2-latest
set container name zabbix-server-mysql network zabbix-net

set container name zabbix-server-mysql environment 'DB_SERVER_HOST' value
↪'mysql-server'
set container name zabbix-server-mysql environment 'MYSQL_DATABASE' value
↪'zabbix'
set container name zabbix-server-mysql environment 'MYSQL_USER' value 'zabbix'
set container name zabbix-server-mysql environment 'MYSQL_PASSWORD' value
↪'zabbix_pwd'
set container name zabbix-server-mysql environment 'MYSQL_ROOT_PASSWORD' value
↪'root_pwd'
set container name zabbix-server-mysql environment 'ZBX_JAVAGATEWAY' value
↪'zabbix-java-gateway'

set container name zabbix-server-mysql port zabbix source 10051
set container name zabbix-server-mysql port zabbix destination 10051

set container name zabbix-web-nginx-mysql image zabbix/zabbix-web-nginx-
↪mysql:alpine-5.2-latest
set container name zabbix-web-nginx-mysql network zabbix-net

set container name zabbix-web-nginx-mysql environment 'MYSQL_DATABASE' value
↪'zabbix'
set container name zabbix-web-nginx-mysql environment 'ZBX_SERVER_HOST' value
↪'zabbix-server-mysql'
set container name zabbix-web-nginx-mysql environment 'DB_SERVER_HOST' value
↪'mysql-server'
set container name zabbix-web-nginx-mysql environment 'MYSQL_USER' value
↪'zabbix'
set container name zabbix-web-nginx-mysql environment 'MYSQL_PASSWORD' value
↪'zabbix_pwd'
set container name zabbix-web-nginx-mysql environment 'MYSQL_ROOT_PASSWORD'␣
↪value 'root_pwd'

set container name zabbix-web-nginx-mysql port http source 80
set container name zabbix-web-nginx-mysql port http destination 8080
```

8.2 Firewall

8.2.1 Overview

VyOS makes use of Linux netfilter for packet filtering.

The firewall supports the creation of groups for ports, addresses, and networks (implemented using netfilter ipset) and the option of interface or zone based firewall policy.

Note: Important note on usage of terms: The firewall makes use of the terms *in*, *out*, and *local* for firewall policy. Users experienced with netfilter often confuse *in* to be a reference to the *INPUT* chain, and *out* the *OUTPUT* chain from netfilter. This is not the case. These instead indicate the use of the *FORWARD* chain and either the input or output interface. The *INPUT* chain, which is used for local traffic to the OS, is a reference to as *local* with respect to its input interface.

8.2.2 Global settings

Some firewall settings are global and have an affect on the whole system.

set firewall all-ping [enable | disable]

By default, when VyOS receives an ICMP echo request packet destined for itself, it will answer with an ICMP echo reply, unless you avoid it through its firewall.

With the firewall you can set rules to accept, drop or reject ICMP in, out or local traffic. You can also use the general **firewall all-ping** command. This command affects only to LOCAL (packets destined for your VyOS system), not to IN or OUT traffic.

Note: firewall all-ping affects only to LOCAL and it always behaves in the most restrictive way

---

```
set firewall all-ping enable
```

When the command above is set, VyOS will answer every ICMP echo request addressed to itself, but that will only happen if no other rule is applied dropping or rejecting local echo requests. In case of conflict, VyOS will not answer ICMP echo requests.

```
set firewall all-ping disable
```

When the command above is set, VyOS will answer no ICMP echo request addressed to itself at all, no matter where it comes from or whether more specific rules are being applied to accept them.

set firewall broadcast-ping [enable | disable]

This setting enable or disable the response of icmp broadcast messages. The following system parameter will be altered:

- `net.ipv4.icmp_echo_ignore_broadcasts`

set firewall ip-src-route [enable | disable]

set firewall ipv6-src-route [enable | disable]

This setting handle if VyOS accept packets with a source route option. The following system parameter will be altered:

- net.ipv4.conf.all.accept_source_route
- net.ipv6.conf.all.accept_source_route

set firewall receive-redirects [enable | disable]

set firewall ipv6-receive-redirects [enable | disable]

enable or disable of ICMPv4 or ICMPv6 redirect messages accepted by VyOS. The following system parameter will be altered:

- net.ipv4.conf.all.accept_redirects
- net.ipv6.conf.all.accept_redirects

set firewall send-redirects [enable | disable]

enable or disable ICMPv4 redirect messages send by VyOS The following system parameter will be altered:

- net.ipv4.conf.all.send_redirects

set firewall log-martians [enable | disable]

enable or disable the logging of martian IPv4 packets. The following system parameter will be altered:

- net.ipv4.conf.all.log_martians

set firewall source-validation [strict | loose | disable]

Set the IPv4 source validation mode. The following system parameter will be altered:

- net.ipv4.conf.all.rp_filter

set firewall syn-cookies [enable | disable]

Enable or Disable if VyOS use IPv4 TCP SYN Cookies. The following system parameter will be altered:

- net.ipv4.tcp_syncookies

set firewall twa-hazards-protection [enable | disable]

Enable or Disable VyOS to be **RFC 1337** conform. The following system parameter will be altered:

- net.ipv4.tcp_rfc1337

set firewall state-policy established action [accept | drop | reject]

set firewall state-policy established log enable

Set the global setting for an established connection.

set firewall state-policy invalid action [accept | drop | reject]

set firewall state-policy invalid log enable

Set the global setting for invalid packets.

set firewall state-policy related action [accept | drop | reject]

set firewall state-policy related log enable

Set the global setting for related connections.

8.2.3 Groups

Firewall groups represent collections of IP addresses, networks, or ports. Once created, a group can be referenced by firewall rules as either a source or destination. Members can be added or removed from a group without changes to, or the need to reload, individual firewall rules.

Groups need to have unique names. Even though some contain IPv4 addresses and others contain IPv6 addresses, they still need to have unique names, so you may want to append "-v4" or "-v6" to your group names.

Address Groups

In an **address group** a single IP address or IP address ranges are defined.

set firewall group address-group <name> address [address | address range]

set firewall group ipv6-address-group <name> address <address>

Define a IPv4 or a IPv6 address group

```
set firewall group address-group ADR-INSIDE-v4 address 192.168.0.1
set firewall group address-group ADR-INSIDE-v4 address 10.0.0.1-10.0.0.8
set firewall group ipv6-address-group ADR-INSIDE-v6 address 2001:db8::1
```

set firewall group address-group <name> description <text>

set firewall group ipv6-address-group <name> description <text>

Provide a IPv4 or IPv6 address group description

Network Groups

While **network groups** accept IP networks in CIDR notation, specific IP addresses can be added as a 32-bit prefix. If you foresee the need to add a mix of addresses and networks, the network group is recommended.

set firewall group network-group <name> network <CIDR>

set firewall group ipv6-network-group <name> network <CIDR>

Define a IPv4 or IPv6 Network group.

```
set firewall group network-group NET-INSIDE-v4 network 192.168.0.0/24
set firewall group network-group NET-INSIDE-v4 network 192.168.1.0/24
set firewall group ipv6-network-group NET-INSIDE-v6 network 2001:db8::/64
```

set firewall group network-group <name> description <text>

set firewall group ipv6-network-group <name> description <text>

Provide a IPv4 or IPv6 network group description.

Port Groups

A **port group** represents only port numbers, not the protocol. Port groups can be referenced for either TCP or UDP. It is recommended that TCP and UDP groups are created separately to avoid accidentally filtering unnecessary ports. Ranges of ports can be specified by using -.

set firewall group port-group <name> port [portname | portnumber | startport-endport]

Define a port group. A port name can be any name defined in /etc/services. e.g.: http

```
set firewall group port-group PORT-TCP-SERVER1 port http
set firewall group port-group PORT-TCP-SERVER1 port 443
set firewall group port-group PORT-TCP-SERVER1 port 5000-5010
```

set firewall group port-group <name> description <text>

Provide a port group description.

8.2.4 Rule-Sets

A rule-set is a named collection of firewall rules that can be applied to an interface or a zone. Each rule is numbered, has an action to apply if the rule is matched, and the ability to specify the criteria to match. Data packets go through the rules from 1 - 999999, at the first match the action of the rule will be executed.

set firewall name <name> description <text>

set firewall ipv6-name <name> description <text>

Provide a rule-set description.

set firewall name <name> default-action [drop | reject | accept]

set firewall ipv6-name <name> default-action [drop | reject | accept]

This set the default action of the rule-set if no rule matched a packet criteria.

set firewall name <name> enable-default-log

set firewall ipv6-name <name> enable-default-log

Use this command to enable the logging of the default action.

set firewall name <name> rule <1-999999> action [drop | reject | accept]

set firewall ipv6-name <name> rule <1-999999> action [drop | reject | accept]

This required setting defines the action of the current rule.

set firewall name <name> rule <1-999999> description <text>

set firewall ipv6-name <name> rule <1-999999> description <text>

Provide a description for each rule.

set firewall name <name> rule <1-999999> log [disable | enable]

set firewall ipv6-name <name> rule <1-999999> log [disable | enable]

Enable or disable logging for the matched packet.

set firewall name <name> rule <1-999999> disable

set firewall ipv6-name <name> rule <1-999999> disable

If you want to disable a rule but let it in the configuration.

Matching criteria

There are a lot of matching criteria against which the package can be tested.

set firewall name <name> rule <1-999999> source address [address | addressrange | CIDR]

set firewall name <name> rule <1-999999> destination address [address | addressrange | CIDR]

set firewall ipv6-name <name> rule <1-999999> source address [address | addressrange | CIDR]

set firewall ipv6-name <name> rule <1-999999> destination address [address | addressrange | CIDR]

This is similar to the network groups part, but here you are able to negate the matching addresses.

```
set firewall name WAN-IN-v4 rule 100 source address 192.0.2.10-192.0.2.11
# with a '!' the rule match everything except the specified subnet
set firewall name WAN-IN-v4 rule 101 source address !203.0.113.0/24
set firewall ipv6-name WAN-IN-v6 rule 100 source address 2001:db8::202
```

set firewall name <name> rule <1-999999> source mac-address <mac-address>

set firewall ipv6-name <name> rule <1-999999> source mac-address <mac-address>

Only in the source criteria, you can specify a mac-address.

```
set firewall name LAN-IN-v4 rule 100 source mac-address 00:53:00:11:22:33
set firewall name LAN-IN-v4 rule 101 source mac-address !00:53:00:aa:12:34
```

set firewall name <name> rule <1-999999> source port [1-65535 | portname | start-end]

set firewall name <name> rule <1-999999> destination port [1-65535 | portname | start-end]

set firewall ipv6-name <name> rule <1-999999> source port [1-65535 | portname | start-end]

set firewall ipv6-name <name> rule <1-999999> destination port [1-65535 | portname | start-end]

A port can be set with a port number or a name which is here defined: `/etc/services`.

```
set firewall name WAN-IN-v4 rule 10 source port '22'
set firewall name WAN-IN-v4 rule 11 source port '!http'
set firewall name WAN-IN-v4 rule 12 source port 'https'
```

Multiple source ports can be specified as a comma-separated list. The whole list can also be "negated" using '!'. For example:

```
set firewall ipv6-name WAN-IN-v6 rule 10 source port '!22,https,3333-3338'
```

set firewall name <name> rule <1-999999> source group address-group <name>

set firewall name <name> rule <1-999999> destination group address-group <name>

set firewall ipv6-name <name> rule <1-999999> source group address-group <name>

set firewall ipv6-name <name> rule <1-999999> destination group address-group <name>

Use a specific address-group. Thes can also be "negated" using '!'. For Example

```
set firewall name WAN-IN-v4 rule 20 source group address-group '!TRUSTED-HOSTS'
```

set firewall name <name> rule <1-999999> source group network-group <name>

set firewall name <name> rule <1-999999> destination group network-group <name>

set firewall ipv6-name <name> rule <1-999999> source group network-group <name>

set firewall ipv6-name <name> rule <1-999999> destination group network-group <name>

Use a specific network-group

set firewall name <name> rule <1-999999> source group port-group <name>

set firewall name <name> rule <1-999999> destination group port-group <name>

set firewall ipv6-name <name> rule <1-999999> source group port-group <name>

set firewall ipv6-name <name> rule <1-999999> destination group port-group <name>

Use a specific port-group

set firewall name <name> rule <1-999999> protocol [<text> | <0-255> | all | tcp_udp]

set firewall ipv6-name <name> rule <1-999999> protocol [<text> | <0-255> | all | tcp_udp]

Match a protocol criteria. A protocol number or a name which is here defined: `/etc/protocols`. Special names are `all` for all protocols and `tcp_udp` for tcp and udp based packets. The `!` negate the selected protocol.

```
set firewall name WAN-IN-v4 rule 10 protocol tcp_udp
set firewall name WAN-IN-v4 rule 11 protocol !tcp_udp
set firewall ipv6-name WAN-IN-v6 rule 10 protocol tcp
```

set firewall name <name> rule <1-999999> tcp flags <text>

set firewall ipv6-name <name> rule <1-999999> tcp flags <text>

Allowed values fpr TCP flags: `SYN`, `ACK`, `FIN`, `RST`, `URG`, `PSH`, `ALL` When specifying more than one flag, flags should be comma separated. The `!` negate the selected protocol.

```
set firewall name WAN-IN-v4 rule 10 tcp flags 'ACK'
set firewall name WAN-IN-v4 rule 12 tcp flags 'SYN'
set firewall name WAN-IN-v4 rule 13 tcp flags 'SYN,!ACK,!FIN,!RST'
```

set firewall name <name> rule <1-999999> state [established | invalid | new | related] [enable | disable]

set firewall ipv6-name <name> rule <1-999999> state [established | invalid | new | related] [enable | disable]

Match against the state of a packet.

set firewall name <name> rule <1-999999> recent count <1-255>

set firewall ipv6-name <name> rule <1-999999> recent count <1-255>

set firewall name <name> rule <1-999999> recent time <second | minute | hour>

set firewall ipv6-name <name> rule <1-999999> recent time <second | minute | hour>

Match when 'count' amount of connections are seen within 'time'. These matching criteria can be used to block brute-force attempts.

8.2.5 Applying a Rule-Set to an Interface

A Rule-Set can be applied to every interface:

- `in`: Ruleset for forwarded packets on an inbound interface
- `out`: Ruleset for forwarded packets on an outbound interface
- `local`: Ruleset for packets destined for this router

set interface ethernet <ethN> firewall [in | out | local] [name | ipv6-name] <rule-set>

Here are some examples for applying a rule-set to an interface

```
set interface ethernet eth1 vif 100 firewall in name LANv4-IN
set interface ethernet eth1 vif 100 firewall out name LANv4-OUT
set interface bonding bond0 firewall in name LANv4-IN
set interfaces openvpn vtun1 firewall in name Lanv4-IN
```

Note: As you can see in the example here, you can assign the same rule-set to several interfaces. An interface can only have one rule-set per chain.

8.2.6 Zone-based Firewall Policy

As an alternative to applying policy to an interface directly, a zone-based firewall can be created to simplify configuration when multiple interfaces belong to the same security zone. Instead of applying rule-sets to interfaces, they are applied to source zone-destination zone pairs.

An basic introduction to zone-based firewalls can be found here, and an example at *Zone-Policy example*.

Define a Zone

To define a zone setup either one with interfaces or a local zone.

set zone-policy zone <name> interface <interfacenames>

Set interfaces to a zone. A zone can have multiple interfaces. But an interface can only be a member in one zone.

set zone-policy zone <name> local-zone

Define the zone as a local zone. A local zone has no interfaces and will be applied to the router itself.

set zone-policy zone <name> default-action [drop | reject]

Change the default-action with this setting.

set zone-policy zone <name> description

Set a meaningful description.

Applying a Rule-Set to a Zone

Before you are able to apply a rule-set to a zone you have to create the zones first.

set zone-policy zone <name> from <name> firewall name <rule-set>

set zone-policy zone <name> from <name> firewall ipv6-name <rule-set>

You apply a rule-set always to a zone from an other zone, it is recommended to create one rule-set for each zone pair.

```
set zone-policy zone DMZ from LAN firewall name LANv4-to-DMZv4
set zone-policy zone LAN from DMZ firewall name DMZv4-to-LANv4
```

8.2.7 Operation-mode Firewall

Rule-set overview

show firewall

This will show you a basic firewall overview

```
vyos@vyos:~$ show firewall

------------------------
Firewall Global Settings
------------------------

Firewall state-policy for all IPv4 and Ipv6 traffic

state           action   log
-----           ------   ---
invalid         accept   disabled
established     accept   disabled
related         accept   disabled

-----------------------------
Rulesets Information
-----------------------------
------------------------------------------------------------------------------
IPv4 Firewall "DMZv4-1-IN":

Active on (eth0,IN)

rule  action   proto     packets  bytes
----  ------   -----     -------  -----
10    accept   icmp      0        0
condition - saddr 10.1.0.0/24 daddr 0.0.0.0/0 LOG enabled

10000 drop     all       0        0
condition - saddr 0.0.0.0/0 daddr 0.0.0.0/0 LOG enabled

------------------------------------------------------------------------------
IPv4 Firewall "DMZv4-1-OUT":
```

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```
Active on (eth0,OUT)

rule  action   proto     packets  bytes
----  ------   -----     -------  -----
10    accept   tcp_udp   1        60
condition - saddr 0.0.0.0/0 daddr 0.0.0.0/0 match-DST-PORT-GROUP DMZ-Ports /*
            DMZv4-1-OUT-10 */LOG enabled

11    accept   icmp      1        84
condition - saddr 0.0.0.0/0 daddr 0.0.0.0/0 /* DMZv4-1-OUT-11 */LOG enabled

10000 drop     all       6        360
condition - saddr 0.0.0.0/0 daddr 0.0.0.0/0 LOG enabled

------------------------------------------------------------------------
IPv4 Firewall "LANv4-IN":

Inactive - Not applied to any interfaces or zones.

rule  action   proto     packets  bytes
----  ------   -----     -------  -----
10    accept   all       0        0
condition - saddr 0.0.0.0/0 daddr 0.0.0.0/0 /* LANv4-IN-10 */

10000 drop     all       0        0
condition - saddr 0.0.0.0/0 daddr 0.0.0.0/0
```

show firewall summary

This will show you a summary of rule-sets and groups

```
vyos@vyos:~$ show firewall summary

------------------------
Firewall Global Settings
------------------------

Firewall state-policy for all IPv4 and Ipv6 traffic

state           action   log
-----           ------   ---
invalid         accept   disabled
related         accept   disabled
established     accept   disabled

------------------------
Firewall Rulesets
------------------------

IPv4 name:

Rule-set name             Description    References
```

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```
-------------              -----------    ----------
DMZv4-1-OUT                               (eth0,OUT)
DMZv4-1-IN                                (eth0,IN)

------------------------
Firewall Groups
------------------------

Port Groups:

Group name                 Description    References
----------                 -----------    ----------
DMZ-Ports                                 DMZv4-1-OUT-10-destination

Network Groups:

Group name                 Description    References
----------                 -----------    ----------
LANv4                                     LANv4-IN-10-source,
                                           DMZv4-1-OUT-10-source,
                                           DMZv4-1-OUT-11-source
```

show firewall statistics

This will show you a statistic of all rule-sets since the last boot.

show firewall [name | ipv6name] <name> rule <1-999999>

This command will give an overview of a rule in a single rule-set

show firewall group <name>

Overview of defined groups. You see the type, the members, and where the group is used.

```
vyos@vyos:~$ show firewall group DMZ-Ports
Name       : DMZ-Ports
Type       : port
References : none
Members    :
             80
             443
             8080
             8443

vyos@vyos:~$ show firewall group LANv4
Name       : LANv4
Type       : network
References : LANv4-IN-10-source
Members    :
             10.10.0.0/16
```

show firewall [name | ipv6name] <name>

This command will give an overview of a single rule-set.

show firewall [name | ipv6name] <name> statistics

This will show you a rule-set statistic since the last boot.

show firewall [name | ipv6name] <name> rule <1-999999>

This command will give an overview of a rule in a single rule-set.

Zone-Policy Overview

show zone-policy zone <name>

Use this command to get an overview of a zone.

```
vyos@vyos:~$ show zone-policy zone DMZ
--------------------
Name: DMZ

Interfaces: eth0 eth1

From Zone:
name                                    firewall
----                                    --------
LAN                                     DMZv4-1-OUT
```

Show Firewall log

show log firewall [name | ipv6name] <name>

Show the logs of a specific Rule-Set.

Note: At the moment it not possible to look at the whole firewall log with VyOS operational commands. All logs will save to `/var/logs/messages`. For example: `grep '10.10.0.10' /var/log/messages`

Example Partial Config

```
firewall {
   all-ping enable
   broadcast-ping disable
   config-trap disable
   group {
       network-group BAD-NETWORKS {
           network 198.51.100.0/24
           network 203.0.113.0/24
       }
       network-group GOOD-NETWORKS {
           network 192.0.2.0/24
       }
       port-group BAD-PORTS {
           port 65535
       }
   }
   name FROM-INTERNET {
```

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```
       default-action accept
       description "From the Internet"
       rule 10 {
           action accept
           description "Authorized Networks"
           protocol all
           source {
               group {
                   network-group GOOD-NETWORKS
               }
           }
       }
       rule 11 {
           action drop
           description "Bad Networks"
           protocol all
           source {
               group {
                   network-group BAD-NETWORKS
               }
           }
       }
       rule 30 {
           action drop
           description "BAD PORTS"
           destination {
               group {
                   port-group BAD-PORTS
               }
           }
           log enable
           protocol all
       }
   }
}
interfaces {
   ethernet eth1 {
       address dhcp
       description OUTSIDE
       duplex auto
       firewall {
           in {
               name FROM-INTERNET
           }
       }
   }
}
```

8.2.8 TCP-MSS Clamping

As Internet wide PMTU discovery rarely works, we sometimes need to clamp our TCP MSS value to a specific value. This is a field in the TCP Options part of a SYN packet. By setting the MSS value, you are telling the remote side unequivocally 'do not try to send me packets bigger than this value'.

Starting with VyOS 1.2 there is a firewall option to clamp your TCP MSS value for IPv4 and IPv6.

Note: MSS value = MTU - 20 (IP header) - 20 (TCP header), resulting in 1452 bytes on a 1492 byte MTU.

IPv4

set firewall options interface <interface> adjust-mss <mss | clamp-mss-to-pmtu>

Use this command to set the maximum segment size for IPv4 transit packets on a specific interface (536-65535 bytes).

Instead of a numerical MSS value *clamp-mss-to-pmtu* can be used to automatically set the proper value.

Example

Clamp outgoing MSS value in a TCP SYN packet to *1452* for *pppoe0* and *1372* for your WireGuard *wg02* tunnel.

```
set firewall options interface pppoe0 adjust-mss '1452'
set firewall options interface wg02 adjust-mss '1372'
```

IPv6

set firewall options interface <interface> adjust-mss6 <mss | clamp-mss-to-pmtu>

Use this command to set the maximum segment size for IPv6 transit packets on a specific interface (1220-65535 bytes).

Instead of a numerical MSS value *clamp-mss-to-pmtu* can be used to automatically set the proper value.

Example

Clamp outgoing MSS value in a TCP SYN packet to *1280* for both *pppoe0* and *wg02* interface.

```
set firewall options interface pppoe0 adjust-mss6 '1280'
set firewall options interface wg02 adjust-mss6 '1280'
```

Hint: When doing your byte calculations, you might find useful this Visual packet size calculator.

8.3 High availability

VRRP (Virtual Router Redundancy Protocol) provides active/backup redundancy for routers. Every VRRP router has a physical IP/IPv6 address, and a virtual address. On startup, routers elect the master, and the router with the highest priority becomes the master and assigns the virtual address to its interface. All routers with lower priorities become backup routers. The master then starts sending keepalive packets to notify other routers that it's available. If the master fails and stops sending keepalive packets, the router with the next highest priority becomes the new master and takes over the virtual address.

VRRP keepalive packets use multicast, and VRRP setups are limited to a single datalink layer segment. You can setup multiple VRRP groups (also called virtual routers). Virtual routers are identified by a VRID (Virtual Router IDentifier). If you setup multiple groups on the same interface, their VRIDs must be unique, but it's possible (even if not recommended for readability reasons) to use duplicate VRIDs on different interfaces.

8.3.1 Basic setup

VRRP groups are created with the `set high-availability vrrp group $GROUP_NAME` commands. The required parameters are interface, vrid, and virtual-address.

minimal config

```
set high-availability vrrp group Foo vrid 10
set high-availability vrrp group Foo interface eth0
set high-availability vrrp group Foo virtual-address 192.0.2.1/24
```

You can verify your VRRP group status with the operational mode `run show vrrp` command:

```
vyos@vyos# run show vrrp
Name        Interface      VRID  State    Last Transition
----------  -----------  ------  -------  -----------------
Foo         eth1             10  MASTER   2s
```

8.3.2 IPv6 support

The `virtual-address` parameter can be either an IPv4 or IPv6 address, but you cannot mix IPv4 and IPv6 in the same group, and will need to create groups with different VRIDs specially for IPv4 and IPv6.

8.3.3 Disabling a VRRP group

You can disable a VRRP group with `disable` option:

```
set high-availability vrrp group Foo disable
```

A disabled group will be removed from the VRRP process and your router will not participate in VRRP for that VRID. It will disappear from operational mode commands output, rather than enter the backup state.

8.3.4 Setting VRRP group priority

VRRP priority can be set with `priority` option:

```
set high-availability vrrp group Foo priority 200
```

The priority must be an integer number from 1 to 255. Higher priority value increases router's precedence in the master elections.

8.3.5 Sync groups

A sync group allows VRRP groups to transition together.

```
edit high-availability vrrp
set sync-group MAIN member VLAN9
set sync-group MAIN member VLAN20
```

In the following example, when VLAN9 transitions, VLAN20 will also transition:

```
vrrp {
    group VLAN9 {
        interface eth0.9
        virtual-address 10.9.1.1/24
        priority 200
        vrid 9
    }
    group VLAN20 {
        interface eth0.20
        priority 200
        virtual-address 10.20.20.1/24
        vrid 20
    }
    sync-group MAIN {
        member VLAN20
        member VLAN9
    }
}
```

Warning: All items in a sync group should be similarly configured. If one VRRP group is set to a different preemption delay or priority, it would result in an endless transition loop.

8.3.6 Preemption

VRRP can use two modes: preemptive and non-preemptive. In the preemptive mode, if a router with a higher priority fails and then comes back, routers with lower priority will give up their master status. In non-preemptive mode, the newly elected master will keep the master status and the virtual address indefinitely.

By default VRRP uses preemption. You can disable it with the "no-preempt" option:

```
set high-availability vrrp group Foo no-preempt
```

You can also configure the time interval for preemption with the "preempt-delay" option. For example, to set the higher priority router to take over in 180 seconds, use:

```
set high-availability vrrp group Foo preempt-delay 180
```

8.3.7 Unicast VRRP

By default VRRP uses multicast packets. If your network does not support multicast for whatever reason, you can make VRRP use unicast communication instead.

```
set high-availability vrrp group Foo peer-address 192.0.2.10
set high-availability vrrp group Foo hello-source-address 192.0.2.15
```

8.3.8 rfc3768-compatibility

RFC 3768 defines a virtual MAC address to each VRRP virtual router. This virtual router MAC address will be used as the source in all periodic VRRP messages sent by the active node. When the rfc3768-compatibility option is set, a new VRRP interface is created, to which the MAC address and the virtual IP address is automatically assigned.

```
set high-availability vrrp group Foo rfc3768-compatibility
```

Verification

```
$show interfaces ethernet eth0v10
eth0v10@eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue
state UP group default qlen 1000
link/ether 00:00:5e:00:01:0a brd ff:ff:ff:ff:ff:ff
inet 172.25.0.247/16 scope global eth0v10
valid_lft forever preferred_lft forever
```

8.3.9 Scripting

VRRP functionality can be extended with scripts. VyOS supports two kinds of scripts: health check scripts and transition scripts. Health check scripts execute custom checks in addition to the master router reachability. Transition scripts are executed when VRRP state changes from master to backup or fault and vice versa and can be used to enable or disable certain services, for example.

Health check scripts

This setup will make the VRRP process execute the `/config/scripts/vrrp-check.sh script` every 60 seconds, and transition the group to the fault state if it fails (i.e. exits with non-zero status) three times:

```
set high-availability vrrp group Foo health-check script /config/scripts/vrrp-check.sh
set high-availability vrrp group Foo health-check interval 60
set high-availability vrrp group Foo health-check failure-count 3
```

Transition scripts

Transition scripts can help you implement various fixups, such as starting and stopping services, or even modifying the VyOS config on VRRP transition. This setup will make the VRRP process execute the `/config/scripts/vrrp-fail.sh` with argument `Foo` when VRRP fails, and the `/config/scripts/vrrp-master.sh` when the router becomes the master:

```
set high-availability vrrp group Foo transition-script backup "/config/scripts/vrrp-fail.
↪sh Foo"
set high-availability vrrp group Foo transition-script fault "/config/scripts/vrrp-fail.
↪sh Foo"
set high-availability vrrp group Foo transition-script master "/config/scripts/vrrp-
↪master.sh Foo"
```

8.4 Interfaces

8.4.1 Bond / Link Aggregation

The bonding interface provides a method for aggregating multiple network interfaces into a single logical "bonded" interface, or LAG, or ether-channel, or port-channel. The behavior of the bonded interfaces depends upon the mode; generally speaking, modes provide either hot standby or load balancing services. Additionally, link integrity monitoring may be performed.

Configuration

Common interface configuration

set interfaces bonding <interface> address <address | dhcp | dhcpv6>

Configure interface <*interface*> with one or more interface addresses.

- **address** can be specified multiple times as IPv4 and/or IPv6 address, e.g. 192.0.2.1/24 and/or 2001:db8::1/64
- **dhcp** interface address is received by DHCP from a DHCP server on this segment.
- **dhcpv6** interface address is received by DHCPv6 from a DHCPv6 server on this segment.

Example:

```
set interfaces bonding bond0 address 192.0.2.1/24
set interfaces bonding bond0 address 2001:db8::1/64
set interfaces bonding bond0 address dhcp
set interfaces bonding bond0 address dhcpv6
```

set interfaces bonding <interface> description <description>

Set a human readable, descriptive alias for this connection. Alias is used by e.g. the `show interfaces` command or SNMP based monitoring tools.

Example:

```
set interfaces bonding bond0 description 'This is an awesome interface running on␣
↪VyOS'
```

set interfaces bonding <interface> disable

Disable given <*interface*>. It will be placed in administratively down (A/D) state.

Example:

```
set interfaces bonding bond0 disable
```

set interfaces bonding <interface> disable-flow-control

Ethernet flow control is a mechanism for temporarily stopping the transmission of data on Ethernet family computer networks. The goal of this mechanism is to ensure zero packet loss in the presence of network congestion.

The first flow control mechanism, the pause frame, was defined by the IEEE 802.3x standard.

A sending station (computer or network switch) may be transmitting data faster than the other end of the link can accept it. Using flow control, the receiving station can signal the sender requesting suspension of transmissions until the receiver catches up.

Use this command to disable the generation of Ethernet flow control (pause frames).

Example:

```
set interfaces bonding bond0 disable-flow-control
```

set interfaces bonding <interface> disable-link-detect

Use this command to direct an interface to not detect any physical state changes on a link, for example, when the cable is unplugged.

Default is to detects physical link state changes.

Example:

```
set interfaces bonding bond0 disable-link-detect
```

set interfaces bonding <interface> mac <xx:xx:xx:xx:xx:xx>

Configure user defined MAC (Media Access Control) address on given <*interface*>.

Example:

```
set interfaces bonding bond0 mac '00:01:02:03:04:05'
```

set interfaces bonding <interface> mtu <mtu>

Configure MTU (Maximum Transmission Unit) on given <*interface*>. It is the size (in bytes) of the largest ethernet frame sent on this link.

Example:

```
set interfaces bonding bond0 mtu 9000
```

set interfaces bonding <interface> ip arp-cache-timeout

Once a neighbor has been found, the entry is considered to be valid for at least for this specifc time. An entry's validity will be extended if it receives positive feedback from higher level protocols.

This defaults to 30 seconds.

Example:

```
set interfaces bonding bond0 ip arp-cache-timeout 180
```

set interfaces bonding <interface> ip disable-arp-filter

If set the kernel can respond to arp requests with addresses from other interfaces. This may seem wrong but it usually makes sense, because it increases the chance of successful communication. IP addresses are owned by the complete host on Linux, not by particular interfaces. Only for more complex setups like load-balancing, does this behaviour cause problems.

If not set (default) allows you to have multiple network interfaces on the same subnet, and have the ARPs for each interface be answered based on whether or not the kernel would route a packet from the ARP'd IP out that interface (therefore you must use source based routing for this to work).

In other words it allows control of which cards (usually 1) will respond to an arp request.

Example:

```
set interfaces bonding bond0 ip disable-arp-filter
```

set interfaces bonding <interface> ip disable-forwarding

Configure interface-specific Host/Router behaviour. If set, the interface will switch to host mode and IPv6 forwarding will be disabled on this interface.

```
set interfaces bonding bond0 ip disable-forwarding
```

set interfaces bonding <interface> ip enable-arp-accept

Define behavior for gratuitous ARP frames who's IP is not already present in the ARP table. If configured create new entries in the ARP table.

Both replies and requests type gratuitous arp will trigger the ARP table to be updated, if this setting is on.

If the ARP table already contains the IP address of the gratuitous arp frame, the arp table will be updated regardless if this setting is on or off.

```
set interfaces bonding bond0 ip enable-arp-accept
```

set interfaces bonding <interface> ip enable-arp-announce

Define different restriction levels for announcing the local source IP address from IP packets in ARP requests sent on interface.

Use any local address, configured on any interface if this is not set.

If configured, try to avoid local addresses that are not in the target's subnet for this interface. This mode is useful when target hosts reachable via this interface require the source IP address in ARP requests to be part of their logical network configured on the receiving interface. When we generate the request we will check all our subnets that include the target IP and will preserve the source address if it is from such subnet. If there is no such subnet we select source address according to the rules for level 2.

```
set interfaces bonding bond0 ip enable-arp-announce
```

set interfaces bonding <interface> ip enable-arp-ignore

Define different modes for sending replies in response to received ARP requests that resolve local target IP addresses:

If configured, reply only if the target IP address is local address configured on the incoming interface.

If this option is unset (default), reply for any local target IP address, configured on any interface.

```
set interfaces bonding bond0 ip enable-arp-ignore
```

set interfaces bonding <interface> ip enable-proxy-arp

Use this command to enable proxy Address Resolution Protocol (ARP) on this interface. Proxy ARP allows an Ethernet interface to respond with its own MAC address to ARP requests for destination IP addresses on subnets attached to other interfaces on the system. Subsequent packets sent to those destination IP addresses are forwarded appropriately by the system.

Example:

```
set interfaces bonding bond0 ip enable-proxy-arp
```

set interfaces bonding <interface> ip proxy-arp-pvlan

Private VLAN proxy arp. Basically allow proxy arp replies back to the same interface (from which the ARP request/solicitation was received).

This is done to support (ethernet) switch features, like RFC 3069, where the individual ports are NOT allowed to communicate with each other, but they are allowed to talk to the upstream router. As described in RFC 3069, it is possible to allow these hosts to communicate through the upstream router by proxy_arp'ing.

Note: Don't need to be used together with proxy_arp.

This technology is known by different names:

- In RFC 3069 it is called VLAN Aggregation
- Cisco and Allied Telesyn call it Private VLAN
- Hewlett-Packard call it Source-Port filtering or port-isolation
- Ericsson call it MAC-Forced Forwarding (RFC Draft)

set interfaces bonding <interface> ip source-validation <strict | loose | disable>

Enable policy for source validation by reversed path, as specified in RFC 3704. Current recommended practice in RFC 3704 is to enable strict mode to prevent IP spoofing from DDos attacks. If using asymmetric routing or other complicated routing, then loose mode is recommended.

- strict: Each incoming packet is tested against the FIB and if the interface is not the best reverse path the packet check will fail. By default failed packets are discarded.
- loose: Each incoming packet's source address is also tested against the FIB and if the source address is not reachable via any interface the packet check will fail.
- disable: No source validation

set interfaces bonding <interface> ipv6 address autoconf

SLAAC (Stateless Address Autoconfiguration) RFC 4862. IPv6 hosts can configure themselves automatically when connected to an IPv6 network using the Neighbor Discovery Protocol via ICMPv6 (Internet Control Message Protocol version 6) router discovery messages. When first connected to a network, a host sends a link-local router solicitation multicast request for its configuration parameters; routers respond to such a request with a router advertisement packet that contains Internet Layer configuration parameters.

Note: This method automatically disables IPv6 traffic forwarding on the interface in question.

Example:

```
set interfaces bonding bond0 ipv6 address autoconf
```

set interfaces bonding <interface> ipv6 address eui64 <prefix>

EUI-64 (64-Bit Extended Unique Identifier) as specified in RFC 4291 allows a host to assign iteslf a unique 64-Bit IPv6 address.

Example:

```
set interfaces bonding bond0 ipv6 address eui64 2001:db8:beef::/64
```

set interfaces bonding <interface> ipv6 address no-default-link-local

Do not assign a link-local IPv6 address to this interface.

Example:

```
set interfaces bonding bond0 ipv6 address no-default-link-local
```

set interfaces bonding <interface> ipv6 disable-forwarding

Configure interface-specific Host/Router behaviour. If set, the interface will switch to host mode and IPv6 forwarding will be disabled on this interface.

Example:

```
set interfaces bonding bond0 ipv6 disable-forwarding
```

set interfaces bonding <interface> vrf <vrf>

Place interface in given VRF instance.

See also:

There is an entire chapter about how to configure a *VRF*, please check this for additional information.

Example:

```
set interfaces bonding bond0 vrf red
```

DHCP(v6)

set interfaces bonding <interface> dhcp-options client-id <description>

RFC 2131 states: The client MAY choose to explicitly provide the identifier through the 'client identifier' option. If the client supplies a 'client identifier', the client MUST use the same 'client identifier' in all subsequent messages, and the server MUST use that identifier to identify the client.

Example:

```
set interfaces bonding bond0 dhcp-options client-id 'foo-bar'
```

set interfaces bonding <interface> dhcp-options host-name <hostname>

Instead of sending the real system hostname to the DHCP server, overwrite the host-name with this given-value.

Example:

```
set interfaces bonding bond0 dhcp-options host-name 'VyOS'
```

set interfaces bonding <interface> dhcp-options vendor-class-id <vendor-id>

The vendor-class-id option can be used to request a specific class of vendor options from the server.

Example:

```
set interfaces bonding bond0 dhcp-options vendor-class-id 'VyOS'
```

set interfaces bonding <interface> dhcp-options no-default-route

Only request an address from the DHCP server but do not request a default gateway.

Example:

```
set interfaces bonding bond0 dhcp-options no-default-route
```

set interfaces bonding <interface> dhcpv6-options duid <duid>

The DHCP unique identifier (DUID) is used by a client to get an IP address from a DHCPv6 server. It has a 2-byte DUID type field, and a variable-length identifier field up to 128 bytes. Its actual length depends on its type. The server compares the DUID with its database and delivers configuration data (address, lease times, DNS servers, etc.) to the client.

```
set interfaces bonding bond0 duid '0e:00:00:01:00:01:27:71:db:f0:00:50:56:bf:c5:6d'
```

set interfaces bonding <interface> dhcpv6-options parameters-only

This statement specifies dhcp6c to only exchange informational configuration parameters with servers. A list of DNS server addresses is an example of such parameters. This statement is useful when the client does not need stateful configuration parameters such as IPv6 addresses or prefixes.

```
set interfaces bonding bond0 dhcpv6-options parameters-only
```

set interfaces bonding <interface> dhcpv6-options rapid-commit

When rapid-commit is specified, dhcp6c will include a rapid-commit option in solicit messages and wait for an immediate reply instead of advertisements.

```
set interfaces bonding bond0 dhcpv6-options rapid-commit
```

set interfaces bonding <interface> dhcpv6-options temporary

Request only a temporary address and not form an IA_NA (Identity Association for Non-temporary Addresses) partnership.

```
set interfaces bonding bond0 dhcpv6-options temporary
```

DHCPv6 Prefix Delegation (PD)

VyOS 1.3 (equuleus) supports DHCPv6-PD (**RFC 3633**). DHCPv6 Prefix Delegation is supported by most ISPs who provide native IPv6 for consumers on fixed networks.

set interfaces bonding <interface> dhcpv6-options pd <id> length <length>

Some ISPs by default only delegate a /64 prefix. To request for a specific prefix size use this option to request for a bigger delegation for this pd <*id*>. This value is in the range from 32 - 64 so you could request up to a /32 prefix (if your ISP allows this) down to a /64 delegation.

The default value corresponds to 64.

To request a /56 prefix from your ISP use:

```
set interfaces bonding bond0 dhcpv6-options pd 0 length 56
```

set interfaces bonding <interface> dhcpv6-options pd <id> interface <delegatee> address <address>

Specify the interface address used locally on the interfcae where the prefix has been delegated to. ID must be a decimal integer.

It will be combined with the delegated prefix and the sla-id to form a complete interface address. The default is to use the EUI-64 address of the interface.

Example: Delegate a /64 prefix to interface eth8 which will use a local address on this router of <prefix>::ffff, as the address 65534 will correspond to ffff in hexadecimal notation.

```
set interfaces bonding bond0 dhcpv6-options pd 0 interface eth8 address 65534
```

set interfaces bonding <interface> dhcpv6-options pd <id> interface <delegatee> sla-id <id>

Specify the identifier value of the site-level aggregator (SLA) on the interface. ID must be a decimal number greater then 0 which fits in the length of SLA IDs (see below).

Example: If ID is 1 and the client is delegated an IPv6 prefix 2001:db8:ffff::/48, dhcp6c will combine the two values into a single IPv6 prefix, 2001:db8:ffff:1::/64, and will configure the prefix on the specified interface.

```
set interfaces bonding bond0 dhcpv6-options pd 0 interface eth8 sla-id 1
```

Member Interfaces

set interfaces bonding <interface> member interface <member>

Enslave <*member*> interface to bond <*interface*>.

Bond options

set interfaces bonding <interface> mode <802.3ad | active-backup | broadcast | round-robin | transmit-load-balance | adaptive-load-balance | xor-hash>

Specifies one of the bonding policies. The default is 802.3ad. Possible values are:

- 802.3ad - IEEE 802.3ad Dynamic link aggregation. Creates aggregation groups that share the same speed and duplex settings. Utilizes all slaves in the active aggregator according to the 802.3ad specification.

  Slave selection for outgoing traffic is done according to the transmit hash policy, which may be changed from the default simple XOR policy via the hash-policy option, documented below.

  Note: Not all transmit policies may be 802.3ad compliant, particularly in regards to the packet misordering requirements of section 43.2.4 of the 802.3ad standard.

- active-backup - Active-backup policy: Only one slave in the bond is active. A different slave becomes active if, and only if, the active slave fails. The bond's MAC address is externally visible on only one port (network adapter) to avoid confusing the switch.

  When a failover occurs in active-backup mode, bonding will issue one or more gratuitous ARPs on the newly active slave. One gratuitous ARP is issued for the bonding master interface and each VLAN interfaces configured above it, provided that the interface has at least one IP address configured. Gratuitous ARPs issued for VLAN interfaces are tagged with the appropriate VLAN id.

This mode provides fault tolerance. The `primary` option, documented below, affects the behavior of this mode.

- `broadcast` - Broadcast policy: transmits everything on all slave interfaces.

  This mode provides fault tolerance.

- `round-robin` - Round-robin policy: Transmit packets in sequential order from the first available slave through the last.

  This mode provides load balancing and fault tolerance.

- `transmit-load-balance` - Adaptive transmit load balancing: channel bonding that does not require any special switch support.

  Incoming traffic is received by the current slave. If the receiving slave fails, another slave takes over the MAC address of the failed receiving slave.

- `adaptive-load-balance` - Adaptive load balancing: includes transmit-load-balance plus receive load balancing for IPV4 traffic, and does not require any special switch support. The receive load balancing is achieved by ARP negotiation. The bonding driver intercepts the ARP Replies sent by the local system on their way out and overwrites the source hardware address with the unique hardware address of one of the slaves in the bond such that different peers use different hardware addresses for the server.

  Receive traffic from connections created by the server is also balanced. When the local system sends an ARP Request the bonding driver copies and saves the peer's IP information from the ARP packet. When the ARP Reply arrives from the peer, its hardware address is retrieved and the bonding driver initiates an ARP reply to this peer assigning it to one of the slaves in the bond. A problematic outcome of using ARP negotiation for balancing is that each time that an ARP request is broadcast it uses the hardware address of the bond. Hence, peers learn the hardware address of the bond and the balancing of receive traffic collapses to the current slave. This is handled by sending updates (ARP Replies) to all the peers with their individually assigned hardware address such that the traffic is redistributed. Receive traffic is also redistributed when a new slave is added to the bond and when an inactive slave is re-activated. The receive load is distributed sequentially (round robin) among the group of highest speed slaves in the bond.

  When a link is reconnected or a new slave joins the bond the receive traffic is redistributed among all active slaves in the bond by initiating ARP Replies with the selected MAC address to each of the clients. The updelay parameter (detailed below) must be set to a value equal or greater than the switch's forwarding delay so that the ARP Replies sent to the peers will not be blocked by the switch.

- `xor-hash` - XOR policy: Transmit based on the selected transmit hash policy. The default policy is a simple [(source MAC address XOR'd with destination MAC address XOR packet type ID) modulo slave count]. Alternate transmit policies may be selected via the `hash-policy` option, described below.

  This mode provides load balancing and fault tolerance.

`set interfaces bonding <interface> min-links <0-16>`

Specifies the minimum number of links that must be active before asserting carrier. It is similar to the Cisco EtherChannel min-links feature. This allows setting the minimum number of member ports that must be up (link-up state) before marking the bond device as up (carrier on). This is useful for situations where higher level services such as clustering want to ensure a minimum number of low bandwidth links are active before switchover.

This option only affects 802.3ad mode.

The default value is 0. This will cause the carrier to be asserted (for 802.3ad mode) whenever there is an active aggregator, regardless of the number of available links in that aggregator.

Note: Because an aggregator cannot be active without at least one available link, setting this option to 0 or to 1 has the exact same effect.

`set interfaces bonding <interface> lacp-rate <slow|fast>`

Option specifying the rate in which we'll ask our link partner to transmit LACPDU packets in 802.3ad mode.

This option only affects 802.3ad mode.

- slow: Request partner to transmit LACPDUs every 30 seconds
- fast: Request partner to transmit LACPDUs every 1 second

The default value is slow.

`set interfaces bonding <interface> hash-policy <policy>`

- **layer2** - Uses XOR of hardware MAC addresses and packet type ID field to generate the hash. The formula is

```
hash = source MAC XOR destination MAC XOR packet type ID
slave number = hash modulo slave count
```

  This algorithm will place all traffic to a particular network peer on the same slave.

  This algorithm is 802.3ad compliant.

- **layer2+3** - This policy uses a combination of layer2 and layer3 protocol information to generate the hash. Uses XOR of hardware MAC addresses and IP addresses to generate the hash. The formula is:

```
hash = source MAC XOR destination MAC XOR packet type ID
hash = hash XOR source IP XOR destination IP
hash = hash XOR (hash RSHIFT 16)
hash = hash XOR (hash RSHIFT 8)
```

  And then hash is reduced modulo slave count.

  If the protocol is IPv6 then the source and destination addresses are first hashed using ipv6_addr_hash.

  This algorithm will place all traffic to a particular network peer on the same slave. For non-IP traffic, the formula is the same as for the layer2 transmit hash policy.

  This policy is intended to provide a more balanced distribution of traffic than layer2 alone, especially in environments where a layer3 gateway device is required to reach most destinations.

  This algorithm is 802.3ad compliant.

- **layer3+4** - This policy uses upper layer protocol information, when available, to generate the hash. This allows for traffic to a particular network peer to span multiple slaves, although a single connection will not span multiple slaves.

  The formula for unfragmented TCP and UDP packets is

```
hash = source port, destination port (as in the header)
hash = hash XOR source IP XOR destination IP
hash = hash XOR (hash RSHIFT 16)
hash = hash XOR (hash RSHIFT 8)
```

And then hash is reduced modulo slave count.

If the protocol is IPv6 then the source and destination addresses are first hashed using ipv6_addr_hash.

For fragmented TCP or UDP packets and all other IPv4 and IPv6 protocol traffic, the source and destination port information is omitted. For non-IP traffic, the formula is the same as for the layer2 transmit hash policy.

This algorithm is not fully 802.3ad compliant. A single TCP or UDP conversation containing both fragmented and unfragmented packets will see packets striped across two interfaces. This may result in out of order delivery. Most traffic types will not meet these criteria, as TCP rarely fragments traffic, and most UDP traffic is not involved in extended conversations. Other implementations of 802.3ad may or may not tolerate this noncompliance.

set interfaces bonding <interface> primary <interface>

An <*interface*> specifying which slave is the primary device. The specified device will always be the active slave while it is available. Only when the primary is off-line will alternate devices be used. This is useful when one slave is preferred over another, e.g., when one slave has higher throughput than another.

The primary option is only valid for active-backup, transmit-load-balance, and adaptive-load-balance mode.

set interfaces bonding <interface> arp-monitor interval <time>

Specifies the ARP link monitoring <*time*> in seconds.

The ARP monitor works by periodically checking the slave devices to determine whether they have sent or received traffic recently (the precise criteria depends upon the bonding mode, and the state of the slave). Regular traffic is generated via ARP probes issued for the addresses specified by the `arp-monitor target` option.

If ARP monitoring is used in an etherchannel compatible mode (modes round-robin and xor-hash), the switch should be configured in a mode that evenly distributes packets across all links. If the switch is configured to distribute the packets in an XOR fashion, all replies from the ARP targets will be received on the same link which could cause the other team members to fail.

A value of 0 disables ARP monitoring. The default value is 0.

set interfaces bonding <interface> arp-monitor target <address>

Specifies the IP addresses to use as ARP monitoring peers when `arp-monitor interval` option is > 0. These are the targets of the ARP request sent to determine the health of the link to the targets.

Multiple target IP addresses can be specified. At least one IP address must be given for ARP monitoring to function.

The maximum number of targets that can be specified is 16. The default value is no IP address.

VLAN

IEEE 802.1q, often referred to as Dot1q, is the networking standard that supports virtual LANs (VLANs) on an IEEE 802.3 Ethernet network. The standard defines a system of VLAN tagging for Ethernet frames and the accompanying procedures to be used by bridges and switches in handling such frames. The standard also contains provisions for a quality-of-service prioritization scheme commonly known as IEEE 802.1p and defines the Generic Attribute Registration Protocol.

Portions of the network which are VLAN-aware (i.e., IEEE 802.1q conformant) can include VLAN tags. When a frame enters the VLAN-aware portion of the network, a tag is added to represent the VLAN membership. Each frame must be distinguishable as being within exactly one VLAN. A frame in the VLAN-aware portion of the network that does not contain a VLAN tag is assumed to be flowing on the native VLAN.

The standard was developed by IEEE 802.1, a working group of the IEEE 802 standards committee, and continues to be actively revised. One of the notable revisions is 802.1Q-2014 which incorporated IEEE 802.1aq (Shortest Path Bridging) and much of the IEEE 802.1d standard.

802.1q VLAN interfaces are represented as virtual sub-interfaces in VyOS. The term used for this is `vif`.

set interfaces bonding <interface> vif <vlan-id>

Create a new VLAN interface on interface <*interface*> using the VLAN number provided via <*vlan-id*>.

You can create multiple VLAN interfaces on a physical interface. The VLAN ID range is from 0 to 4094.

Note: Only 802.1Q-tagged packets are accepted on Ethernet vifs.

---

set interfaces bonding <interface> vif <vlan-id> address <address | dhcp | dhcpv6>

Configure interface <*interface*> with one or more interface addresses.

- **address** can be specified multiple times as IPv4 and/or IPv6 address, e.g. 192.0.2.1/24 and/or 2001:db8::1/64
- **dhcp** interface address is received by DHCP from a DHCP server on this segment.
- **dhcpv6** interface address is received by DHCPv6 from a DHCPv6 server on this segment.

Example:

```
set interfaces bonding bond0 vif 10 address 192.0.2.1/24
set interfaces bonding bond0 vif 10 address 2001:db8::1/64
set interfaces bonding bond0 vif 10 address dhcp
set interfaces bonding bond0 vif 10 address dhcpv6
```

set interfaces bonding <interface> vif <vlan-id> description <description>

Set a human readable, descriptive alias for this connection. Alias is used by e.g. the `show interfaces` command or SNMP based monitoring tools.

Example:

```
set interfaces bonding bond0 vif 10 description 'This is an awesome interface␣
↪running on VyOS'
```

set interfaces bonding <interface> vif <vlan-id> disable

Disable given <*interface*>. It will be placed in administratively down (`A/D`) state.

Example:

```
set interfaces bonding bond0 vif 10 disable
```

set interfaces bonding <interface> vif <vlan-id> disable-link-detect

Use this command to direct an interface to not detect any physical state changes on a link, for example, when the cable is unplugged.

Default is to detects physical link state changes.

Example:

```
set interfaces bonding bond0 vif 10 disable-link-detect
```

set interfaces bonding <interface> vif <vlan-id> mac <xx:xx:xx:xx:xx:xx>

Configure user defined MAC address on given <*interface*>.

Example:

```
set interfaces bonding bond0 vif 10 mac '00:01:02:03:04:05'
```

set interfaces bonding <interface> vif <vlan-id> mtu <mtu>

Configure MTU on given <*interface*>. It is the size (in bytes) of the largest ethernet frame sent on this link.

Example:

```
set interfaces bonding bond0 vif 10 mtu 9000
```

set interfaces bonding <interface> vif <vlan-id> ip arp-cache-timeout

Once a neighbor has been found, the entry is considered to be valid for at least for this specifc time. An entry's validity will be extended if it receives positive feedback from higher level protocols.

This defaults to 30 seconds.

Example:

```
set interfaces bonding bond0 vif 10 ip arp-cache-timeout 180
```

set interfaces bonding <interface> vif <vlan-id> ip disable-arp-filter

If set the kernel can respond to arp requests with addresses from other interfaces. This may seem wrong but it usually makes sense, because it increases the chance of successful communication. IP addresses are owned by the complete host on Linux, not by particular interfaces. Only for more complex setups like load-balancing, does this behaviour cause problems.

If not set (default) allows you to have multiple network interfaces on the same subnet, and have the ARPs for each interface be answered based on whether or not the kernel would route a packet from the ARP'd IP out that interface (therefore you must use source based routing for this to work).

In other words it allows control of which cards (usually 1) will respond to an arp request.

Example:

```
set interfaces bonding bond0 vif 10 ip disable-arp-filter
```

set interfaces bonding <interface> vif <vlan-id> ip disable-forwarding

Configure interface-specific Host/Router behaviour. If set, the interface will switch to host mode and IPv6 forwarding will be disabled on this interface.

```
set interfaces bonding bond0 vif 10 ip disable-forwarding
```

set interfaces bonding <interface> vif <vlan-id> ip enable-arp-accept

Define behavior for gratuitous ARP frames who's IP is not already present in the ARP table. If configured create new entries in the ARP table.

Both replies and requests type gratuitous arp will trigger the ARP table to be updated, if this setting is on.

If the ARP table already contains the IP address of the gratuitous arp frame, the arp table will be updated regardless if this setting is on or off.

```
set interfaces bonding bond0 vif 10 ip enable-arp-accept
```

set interfaces bonding <interface> vif <vlan-id> ip enable-arp-announce

Define different restriction levels for announcing the local source IP address from IP packets in ARP requests sent on interface.

Use any local address, configured on any interface if this is not set.

If configured, try to avoid local addresses that are not in the target's subnet for this interface. This mode is useful when target hosts reachable via this interface require the source IP address in ARP requests to be part of their logical network configured on the receiving interface. When we generate the request we will check all our subnets that include the target IP and will preserve the source address if it is from such subnet. If there is no such subnet we select source address according to the rules for level 2.

```
set interfaces bonding bond0 vif 10 ip enable-arp-announce
```

set interfaces bonding <interface> vif <vlan-id> ip enable-arp-ignore

Define different modes for sending replies in response to received ARP requests that resolve local target IP addresses:

If configured, reply only if the target IP address is local address configured on the incoming interface.

If this option is unset (default), reply for any local target IP address, configured on any interface.

```
set interfaces bonding bond0 vif 10 ip enable-arp-ignore
```

set interfaces bonding <interface> vif <vlan-id> ip enable-proxy-arp

Use this command to enable proxy Address Resolution Protocol (ARP) on this interface. Proxy ARP allows an Ethernet interface to respond with its own MAC address to ARP requests for destination IP addresses on subnets attached to other interfaces on the system. Subsequent packets sent to those destination IP addresses are forwarded appropriately by the system.

Example:

```
set interfaces bonding bond0 vif 10 ip enable-proxy-arp
```

set interfaces bonding <interface> vif <vlan-id> ip proxy-arp-pvlan

Private VLAN proxy arp. Basically allow proxy arp replies back to the same interface (from which the ARP request/solicitation was received).

This is done to support (ethernet) switch features, like **RFC 3069**, where the individual ports are NOT allowed to communicate with each other, but they are allowed to talk to the upstream router. As described in **RFC 3069**, it is possible to allow these hosts to communicate through the upstream router by proxy_arp'ing.

Note: Don't need to be used together with proxy_arp.

This technology is known by different names:

- In **RFC 3069** it is called VLAN Aggregation
- Cisco and Allied Telesyn call it Private VLAN
- Hewlett-Packard call it Source-Port filtering or port-isolation
- Ericsson call it MAC-Forced Forwarding (RFC Draft)

set interfaces bonding <interface> vif <vlan-id> ip source-validation <strict | loose | disable>

Enable policy for source validation by reversed path, as specified in **RFC 3704**. Current recommended practice in **RFC 3704** is to enable strict mode to prevent IP spoofing from DDos attacks. If using asymmetric routing or other complicated routing, then loose mode is recommended.

- strict: Each incoming packet is tested against the FIB and if the interface is not the best reverse path the packet check will fail. By default failed packets are discarded.
- loose: Each incoming packet's source address is also tested against the FIB and if the source address is not reachable via any interface the packet check will fail.
- disable: No source validation

set interfaces bonding <interface> vif <vlan-id> ipv6 address autoconf

SLAAC **RFC 4862**. IPv6 hosts can configure themselves automatically when connected to an IPv6 network using the Neighbor Discovery Protocol via ICMPv6 router discovery messages. When first connected to a network, a host sends a link-local router solicitation multicast request for its configuration parameters; routers respond to such a request with a router advertisement packet that contains Internet Layer configuration parameters.

Note: This method automatically disables IPv6 traffic forwarding on the interface in question.

Example:

```
set interfaces bonding bond0 vif 10 ipv6 address autoconf
```

set interfaces bonding <interface> vif <vlan-id> ipv6 address eui64 <prefix>

EUI-64 as specified in **RFC 4291** allows a host to assign iteslf a unique 64-Bit IPv6 address.

Example:

```
set interfaces bonding bond0 vif 10 ipv6 address eui64 2001:db8:beef::/64
```

set interfaces bonding <interface> vif <vlan-id> ipv6 address no-default-link-local

Do not assign a link-local IPv6 address to this interface.

Example:

```
set interfaces bonding bond0 vif 10 ipv6 address no-default-link-local
```

set interfaces bonding <interface> vif <vlan-id> ipv6 disable-forwarding

Configure interface-specific Host/Router behaviour. If set, the interface will switch to host mode and IPv6 forwarding will be disabled on this interface.

Example:

```
set interfaces bonding bond0 vif 10 ipv6 disable-forwarding
```

set interfaces bonding <interface> vif <vlan-id> vrf <vrf>

Place interface in given VRF instance.

See also:

There is an entire chapter about how to configure a *VRF*, please check this for additional information.

Example:

```
set interfaces bonding bond0 vif 10 vrf red
```

DHCP(v6)

set interfaces bonding <interface> vif <vlan-id> dhcp-options client-id <description>

RFC 2131 states: The client MAY choose to explicitly provide the identifier through the 'client identifier' option. If the client supplies a 'client identifier', the client MUST use the same 'client identifier' in all subsequent messages, and the server MUST use that identifier to identify the client.

Example:

```
set interfaces bonding bond0 vif 10 dhcp-options client-id 'foo-bar'
```

set interfaces bonding <interface> vif <vlan-id> dhcp-options host-name <hostname>

Instead of sending the real system hostname to the DHCP server, overwrite the host-name with this given-value.

Example:

```
set interfaces bonding bond0 vif 10 dhcp-options host-name 'VyOS'
```

set interfaces bonding <interface> vif <vlan-id> dhcp-options vendor-class-id <vendor-id>

The vendor-class-id option can be used to request a specific class of vendor options from the server.

Example:

```
set interfaces bonding bond0 vif 10 dhcp-options vendor-class-id 'VyOS'
```

set interfaces bonding <interface> vif <vlan-id> dhcp-options no-default-route

Only request an address from the DHCP server but do not request a default gateway.

Example:

```
set interfaces bonding bond0 vif 10 dhcp-options no-default-route
```

set interfaces bonding <interface> vif <vlan-id> dhcpv6-options duid <duid>

The DHCP unique identifier (DUID) is used by a client to get an IP address from a DHCPv6 server. It has a 2-byte DUID type field, and a variable-length identifier field up to 128 bytes. Its actual length depends on its type. The server compares the DUID with its database and delivers configuration data (address, lease times, DNS servers, etc.) to the client.

```
set interfaces bonding bond0 vif 10 duid
↪'0e:00:00:01:00:01:27:71:db:f0:00:50:56:bf:c5:6d'
```

set interfaces bonding <interface> vif <vlan-id> dhcpv6-options parameters-only

This statement specifies dhcp6c to only exchange informational configuration parameters with servers. A list of DNS server addresses is an example of such parameters. This statement is useful when the client does not need stateful configuration parameters such as IPv6 addresses or prefixes.

```
set interfaces bonding bond0 vif 10 dhcpv6-options parameters-only
```

set interfaces bonding <interface> vif <vlan-id> dhcpv6-options rapid-commit

When rapid-commit is specified, dhcp6c will include a rapid-commit option in solicit messages and wait for an immediate reply instead of advertisements.

```
set interfaces bonding bond0 vif 10 dhcpv6-options rapid-commit
```

set interfaces bonding <interface> vif <vlan-id> dhcpv6-options temporary

Request only a temporary address and not form an IA_NA (Identity Association for Non-temporary Addresses) partnership.

```
set interfaces bonding bond0 vif 10 dhcpv6-options temporary
```

DHCPv6 Prefix Delegation (PD)

VyOS 1.3 (equuleus) supports DHCPv6-PD (**RFC 3633**). DHCPv6 Prefix Delegation is supported by most ISPs who provide native IPv6 for consumers on fixed networks.

set interfaces bonding <interface> vif <vlan-id> dhcpv6-options pd <id> length <length>

Some ISPs by default only delegate a /64 prefix. To request for a specific prefix size use this option to request for a bigger delegation for this pd <*id*>. This value is in the range from 32 - 64 so you could request up to a /32 prefix (if your ISP allows this) down to a /64 delegation.

The default value corresponds to 64.

To request a /56 prefix from your ISP use:

```
set interfaces bonding bond0 vif 10 dhcpv6-options pd 0 length 56
```

set interfaces bonding <interface> vif <vlan-id> dhcpv6-options pd <id> interface <delegatee> address <address>

Specify the interface address used locally on the interfcae where the prefix has been delegated to. ID must be a decimal integer.

It will be combined with the delegated prefix and the sla-id to form a complete interface address. The default is to use the EUI-64 address of the interface.

Example: Delegate a /64 prefix to interface eth8 which will use a local address on this router of <prefix>::ffff, as the address 65534 will correspond to ffff in hexadecimal notation.

```
set interfaces bonding bond0 vif 10 dhcpv6-options pd 0 interface eth8 address 65534
```

set interfaces bonding <interface> vif <vlan-id> dhcpv6-options pd <id> interface <delegatee> sla-id <id>

Specify the identifier value of the site-level aggregator (SLA) on the interface. ID must be a decimal number greater then 0 which fits in the length of SLA IDs (see below).

Example: If ID is 1 and the client is delegated an IPv6 prefix 2001:db8:ffff::/48, dhcp6c will combine the two values into a single IPv6 prefix, 2001:db8:ffff:1::/64, and will configure the prefix on the specified interface.

```
set interfaces bonding bond0 vif 10 dhcpv6-options pd 0 interface eth8 sla-id 1
```

Port Mirror (SPAN)

SPAN port mirroring can copy the inbound/outbound traffic of the interface to the specified interface, usually the interface can be connected to some special equipment, such as behavior control system, intrusion detection system and traffic collector, and can copy all related traffic from this port. The benefit of mirroring the traffic is that the application is isolated from the source traffic and so application processing does not affect the traffic or the system performance.

VyOS uses the *mirror* option to configure port mirroring. The configuration is divided into 2 different directions. Destination ports should be configured for different traffic directions.

set interfaces bonding <interface> mirror ingress <monitor-interface>

Configure port mirroring for *interface* inbound traffic and copy the traffic to *monitor-interface*

Example: Mirror the inbound traffic of *bond1* port to *eth3*

```
set interfaces bonding bond1 mirror ingress eth3
```

set interfaces bonding <interface> mirror egress <monitor-interface>

Configure port mirroring for *interface* outbound traffic and copy the traffic to *monitor-interface*

Example: Mirror the outbound traffic of *bond1* port to *eth3*

```
set interfaces bonding bond1 mirror egress eth3
```

Example

The following configuration on VyOS applies to all following 3rd party vendors. It creates a bond with two links and VLAN 10, 100 on the bonded interfaces with a per VIF IPv4 address.

```
# Create bonding interface bond0 with 802.3ad LACP
set interfaces bonding bond0 hash-policy 'layer2'
set interfaces bonding bond0 mode '802.3ad'

# Add the required vlans and IPv4 addresses on them
set interfaces bonding bond0 vif 10 address 192.168.0.1/24
set interfaces bonding bond0 vif 100 address 10.10.10.1/24

# Add the member interfaces to the bonding interface
set interfaces bonding bond0 member interface eth1
set interfaces bonding bond0 member interface eth2
```

Note: If you happen to run this in a virtual environment like by EVE-NG you need to ensure your VyOS NIC is set to use the e1000 driver. Using the default `virtio-net-pci` or the `vmxnet3` driver will not work. ICMP messages will not be properly processed. They are visible on the virtual wire but will not make it fully up the networking stack.

You can check your NIC driver by issuing `show interfaces ethernet eth0 physical | grep -i driver`

Cisco Catalyst

Assign member interfaces to PortChannel

```
interface GigabitEthernet1/0/23
 description VyOS eth1
 channel-group 1 mode active
!
interface GigabitEthernet1/0/24
 description VyOS eth2
 channel-group 1 mode active
!
```

A new interface becomes present `Port-channel1`, all configuration like allowed VLAN interfaces, STP will happen here.

```
interface Port-channel1
 description LACP Channel for VyOS
 switchport trunk encapsulation dot1q
 switchport trunk allowed vlan 10,100
 switchport mode trunk
 spanning-tree portfast trunk
!
```

Juniper EX Switch

For a headstart you can use the below example on how to build a bond with two interfaces from VyOS to a Juniper EX Switch system.

```
# Create aggregated ethernet device with 802.3ad LACP and port speeds of 10gbit/s
set interfaces ae0 aggregated-ether-options link-speed 10g
set interfaces ae0 aggregated-ether-options lacp active

# Create layer 2 on the aggregated ethernet device with trunking for our vlans
set interfaces ae0 unit 0 family ethernet-switching port-mode trunk

# Add the required vlans to the device
set interfaces ae0 unit 0 family ethernet-switching vlan members 10
set interfaces ae0 unit 0 family ethernet-switching vlan members 100

# Add the two interfaces to the aggregated ethernet device, in this setup both
# ports are on the same switch (switch 0, module 1, port 0 and 1)
set interfaces xe-0/1/0 ether-options 802.3ad ae0
set interfaces xe-0/1/1 ether-options 802.3ad ae0

# But this can also be done with multiple switches in a stack, a virtual
# chassis on Juniper (switch 0 and switch 1, module 1, port 0 on both switches)
set interfaces xe-0/1/0 ether-options 802.3ad ae0
set interfaces xe-1/1/0 ether-options 802.3ad ae0
```

Aruba/HP

For a headstart you can use the below example on how to build a bond,port-channel with two interfaces from VyOS to a Aruba/HP 2510G switch.

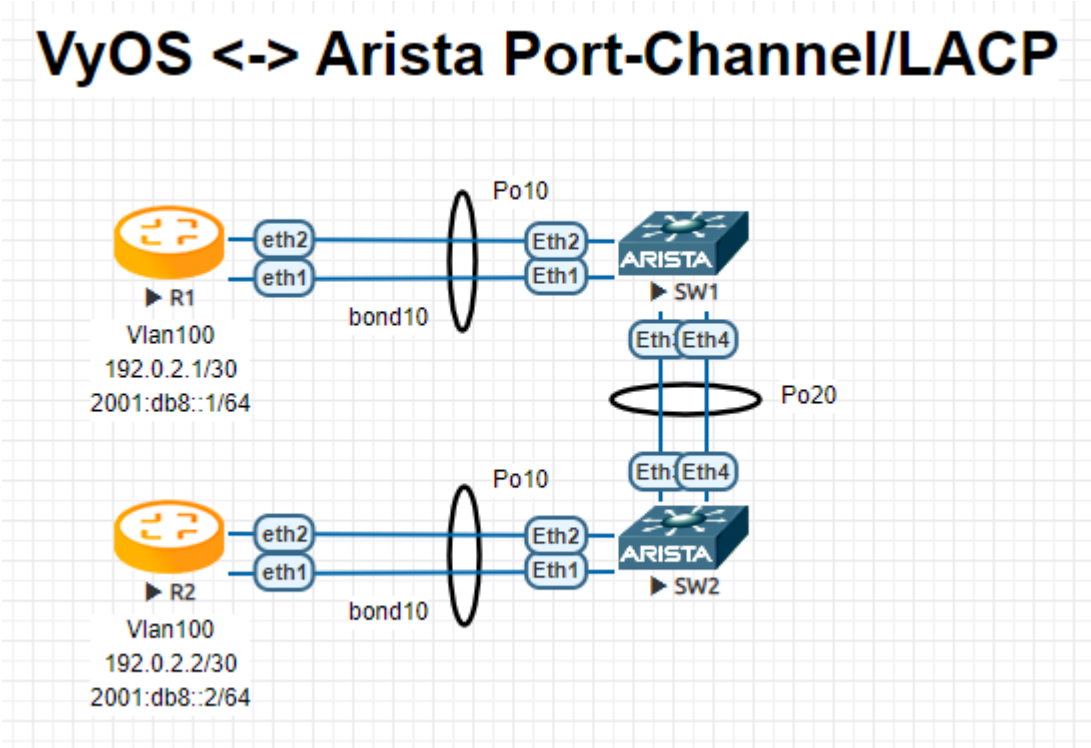
```
# Create trunk with 2 member interfaces (interface 1 and 2) and LACP
trunk 1-2 Trk1 LACP

# Add the required vlans to the trunk
vlan 10 tagged Trk1
vlan 100 tagged Trk1
```

Arista EOS

When utilizing VyOS in an environment with Arista gear you can use this blue print as an initial setup to get an LACP bond / port-channel operational between those two devices.

Lets assume the following topology:



R1

```
interfaces {
    bonding bond10 {
        hash-policy layer3+4
        member {
            interface eth1
            interface eth2
        }
```

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```
        mode 802.3ad
        vif 100 {
            address 192.0.2.1/30
            address 2001:db8::1/64
        }
    }
```

R2

```
interfaces {
    bonding bond10 {
        hash-policy layer3+4
        member {
            interface eth1
            interface eth2
        }
        mode 802.3ad
        vif 100 {
            address 192.0.2.2/30
            address 2001:db8::2/64
        }
    }
```

SW1

```
!
vlan 100
   name FOO
!
interface Port-Channel10
   switchport trunk allowed vlan 100
   switchport mode trunk
   spanning-tree portfast
!
interface Port-Channel20
   switchport mode trunk
   no spanning-tree portfast auto
   spanning-tree portfast network
!
interface Ethernet1
   channel-group 10 mode active
!
interface Ethernet2
   channel-group 10 mode active
!
interface Ethernet3
   channel-group 20 mode active
!
interface Ethernet4
   channel-group 20 mode active
!
```

SW2

```
!
vlan 100
   name FOO
!
interface Port-Channel10
   switchport trunk allowed vlan 100
   switchport mode trunk
   spanning-tree portfast
!
interface Port-Channel20
   switchport mode trunk
   no spanning-tree portfast auto
   spanning-tree portfast network
!
interface Ethernet1
   channel-group 10 mode active
!
interface Ethernet2
   channel-group 10 mode active
!
interface Ethernet3
   channel-group 20 mode active
!
interface Ethernet4
   channel-group 20 mode active
!
```

Note: When using EVE-NG to lab this environment ensure you are using e1000 as the desired driver for your VyOS network interfaces. When using the regular virtio network driver no LACP PDUs will be sent by VyOS thus the port-channel will never become active!

Operation

show interfaces bonding

Show brief interface information.

```
vyos@vyos:~$ show interfaces bonding
Codes: S - State, L - Link, u - Up, D - Down, A - Admin Down
Interface        IP Address                        S/L  Description
---------        ----------                        ---  -----------
bond0            -                                 u/u  my-sw1 int 23 and 24
bond0.10         192.168.0.1/24                    u/u  office-net
bond0.100        10.10.10.1/24                     u/u  management-net
```

show interfaces bonding <interface>

Show detailed information on given <*interface*>

```
vyos@vyos:~$ show interfaces bonding bond5
bond5: <NO-CARRIER,BROADCAST,MULTICAST,MASTER,UP> mtu 1500 qdisc noqueue state DOWN␣
```

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```
↪group default qlen 1000
    link/ether 00:50:56:bf:ef:aa brd ff:ff:ff:ff:ff:ff
    inet6 fe80::e862:26ff:fe72:2dac/64 scope link tentative
       valid_lft forever preferred_lft forever

    RX:  bytes  packets  errors  dropped  overrun       mcast
             0        0       0        0        0           0
    TX:  bytes  packets  errors  dropped  carrier  collisions
             0        0       0        0        0           0
```

show interfaces bonding <interface> detail

Show detailed information about the underlaying physical links on given bond <*interface*>.

```
vyos@vyos:~$ show interfaces bonding bond5 detail
Ethernet Channel Bonding Driver: v3.7.1 (April 27, 2011)

Bonding Mode: IEEE 802.3ad Dynamic link aggregation
Transmit Hash Policy: layer2 (0)
MII Status: down
MII Polling Interval (ms): 100
Up Delay (ms): 0
Down Delay (ms): 0

802.3ad info
LACP rate: slow
Min links: 0
Aggregator selection policy (ad_select): stable

Slave Interface: eth1
MII Status: down
Speed: Unknown
Duplex: Unknown
Link Failure Count: 0
Permanent HW addr: 00:50:56:bf:ef:aa
Slave queue ID: 0
Aggregator ID: 1
Actor Churn State: churned
Partner Churn State: churned
Actor Churned Count: 1
Partner Churned Count: 1

Slave Interface: eth2
MII Status: down
Speed: Unknown
Duplex: Unknown
Link Failure Count: 0
Permanent HW addr: 00:50:56:bf:19:26
Slave queue ID: 0
Aggregator ID: 2
Actor Churn State: churned
Partner Churn State: churned
Actor Churned Count: 1
```

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```
Partner Churned Count: 1
```

8.4.2 Bridge

A Bridge is a way to connect two Ethernet segments together in a protocol independent way. Packets are forwarded based on Ethernet address, rather than IP address (like a router). Since forwarding is done at Layer 2, all protocols can go transparently through a bridge. The Linux bridge code implements a subset of the ANSI/IEEE 802.1d standard.

Note: Spanning Tree Protocol is not enabled by default in VyOS. *STP Parameter* can be easily enabled if needed.

Configuration

Common interface configuration

set interfaces bridge <interface> address <address | dhcp | dhcpv6>

Configure interface <*interface*> with one or more interface addresses.

- **address** can be specified multiple times as IPv4 and/or IPv6 address, e.g. 192.0.2.1/24 and/or 2001:db8::1/64
- **dhcp** interface address is received by DHCP from a DHCP server on this segment.
- **dhcpv6** interface address is received by DHCPv6 from a DHCPv6 server on this segment.

Example:

```
set interfaces bridge br0 address 192.0.2.1/24
set interfaces bridge br0 address 2001:db8::1/64
set interfaces bridge br0 address dhcp
set interfaces bridge br0 address dhcpv6
```

set interfaces bridge <interface> description <description>

Set a human readable, descriptive alias for this connection. Alias is used by e.g. the `show interfaces` command or SNMP based monitoring tools.

Example:

```
set interfaces bridge br0 description 'This is an awesome interface running on VyOS'
```

set interfaces bridge <interface> disable

Disable given <*interface*>. It will be placed in administratively down (`A/D`) state.

Example:

```
set interfaces bridge br0 disable
```

set interfaces bridge <interface> disable-flow-control

Ethernet flow control is a mechanism for temporarily stopping the transmission of data on Ethernet family computer networks. The goal of this mechanism is to ensure zero packet loss in the presence of network congestion.

The first flow control mechanism, the pause frame, was defined by the IEEE 802.3x standard.

A sending station (computer or network switch) may be transmitting data faster than the other end of the link can accept it. Using flow control, the receiving station can signal the sender requesting suspension of transmissions until the receiver catches up.

Use this command to disable the generation of Ethernet flow control (pause frames).

Example:

```
set interfaces bridge br0 disable-flow-control
```

set interfaces bridge <interface> disable-link-detect

Use this command to direct an interface to not detect any physical state changes on a link, for example, when the cable is unplugged.

Default is to detects physical link state changes.

Example:

```
set interfaces bridge br0 disable-link-detect
```

set interfaces bridge <interface> mac <xx:xx:xx:xx:xx:xx>

Configure user defined MAC address on given <*interface*>.

Example:

```
set interfaces bridge br0 mac '00:01:02:03:04:05'
```

set interfaces bridge <interface> mtu <mtu>

Configure MTU on given <*interface*>. It is the size (in bytes) of the largest ethernet frame sent on this link.

Example:

```
set interfaces bridge br0 mtu 9000
```

set interfaces bridge <interface> ip arp-cache-timeout

Once a neighbor has been found, the entry is considered to be valid for at least for this specifc time. An entry's validity will be extended if it receives positive feedback from higher level protocols.

This defaults to 30 seconds.

Example:

```
set interfaces bridge br0 ip arp-cache-timeout 180
```

set interfaces bridge <interface> ip disable-arp-filter

If set the kernel can respond to arp requests with addresses from other interfaces. This may seem wrong but it usually makes sense, because it increases the chance of successful communication. IP addresses are owned by the complete host on Linux, not by particular interfaces. Only for more complex setups like load-balancing, does this behaviour cause problems.

If not set (default) allows you to have multiple network interfaces on the same subnet, and have the ARPs for each interface be answered based on whether or not the kernel would route a packet from the ARP'd IP out that interface (therefore you must use source based routing for this to work).

In other words it allows control of which cards (usually 1) will respond to an arp request.

Example:

```
set interfaces bridge br0 ip disable-arp-filter
```

set interfaces bridge <interface> ip disable-forwarding

Configure interface-specific Host/Router behaviour. If set, the interface will switch to host mode and IPv6 forwarding will be disabled on this interface.

```
set interfaces bridge br0 ip disable-forwarding
```

set interfaces bridge <interface> ip enable-arp-accept

Define behavior for gratuitous ARP frames who's IP is not already present in the ARP table. If configured create new entries in the ARP table.

Both replies and requests type gratuitous arp will trigger the ARP table to be updated, if this setting is on.

If the ARP table already contains the IP address of the gratuitous arp frame, the arp table will be updated regardless if this setting is on or off.

```
set interfaces bridge br0 ip enable-arp-accept
```

set interfaces bridge <interface> ip enable-arp-announce

Define different restriction levels for announcing the local source IP address from IP packets in ARP requests sent on interface.

Use any local address, configured on any interface if this is not set.

If configured, try to avoid local addresses that are not in the target's subnet for this interface. This mode is useful when target hosts reachable via this interface require the source IP address in ARP requests to be part of their logical network configured on the receiving interface. When we generate the request we will check all our subnets that include the target IP and will preserve the source address if it is from such subnet. If there is no such subnet we select source address according to the rules for level 2.

```
set interfaces bridge br0 ip enable-arp-announce
```

set interfaces bridge <interface> ip enable-arp-ignore

Define different modes for sending replies in response to received ARP requests that resolve local target IP addresses:

If configured, reply only if the target IP address is local address configured on the incoming interface.

If this option is unset (default), reply for any local target IP address, configured on any interface.

```
set interfaces bridge br0 ip enable-arp-ignore
```

set interfaces bridge <interface> ip enable-proxy-arp

Use this command to enable proxy Address Resolution Protocol (ARP) on this interface. Proxy ARP allows an Ethernet interface to respond with its own MAC address to ARP requests for destination IP addresses on subnets attached to other interfaces on the system. Subsequent packets sent to those destination IP addresses are forwarded appropriately by the system.

Example:

```
set interfaces bridge br0 ip enable-proxy-arp
```

set interfaces bridge <interface> ip proxy-arp-pvlan

Private VLAN proxy arp. Basically allow proxy arp replies back to the same interface (from which the ARP request/solicitation was received).

This is done to support (ethernet) switch features, like RFC 3069, where the individual ports are NOT allowed to communicate with each other, but they are allowed to talk to the upstream router. As described in RFC 3069, it is possible to allow these hosts to communicate through the upstream router by proxy_arp'ing.

Note: Don't need to be used together with proxy_arp.

This technology is known by different names:

- In RFC 3069 it is called VLAN Aggregation
- Cisco and Allied Telesyn call it Private VLAN
- Hewlett-Packard call it Source-Port filtering or port-isolation
- Ericsson call it MAC-Forced Forwarding (RFC Draft)

set interfaces bridge <interface> ip source-validation <strict | loose | disable>

Enable policy for source validation by reversed path, as specified in RFC 3704. Current recommended practice in RFC 3704 is to enable strict mode to prevent IP spoofing from DDos attacks. If using asymmetric routing or other complicated routing, then loose mode is recommended.

- strict: Each incoming packet is tested against the FIB and if the interface is not the best reverse path the packet check will fail. By default failed packets are discarded.
- loose: Each incoming packet's source address is also tested against the FIB and if the source address is not reachable via any interface the packet check will fail.
- disable: No source validation

set interfaces bridge <interface> ipv6 address autoconf

SLAAC RFC 4862. IPv6 hosts can configure themselves automatically when connected to an IPv6 network using the Neighbor Discovery Protocol via ICMPv6 router discovery messages. When first connected to a network, a host sends a link-local router solicitation multicast request for its configuration parameters; routers respond to such a request with a router advertisement packet that contains Internet Layer configuration parameters.

Note: This method automatically disables IPv6 traffic forwarding on the interface in question.

Example:

```
set interfaces bridge br0 ipv6 address autoconf
```

set interfaces bridge <interface> ipv6 address eui64 <prefix>

EUI-64 as specified in RFC 4291 allows a host to assign iteslf a unique 64-Bit IPv6 address.

Example:

```
set interfaces bridge br0 ipv6 address eui64 2001:db8:beef::/64
```

set interfaces bridge <interface> ipv6 address no-default-link-local

Do not assign a link-local IPv6 address to this interface.

Example:

```
set interfaces bridge br0 ipv6 address no-default-link-local
```

set interfaces bridge <interface> ipv6 disable-forwarding

Configure interface-specific Host/Router behaviour. If set, the interface will switch to host mode and IPv6 forwarding will be disabled on this interface.

Example:

```
set interfaces bridge br0 ipv6 disable-forwarding
```

set interfaces bridge <interface> vrf <vrf>

Place interface in given VRF instance.

See also:

There is an entire chapter about how to configure a *VRF*, please check this for additional information.

Example:

```
set interfaces bridge br0 vrf red
```

DHCP(v6)

set interfaces bridge <interface> dhcp-options client-id <description>

RFC 2131 states: The client MAY choose to explicitly provide the identifier through the 'client identifier' option. If the client supplies a 'client identifier', the client MUST use the same 'client identifier' in all subsequent messages, and the server MUST use that identifier to identify the client.

Example:

```
set interfaces bridge br0 dhcp-options client-id 'foo-bar'
```

set interfaces bridge <interface> dhcp-options host-name <hostname>

Instead of sending the real system hostname to the DHCP server, overwrite the host-name with this given-value.

Example:

```
set interfaces bridge br0 dhcp-options host-name 'VyOS'
```

set interfaces bridge <interface> dhcp-options vendor-class-id <vendor-id>

The vendor-class-id option can be used to request a specific class of vendor options from the server.

Example:

```
set interfaces bridge br0 dhcp-options vendor-class-id 'VyOS'
```

set interfaces bridge <interface> dhcp-options no-default-route

Only request an address from the DHCP server but do not request a default gateway.

Example:

```
set interfaces bridge br0 dhcp-options no-default-route
```

set interfaces bridge <interface> dhcpv6-options duid <duid>

The DHCP unique identifier (DUID) is used by a client to get an IP address from a DHCPv6 server. It has a 2-byte DUID type field, and a variable-length identifier field up to 128 bytes. Its actual length depends on its type. The server compares the DUID with its database and delivers configuration data (address, lease times, DNS servers, etc.) to the client.

```
set interfaces bridge br0 duid '0e:00:00:01:00:01:27:71:db:f0:00:50:56:bf:c5:6d'
```

set interfaces bridge <interface> dhcpv6-options parameters-only

This statement specifies dhcp6c to only exchange informational configuration parameters with servers. A list of DNS server addresses is an example of such parameters. This statement is useful when the client does not need stateful configuration parameters such as IPv6 addresses or prefixes.

```
set interfaces bridge br0 dhcpv6-options parameters-only
```

set interfaces bridge <interface> dhcpv6-options rapid-commit

When rapid-commit is specified, dhcp6c will include a rapid-commit option in solicit messages and wait for an immediate reply instead of advertisements.

```
set interfaces bridge br0 dhcpv6-options rapid-commit
```

set interfaces bridge <interface> dhcpv6-options temporary

Request only a temporary address and not form an IA_NA (Identity Association for Non-temporary Addresses) partnership.

```
set interfaces bridge br0 dhcpv6-options temporary
```

DHCPv6 Prefix Delegation (PD)

VyOS 1.3 (equuleus) supports DHCPv6-PD (**RFC 3633**). DHCPv6 Prefix Delegation is supported by most ISPs who provide native IPv6 for consumers on fixed networks.

set interfaces bridge <interface> dhcpv6-options pd <id> length <length>

Some ISPs by default only delegate a /64 prefix. To request for a specific prefix size use this option to request for a bigger delegation for this pd *<id>*. This value is in the range from 32 - 64 so you could request up to a /32 prefix (if your ISP allows this) down to a /64 delegation.

The default value corresponds to 64.

To request a /56 prefix from your ISP use:

```
set interfaces bridge br0 dhcpv6-options pd 0 length 56
```

set interfaces bridge <interface> dhcpv6-options pd <id> interface <delegatee> address <address>

Specify the interface address used locally on the interfcae where the prefix has been delegated to. ID must be a decimal integer.

It will be combined with the delegated prefix and the sla-id to form a complete interface address. The default is to use the EUI-64 address of the interface.

Example: Delegate a /64 prefix to interface eth8 which will use a local address on this router of `<prefix>::ffff`, as the address 65534 will correspond to `ffff` in hexadecimal notation.

```
set interfaces bridge br0 dhcpv6-options pd 0 interface eth8 address 65534
```

set interfaces bridge <interface> dhcpv6-options pd <id> interface <delegatee> sla-id <id>

Specify the identifier value of the site-level aggregator (SLA) on the interface. ID must be a decimal number greater then 0 which fits in the length of SLA IDs (see below).

Example: If ID is 1 and the client is delegated an IPv6 prefix 2001:db8:ffff::/48, dhcp6c will combine the two values into a single IPv6 prefix, 2001:db8:ffff:1::/64, and will configure the prefix on the specified interface.

```
set interfaces bridge br0 dhcpv6-options pd 0 interface eth8 sla-id 1
```

Member Interfaces

set interfaces bridge <interface> member interface <member>

Assign <*member*> interface to bridge <*interface*>. A completion helper will help you with all allowed interfaces which can be bridged. This includes *Ethernet*, *Bond / Link Aggregation*, *L2TPv3*, *OpenVPN*, *VXLAN*, *WLAN/WIFI - Wireless LAN*, *Tunnel* and *GENEVE*.

set interfaces bridge <interface> member interface <member> priority <priority>

Configure individual bridge port <*priority*>.

Each bridge has a relative priority and cost. Each interface is associated with a port (number) in the STP code. Each has a priority and a cost, that is used to decide which is the shortest path to forward a packet. The lowest cost path is always used unless the other path is down. If you have multiple bridges and interfaces then you may need to adjust the priorities to achieve optimum performance.

set interfaces bridge <interface> member interface <member> cost <cost>

Path <*cost*> value for Spanning Tree Protocol. Each interface in a bridge could have a different speed and this value is used when deciding which link to use. Faster interfaces should have lower costs.

Bridge Options

set interfaces bridge <interface> aging <time>

MAC address aging <*time*> in seconds (default: 300).

set interfaces bridge <interface> max-age <time>

Bridge maximum aging <*time*> in seconds (default: 20).

If an another bridge in the spanning tree does not send out a hello packet for a long period of time, it is assumed to be dead.

set interfaces bridge <interface> igmp querier

Enable IGMP querier

STP Parameter

STP (Spanning Tree Protocol) is a network protocol that builds a loop-free logical topology for Ethernet networks. The basic function of STP is to prevent bridge loops and the broadcast radiation that results from them. Spanning tree also allows a network design to include backup links providing fault tolerance if an active link fails.

set interfaces bridge <interface> stp

Enable spanning tree protocol. STP is disabled by default.

set interfaces bridge <interface> forwarding-delay <delay>

Spanning Tree Protocol forwarding <*delay*> in seconds (default: 15).

The forwarding delay time is the time spent in each of the listening and learning states before the Forwarding state is entered. This delay is so that when a new bridge comes onto a busy network it looks at some traffic before participating.

set interfaces bridge <interface> hello-time <interval>

Spanning Tree Protocol hello advertisement <*interval*> in seconds (default: 2).

Periodically, a hello packet is sent out by the Root Bridge and the Designated Bridges. Hello packets are used to communicate information about the topology throughout the entire Bridged Local Area Network.

VLAN

Enable VLAN-Aware Bridge

set interfaces bridge <interface> enable-vlan

To activate the VLAN aware bridge, you must activate this setting to use VLAN settings for the bridge

VLAN Options

Note: It is not valid to use the *vif 1* option for VLAN aware bridges because VLAN aware bridges assume that all unlabeled packets belong to the default VLAN 1 member and that the VLAN ID of the bridge's parent interface is always 1

IEEE 802.1q, often referred to as Dot1q, is the networking standard that supports virtual LANs (VLANs) on an IEEE 802.3 Ethernet network. The standard defines a system of VLAN tagging for Ethernet frames and the accompanying procedures to be used by bridges and switches in handling such frames. The standard also contains provisions for a quality-of-service prioritization scheme commonly known as IEEE 802.1p and defines the Generic Attribute Registration Protocol.

Portions of the network which are VLAN-aware (i.e., IEEE 802.1q conformant) can include VLAN tags. When a frame enters the VLAN-aware portion of the network, a tag is added to represent the VLAN membership. Each frame must be distinguishable as being within exactly one VLAN. A frame in the VLAN-aware portion of the network that does not contain a VLAN tag is assumed to be flowing on the native VLAN.

The standard was developed by IEEE 802.1, a working group of the IEEE 802 standards committee, and continues to be actively revised. One of the notable revisions is 802.1Q-2014 which incorporated IEEE 802.1aq (Shortest Path Bridging) and much of the IEEE 802.1d standard.

802.1q VLAN interfaces are represented as virtual sub-interfaces in VyOS. The term used for this is `vif`.

set interfaces bridge <interface> vif <vlan-id>

Create a new VLAN interface on interface <*interface*> using the VLAN number provided via <*vlan-id*>.

You can create multiple VLAN interfaces on a physical interface. The VLAN ID range is from 0 to 4094.

Note: Only 802.1Q-tagged packets are accepted on Ethernet vifs.

---

set interfaces bridge <interface> vif <vlan-id> address <address | dhcp | dhcpv6>

Configure interface <*interface*> with one or more interface addresses.

- **address** can be specified multiple times as IPv4 and/or IPv6 address, e.g. 192.0.2.1/24 and/or 2001:db8::1/64
- **dhcp** interface address is received by DHCP from a DHCP server on this segment.
- **dhcpv6** interface address is received by DHCPv6 from a DHCPv6 server on this segment.

Example:

```
set interfaces bridge br0 vif 10 address 192.0.2.1/24
set interfaces bridge br0 vif 10 address 2001:db8::1/64
set interfaces bridge br0 vif 10 address dhcp
set interfaces bridge br0 vif 10 address dhcpv6
```

set interfaces bridge <interface> vif <vlan-id> description <description>

Set a human readable, descriptive alias for this connection. Alias is used by e.g. the `show interfaces` command or SNMP based monitoring tools.

Example:

```
set interfaces bridge br0 vif 10 description 'This is an awesome interface running␣
↪on VyOS'
```

set interfaces bridge <interface> vif <vlan-id> disable

Disable given <*interface*>. It will be placed in administratively down (`A/D`) state.

Example:

```
set interfaces bridge br0 vif 10 disable
```

set interfaces bridge <interface> vif <vlan-id> disable-link-detect

Use this command to direct an interface to not detect any physical state changes on a link, for example, when the cable is unplugged.

Default is to detects physical link state changes.

Example:

```
set interfaces bridge br0 vif 10 disable-link-detect
```

set interfaces bridge <interface> vif <vlan-id> mac <xx:xx:xx:xx:xx:xx>

Configure user defined MAC address on given <*interface*>.

Example:

```
set interfaces bridge br0 vif 10 mac '00:01:02:03:04:05'
```

set interfaces bridge <interface> vif <vlan-id> mtu <mtu>

Configure MTU on given <*interface*>. It is the size (in bytes) of the largest ethernet frame sent on this link.

Example:

```
set interfaces bridge br0 vif 10 mtu 9000
```

set interfaces bridge <interface> vif <vlan-id> ip arp-cache-timeout

Once a neighbor has been found, the entry is considered to be valid for at least for this specifc time. An entry's validity will be extended if it receives positive feedback from higher level protocols.

This defaults to 30 seconds.

Example:

```
set interfaces bridge br0 vif 10 ip arp-cache-timeout 180
```

set interfaces bridge <interface> vif <vlan-id> ip disable-arp-filter

If set the kernel can respond to arp requests with addresses from other interfaces. This may seem wrong but it usually makes sense, because it increases the chance of successful communication. IP addresses are owned by the complete host on Linux, not by particular interfaces. Only for more complex setups like load-balancing, does this behaviour cause problems.

If not set (default) allows you to have multiple network interfaces on the same subnet, and have the ARPs for each interface be answered based on whether or not the kernel would route a packet from the ARP'd IP out that interface (therefore you must use source based routing for this to work).

In other words it allows control of which cards (usually 1) will respond to an arp request.

Example:

```
set interfaces bridge br0 vif 10 ip disable-arp-filter
```

set interfaces bridge <interface> vif <vlan-id> ip disable-forwarding

Configure interface-specific Host/Router behaviour. If set, the interface will switch to host mode and IPv6 forwarding will be disabled on this interface.

```
set interfaces bridge br0 vif 10 ip disable-forwarding
```

set interfaces bridge <interface> vif <vlan-id> ip enable-arp-accept

Define behavior for gratuitous ARP frames who's IP is not already present in the ARP table. If configured create new entries in the ARP table.

Both replies and requests type gratuitous arp will trigger the ARP table to be updated, if this setting is on.

If the ARP table already contains the IP address of the gratuitous arp frame, the arp table will be updated regardless if this setting is on or off.

```
set interfaces bridge br0 vif 10 ip enable-arp-accept
```

set interfaces bridge <interface> vif <vlan-id> ip enable-arp-announce

Define different restriction levels for announcing the local source IP address from IP packets in ARP requests sent on interface.

Use any local address, configured on any interface if this is not set.

If configured, try to avoid local addresses that are not in the target's subnet for this interface. This mode is useful when target hosts reachable via this interface require the source IP address in ARP requests to be part of their logical network configured on the receiving interface. When we generate the request we will check all our subnets that include the target IP and will preserve the source address if it is from such subnet. If there is no such subnet we select source address according to the rules for level 2.

```
set interfaces bridge br0 vif 10 ip enable-arp-announce
```

set interfaces bridge <interface> vif <vlan-id> ip enable-arp-ignore

Define different modes for sending replies in response to received ARP requests that resolve local target IP addresses:

If configured, reply only if the target IP address is local address configured on the incoming interface.

If this option is unset (default), reply for any local target IP address, configured on any interface.

```
set interfaces bridge br0 vif 10 ip enable-arp-ignore
```

set interfaces bridge <interface> vif <vlan-id> ip enable-proxy-arp

Use this command to enable proxy Address Resolution Protocol (ARP) on this interface. Proxy ARP allows an Ethernet interface to respond with its own MAC address to ARP requests for destination IP addresses on subnets attached to other interfaces on the system. Subsequent packets sent to those destination IP addresses are forwarded appropriately by the system.

Example:

```
set interfaces bridge br0 vif 10 ip enable-proxy-arp
```

set interfaces bridge <interface> vif <vlan-id> ip proxy-arp-pvlan

Private VLAN proxy arp. Basically allow proxy arp replies back to the same interface (from which the ARP request/solicitation was received).

This is done to support (ethernet) switch features, like **RFC 3069**, where the individual ports are NOT allowed to communicate with each other, but they are allowed to talk to the upstream router. As described in **RFC 3069**, it is possible to allow these hosts to communicate through the upstream router by proxy_arp'ing.

Note: Don't need to be used together with proxy_arp.

This technology is known by different names:

- In **RFC 3069** it is called VLAN Aggregation
- Cisco and Allied Telesyn call it Private VLAN
- Hewlett-Packard call it Source-Port filtering or port-isolation
- Ericsson call it MAC-Forced Forwarding (RFC Draft)

set interfaces bridge <interface> vif <vlan-id> ip source-validation <strict | loose | disable>

Enable policy for source validation by reversed path, as specified in **RFC 3704**. Current recommended practice in **RFC 3704** is to enable strict mode to prevent IP spoofing from DDos attacks. If using asymmetric routing or other complicated routing, then loose mode is recommended.

- strict: Each incoming packet is tested against the FIB and if the interface is not the best reverse path the packet check will fail. By default failed packets are discarded.
- loose: Each incoming packet's source address is also tested against the FIB and if the source address is not reachable via any interface the packet check will fail.
- disable: No source validation

set interfaces bridge <interface> vif <vlan-id> ipv6 address autoconf

SLAAC **RFC 4862**. IPv6 hosts can configure themselves automatically when connected to an IPv6 network using the Neighbor Discovery Protocol via ICMPv6 router discovery messages. When first connected to a network, a host sends a link-local router solicitation multicast request for its configuration parameters; routers respond to such a request with a router advertisement packet that contains Internet Layer configuration parameters.

Note: This method automatically disables IPv6 traffic forwarding on the interface in question.

Example:

```
set interfaces bridge br0 vif 10 ipv6 address autoconf
```

set interfaces bridge <interface> vif <vlan-id> ipv6 address eui64 <prefix>

EUI-64 as specified in **RFC 4291** allows a host to assign iteslf a unique 64-Bit IPv6 address.

Example:

```
set interfaces bridge br0 vif 10 ipv6 address eui64 2001:db8:beef::/64
```

set interfaces bridge <interface> vif <vlan-id> ipv6 address no-default-link-local

Do not assign a link-local IPv6 address to this interface.

Example:

```
set interfaces bridge br0 vif 10 ipv6 address no-default-link-local
```

set interfaces bridge <interface> vif <vlan-id> ipv6 disable-forwarding

Configure interface-specific Host/Router behaviour. If set, the interface will switch to host mode and IPv6 forwarding will be disabled on this interface.

Example:

```
set interfaces bridge br0 vif 10 ipv6 disable-forwarding
```

set interfaces bridge <interface> vif <vlan-id> vrf <vrf>

Place interface in given VRF instance.

See also:

There is an entire chapter about how to configure a *VRF*, please check this for additional information.

Example:

```
set interfaces bridge br0 vif 10 vrf red
```

DHCP(v6)

set interfaces bridge <interface> vif <vlan-id> dhcp-options client-id <description>

RFC 2131 states: The client MAY choose to explicitly provide the identifier through the 'client identifier' option. If the client supplies a 'client identifier', the client MUST use the same 'client identifier' in all subsequent messages, and the server MUST use that identifier to identify the client.

Example:

```
set interfaces bridge br0 vif 10 dhcp-options client-id 'foo-bar'
```

set interfaces bridge <interface> vif <vlan-id> dhcp-options host-name <hostname>

Instead of sending the real system hostname to the DHCP server, overwrite the host-name with this given-value.

Example:

```
set interfaces bridge br0 vif 10 dhcp-options host-name 'VyOS'
```

set interfaces bridge <interface> vif <vlan-id> dhcp-options vendor-class-id <vendor-id>

The vendor-class-id option can be used to request a specific class of vendor options from the server.

Example:

```
set interfaces bridge br0 vif 10 dhcp-options vendor-class-id 'VyOS'
```

set interfaces bridge <interface> vif <vlan-id> dhcp-options no-default-route

Only request an address from the DHCP server but do not request a default gateway.

Example:

```
set interfaces bridge br0 vif 10 dhcp-options no-default-route
```

set interfaces bridge <interface> vif <vlan-id> dhcpv6-options duid <duid>

The DHCP unique identifier (DUID) is used by a client to get an IP address from a DHCPv6 server. It has a 2-byte DUID type field, and a variable-length identifier field up to 128 bytes. Its actual length depends on its type. The server compares the DUID with its database and delivers configuration data (address, lease times, DNS servers, etc.) to the client.

```
set interfaces bridge br0 vif 10 duid
↪'0e:00:00:01:00:01:27:71:db:f0:00:50:56:bf:c5:6d'
```

set interfaces bridge <interface> vif <vlan-id> dhcpv6-options parameters-only

This statement specifies dhcp6c to only exchange informational configuration parameters with servers. A list of DNS server addresses is an example of such parameters. This statement is useful when the client does not need stateful configuration parameters such as IPv6 addresses or prefixes.

```
set interfaces bridge br0 vif 10 dhcpv6-options parameters-only
```

set interfaces bridge <interface> vif <vlan-id> dhcpv6-options rapid-commit

When rapid-commit is specified, dhcp6c will include a rapid-commit option in solicit messages and wait for an immediate reply instead of advertisements.

```
set interfaces bridge br0 vif 10 dhcpv6-options rapid-commit
```

set interfaces bridge <interface> vif <vlan-id> dhcpv6-options temporary

Request only a temporary address and not form an IA_NA (Identity Association for Non-temporary Addresses) partnership.

```
set interfaces bridge br0 vif 10 dhcpv6-options temporary
```

DHCPv6 Prefix Delegation (PD)

VyOS 1.3 (equuleus) supports DHCPv6-PD (**RFC 3633**). DHCPv6 Prefix Delegation is supported by most ISPs who provide native IPv6 for consumers on fixed networks.

set interfaces bridge <interface> vif <vlan-id> dhcpv6-options pd <id> length <length>

Some ISPs by default only delegate a /64 prefix. To request for a specific prefix size use this option to request for a bigger delegation for this pd <*id*>. This value is in the range from 32 - 64 so you could request up to a /32 prefix (if your ISP allows this) down to a /64 delegation.

The default value corresponds to 64.

To request a /56 prefix from your ISP use:

```
set interfaces bridge br0 vif 10 dhcpv6-options pd 0 length 56
```

set interfaces bridge <interface> vif <vlan-id> dhcpv6-options pd <id> interface <delegatee> address <address>

Specify the interface address used locally on the interfcae where the prefix has been delegated to. ID must be a decimal integer.

It will be combined with the delegated prefix and the sla-id to form a complete interface address. The default is to use the EUI-64 address of the interface.

Example: Delegate a /64 prefix to interface eth8 which will use a local address on this router of <prefix>::ffff, as the address 65534 will correspond to ffff in hexadecimal notation.

```
set interfaces bridge br0 vif 10 dhcpv6-options pd 0 interface eth8 address 65534
```

set interfaces bridge <interface> vif <vlan-id> dhcpv6-options pd <id> interface <delegatee> sla-id <id>

Specify the identifier value of the site-level aggregator (SLA) on the interface. ID must be a decimal number greater then 0 which fits in the length of SLA IDs (see below).

Example: If ID is 1 and the client is delegated an IPv6 prefix 2001:db8:ffff::/48, dhcp6c will combine the two values into a single IPv6 prefix, 2001:db8:ffff:1::/64, and will configure the prefix on the specified interface.

```
set interfaces bridge br0 vif 10 dhcpv6-options pd 0 interface eth8 sla-id 1
```

set interfaces bridge <interface> member interface <member> native-vlan <vlan-id>

Set the native VLAN ID flag of the interface. When a data packet without a VLAN tag enters the port, the data packet will be forced to add a tag of a specific vlan id. When the vlan id flag flows out, the tag of the vlan id will be stripped

Example: Set *eth0* member port to be native VLAN 2

```
set interfaces bridge br1 member interface eth0 native-vlan 2
```

set interfaces bridge <interface> member interface <member> allowed-vlan <vlan-id>

Allows specific VLAN IDs to pass through the bridge member interface. This can either be an individual VLAN id or a range of VLAN ids delimited by a hyphen.

Example: Set *eth0* member port to be allowed VLAN 4

```
set interfaces bridge br1 member interface eth0 allowed-vlan 4
```

Example: Set *eth0* member port to be allowed VLAN 6-8

```
set interfaces bridge br1 member interface eth0 allowed-vlan 6-8
```

Port Mirror (SPAN)

SPAN port mirroring can copy the inbound/outbound traffic of the interface to the specified interface, usually the interface can be connected to some special equipment, such as behavior control system, intrusion detection system and traffic collector, and can copy all related traffic from this port. The benefit of mirroring the traffic is that the application is isolated from the source traffic and so application processing does not affect the traffic or the system performance.

VyOS uses the *mirror* option to configure port mirroring. The configuration is divided into 2 different directions. Destination ports should be configured for different traffic directions.

set interfaces bridge <interface> mirror ingress <monitor-interface>

Configure port mirroring for *interface* inbound traffic and copy the traffic to *monitor-interface*

Example: Mirror the inbound traffic of *br1* port to *eth3*

```
set interfaces bridge br1 mirror ingress eth3
```

set interfaces bridge <interface> mirror egress <monitor-interface>

Configure port mirroring for *interface* outbound traffic and copy the traffic to *monitor-interface*

Example: Mirror the outbound traffic of *br1* port to *eth3*

```
set interfaces bridge br1 mirror egress eth3
```

Examples

Create a basic bridge

Creating a bridge interface is very simple. In this example, we will have:

- A bridge named *br100*
- Member interfaces *eth1* and VLAN 10 on interface *eth2*
- Enable STP
- Bridge answers on IP address 192.0.2.1/24 and 2001:db8::ffff/64

```
set interfaces bridge br100 address 192.0.2.1/24
set interfaces bridge br100 address 2001:db8::ffff/64
set interfaces bridge br100 member interface eth1
set interfaces bridge br100 member interface eth2.10
set interfaces bridge br100 stp
```

This results in the active configuration:

```
vyos@vyos# show interfaces bridge br100
 address 192.0.2.1/24
 address 2001:db8::ffff/64
 member {
     interface eth1 {
     }
     interface eth2.10 {
     }
 }
 stp
```

Using VLAN aware Bridge

An example of creating a VLAN-aware bridge is as follows:

- A bridge named *br100*
- The member interface *eth1* is a trunk that allows VLAN 10 to pass
- VLAN 10 on member interface *eth2* (ACCESS mode)
- Enable STP
- Bridge answers on IP address 192.0.2.1/24 and 2001:db8::ffff/64

```
set interfaces bridge br100 enable-vlan
set interfaces bridge br100 member interface eth1 allowed-vlan 10
set interfaces bridge br100 member interface eth2 native-vlan 10
set interfaces bridge br100 vif 10 address 192.0.2.1/24
set interfaces bridge br100 vif 10 address 2001:db8::ffff/64
set interfaces bridge br100 stp
```

This results in the active configuration:

```
vyos@vyos# show interfaces bridge br100
 enable-vlan
 member {
     interface eth1 {
         allowed-vlan 10
     }
     interface eth2 {
         native-vlan 10
     }
 }
 stp
 vif 10 {
     address 192.0.2.1/24
     address 2001:db8::ffff/64
 }
```

Using the operation mode command to view Bridge Information

show bridge

The *show bridge* operational command can be used to display configured bridges:

```
vyos@vyos:~$ show bridge
bridge name     bridge id               STP enabled     interfaces
br100           8000.0050569d11df       yes             eth1
                                                       eth2.10
```

show bridge <name> spanning-tree

Show bridge <*name*> STP configuration.

```
vyos@vyos:~$ show bridge br100 spanning-tree
br100
 bridge id              8000.0050569d11df
 designated root        8000.0050569d11df
 root port                 0                    path cost                  0
 max age                  20.00                 bridge max age            20.00
 hello time                2.00                 bridge hello time          2.00
 forward delay            14.00                 bridge forward delay      14.00
 ageing time             300.00
 hello timer               0.06                 tcn timer                  0.00
 topology change timer     0.00                 gc timer                 242.02
 flags

eth1 (1)
 port id                8001                    state                   disabled
 designated root        8000.0050569d11df       path cost                  100
 designated bridge      8000.0050569d11df       message age timer          0.00
 designated port        8001                    forward delay timer        0.00
 designated cost           0                    hold timer                 0.00
 flags

eth2.10 (2)
 port id                8002                    state                   disabled
 designated root        8000.0050569d11df       path cost                  100
 designated bridge      8000.0050569d11df       message age timer          0.00
 designated port        8002                    forward delay timer        0.00
 designated cost           0                    hold timer                 0.00
```

8.4.3 Dummy

The dummy interface is really a little exotic, but rather useful nevertheless. Dummy interfaces are much like the *Loopback* interface, except you can have as many as you want.

Note: Dummy interfaces can be used as interfaces that always stay up (in the same fashion to loopbacks in Cisco IOS), or for testing purposes.

Hint: On systems with multiple redundant uplinks and routes, it's a good idea to use a dedicated address for man-

agement and dynamic routing protocols. However, assigning that address to a physical link is risky: if that link goes down, that address will become inaccessible. A common solution is to assign the management address to a loopback or a dummy interface and advertise that address via all physical links, so that it's reachable through any of them. Since in Linux-based systems, there can be only one loopback interface, it's better to use a dummy interface for that purpose, since they can be added, removed, and taken up and down independently.

Configuration

Common interface configuration

set interfaces dummy <interface> address <address>

Configure interface <*interface*> with one or more interface addresses.

- **address** can be specified multiple times as IPv4 and/or IPv6 address, e.g. 192.0.2.1/24 and/or 2001:db8::1/64

Example:

```
set interfaces dummy dum0 address 192.0.2.1/24
set interfaces dummy dum0 address 2001:db8::1/64
```

set interfaces dummy <interface> description <description>

Set a human readable, descriptive alias for this connection. Alias is used by e.g. the `show interfaces` command or SNMP based monitoring tools.

Example:

```
set interfaces dummy dum0 description 'This is an awesome interface running on VyOS'
```

set interfaces dummy <interface> disable

Disable given <*interface*>. It will be placed in administratively down (`A/D`) state.

Example:

```
set interfaces dummy dum0 disable
```

set interfaces dummy <interface> vrf <vrf>

Place interface in given VRF instance.

See also:

There is an entire chapter about how to configure a *VRF*, please check this for additional information.

Example:

```
set interfaces dummy dum0 vrf red
```

Operation

show interfaces dummy

Show brief interface information.

```
vyos@vyos:~$ show interfaces dummy
Codes: S - State, L - Link, u - Up, D - Down, A - Admin Down
Interface        IP Address                        S/L  Description
---------        ----------                        ---  -----------
dum0             172.18.254.201/32                 u/u
```

show interfaces dummy <interface>

Show detailed information on given <*interface*>

```
vyos@vyos:~$ show interfaces dummy dum0
dum0: <BROADCAST,NOARP,UP,LOWER_UP> mtu 1500 qdisc noqueue state UNKNOWN group␣
↪default qlen 1000
    link/ether 26:7c:8e:bc:fc:f5 brd ff:ff:ff:ff:ff:ff
    inet 172.18.254.201/32 scope global dum0
       valid_lft forever preferred_lft forever
    inet6 fe80::247c:8eff:febc:fcf5/64 scope link
       valid_lft forever preferred_lft forever

    RX:  bytes    packets     errors    dropped    overrun      mcast
            0          0          0          0          0          0
    TX:  bytes    packets     errors    dropped    carrier collisions
       1369707       4267          0          0          0          0
```

8.4.4 Ethernet

This will be the most widely used interface on a router carrying traffic to the real world.

Configuration

Common interface configuration

set interfaces ethernet <interface> address <address | dhcp | dhcpv6>

Configure interface <*interface*> with one or more interface addresses.

- **address** can be specified multiple times as IPv4 and/or IPv6 address, e.g. 192.0.2.1/24 and/or 2001:db8::1/64
- **dhcp** interface address is received by DHCP from a DHCP server on this segment.
- **dhcpv6** interface address is received by DHCPv6 from a DHCPv6 server on this segment.

Example:

```
set interfaces ethernet eth0 address 192.0.2.1/24
set interfaces ethernet eth0 address 2001:db8::1/64
set interfaces ethernet eth0 address dhcp
set interfaces ethernet eth0 address dhcpv6
```

set interfaces ethernet <interface> description <description>

Set a human readable, descriptive alias for this connection. Alias is used by e.g. the `show interfaces` command or SNMP based monitoring tools.

Example:

```
set interfaces ethernet eth0 description 'This is an awesome interface running on␣
↪VyOS'
```

set interfaces ethernet <interface> disable

Disable given <*interface*>. It will be placed in administratively down (`A/D`) state.

Example:

```
set interfaces ethernet eth0 disable
```

set interfaces ethernet <interface> disable-flow-control

Ethernet flow control is a mechanism for temporarily stopping the transmission of data on Ethernet family computer networks. The goal of this mechanism is to ensure zero packet loss in the presence of network congestion.

The first flow control mechanism, the pause frame, was defined by the IEEE 802.3x standard.

A sending station (computer or network switch) may be transmitting data faster than the other end of the link can accept it. Using flow control, the receiving station can signal the sender requesting suspension of transmissions until the receiver catches up.

Use this command to disable the generation of Ethernet flow control (pause frames).

Example:

```
set interfaces ethernet eth0 disable-flow-control
```

set interfaces ethernet <interface> disable-link-detect

Use this command to direct an interface to not detect any physical state changes on a link, for example, when the cable is unplugged.

Default is to detects physical link state changes.

Example:

```
set interfaces ethernet eth0 disable-link-detect
```

set interfaces ethernet <interface> mac <xx:xx:xx:xx:xx:xx>

Configure user defined MAC address on given <*interface*>.

Example:

```
set interfaces ethernet eth0 mac '00:01:02:03:04:05'
```

set interfaces ethernet <interface> mtu <mtu>

Configure MTU on given <*interface*>. It is the size (in bytes) of the largest ethernet frame sent on this link.

Example:

```
set interfaces ethernet eth0 mtu 9000
```

set interfaces ethernet <interface> ip arp-cache-timeout

Once a neighbor has been found, the entry is considered to be valid for at least for this specifc time. An entry's validity will be extended if it receives positive feedback from higher level protocols.

This defaults to 30 seconds.

Example:

```
set interfaces ethernet eth0 ip arp-cache-timeout 180
```

set interfaces ethernet <interface> ip disable-arp-filter

If set the kernel can respond to arp requests with addresses from other interfaces. This may seem wrong but it usually makes sense, because it increases the chance of successful communication. IP addresses are owned by the complete host on Linux, not by particular interfaces. Only for more complex setups like load-balancing, does this behaviour cause problems.

If not set (default) allows you to have multiple network interfaces on the same subnet, and have the ARPs for each interface be answered based on whether or not the kernel would route a packet from the ARP'd IP out that interface (therefore you must use source based routing for this to work).

In other words it allows control of which cards (usually 1) will respond to an arp request.

Example:

```
set interfaces ethernet eth0 ip disable-arp-filter
```

set interfaces ethernet <interface> ip disable-forwarding

Configure interface-specific Host/Router behaviour. If set, the interface will switch to host mode and IPv6 forwarding will be disabled on this interface.

```
set interfaces ethernet eth0 ip disable-forwarding
```

set interfaces ethernet <interface> ip enable-arp-accept

Define behavior for gratuitous ARP frames who's IP is not already present in the ARP table. If configured create new entries in the ARP table.

Both replies and requests type gratuitous arp will trigger the ARP table to be updated, if this setting is on.

If the ARP table already contains the IP address of the gratuitous arp frame, the arp table will be updated regardless if this setting is on or off.

```
set interfaces ethernet eth0 ip enable-arp-accept
```

set interfaces ethernet <interface> ip enable-arp-announce

Define different restriction levels for announcing the local source IP address from IP packets in ARP requests sent on interface.

Use any local address, configured on any interface if this is not set.

If configured, try to avoid local addresses that are not in the target's subnet for this interface. This mode is useful when target hosts reachable via this interface require the source IP address in ARP requests to be part of their logical network configured on the receiving interface. When we generate the request we will check all our subnets that include the target IP and will preserve the source address if it is from such subnet. If there is no such subnet we select source address according to the rules for level 2.

```
set interfaces ethernet eth0 ip enable-arp-announce
```

set interfaces ethernet <interface> ip enable-arp-ignore

Define different modes for sending replies in response to received ARP requests that resolve local target IP addresses:

If configured, reply only if the target IP address is local address configured on the incoming interface.

If this option is unset (default), reply for any local target IP address, configured on any interface.

```
set interfaces ethernet eth0 ip enable-arp-ignore
```

set interfaces ethernet <interface> ip enable-proxy-arp

Use this command to enable proxy Address Resolution Protocol (ARP) on this interface. Proxy ARP allows an Ethernet interface to respond with its own MAC address to ARP requests for destination IP addresses on subnets attached to other interfaces on the system. Subsequent packets sent to those destination IP addresses are forwarded appropriately by the system.

Example:

```
set interfaces ethernet eth0 ip enable-proxy-arp
```

set interfaces ethernet <interface> ip proxy-arp-pvlan

Private VLAN proxy arp. Basically allow proxy arp replies back to the same interface (from which the ARP request/solicitation was received).

This is done to support (ethernet) switch features, like RFC 3069, where the individual ports are NOT allowed to communicate with each other, but they are allowed to talk to the upstream router. As described in RFC 3069, it is possible to allow these hosts to communicate through the upstream router by proxy_arp'ing.

Note: Don't need to be used together with proxy_arp.

This technology is known by different names:

- In RFC 3069 it is called VLAN Aggregation
- Cisco and Allied Telesyn call it Private VLAN
- Hewlett-Packard call it Source-Port filtering or port-isolation
- Ericsson call it MAC-Forced Forwarding (RFC Draft)

set interfaces ethernet <interface> ip source-validation <strict | loose | disable>

Enable policy for source validation by reversed path, as specified in RFC 3704. Current recommended practice in RFC 3704 is to enable strict mode to prevent IP spoofing from DDos attacks. If using asymmetric routing or other complicated routing, then loose mode is recommended.

- strict: Each incoming packet is tested against the FIB and if the interface is not the best reverse path the packet check will fail. By default failed packets are discarded.
- loose: Each incoming packet's source address is also tested against the FIB and if the source address is not reachable via any interface the packet check will fail.
- disable: No source validation

set interfaces ethernet <interface> ipv6 address autoconf

SLAAC RFC 4862. IPv6 hosts can configure themselves automatically when connected to an IPv6 network using the Neighbor Discovery Protocol via ICMPv6 router discovery messages. When first connected to a network, a host sends a link-local router solicitation multicast request for its configuration parameters; routers respond to such a request with a router advertisement packet that contains Internet Layer configuration parameters.

Note: This method automatically disables IPv6 traffic forwarding on the interface in question.

Example:

```
set interfaces ethernet eth0 ipv6 address autoconf
```

set interfaces ethernet <interface> ipv6 address eui64 <prefix>

EUI-64 as specified in RFC 4291 allows a host to assign iteslf a unique 64-Bit IPv6 address.

Example:

```
set interfaces ethernet eth0 ipv6 address eui64 2001:db8:beef::/64
```

set interfaces ethernet <interface> ipv6 address no-default-link-local

Do not assign a link-local IPv6 address to this interface.

Example:

```
set interfaces ethernet eth0 ipv6 address no-default-link-local
```

set interfaces ethernet <interface> ipv6 disable-forwarding

Configure interface-specific Host/Router behaviour. If set, the interface will switch to host mode and IPv6 forwarding will be disabled on this interface.

Example:

```
set interfaces ethernet eth0 ipv6 disable-forwarding
```

set interfaces ethernet <interface> vrf <vrf>

Place interface in given VRF instance.

See also:

There is an entire chapter about how to configure a *VRF*, please check this for additional information.

Example:

```
set interfaces ethernet eth0 vrf red
```

DHCP(v6)

set interfaces ethernet <interface> dhcp-options client-id <description>

RFC 2131 states: The client MAY choose to explicitly provide the identifier through the 'client identifier' option. If the client supplies a 'client identifier', the client MUST use the same 'client identifier' in all subsequent messages, and the server MUST use that identifier to identify the client.

Example:

```
set interfaces ethernet eth0 dhcp-options client-id 'foo-bar'
```

set interfaces ethernet <interface> dhcp-options host-name <hostname>

Instead of sending the real system hostname to the DHCP server, overwrite the host-name with this given-value.

Example:

```
set interfaces ethernet eth0 dhcp-options host-name 'VyOS'
```

set interfaces ethernet <interface> dhcp-options vendor-class-id <vendor-id>

The vendor-class-id option can be used to request a specific class of vendor options from the server.

Example:

```
set interfaces ethernet eth0 dhcp-options vendor-class-id 'VyOS'
```

set interfaces ethernet <interface> dhcp-options no-default-route

Only request an address from the DHCP server but do not request a default gateway.

Example:

```
set interfaces ethernet eth0 dhcp-options no-default-route
```

set interfaces ethernet <interface> dhcpv6-options duid <duid>

The DHCP unique identifier (DUID) is used by a client to get an IP address from a DHCPv6 server. It has a 2-byte DUID type field, and a variable-length identifier field up to 128 bytes. Its actual length depends on its type. The server compares the DUID with its database and delivers configuration data (address, lease times, DNS servers, etc.) to the client.

```
set interfaces ethernet eth0 duid '0e:00:00:01:00:01:27:71:db:f0:00:50:56:bf:c5:6d'
```

set interfaces ethernet <interface> dhcpv6-options parameters-only

This statement specifies dhcp6c to only exchange informational configuration parameters with servers. A list of DNS server addresses is an example of such parameters. This statement is useful when the client does not need stateful configuration parameters such as IPv6 addresses or prefixes.

```
set interfaces ethernet eth0 dhcpv6-options parameters-only
```

set interfaces ethernet <interface> dhcpv6-options rapid-commit

When rapid-commit is specified, dhcp6c will include a rapid-commit option in solicit messages and wait for an immediate reply instead of advertisements.

```
set interfaces ethernet eth0 dhcpv6-options rapid-commit
```

set interfaces ethernet <interface> dhcpv6-options temporary

Request only a temporary address and not form an IA_NA (Identity Association for Non-temporary Addresses) partnership.

```
set interfaces ethernet eth0 dhcpv6-options temporary
```

DHCPv6 Prefix Delegation (PD)

VyOS 1.3 (equuleus) supports DHCPv6-PD (**RFC 3633**). DHCPv6 Prefix Delegation is supported by most ISPs who provide native IPv6 for consumers on fixed networks.

set interfaces ethernet <interface> dhcpv6-options pd <id> length <length>

Some ISPs by default only delegate a /64 prefix. To request for a specific prefix size use this option to request for a bigger delegation for this pd <*id*>. This value is in the range from 32 - 64 so you could request up to a /32 prefix (if your ISP allows this) down to a /64 delegation.

The default value corresponds to 64.

To request a /56 prefix from your ISP use:

```
set interfaces ethernet eth0 dhcpv6-options pd 0 length 56
```

set interfaces ethernet <interface> dhcpv6-options pd <id> interface <delegatee> address <address>

Specify the interface address used locally on the interfcae where the prefix has been delegated to. ID must be a decimal integer.

It will be combined with the delegated prefix and the sla-id to form a complete interface address. The default is to use the EUI-64 address of the interface.

Example: Delegate a /64 prefix to interface eth8 which will use a local address on this router of <prefix>::ffff, as the address 65534 will correspond to ffff in hexadecimal notation.

```
set interfaces ethernet eth0 dhcpv6-options pd 0 interface eth8 address 65534
```

set interfaces ethernet <interface> dhcpv6-options pd <id> interface <delegatee> sla-id <id>

Specify the identifier value of the site-level aggregator (SLA) on the interface. ID must be a decimal number greater then 0 which fits in the length of SLA IDs (see below).

Example: If ID is 1 and the client is delegated an IPv6 prefix 2001:db8:ffff::/48, dhcp6c will combine the two values into a single IPv6 prefix, 2001:db8:ffff:1::/64, and will configure the prefix on the specified interface.

```
set interfaces ethernet eth0 dhcpv6-options pd 0 interface eth8 sla-id 1
```

Ethernet options

set interfaces ethernet <interface> duplex <auto | full | half>

Configure physical interface duplex setting.

- auto - interface duplex setting is auto-negotiated
- full - always use full-duplex
- half - always use half-duplex

VyOS default will be *auto*.

set interfaces ethernet <interface> speed <auto | 10 | 100 | 1000 | 2500 | 5000 | 10000 | 25000 | 40000 | 50000 | 100000>

Configure physical interface speed setting.

- auto - interface speed is auto-negotiated
- 10 - 10 MBit/s
- 100 - 100 MBit/s
- 1000 - 1 GBit/s
- 2500 - 2.5 GBit/s
- 5000 - 5 GBit/s
- 10000 - 10 GBit/s
- 25000 - 25 GBit/s

- 40000 - 40 GBit/s
- 50000 - 50 GBit/s
- 100000 - 100 GBit/s

VyOS default will be *auto*.

Offloading

set interfaces ethernet <interface> offload <gro | gso | sg | tso | ufo | rps>

Enable different types of hardware offloading on the given NIC.

LRO (Large Receive Offload) is a technique designed to boost the efficiency of how your computer's network interface card (NIC) processes incoming network traffic. Typically, network data arrives in smaller chunks called packets. Processing each packet individually consumes CPU (central processing unit) resources. Lots of small packets can lead to a performance bottleneck. Instead of handing the CPU each packet as it comes in, LRO instructs the NIC to combine multiple incoming packets into a single, larger packet. This larger packet is then passed to the CPU for processing.

Note: Under some circumstances, LRO is known to modify the packet headers of forwarded traffic, which breaks the end-to-end principle of computer networking. LRO is also only able to offload TCP segments encapsulated in IPv4 packets. Due to these limitations, it is recommended to use GRO (Generic Receive Offload) where possible. More information on the limitations of LRO can be found here: https://lwn.net/Articles/358910/

GSO (Generic Segmentation Offload) is a pure software offload that is meant to deal with cases where device drivers cannot perform the offloads described above. What occurs in GSO is that a given skbuff will have its data broken out over multiple skbuffs that have been resized to match the MSS provided via skb_shinfo()->gso_size.

Before enabling any hardware segmentation offload a corresponding software offload is required in GSO. Otherwise it becomes possible for a frame to be re-routed between devices and end up being unable to be transmitted.

GRO (Generic receive offload) is the complement to GSO. Ideally any frame assembled by GRO should be segmented to create an identical sequence of frames using GSO, and any sequence of frames segmented by GSO should be able to be reassembled back to the original by GRO. The only exception to this is IPv4 ID in the case that the DF bit is set for a given IP header. If the value of the IPv4 ID is not sequentially incrementing it will be altered so that it is when a frame assembled via GRO is segmented via GSO.

RPS (Receive Packet Steering) is logically a software implementation of RSS (Receive Side Scaling). Being in software, it is necessarily called later in the datapath. Whereas RSS selects the queue and hence CPU that will run the hardware interrupt handler, RPS selects the CPU to perform protocol processing above the interrupt handler. This is accomplished by placing the packet on the desired CPU's backlog queue and waking up the CPU for processing. RPS has some advantages over RSS:

- it can be used with any NIC
- software filters can easily be added to hash over new protocols
- it does not increase hardware device interrupt rate, although it does introduce inter-processor interrupts (IPIs)

Note: In order to use TSO/LRO with VMXNET3 adapters, the SG offloading option must also be enabled.

Authentication (EAPoL)

EAP (Extensible Authentication Protocol) over LAN (EAPoL) is a network port authentication protocol used in IEEE 802.1X (Port Based Network Access Control) developed to give a generic network sign-on to access network resources.

EAPoL comes with an identify option. We automatically use the interface MAC address as identity parameter.

set interfaces ethernet <interface> eapol ca-cert-file <file>

SSL CA (Certificate Authority) x509 PEM file used afor authentication of the remote side.

```
set interfaces ethernet eth0 eapol ca-cert-file /config/auth/ca.pem
```

set interfaces ethernet <interface> eapol cert-file <file>

SSL/x509 public certificate file provided by the client to authenticate against the 802.1x system.

```
set interfaces ethernet eth0 eapol cert-file /config/auth/public.pem
```

set interfaces ethernet <interface> eapol key-file <file>

SSL/x509 private certificate file provided by the client to authenticate against the 802.1x system.

```
set interfaces ethernet eth0 eapol key-file /config/auth/private.key
```

VLAN

Regular VLANs (802.1q)

IEEE 802.1q, often referred to as Dot1q, is the networking standard that supports virtual LANs (VLANs) on an IEEE 802.3 Ethernet network. The standard defines a system of VLAN tagging for Ethernet frames and the accompanying procedures to be used by bridges and switches in handling such frames. The standard also contains provisions for a quality-of-service prioritization scheme commonly known as IEEE 802.1p and defines the Generic Attribute Registration Protocol.

Portions of the network which are VLAN-aware (i.e., IEEE 802.1q conformant) can include VLAN tags. When a frame enters the VLAN-aware portion of the network, a tag is added to represent the VLAN membership. Each frame must be distinguishable as being within exactly one VLAN. A frame in the VLAN-aware portion of the network that does not contain a VLAN tag is assumed to be flowing on the native VLAN.

The standard was developed by IEEE 802.1, a working group of the IEEE 802 standards committee, and continues to be actively revised. One of the notable revisions is 802.1Q-2014 which incorporated IEEE 802.1aq (Shortest Path Bridging) and much of the IEEE 802.1d standard.

802.1q VLAN interfaces are represented as virtual sub-interfaces in VyOS. The term used for this is `vif`.

set interfaces ethernet <interface> vif <vlan-id>

Create a new VLAN interface on interface <*interface*> using the VLAN number provided via <*vlan-id*>.

You can create multiple VLAN interfaces on a physical interface. The VLAN ID range is from 0 to 4094.

Note: Only 802.1Q-tagged packets are accepted on Ethernet vifs.

---

set interfaces ethernet <interface> vif <vlan-id> address <address | dhcp | dhcpv6>

Configure interface <*interface*> with one or more interface addresses.

- **address** can be specified multiple times as IPv4 and/or IPv6 address, e.g. 192.0.2.1/24 and/or 2001:db8::1/64
- **dhcp** interface address is received by DHCP from a DHCP server on this segment.
- **dhcpv6** interface address is received by DHCPv6 from a DHCPv6 server on this segment.

Example:

```
set interfaces ethernet eth0 vif 10 address 192.0.2.1/24
set interfaces ethernet eth0 vif 10 address 2001:db8::1/64
set interfaces ethernet eth0 vif 10 address dhcp
set interfaces ethernet eth0 vif 10 address dhcpv6
```

set interfaces ethernet <interface> vif <vlan-id> description <description>

Set a human readable, descriptive alias for this connection. Alias is used by e.g. the `show interfaces` command or SNMP based monitoring tools.

Example:

```
set interfaces ethernet eth0 vif 10 description 'This is an awesome interface␣
↪running on VyOS'
```

set interfaces ethernet <interface> vif <vlan-id> disable

Disable given <*interface*>. It will be placed in administratively down (`A/D`) state.

Example:

```
set interfaces ethernet eth0 vif 10 disable
```

set interfaces ethernet <interface> vif <vlan-id> disable-link-detect

Use this command to direct an interface to not detect any physical state changes on a link, for example, when the cable is unplugged.

Default is to detects physical link state changes.

Example:

```
set interfaces ethernet eth0 vif 10 disable-link-detect
```

set interfaces ethernet <interface> vif <vlan-id> mac <xx:xx:xx:xx:xx:xx>

Configure user defined MAC address on given <*interface*>.

Example:

```
set interfaces ethernet eth0 vif 10 mac '00:01:02:03:04:05'
```

set interfaces ethernet <interface> vif <vlan-id> mtu <mtu>

Configure MTU on given <*interface*>. It is the size (in bytes) of the largest ethernet frame sent on this link.

Example:

```
set interfaces ethernet eth0 vif 10 mtu 9000
```

set interfaces ethernet <interface> vif <vlan-id> ip arp-cache-timeout

Once a neighbor has been found, the entry is considered to be valid for at least for this specifc time. An entry's validity will be extended if it receives positive feedback from higher level protocols.

This defaults to 30 seconds.

Example:

```
set interfaces ethernet eth0 vif 10 ip arp-cache-timeout 180
```

set interfaces ethernet <interface> vif <vlan-id> ip disable-arp-filter

If set the kernel can respond to arp requests with addresses from other interfaces. This may seem wrong but it usually makes sense, because it increases the chance of successful communication. IP addresses are owned by the complete host on Linux, not by particular interfaces. Only for more complex setups like load-balancing, does this behaviour cause problems.

If not set (default) allows you to have multiple network interfaces on the same subnet, and have the ARPs for each interface be answered based on whether or not the kernel would route a packet from the ARP'd IP out that interface (therefore you must use source based routing for this to work).

In other words it allows control of which cards (usually 1) will respond to an arp request.

Example:

```
set interfaces ethernet eth0 vif 10 ip disable-arp-filter
```

set interfaces ethernet <interface> vif <vlan-id> ip disable-forwarding

Configure interface-specific Host/Router behaviour. If set, the interface will switch to host mode and IPv6 forwarding will be disabled on this interface.

```
set interfaces ethernet eth0 vif 10 ip disable-forwarding
```

set interfaces ethernet <interface> vif <vlan-id> ip enable-arp-accept

Define behavior for gratuitous ARP frames who's IP is not already present in the ARP table. If configured create new entries in the ARP table.

Both replies and requests type gratuitous arp will trigger the ARP table to be updated, if this setting is on.

If the ARP table already contains the IP address of the gratuitous arp frame, the arp table will be updated regardless if this setting is on or off.

```
set interfaces ethernet eth0 vif 10 ip enable-arp-accept
```

set interfaces ethernet <interface> vif <vlan-id> ip enable-arp-announce

Define different restriction levels for announcing the local source IP address from IP packets in ARP requests sent on interface.

Use any local address, configured on any interface if this is not set.

If configured, try to avoid local addresses that are not in the target's subnet for this interface. This mode is useful when target hosts reachable via this interface require the source IP address in ARP requests to be part of their logical network configured on the receiving interface. When we generate the request we will check all our subnets that include the target IP and will preserve the source address if it is from such subnet. If there is no such subnet we select source address according to the rules for level 2.

```
set interfaces ethernet eth0 vif 10 ip enable-arp-announce
```

set interfaces ethernet <interface> vif <vlan-id> ip enable-arp-ignore

Define different modes for sending replies in response to received ARP requests that resolve local target IP addresses:

If configured, reply only if the target IP address is local address configured on the incoming interface.

If this option is unset (default), reply for any local target IP address, configured on any interface.

```
set interfaces ethernet eth0 vif 10 ip enable-arp-ignore
```

set interfaces ethernet <interface> vif <vlan-id> ip enable-proxy-arp

Use this command to enable proxy Address Resolution Protocol (ARP) on this interface. Proxy ARP allows an Ethernet interface to respond with its own MAC address to ARP requests for destination IP addresses on subnets attached to other interfaces on the system. Subsequent packets sent to those destination IP addresses are forwarded appropriately by the system.

Example:

```
set interfaces ethernet eth0 vif 10 ip enable-proxy-arp
```

set interfaces ethernet <interface> vif <vlan-id> ip proxy-arp-pvlan

Private VLAN proxy arp. Basically allow proxy arp replies back to the same interface (from which the ARP request/solicitation was received).

This is done to support (ethernet) switch features, like RFC 3069, where the individual ports are NOT allowed to communicate with each other, but they are allowed to talk to the upstream router. As described in RFC 3069, it is possible to allow these hosts to communicate through the upstream router by proxy_arp'ing.

Note: Don't need to be used together with proxy_arp.

This technology is known by different names:

- In RFC 3069 it is called VLAN Aggregation
- Cisco and Allied Telesyn call it Private VLAN
- Hewlett-Packard call it Source-Port filtering or port-isolation
- Ericsson call it MAC-Forced Forwarding (RFC Draft)

set interfaces ethernet <interface> vif <vlan-id> ip source-validation <strict | loose | disable>

Enable policy for source validation by reversed path, as specified in RFC 3704. Current recommended practice in RFC 3704 is to enable strict mode to prevent IP spoofing from DDos attacks. If using asymmetric routing or other complicated routing, then loose mode is recommended.

- strict: Each incoming packet is tested against the FIB and if the interface is not the best reverse path the packet check will fail. By default failed packets are discarded.
- loose: Each incoming packet's source address is also tested against the FIB and if the source address is not reachable via any interface the packet check will fail.
- disable: No source validation

set interfaces ethernet <interface> vif <vlan-id> ipv6 address autoconf

SLAAC RFC 4862. IPv6 hosts can configure themselves automatically when connected to an IPv6 network using the Neighbor Discovery Protocol via ICMPv6 router discovery messages. When first connected to a network, a host sends a link-local router solicitation multicast request for its configuration parameters; routers respond to such a request with a router advertisement packet that contains Internet Layer configuration parameters.

Note: This method automatically disables IPv6 traffic forwarding on the interface in question.

Example:

```
set interfaces ethernet eth0 vif 10 ipv6 address autoconf
```

set interfaces ethernet <interface> vif <vlan-id> ipv6 address eui64 <prefix>

EUI-64 as specified in **RFC 4291** allows a host to assign iteslf a unique 64-Bit IPv6 address.

Example:

```
set interfaces ethernet eth0 vif 10 ipv6 address eui64 2001:db8:beef::/64
```

set interfaces ethernet <interface> vif <vlan-id> ipv6 address no-default-link-local

Do not assign a link-local IPv6 address to this interface.

Example:

```
set interfaces ethernet eth0 vif 10 ipv6 address no-default-link-local
```

set interfaces ethernet <interface> vif <vlan-id> ipv6 disable-forwarding

Configure interface-specific Host/Router behaviour. If set, the interface will switch to host mode and IPv6 forwarding will be disabled on this interface.

Example:

```
set interfaces ethernet eth0 vif 10 ipv6 disable-forwarding
```

set interfaces ethernet <interface> vif <vlan-id> vrf <vrf>

Place interface in given VRF instance.

See also:

There is an entire chapter about how to configure a *VRF*, please check this for additional information.

Example:

```
set interfaces ethernet eth0 vif 10 vrf red
```

DHCP(v6)

set interfaces ethernet <interface> vif <vlan-id> dhcp-options client-id <description>

RFC 2131 states: The client MAY choose to explicitly provide the identifier through the 'client identifier' option. If the client supplies a 'client identifier', the client MUST use the same 'client identifier' in all subsequent messages, and the server MUST use that identifier to identify the client.

Example:

```
set interfaces ethernet eth0 vif 10 dhcp-options client-id 'foo-bar'
```

set interfaces ethernet <interface> vif <vlan-id> dhcp-options host-name <hostname>

Instead of sending the real system hostname to the DHCP server, overwrite the host-name with this given-value.

Example:

```
set interfaces ethernet eth0 vif 10 dhcp-options host-name 'VyOS'
```

set interfaces ethernet <interface> vif <vlan-id> dhcp-options vendor-class-id <vendor-id>

The vendor-class-id option can be used to request a specific class of vendor options from the server.

Example:

```
set interfaces ethernet eth0 vif 10 dhcp-options vendor-class-id 'VyOS'
```

set interfaces ethernet <interface> vif <vlan-id> dhcp-options no-default-route

Only request an address from the DHCP server but do not request a default gateway.

Example:

```
set interfaces ethernet eth0 vif 10 dhcp-options no-default-route
```

set interfaces ethernet <interface> vif <vlan-id> dhcpv6-options duid <duid>

The DHCP unique identifier (DUID) is used by a client to get an IP address from a DHCPv6 server. It has a 2-byte DUID type field, and a variable-length identifier field up to 128 bytes. Its actual length depends on its type. The server compares the DUID with its database and delivers configuration data (address, lease times, DNS servers, etc.) to the client.

```
set interfaces ethernet eth0 vif 10 duid
↪'0e:00:00:01:00:01:27:71:db:f0:00:50:56:bf:c5:6d'
```

set interfaces ethernet <interface> vif <vlan-id> dhcpv6-options parameters-only

This statement specifies dhcp6c to only exchange informational configuration parameters with servers. A list of DNS server addresses is an example of such parameters. This statement is useful when the client does not need stateful configuration parameters such as IPv6 addresses or prefixes.

```
set interfaces ethernet eth0 vif 10 dhcpv6-options parameters-only
```

set interfaces ethernet <interface> vif <vlan-id> dhcpv6-options rapid-commit

When rapid-commit is specified, dhcp6c will include a rapid-commit option in solicit messages and wait for an immediate reply instead of advertisements.

```
set interfaces ethernet eth0 vif 10 dhcpv6-options rapid-commit
```

set interfaces ethernet <interface> vif <vlan-id> dhcpv6-options temporary

Request only a temporary address and not form an IA_NA (Identity Association for Non-temporary Addresses) partnership.

```
set interfaces ethernet eth0 vif 10 dhcpv6-options temporary
```

DHCPv6 Prefix Delegation (PD)

VyOS 1.3 (equuleus) supports DHCPv6-PD (**RFC 3633**). DHCPv6 Prefix Delegation is supported by most ISPs who provide native IPv6 for consumers on fixed networks.

set interfaces ethernet <interface> vif <vlan-id> dhcpv6-options pd <id> length <length>

Some ISPs by default only delegate a /64 prefix. To request for a specific prefix size use this option to request for a bigger delegation for this pd <*id*>. This value is in the range from 32 - 64 so you could request up to a /32 prefix (if your ISP allows this) down to a /64 delegation.

The default value corresponds to 64.

To request a /56 prefix from your ISP use:

```
set interfaces ethernet eth0 vif 10 dhcpv6-options pd 0 length 56
```

set interfaces ethernet <interface> vif <vlan-id> dhcpv6-options pd <id> interface <delegatee> address <address>

Specify the interface address used locally on the interfcae where the prefix has been delegated to. ID must be a decimal integer.

It will be combined with the delegated prefix and the sla-id to form a complete interface address. The default is to use the EUI-64 address of the interface.

Example: Delegate a /64 prefix to interface eth8 which will use a local address on this router of <prefix>::ffff, as the address 65534 will correspond to ffff in hexadecimal notation.

```
set interfaces ethernet eth0 vif 10 dhcpv6-options pd 0 interface eth8 address 65534
```

set interfaces ethernet <interface> vif <vlan-id> dhcpv6-options pd <id> interface <delegatee> sla-id <id>

Specify the identifier value of the site-level aggregator (SLA) on the interface. ID must be a decimal number greater then 0 which fits in the length of SLA IDs (see below).

Example: If ID is 1 and the client is delegated an IPv6 prefix 2001:db8:ffff::/48, dhcp6c will combine the two values into a single IPv6 prefix, 2001:db8:ffff:1::/64, and will configure the prefix on the specified interface.

```
set interfaces ethernet eth0 vif 10 dhcpv6-options pd 0 interface eth8 sla-id 1
```

QinQ (802.1ad)

IEEE 802.1ad was an Ethernet networking standard informally known as QinQ as an amendment to IEEE standard 802.1q VLAN interfaces as described above. 802.1ad was incorporated into the base 802.1q standard in 2011. The technique is also known as provider bridging, Stacked VLANs, or simply QinQ or Q-in-Q. "Q-in-Q" can for supported devices apply to C-tag stacking on C-tag (Ethernet Type = 0x8100).

The original 802.1q specification allows a single Virtual Local Area Network (VLAN) header to be inserted into an Ethernet frame. QinQ allows multiple VLAN tags to be inserted into a single frame, an essential capability for implementing Metro Ethernet network topologies. Just as QinQ extends 802.1Q, QinQ itself is extended by other Metro Ethernet protocols.

In a multiple VLAN header context, out of convenience the term "VLAN tag" or just "tag" for short is often used in place of "802.1q VLAN header". QinQ allows multiple VLAN tags in an Ethernet frame; together these tags constitute a tag stack. When used in the context of an Ethernet frame, a QinQ frame is a frame that has 2 VLAN 802.1q headers (double-tagged).

In VyOS the terms `vif-s` and `vif-c` stand for the ethertype tags that are used.

The inner tag is the tag which is closest to the payload portion of the frame. It is officially called C-TAG (customer tag, with ethertype 0x8100). The outer tag is the one closer/closest to the Ethernet header, its name is S-TAG (service tag with Ethernet Type = 0x88a8).

set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> address <address | dhcp | dhcpv6>

Configure interface <*interface*> with one or more interface addresses.

- **address** can be specified multiple times as IPv4 and/or IPv6 address, e.g. 192.0.2.1/24 and/or 2001:db8::1/64
- **dhcp** interface address is received by DHCP from a DHCP server on this segment.
- **dhcpv6** interface address is received by DHCPv6 from a DHCPv6 server on this segment.

Example:

```
set interfaces ethernet eth0 vif-s 1000 vif-c 20 address 192.0.2.1/24
set interfaces ethernet eth0 vif-s 1000 vif-c 20 address 2001:db8::1/64
set interfaces ethernet eth0 vif-s 1000 vif-c 20 address dhcp
set interfaces ethernet eth0 vif-s 1000 vif-c 20 address dhcpv6
```

set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> description <description>

Set a human readable, descriptive alias for this connection. Alias is used by e.g. the `show interfaces` command or SNMP based monitoring tools.

Example:

```
set interfaces ethernet eth0 vif-s 1000 vif-c 20 description 'This is an awesome␣
↪interface running on VyOS'
```

set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> disable

Disable given <*interface*>. It will be placed in administratively down (`A/D`) state.

Example:

```
set interfaces ethernet eth0 vif-s 1000 vif-c 20 disable
```

set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> disable-link-detect

Use this command to direct an interface to not detect any physical state changes on a link, for example, when the cable is unplugged.

Default is to detects physical link state changes.

Example:

```
set interfaces ethernet eth0 vif-s 1000 vif-c 20 disable-link-detect
```

set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> mac <xx:xx:xx:xx:xx:xx>

Configure user defined MAC address on given <*interface*>.

Example:

```
set interfaces ethernet eth0 vif-s 1000 vif-c 20 mac '00:01:02:03:04:05'
```

set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> mtu <mtu>

Configure MTU on given <*interface*>. It is the size (in bytes) of the largest ethernet frame sent on this link.

Example:

```
set interfaces ethernet eth0 vif-s 1000 vif-c 20 mtu 9000
```

set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> ip arp-cache-timeout

Once a neighbor has been found, the entry is considered to be valid for at least for this specifc time. An entry's validity will be extended if it receives positive feedback from higher level protocols.

This defaults to 30 seconds.

Example:

```
set interfaces ethernet eth0 vif-s 1000 vif-c 20 ip arp-cache-timeout 180
```

set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> ip disable-arp-filter

If set the kernel can respond to arp requests with addresses from other interfaces. This may seem wrong but it usually makes sense, because it increases the chance of successful communication. IP addresses are owned by the complete host on Linux, not by particular interfaces. Only for more complex setups like load-balancing, does this behaviour cause problems.

If not set (default) allows you to have multiple network interfaces on the same subnet, and have the ARPs for each interface be answered based on whether or not the kernel would route a packet from the ARP'd IP out that interface (therefore you must use source based routing for this to work).

In other words it allows control of which cards (usually 1) will respond to an arp request.

Example:

```
set interfaces ethernet eth0 vif-s 1000 vif-c 20 ip disable-arp-filter
```

set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> ip disable-forwarding

Configure interface-specific Host/Router behaviour. If set, the interface will switch to host mode and IPv6 forwarding will be disabled on this interface.

```
set interfaces ethernet eth0 vif-s 1000 vif-c 20 ip disable-forwarding
```

set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> ip enable-arp-accept

Define behavior for gratuitous ARP frames who's IP is not already present in the ARP table. If configured create new entries in the ARP table.

Both replies and requests type gratuitous arp will trigger the ARP table to be updated, if this setting is on.

If the ARP table already contains the IP address of the gratuitous arp frame, the arp table will be updated regardless if this setting is on or off.

```
set interfaces ethernet eth0 vif-s 1000 vif-c 20 ip enable-arp-accept
```

set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> ip enable-arp-announce

Define different restriction levels for announcing the local source IP address from IP packets in ARP requests sent on interface.

Use any local address, configured on any interface if this is not set.

If configured, try to avoid local addresses that are not in the target's subnet for this interface. This mode is useful when target hosts reachable via this interface require the source IP address in ARP requests to be part of their logical network configured on the receiving interface. When we generate the request we will check all our

subnets that include the target IP and will preserve the source address if it is from such subnet. If there is no such subnet we select source address according to the rules for level 2.

```
set interfaces ethernet eth0 vif-s 1000 vif-c 20 ip enable-arp-announce
```

set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> ip enable-arp-ignore

Define different modes for sending replies in response to received ARP requests that resolve local target IP addresses:

If configured, reply only if the target IP address is local address configured on the incoming interface.

If this option is unset (default), reply for any local target IP address, configured on any interface.

```
set interfaces ethernet eth0 vif-s 1000 vif-c 20 ip enable-arp-ignore
```

set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> ip enable-proxy-arp

Use this command to enable proxy Address Resolution Protocol (ARP) on this interface. Proxy ARP allows an Ethernet interface to respond with its own MAC address to ARP requests for destination IP addresses on subnets attached to other interfaces on the system. Subsequent packets sent to those destination IP addresses are forwarded appropriately by the system.

Example:

```
set interfaces ethernet eth0 vif-s 1000 vif-c 20 ip enable-proxy-arp
```

set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> ip proxy-arp-pvlan

Private VLAN proxy arp. Basically allow proxy arp replies back to the same interface (from which the ARP request/solicitation was received).

This is done to support (ethernet) switch features, like **RFC 3069**, where the individual ports are NOT allowed to communicate with each other, but they are allowed to talk to the upstream router. As described in **RFC 3069**, it is possible to allow these hosts to communicate through the upstream router by proxy_arp'ing.

Note: Don't need to be used together with proxy_arp.

This technology is known by different names:

- In **RFC 3069** it is called VLAN Aggregation
- Cisco and Allied Telesyn call it Private VLAN
- Hewlett-Packard call it Source-Port filtering or port-isolation
- Ericsson call it MAC-Forced Forwarding (RFC Draft)

set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> ip source-validation <strict | loose | disable>

Enable policy for source validation by reversed path, as specified in **RFC 3704**. Current recommended practice in **RFC 3704** is to enable strict mode to prevent IP spoofing from DDos attacks. If using asymmetric routing or other complicated routing, then loose mode is recommended.

- strict: Each incoming packet is tested against the FIB and if the interface is not the best reverse path the packet check will fail. By default failed packets are discarded.
- loose: Each incoming packet's source address is also tested against the FIB and if the source address is not reachable via any interface the packet check will fail.
- disable: No source validation

set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> ipv6 address autoconf

SLAAC **RFC 4862**. IPv6 hosts can configure themselves automatically when connected to an IPv6 network using the Neighbor Discovery Protocol via ICMPv6 router discovery messages. When first connected to a network, a host sends a link-local router solicitation multicast request for its configuration parameters; routers respond to such a request with a router advertisement packet that contains Internet Layer configuration parameters.

Note: This method automatically disables IPv6 traffic forwarding on the interface in question.

Example:

```
set interfaces ethernet eth0 vif-s 1000 vif-c 20 ipv6 address autoconf
```

set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> ipv6 address eui64 <prefix>

EUI-64 as specified in **RFC 4291** allows a host to assign iteslf a unique 64-Bit IPv6 address.

Example:

```
set interfaces ethernet eth0 vif-s 1000 vif-c 20 ipv6 address eui64 2001:db8:beef::/
↪64
```

set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> ipv6 address no-default-link-local

Do not assign a link-local IPv6 address to this interface.

Example:

```
set interfaces ethernet eth0 vif-s 1000 vif-c 20 ipv6 address no-default-link-local
```

set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> ipv6 disable-forwarding

Configure interface-specific Host/Router behaviour. If set, the interface will switch to host mode and IPv6 forwarding will be disabled on this interface.

Example:

```
set interfaces ethernet eth0 vif-s 1000 vif-c 20 ipv6 disable-forwarding
```

set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> vrf <vrf>

Place interface in given VRF instance.

See also:

There is an entire chapter about how to configure a *VRF*, please check this for additional information.

Example:

```
set interfaces ethernet eth0 vif-s 1000 vif-c 20 vrf red
```

DHCP(v6)

set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> dhcp-options client-id <description>

RFC 2131 states: The client MAY choose to explicitly provide the identifier through the 'client identifier' option. If the client supplies a 'client identifier', the client MUST use the same 'client identifier' in all subsequent messages, and the server MUST use that identifier to identify the client.

Example:

```
set interfaces ethernet eth0 vif-s 1000 vif-c 20 dhcp-options client-id 'foo-bar'
```

set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> dhcp-options host-name <hostname>

Instead of sending the real system hostname to the DHCP server, overwrite the host-name with this given-value.

Example:

```
set interfaces ethernet eth0 vif-s 1000 vif-c 20 dhcp-options host-name 'VyOS'
```

set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> dhcp-options vendor-class-id <vendor-id>

The vendor-class-id option can be used to request a specific class of vendor options from the server.

Example:

```
set interfaces ethernet eth0 vif-s 1000 vif-c 20 dhcp-options vendor-class-id 'VyOS'
```

set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> dhcp-options no-default-route

Only request an address from the DHCP server but do not request a default gateway.

Example:

```
set interfaces ethernet eth0 vif-s 1000 vif-c 20 dhcp-options no-default-route
```

set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> dhcpv6-options duid <duid>

The DHCP unique identifier (DUID) is used by a client to get an IP address from a DHCPv6 server. It has a 2-byte DUID type field, and a variable-length identifier field up to 128 bytes. Its actual length depends on its type. The server compares the DUID with its database and delivers configuration data (address, lease times, DNS servers, etc.) to the client.

```
set interfaces ethernet eth0 vif-s 1000 vif-c 20 duid
↪'0e:00:00:01:00:01:27:71:db:f0:00:50:56:bf:c5:6d'
```

set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> dhcpv6-options parameters-only

This statement specifies dhcp6c to only exchange informational configuration parameters with servers. A list of DNS server addresses is an example of such parameters. This statement is useful when the client does not need stateful configuration parameters such as IPv6 addresses or prefixes.

```
set interfaces ethernet eth0 vif-s 1000 vif-c 20 dhcpv6-options parameters-only
```

set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> dhcpv6-options rapid-commit

When rapid-commit is specified, dhcp6c will include a rapid-commit option in solicit messages and wait for an immediate reply instead of advertisements.

```
set interfaces ethernet eth0 vif-s 1000 vif-c 20 dhcpv6-options rapid-commit
```

set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> dhcpv6-options temporary

Request only a temporary address and not form an IA_NA (Identity Association for Non-temporary Addresses) partnership.

```
set interfaces ethernet eth0 vif-s 1000 vif-c 20 dhcpv6-options temporary
```

DHCPv6 Prefix Delegation (PD)

VyOS 1.3 (equuleus) supports DHCPv6-PD (**RFC 3633**). DHCPv6 Prefix Delegation is supported by most ISPs who provide native IPv6 for consumers on fixed networks.

set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> dhcpv6-options pd <id> length <length>

Some ISPs by default only delegate a /64 prefix. To request for a specific prefix size use this option to request for a bigger delegation for this pd <*id*>. This value is in the range from 32 - 64 so you could request up to a /32 prefix (if your ISP allows this) down to a /64 delegation.

The default value corresponds to 64.

To request a /56 prefix from your ISP use:

```
set interfaces ethernet eth0 vif-s 1000 vif-c 20 dhcpv6-options pd 0 length 56
```

set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> dhcpv6-options pd <id> interface <delegatee> address <address>

Specify the interface address used locally on the interfcae where the prefix has been delegated to. ID must be a decimal integer.

It will be combined with the delegated prefix and the sla-id to form a complete interface address. The default is to use the EUI-64 address of the interface.

Example: Delegate a /64 prefix to interface eth8 which will use a local address on this router of `<prefix>::ffff`, as the address 65534 will correspond to `ffff` in hexadecimal notation.

```
set interfaces ethernet eth0 vif-s 1000 vif-c 20 dhcpv6-options pd 0 interface eth8␣
↪address 65534
```

set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> dhcpv6-options pd <id> interface <delegatee> sla-id <id>

Specify the identifier value of the site-level aggregator (SLA) on the interface. ID must be a decimal number greater then 0 which fits in the length of SLA IDs (see below).

Example: If ID is 1 and the client is delegated an IPv6 prefix 2001:db8:ffff::/48, dhcp6c will combine the two values into a single IPv6 prefix, 2001:db8:ffff:1::/64, and will configure the prefix on the specified interface.

```
set interfaces ethernet eth0 vif-s 1000 vif-c 20 dhcpv6-options pd 0 interface eth8␣
↪sla-id 1
```

Port Mirror (SPAN)

SPAN port mirroring can copy the inbound/outbound traffic of the interface to the specified interface, usually the interface can be connected to some special equipment, such as behavior control system, intrusion detection system and traffic collector, and can copy all related traffic from this port. The benefit of mirroring the traffic is that the application is isolated from the source traffic and so application processing does not affect the traffic or the system performance.

VyOS uses the *mirror* option to configure port mirroring. The configuration is divided into 2 different directions. Destination ports should be configured for different traffic directions.

set interfaces ethernet <interface> mirror ingress <monitor-interface>

Configure port mirroring for *interface* inbound traffic and copy the traffic to *monitor-interface*

Example: Mirror the inbound traffic of *eth1* port to *eth3*

```
set interfaces ethernet eth1 mirror ingress eth3
```

set interfaces ethernet <interface> mirror egress <monitor-interface>

Configure port mirroring for *interface* outbound traffic and copy the traffic to *monitor-interface*

Example: Mirror the outbound traffic of *eth1* port to *eth3*

```
set interfaces ethernet eth1 mirror egress eth3
```

Operation

show interfaces ethernet

Show brief interface information.

```
vyos@vyos:~$ show interfaces ethernet
Codes: S - State, L - Link, u - Up, D - Down, A - Admin Down
Interface        IP Address                        S/L  Description
---------        ----------                        ---  -----------
eth0             172.18.201.10/24                  u/u  LAN
eth1             172.18.202.11/24                  u/u  WAN
eth2             -                                 u/D
```

show interfaces ethernet <interface>

Show detailed information on given <*interface*>

```
vyos@vyos:~$ show interfaces ethernet eth0
eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group␣
↪default qlen 1000
    link/ether 00:50:44:00:f5:c9 brd ff:ff:ff:ff:ff:ff
    inet6 fe80::250:44ff:fe00:f5c9/64 scope link
       valid_lft forever preferred_lft forever

    RX:  bytes    packets     errors    dropped    overrun      mcast
      56735451     179841          0          0          0     142380
    TX:  bytes    packets     errors    dropped    carrier collisions
       5601460      62595          0          0          0          0
```

show interfaces ethernet <interface> physical

Show information about physical <*interface*>

```
vyos@vyos:~$ show interfaces ethernet eth0 physical
Settings for eth0:
        Supported ports: [ TP ]
        Supported link modes:   1000baseT/Full
                                10000baseT/Full
        Supported pause frame use: No
        Supports auto-negotiation: No
        Supported FEC modes: Not reported
        Advertised link modes:  Not reported
        Advertised pause frame use: No
        Advertised auto-negotiation: No
        Advertised FEC modes: Not reported
        Speed: 10000Mb/s
        Duplex: Full
        Port: Twisted Pair
        PHYAD: 0
        Transceiver: internal
        Auto-negotiation: off
        MDI-X: Unknown
        Supports Wake-on: uag
        Wake-on: d
        Link detected: yes
driver: vmxnet3
version: 1.4.16.0-k-NAPI
firmware-version:
expansion-rom-version:
bus-info: 0000:0b:00.0
supports-statistics: yes
supports-test: no
supports-eeprom-access: no
supports-register-dump: yes
supports-priv-flags: no
```

show interfaces ethernet <interface> physical offload

Show available offloading functions on given <*interface*>

```
vyos@vyos:~$ show interfaces ethernet eth0 physical offload
rx-checksumming               on
tx-checksumming               on
tx-checksum-ip-generic        on
scatter-gather                off
tx-scatter-gather             off
tcp-segmentation-offload      off
tx-tcp-segmentation           off
tx-tcp-mangleid-segmentation  off
tx-tcp6-segmentation          off
udp-fragmentation-offload     off
generic-segmentation-offload  off
generic-receive-offload       off
large-receive-offload         off
rx-vlan-offload               on
```

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```
tx-vlan-offload               on
ntuple-filters                off
receive-hashing               on
tx-gre-segmentation           on
tx-gre-csum-segmentation      on
tx-udp_tnl-segmentation       on
tx-udp_tnl-csum-segmentation  on
tx-gso-partial                on
tx-nocache-copy               off
rx-all                        off
```

show interfaces ethernet <interface> transceiver

Show transceiver information from plugin modules, e.g SFP+, QSFP

```
vyos@vyos:~$ show interfaces ethernet eth5 transceiver
   Identifier              : 0x03 (SFP)
   Extended identifier     : 0x04 (GBIC/SFP defined by 2-wire interface ID)
   Connector               : 0x07 (LC)
   Transceiver codes       : 0x00 0x00 0x00 0x01 0x00 0x00 0x00 0x00 0x00
   Transceiver type        : Ethernet: 1000BASE-SX
   Encoding                : 0x01 (8B/10B)
   BR, Nominal             : 1300MBd
   Rate identifier         : 0x00 (unspecified)
   Length (SMF,km)         : 0km
   Length (SMF)            : 0m
   Length (50um)           : 550m
   Length (62.5um)         : 270m
   Length (Copper)         : 0m
   Length (OM3)            : 0m
   Laser wavelength        : 850nm
   Vendor name             : CISCO-FINISAR
   Vendor OUI              : 00:90:65
   Vendor PN               : FTRJ-8519-7D-CS4
   Vendor rev              : A
   Option values           : 0x00 0x1a
   Option                  : RX_LOS implemented
   Option                  : TX_FAULT implemented
   Option                  : TX_DISABLE implemented
   BR margin, max          : 0%
   BR margin, min          : 0%
   Vendor SN               : FNS092xxxxx
   Date code               : 0506xx
```

8.4.5 GENEVE

GENEVE (Generic Network Virtualization Encapsulation) supports all of the capabilities of VXLAN (Virtual Extensible LAN), NVGRE (Network Virtualization using Generic Routing Encapsulation), and STT (Stateless Transport Tunneling) and was designed to overcome their perceived limitations. Many believe GENEVE could eventually replace these earlier formats entirely.

GENEVE is designed to support network virtualization use cases, where tunnels are typically established to act as a backplane between the virtual switches residing in hypervisors, physical switches, or middleboxes or other appliances. An arbitrary IP network can be used as an underlay although Clos networks - A technique for composing network fabrics larger than a single switch while maintaining non-blocking bandwidth across connection points. ECMP is used to divide traffic across the multiple links and switches that constitute the fabric. Sometimes termed "leaf and spine" or "fat tree" topologies.

Geneve Header:

```
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|Ver|  Opt Len  |O|C|    Rsvd.  |          Protocol Type        |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|        Virtual Network Identifier (VNI)       |    Reserved   |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                    Variable Length Options                    |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

Configuration

Common interface configuration

set interfaces geneve <interface> address <address>

Configure interface <*interface*> with one or more interface addresses.

- **address** can be specified multiple times as IPv4 and/or IPv6 address, e.g. 192.0.2.1/24 and/or 2001:db8::1/64

Example:

```
set interfaces geneve gnv0 address 192.0.2.1/24
set interfaces geneve gnv0 address 2001:db8::1/64
```

set interfaces geneve <interface> description <description>

Set a human readable, descriptive alias for this connection. Alias is used by e.g. the `show interfaces` command or SNMP based monitoring tools.

Example:

```
set interfaces geneve gnv0 description 'This is an awesome interface running on VyOS
↪'
```

set interfaces geneve <interface> disable

Disable given <*interface*>. It will be placed in administratively down (`A/D`) state.

Example:

```
set interfaces geneve gnv0 disable
```

set interfaces geneve <interface> disable-flow-control

Ethernet flow control is a mechanism for temporarily stopping the transmission of data on Ethernet family computer networks. The goal of this mechanism is to ensure zero packet loss in the presence of network congestion.

The first flow control mechanism, the pause frame, was defined by the IEEE 802.3x standard.

A sending station (computer or network switch) may be transmitting data faster than the other end of the link can accept it. Using flow control, the receiving station can signal the sender requesting suspension of transmissions until the receiver catches up.

Use this command to disable the generation of Ethernet flow control (pause frames).

Example:

```
set interfaces geneve gnv0 disable-flow-control
```

set interfaces geneve <interface> disable-link-detect

Use this command to direct an interface to not detect any physical state changes on a link, for example, when the cable is unplugged.

Default is to detects physical link state changes.

Example:

```
set interfaces geneve gnv0 disable-link-detect
```

set interfaces geneve <interface> mac <xx:xx:xx:xx:xx:xx>

Configure user defined MAC address on given <*interface*>.

Example:

```
set interfaces geneve gnv0 mac '00:01:02:03:04:05'
```

set interfaces geneve <interface> mtu <mtu>

Configure MTU on given <*interface*>. It is the size (in bytes) of the largest ethernet frame sent on this link.

Example:

```
set interfaces geneve gnv0 mtu 9000
```

set interfaces geneve <interface> ip arp-cache-timeout

Once a neighbor has been found, the entry is considered to be valid for at least for this specifc time. An entry's validity will be extended if it receives positive feedback from higher level protocols.

This defaults to 30 seconds.

Example:

```
set interfaces geneve gnv0 ip arp-cache-timeout 180
```

set interfaces geneve <interface> ip disable-arp-filter

If set the kernel can respond to arp requests with addresses from other interfaces. This may seem wrong but it usually makes sense, because it increases the chance of successful communication. IP addresses are owned by the complete host on Linux, not by particular interfaces. Only for more complex setups like load-balancing, does this behaviour cause problems.

If not set (default) allows you to have multiple network interfaces on the same subnet, and have the ARPs for each interface be answered based on whether or not the kernel would route a packet from the ARP'd IP out that interface (therefore you must use source based routing for this to work).

In other words it allows control of which cards (usually 1) will respond to an arp request.

Example:

```
set interfaces geneve gnv0 ip disable-arp-filter
```

set interfaces geneve <interface> ip disable-forwarding

Configure interface-specific Host/Router behaviour. If set, the interface will switch to host mode and IPv6 forwarding will be disabled on this interface.

```
set interfaces geneve gnv0 ip disable-forwarding
```

set interfaces geneve <interface> ip enable-arp-accept

Define behavior for gratuitous ARP frames who's IP is not already present in the ARP table. If configured create new entries in the ARP table.

Both replies and requests type gratuitous arp will trigger the ARP table to be updated, if this setting is on.

If the ARP table already contains the IP address of the gratuitous arp frame, the arp table will be updated regardless if this setting is on or off.

```
set interfaces geneve gnv0 ip enable-arp-accept
```

set interfaces geneve <interface> ip enable-arp-announce

Define different restriction levels for announcing the local source IP address from IP packets in ARP requests sent on interface.

Use any local address, configured on any interface if this is not set.

If configured, try to avoid local addresses that are not in the target's subnet for this interface. This mode is useful when target hosts reachable via this interface require the source IP address in ARP requests to be part of their logical network configured on the receiving interface. When we generate the request we will check all our subnets that include the target IP and will preserve the source address if it is from such subnet. If there is no such subnet we select source address according to the rules for level 2.

```
set interfaces geneve gnv0 ip enable-arp-announce
```

set interfaces geneve <interface> ip enable-arp-ignore

Define different modes for sending replies in response to received ARP requests that resolve local target IP addresses:

If configured, reply only if the target IP address is local address configured on the incoming interface.

If this option is unset (default), reply for any local target IP address, configured on any interface.

```
set interfaces geneve gnv0 ip enable-arp-ignore
```

set interfaces geneve <interface> ip enable-proxy-arp

Use this command to enable proxy Address Resolution Protocol (ARP) on this interface. Proxy ARP allows an Ethernet interface to respond with its own MAC address to ARP requests for destination IP addresses on subnets attached to other interfaces on the system. Subsequent packets sent to those destination IP addresses are forwarded appropriately by the system.

Example:

```
set interfaces geneve gnv0 ip enable-proxy-arp
```

set interfaces geneve <interface> ip proxy-arp-pvlan

Private VLAN proxy arp. Basically allow proxy arp replies back to the same interface (from which the ARP request/solicitation was received).

This is done to support (ethernet) switch features, like RFC 3069, where the individual ports are NOT allowed to communicate with each other, but they are allowed to talk to the upstream router. As described in RFC 3069, it is possible to allow these hosts to communicate through the upstream router by proxy_arp'ing.

Note: Don't need to be used together with proxy_arp.

This technology is known by different names:

- In RFC 3069 it is called VLAN Aggregation
- Cisco and Allied Telesyn call it Private VLAN
- Hewlett-Packard call it Source-Port filtering or port-isolation
- Ericsson call it MAC-Forced Forwarding (RFC Draft)

set interfaces geneve <interface> ip source-validation <strict | loose | disable>

Enable policy for source validation by reversed path, as specified in RFC 3704. Current recommended practice in RFC 3704 is to enable strict mode to prevent IP spoofing from DDos attacks. If using asymmetric routing or other complicated routing, then loose mode is recommended.

- strict: Each incoming packet is tested against the FIB and if the interface is not the best reverse path the packet check will fail. By default failed packets are discarded.
- loose: Each incoming packet's source address is also tested against the FIB and if the source address is not reachable via any interface the packet check will fail.
- disable: No source validation

set interfaces geneve <interface> ipv6 address autoconf

SLAAC RFC 4862. IPv6 hosts can configure themselves automatically when connected to an IPv6 network using the Neighbor Discovery Protocol via ICMPv6 router discovery messages. When first connected to a network, a host sends a link-local router solicitation multicast request for its configuration parameters; routers respond to such a request with a router advertisement packet that contains Internet Layer configuration parameters.

Note: This method automatically disables IPv6 traffic forwarding on the interface in question.

Example:

```
set interfaces geneve gnv0 ipv6 address autoconf
```

set interfaces geneve <interface> ipv6 address eui64 <prefix>

EUI-64 as specified in RFC 4291 allows a host to assign iteslf a unique 64-Bit IPv6 address.

Example:

```
set interfaces geneve gnv0 ipv6 address eui64 2001:db8:beef::/64
```

set interfaces geneve <interface> ipv6 address no-default-link-local

Do not assign a link-local IPv6 address to this interface.

Example:

```
set interfaces geneve gnv0 ipv6 address no-default-link-local
```

set interfaces geneve <interface> ipv6 disable-forwarding

Configure interface-specific Host/Router behaviour. If set, the interface will switch to host mode and IPv6 forwarding will be disabled on this interface.

Example:

```
set interfaces geneve gnv0 ipv6 disable-forwarding
```

set interfaces geneve <interface> vrf <vrf>

Place interface in given VRF instance.

See also:

There is an entire chapter about how to configure a *VRF*, please check this for additional information.

Example:

```
set interfaces geneve gnv0 vrf red
```

GENEVE options

set interfaces geneve gnv0 remote <address>

Configure GENEVE tunnel far end/remote tunnel endpoint.

set interfaces geneve gnv0 vni <vni>

VNI (Virtual Network Identifier) is an identifier for a unique element of a virtual network. In many situations this may represent an L2 segment, however, the control plane defines the forwarding semantics of decapsulated packets. The VNI MAY be used as part of ECMP forwarding decisions or MAY be used as a mechanism to distinguish between overlapping address spaces contained in the encapsulated packet when load balancing across CPUs.

8.4.6 L2TPv3

Layer 2 Tunnelling Protocol Version 3 is an IETF standard related to L2TP that can be used as an alternative protocol to *MPLS* for encapsulation of multiprotocol Layer 2 communications traffic over IP networks. Like L2TP, L2TPv3 provides a pseudo-wire service but is scaled to fit carrier requirements.

L2TPv3 can be regarded as being to MPLS what IP is to ATM: a simplified version of the same concept, with much of the same benefit achieved at a fraction of the effort, at the cost of losing some technical features considered less important in the market.

In the case of L2TPv3, the features lost are teletraffic engineering features considered important in MPLS. However, there is no reason these features could not be re-engineered in or on top of L2TPv3 in later products.

The protocol overhead of L2TPv3 is also significantly bigger than MPLS.

L2TPv3 is described in **RFC 3931**.

Configuration

Common interface configuration

set interfaces l2tpv3 <interface> address <address>

Configure interface <*interface*> with one or more interface addresses.

- **address** can be specified multiple times as IPv4 and/or IPv6 address, e.g. 192.0.2.1/24 and/or 2001:db8::1/64

Example:

```
set interfaces l2tpv3 l2tpeth0 address 192.0.2.1/24
set interfaces l2tpv3 l2tpeth0 address 2001:db8::1/64
```

set interfaces l2tpv3 <interface> description <description>

Set a human readable, descriptive alias for this connection. Alias is used by e.g. the `show interfaces` command or SNMP based monitoring tools.

Example:

```
set interfaces l2tpv3 l2tpeth0 description 'This is an awesome interface running on␣
↪VyOS'
```

set interfaces l2tpv3 <interface> disable

Disable given <*interface*>. It will be placed in administratively down (`A/D`) state.

Example:

```
set interfaces l2tpv3 l2tpeth0 disable
```

set interfaces l2tpv3 <interface> disable-flow-control

Ethernet flow control is a mechanism for temporarily stopping the transmission of data on Ethernet family computer networks. The goal of this mechanism is to ensure zero packet loss in the presence of network congestion.

The first flow control mechanism, the pause frame, was defined by the IEEE 802.3x standard.

A sending station (computer or network switch) may be transmitting data faster than the other end of the link can accept it. Using flow control, the receiving station can signal the sender requesting suspension of transmissions until the receiver catches up.

Use this command to disable the generation of Ethernet flow control (pause frames).

Example:

```
set interfaces l2tpv3 l2tpeth0 disable-flow-control
```

set interfaces l2tpv3 <interface> disable-link-detect

Use this command to direct an interface to not detect any physical state changes on a link, for example, when the cable is unplugged.

Default is to detects physical link state changes.

Example:

```
set interfaces l2tpv3 l2tpeth0 disable-link-detect
```

set interfaces l2tpv3 <interface> mac <xx:xx:xx:xx:xx:xx>

Configure user defined MAC address on given <*interface*>.

Example:

```
set interfaces l2tpv3 l2tpeth0 mac '00:01:02:03:04:05'
```

set interfaces l2tpv3 <interface> mtu <mtu>

Configure MTU on given <*interface*>. It is the size (in bytes) of the largest ethernet frame sent on this link.

Example:

```
set interfaces l2tpv3 l2tpeth0 mtu 9000
```

set interfaces l2tpv3 <interface> ip arp-cache-timeout

Once a neighbor has been found, the entry is considered to be valid for at least for this specifc time. An entry's validity will be extended if it receives positive feedback from higher level protocols.

This defaults to 30 seconds.

Example:

```
set interfaces l2tpv3 l2tpeth0 ip arp-cache-timeout 180
```

set interfaces l2tpv3 <interface> ip disable-arp-filter

If set the kernel can respond to arp requests with addresses from other interfaces. This may seem wrong but it usually makes sense, because it increases the chance of successful communication. IP addresses are owned by the complete host on Linux, not by particular interfaces. Only for more complex setups like load-balancing, does this behaviour cause problems.

If not set (default) allows you to have multiple network interfaces on the same subnet, and have the ARPs for each interface be answered based on whether or not the kernel would route a packet from the ARP'd IP out that interface (therefore you must use source based routing for this to work).

In other words it allows control of which cards (usually 1) will respond to an arp request.

Example:

```
set interfaces l2tpv3 l2tpeth0 ip disable-arp-filter
```

set interfaces l2tpv3 <interface> ip disable-forwarding

Configure interface-specific Host/Router behaviour. If set, the interface will switch to host mode and IPv6 forwarding will be disabled on this interface.

```
set interfaces l2tpv3 l2tpeth0 ip disable-forwarding
```

set interfaces l2tpv3 <interface> ip enable-arp-accept

Define behavior for gratuitous ARP frames who's IP is not already present in the ARP table. If configured create new entries in the ARP table.

Both replies and requests type gratuitous arp will trigger the ARP table to be updated, if this setting is on.

If the ARP table already contains the IP address of the gratuitous arp frame, the arp table will be updated regardless if this setting is on or off.

```
set interfaces l2tpv3 l2tpeth0 ip enable-arp-accept
```

set interfaces l2tpv3 <interface> ip enable-arp-announce

Define different restriction levels for announcing the local source IP address from IP packets in ARP requests sent on interface.

Use any local address, configured on any interface if this is not set.

If configured, try to avoid local addresses that are not in the target's subnet for this interface. This mode is useful when target hosts reachable via this interface require the source IP address in ARP requests to be part of their logical network configured on the receiving interface. When we generate the request we will check all our subnets that include the target IP and will preserve the source address if it is from such subnet. If there is no such subnet we select source address according to the rules for level 2.

```
set interfaces l2tpv3 l2tpeth0 ip enable-arp-announce
```

set interfaces l2tpv3 <interface> ip enable-arp-ignore

Define different modes for sending replies in response to received ARP requests that resolve local target IP addresses:

If configured, reply only if the target IP address is local address configured on the incoming interface.

If this option is unset (default), reply for any local target IP address, configured on any interface.

```
set interfaces l2tpv3 l2tpeth0 ip enable-arp-ignore
```

set interfaces l2tpv3 <interface> ip enable-proxy-arp

Use this command to enable proxy Address Resolution Protocol (ARP) on this interface. Proxy ARP allows an Ethernet interface to respond with its own MAC address to ARP requests for destination IP addresses on subnets attached to other interfaces on the system. Subsequent packets sent to those destination IP addresses are forwarded appropriately by the system.

Example:

```
set interfaces l2tpv3 l2tpeth0 ip enable-proxy-arp
```

set interfaces l2tpv3 <interface> ip proxy-arp-pvlan

Private VLAN proxy arp. Basically allow proxy arp replies back to the same interface (from which the ARP request/solicitation was received).

This is done to support (ethernet) switch features, like **RFC 3069**, where the individual ports are NOT allowed to communicate with each other, but they are allowed to talk to the upstream router. As described in **RFC 3069**, it is possible to allow these hosts to communicate through the upstream router by proxy_arp'ing.

Note: Don't need to be used together with proxy_arp.

This technology is known by different names:

- In **RFC 3069** it is called VLAN Aggregation
- Cisco and Allied Telesyn call it Private VLAN
- Hewlett-Packard call it Source-Port filtering or port-isolation
- Ericsson call it MAC-Forced Forwarding (RFC Draft)

set interfaces l2tpv3 <interface> ip source-validation <strict | loose | disable>

Enable policy for source validation by reversed path, as specified in **RFC 3704**. Current recommended practice in **RFC 3704** is to enable strict mode to prevent IP spoofing from DDos attacks. If using asymmetric routing or other complicated routing, then loose mode is recommended.

- strict: Each incoming packet is tested against the FIB and if the interface is not the best reverse path the packet check will fail. By default failed packets are discarded.
- loose: Each incoming packet's source address is also tested against the FIB and if the source address is not reachable via any interface the packet check will fail.
- disable: No source validation

set interfaces l2tpv3 <interface> ipv6 address autoconf

SLAAC **RFC 4862**. IPv6 hosts can configure themselves automatically when connected to an IPv6 network using the Neighbor Discovery Protocol via ICMPv6 router discovery messages. When first connected to a network, a host sends a link-local router solicitation multicast request for its configuration parameters; routers respond to such a request with a router advertisement packet that contains Internet Layer configuration parameters.

Note: This method automatically disables IPv6 traffic forwarding on the interface in question.

Example:

```
set interfaces l2tpv3 l2tpeth0 ipv6 address autoconf
```

set interfaces l2tpv3 <interface> ipv6 address eui64 <prefix>

EUI-64 as specified in **RFC 4291** allows a host to assign iteslf a unique 64-Bit IPv6 address.

Example:

```
set interfaces l2tpv3 l2tpeth0 ipv6 address eui64 2001:db8:beef::/64
```

set interfaces l2tpv3 <interface> ipv6 address no-default-link-local

Do not assign a link-local IPv6 address to this interface.

Example:

```
set interfaces l2tpv3 l2tpeth0 ipv6 address no-default-link-local
```

set interfaces l2tpv3 <interface> ipv6 disable-forwarding

Configure interface-specific Host/Router behaviour. If set, the interface will switch to host mode and IPv6 forwarding will be disabled on this interface.

Example:

```
set interfaces l2tpv3 l2tpeth0 ipv6 disable-forwarding
```

set interfaces l2tpv3 <interface> vrf <vrf>

Place interface in given VRF instance.

See also:

There is an entire chapter about how to configure a *VRF*, please check this for additional information.

Example:

```
set interfaces l2tpv3 l2tpeth0 vrf red
```

L2TPv3 options

set interfaces l2tpv3 <interface> encapsulation <udp | ip>

Set the encapsulation type of the tunnel. Valid values for encapsulation are: udp, ip.

This defaults to UDP

set interfaces l2tpv3 <interface> source-address <address>

Set the IP address of the local interface to be used for the tunnel.

This address must be the address of a local interface. It may be specified as an IPv4 address or an IPv6 address.

set interfaces l2tpv3 <interface> remote <address>

Set the IP address of the remote peer. It may be specified as an IPv4 address or an IPv6 address.

set interfaces l2tpv3 <interface> session-id <id>

Set the session id, which is a 32-bit integer value. Uniquely identifies the session being created. The value used must match the peer_session_id value being used at the peer.

set interfaces l2tpv3 <interface> peer-session-id <id>

Set the peer-session-id, which is a 32-bit integer value assigned to the session by the peer. The value used must match the session_id value being used at the peer.

set interfaces l2tpv3 <interface> tunnel-id <id>

Set the tunnel id, which is a 32-bit integer value. Uniquely identifies the tunnel into which the session will be created.

set interfaces l2tpv3 <interface> peer-tunnel-id <id>

Set the tunnel id, which is a 32-bit integer value. Uniquely identifies the tunnel into which the session will be created.

Example

Over IP

```
# show interfaces l2tpv3
l2tpv3 l2tpeth10 {
    address 192.168.37.1/27
    encapsulation ip
    source-address 192.0.2.1
    peer-session-id 100
    peer-tunnel-id 200
    remote 203.0.113.24
    session-id 100
    tunnel-id 200
}
```

The inverse configuration has to be applied to the remote side.

Over UDP

UDP mode works better with NAT:

- Set source-address to your local IP (LAN).
- Add a forwarding rule matching UDP port on your internet router.

```
# show interfaces l2tpv3
l2tpv3 l2tpeth10 {
    address 192.168.37.1/27
    destination-port 9001
    encapsulation udp
    source-address 192.0.2.1
    peer-session-id 100
    peer-tunnel-id 200
    remote 203.0.113.24
    session-id 100
    source-port 9000
    tunnel-id 200
}
```

To create more than one tunnel, use distinct UDP ports.

Over IPSec, L2 VPN (bridge)

This is the LAN extension use case. The eth0 port of the distant VPN peers will be directly connected like if there was a switch between them.

IPSec:

```
set vpn ipsec ipsec-interfaces <VPN-interface>
set vpn ipsec esp-group test-ESP-1 compression 'disable'
set vpn ipsec esp-group test-ESP-1 lifetime '3600'
set vpn ipsec esp-group test-ESP-1 mode 'transport'
set vpn ipsec esp-group test-ESP-1 pfs 'enable'
set vpn ipsec esp-group test-ESP-1 proposal 1 encryption 'aes128'
set vpn ipsec esp-group test-ESP-1 proposal 1 hash 'sha1'
set vpn ipsec ike-group test-IKE-1 ikev2-reauth 'no'
set vpn ipsec ike-group test-IKE-1 key-exchange 'ikev1'
set vpn ipsec ike-group test-IKE-1 lifetime '3600'
set vpn ipsec ike-group test-IKE-1 proposal 1 dh-group '5'
set vpn ipsec ike-group test-IKE-1 proposal 1 encryption 'aes128'
set vpn ipsec ike-group test-IKE-1 proposal 1 hash 'sha1'
set vpn ipsec site-to-site peer <peer-ip> authentication mode 'pre-shared-secret'
set vpn ipsec site-to-site peer <peer-ip> authentication pre-shared-secret <pre-shared-
↪key>
set vpn ipsec site-to-site peer <peer-ip> connection-type 'initiate'
set vpn ipsec site-to-site peer <peer-ip> ike-group 'test-IKE-1'
set vpn ipsec site-to-site peer <peer-ip> ikev2-reauth 'inherit'
set vpn ipsec site-to-site peer <peer-ip> local-address <source-address>
set vpn ipsec site-to-site peer <peer-ip> tunnel 1 allow-nat-networks 'disable'
set vpn ipsec site-to-site peer <peer-ip> tunnel 1 allow-public-networks 'disable'
```

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```
set vpn ipsec site-to-site peer <peer-ip> tunnel 1 esp-group 'test-ESP-1'
set vpn ipsec site-to-site peer <peer-ip> tunnel 1 protocol 'l2tp'
```

Bridge:

```
set interfaces bridge br0 description 'L2 VPN Bridge'
# remote side in this example:
# set interfaces bridge br0 address '172.16.30.18/30'
set interfaces bridge br0 address '172.16.30.17/30'
set interfaces bridge br0 member interface eth0
set interfaces ethernet eth0 description 'L2 VPN Physical port'
```

L2TPv3:

```
set interfaces bridge br0 member interface 'l2tpeth0'
set interfaces l2tpv3 l2tpeth0 description 'L2 VPN Tunnel'
set interfaces l2tpv3 l2tpeth0 destination-port '5000'
set interfaces l2tpv3 l2tpeth0 encapsulation 'ip'
set interfaces l2tpv3 l2tpeth0 source-address <source-address>
set interfaces l2tpv3 l2tpeth0 mtu '1500'
set interfaces l2tpv3 l2tpeth0 peer-session-id '110'
set interfaces l2tpv3 l2tpeth0 peer-tunnel-id '10'
set interfaces l2tpv3 l2tpeth0 remote <peer-ip>
set interfaces l2tpv3 l2tpeth0 session-id '110'
set interfaces l2tpv3 l2tpeth0 source-port '5000'
set interfaces l2tpv3 l2tpeth0 tunnel-id '10'
```

8.4.7 Loopback

The loopback networking interface is a virtual network device implemented entirely in software. All traffic sent to it "loops back" and just targets services on your local machine.

Note: There can only be one loopback `lo` interface on the system. If you need multiple interfaces, please use the *Dummy* interface type.

Hint: A lookback interface is always up, thus it could be used for management traffic or as source/destination for and IGP (Interior Gateway Protocol) like *BGP* so your internal BGP link is not dependent on physical link states and multiple routes can be chosen to the destination. A *Dummy* Interface should always be preferred over a *Loopback* interface.

Configuration

Common interface configuration

set interfaces loopback <interface> address <address>

Configure interface <*interface*> with one or more interface addresses.

- **address** can be specified multiple times as IPv4 and/or IPv6 address, e.g. 192.0.2.1/24 and/or 2001:db8::1/64

Example:

```
set interfaces loopback lo address 192.0.2.1/24
set interfaces loopback lo address 2001:db8::1/64
```

set interfaces loopback <interface> description <description>

Set a human readable, descriptive alias for this connection. Alias is used by e.g. the `show interfaces` command or SNMP based monitoring tools.

Example:

```
set interfaces loopback lo description 'This is an awesome interface running on VyOS
↪'
```

Operation

show interfaces loopback

Show brief interface information.

```
vyos@vyos:~$ show interfaces loopback
Codes: S - State, L - Link, u - Up, D - Down, A - Admin Down
Interface        IP Address                        S/L  Description
---------        ----------                        ---  -----------
lo               127.0.0.1/8                       u/u
                 ::1/128
```

show interfaces loopback lo

Show detailed information on the given loopback interface *lo*.

```
vyos@vyos:~$ show interfaces loopback lo
lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen␣
↪1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever

    RX:  bytes    packets     errors    dropped    overrun      mcast
           300          6          0          0          0          0
    TX:  bytes    packets     errors    dropped    carrier collisions
           300          6          0          0          0          0
```

8.4.8 MACsec

MACsec is an IEEE standard (IEEE 802.1AE) for MAC security, introduced in 2006. It defines a way to establish a protocol independent connection between two hosts with data confidentiality, authenticity and/or integrity, using GCM-AES-128. MACsec operates on the Ethernet layer and as such is a layer 2 protocol, which means it's designed to secure traffic within a layer 2 network, including DHCP or ARP requests. It does not compete with other security solutions such as IPsec (layer 3) or TLS (layer 4), as all those solutions are used for their own specific use cases.

Configuration

Common interface configuration

set interfaces macsec <interface> address <address | dhcp | dhcpv6>

Configure interface <*interface*> with one or more interface addresses.

- **address** can be specified multiple times as IPv4 and/or IPv6 address, e.g. 192.0.2.1/24 and/or 2001:db8::1/64
- **dhcp** interface address is received by DHCP from a DHCP server on this segment.
- **dhcpv6** interface address is received by DHCPv6 from a DHCPv6 server on this segment.

Example:

```
set interfaces macsec macsec0 address 192.0.2.1/24
set interfaces macsec macsec0 address 2001:db8::1/64
set interfaces macsec macsec0 address dhcp
set interfaces macsec macsec0 address dhcpv6
```

set interfaces macsec <interface> description <description>

Set a human readable, descriptive alias for this connection. Alias is used by e.g. the `show interfaces` command or SNMP based monitoring tools.

Example:

```
set interfaces macsec macsec0 description 'This is an awesome interface running on␣
↪VyOS'
```

set interfaces macsec <interface> disable

Disable given <*interface*>. It will be placed in administratively down (`A/D`) state.

Example:

```
set interfaces macsec macsec0 disable
```

set interfaces macsec <interface> disable-flow-control

Ethernet flow control is a mechanism for temporarily stopping the transmission of data on Ethernet family computer networks. The goal of this mechanism is to ensure zero packet loss in the presence of network congestion.

The first flow control mechanism, the pause frame, was defined by the IEEE 802.3x standard.

A sending station (computer or network switch) may be transmitting data faster than the other end of the link can accept it. Using flow control, the receiving station can signal the sender requesting suspension of transmissions until the receiver catches up.

Use this command to disable the generation of Ethernet flow control (pause frames).

Example:

```
set interfaces macsec macsec0 disable-flow-control
```

set interfaces macsec <interface> disable-link-detect

Use this command to direct an interface to not detect any physical state changes on a link, for example, when the cable is unplugged.

Default is to detects physical link state changes.

Example:

```
set interfaces macsec macsec0 disable-link-detect
```

set interfaces macsec <interface> mac <xx:xx:xx:xx:xx:xx>

Configure user defined MAC address on given <*interface*>.

Example:

```
set interfaces macsec macsec0 mac '00:01:02:03:04:05'
```

set interfaces macsec <interface> mtu <mtu>

Configure MTU on given <*interface*>. It is the size (in bytes) of the largest ethernet frame sent on this link.

Example:

```
set interfaces macsec macsec0 mtu 9000
```

set interfaces macsec <interface> ip arp-cache-timeout

Once a neighbor has been found, the entry is considered to be valid for at least for this specifc time. An entry's validity will be extended if it receives positive feedback from higher level protocols.

This defaults to 30 seconds.

Example:

```
set interfaces macsec macsec0 ip arp-cache-timeout 180
```

set interfaces macsec <interface> ip disable-arp-filter

If set the kernel can respond to arp requests with addresses from other interfaces. This may seem wrong but it usually makes sense, because it increases the chance of successful communication. IP addresses are owned by the complete host on Linux, not by particular interfaces. Only for more complex setups like load-balancing, does this behaviour cause problems.

If not set (default) allows you to have multiple network interfaces on the same subnet, and have the ARPs for each interface be answered based on whether or not the kernel would route a packet from the ARP'd IP out that interface (therefore you must use source based routing for this to work).

In other words it allows control of which cards (usually 1) will respond to an arp request.

Example:

```
set interfaces macsec macsec0 ip disable-arp-filter
```

set interfaces macsec <interface> ip disable-forwarding

Configure interface-specific Host/Router behaviour. If set, the interface will switch to host mode and IPv6 forwarding will be disabled on this interface.

```
set interfaces macsec macsec0 ip disable-forwarding
```

set interfaces macsec <interface> ip enable-arp-accept

Define behavior for gratuitous ARP frames who's IP is not already present in the ARP table. If configured create new entries in the ARP table.

Both replies and requests type gratuitous arp will trigger the ARP table to be updated, if this setting is on.

If the ARP table already contains the IP address of the gratuitous arp frame, the arp table will be updated regardless if this setting is on or off.

```
set interfaces macsec macsec0 ip enable-arp-accept
```

set interfaces macsec <interface> ip enable-arp-announce

Define different restriction levels for announcing the local source IP address from IP packets in ARP requests sent on interface.

Use any local address, configured on any interface if this is not set.

If configured, try to avoid local addresses that are not in the target's subnet for this interface. This mode is useful when target hosts reachable via this interface require the source IP address in ARP requests to be part of their logical network configured on the receiving interface. When we generate the request we will check all our subnets that include the target IP and will preserve the source address if it is from such subnet. If there is no such subnet we select source address according to the rules for level 2.

```
set interfaces macsec macsec0 ip enable-arp-announce
```

set interfaces macsec <interface> ip enable-arp-ignore

Define different modes for sending replies in response to received ARP requests that resolve local target IP addresses:

If configured, reply only if the target IP address is local address configured on the incoming interface.

If this option is unset (default), reply for any local target IP address, configured on any interface.

```
set interfaces macsec macsec0 ip enable-arp-ignore
```

set interfaces macsec <interface> ip enable-proxy-arp

Use this command to enable proxy Address Resolution Protocol (ARP) on this interface. Proxy ARP allows an Ethernet interface to respond with its own MAC address to ARP requests for destination IP addresses on subnets attached to other interfaces on the system. Subsequent packets sent to those destination IP addresses are forwarded appropriately by the system.

Example:

```
set interfaces macsec macsec0 ip enable-proxy-arp
```

set interfaces macsec <interface> ip proxy-arp-pvlan

Private VLAN proxy arp. Basically allow proxy arp replies back to the same interface (from which the ARP request/solicitation was received).

This is done to support (ethernet) switch features, like **RFC 3069**, where the individual ports are NOT allowed to communicate with each other, but they are allowed to talk to the upstream router. As described in **RFC 3069**, it is possible to allow these hosts to communicate through the upstream router by proxy_arp'ing.

Note: Don't need to be used together with proxy_arp.

This technology is known by different names:

- In RFC 3069 it is called VLAN Aggregation
- Cisco and Allied Telesyn call it Private VLAN
- Hewlett-Packard call it Source-Port filtering or port-isolation
- Ericsson call it MAC-Forced Forwarding (RFC Draft)

set interfaces macsec <interface> ip source-validation <strict | loose | disable>

Enable policy for source validation by reversed path, as specified in RFC 3704. Current recommended practice in RFC 3704 is to enable strict mode to prevent IP spoofing from DDos attacks. If using asymmetric routing or other complicated routing, then loose mode is recommended.

- strict: Each incoming packet is tested against the FIB and if the interface is not the best reverse path the packet check will fail. By default failed packets are discarded.
- loose: Each incoming packet's source address is also tested against the FIB and if the source address is not reachable via any interface the packet check will fail.
- disable: No source validation

set interfaces macsec <interface> ipv6 address autoconf

SLAAC RFC 4862. IPv6 hosts can configure themselves automatically when connected to an IPv6 network using the Neighbor Discovery Protocol via ICMPv6 router discovery messages. When first connected to a network, a host sends a link-local router solicitation multicast request for its configuration parameters; routers respond to such a request with a router advertisement packet that contains Internet Layer configuration parameters.

Note: This method automatically disables IPv6 traffic forwarding on the interface in question.

Example:

```
set interfaces macsec macsec0 ipv6 address autoconf
```

set interfaces macsec <interface> ipv6 address eui64 <prefix>

EUI-64 as specified in RFC 4291 allows a host to assign iteslf a unique 64-Bit IPv6 address.

Example:

```
set interfaces macsec macsec0 ipv6 address eui64 2001:db8:beef::/64
```

set interfaces macsec <interface> ipv6 address no-default-link-local

Do not assign a link-local IPv6 address to this interface.

Example:

```
set interfaces macsec macsec0 ipv6 address no-default-link-local
```

set interfaces macsec <interface> ipv6 disable-forwarding

Configure interface-specific Host/Router behaviour. If set, the interface will switch to host mode and IPv6 forwarding will be disabled on this interface.

Example:

```
set interfaces macsec macsec0 ipv6 disable-forwarding
```

set interfaces macsec <interface> vrf <vrf>

Place interface in given VRF instance.

See also:

There is an entire chapter about how to configure a *VRF*, please check this for additional information.

Example:

```
set interfaces macsec macsec0 vrf red
```

DHCP(v6)

set interfaces macsec <interface> dhcp-options client-id <description>

RFC 2131 states: The client MAY choose to explicitly provide the identifier through the 'client identifier' option. If the client supplies a 'client identifier', the client MUST use the same 'client identifier' in all subsequent messages, and the server MUST use that identifier to identify the client.

Example:

```
set interfaces macsec macsec0 dhcp-options client-id 'foo-bar'
```

set interfaces macsec <interface> dhcp-options host-name <hostname>

Instead of sending the real system hostname to the DHCP server, overwrite the host-name with this given-value.

Example:

```
set interfaces macsec macsec0 dhcp-options host-name 'VyOS'
```

set interfaces macsec <interface> dhcp-options vendor-class-id <vendor-id>

The vendor-class-id option can be used to request a specific class of vendor options from the server.

Example:

```
set interfaces macsec macsec0 dhcp-options vendor-class-id 'VyOS'
```

set interfaces macsec <interface> dhcp-options no-default-route

Only request an address from the DHCP server but do not request a default gateway.

Example:

```
set interfaces macsec macsec0 dhcp-options no-default-route
```

set interfaces macsec <interface> dhcpv6-options duid <duid>

The DHCP unique identifier (DUID) is used by a client to get an IP address from a DHCPv6 server. It has a 2-byte DUID type field, and a variable-length identifier field up to 128 bytes. Its actual length depends on its type. The server compares the DUID with its database and delivers configuration data (address, lease times, DNS servers, etc.) to the client.

```
set interfaces macsec macsec0 duid '0e:00:00:01:00:01:27:71:db:f0:00:50:56:bf:c5:6d'
```

set interfaces macsec <interface> dhcpv6-options parameters-only

This statement specifies dhcp6c to only exchange informational configuration parameters with servers. A list of DNS server addresses is an example of such parameters. This statement is useful when the client does not need stateful configuration parameters such as IPv6 addresses or prefixes.

```
set interfaces macsec macsec0 dhcpv6-options parameters-only
```

set interfaces macsec <interface> dhcpv6-options rapid-commit

When rapid-commit is specified, dhcp6c will include a rapid-commit option in solicit messages and wait for an immediate reply instead of advertisements.

```
set interfaces macsec macsec0 dhcpv6-options rapid-commit
```

set interfaces macsec <interface> dhcpv6-options temporary

Request only a temporary address and not form an IA_NA (Identity Association for Non-temporary Addresses) partnership.

```
set interfaces macsec macsec0 dhcpv6-options temporary
```

DHCPv6 Prefix Delegation (PD)

VyOS 1.3 (equuleus) supports DHCPv6-PD (**RFC 3633**). DHCPv6 Prefix Delegation is supported by most ISPs who provide native IPv6 for consumers on fixed networks.

set interfaces macsec <interface> dhcpv6-options pd <id> length <length>

Some ISPs by default only delegate a /64 prefix. To request for a specific prefix size use this option to request for a bigger delegation for this pd <*id*>. This value is in the range from 32 - 64 so you could request up to a /32 prefix (if your ISP allows this) down to a /64 delegation.

The default value corresponds to 64.

To request a /56 prefix from your ISP use:

```
set interfaces macsec macsec0 dhcpv6-options pd 0 length 56
```

set interfaces macsec <interface> dhcpv6-options pd <id> interface <delegatee> address <address>

Specify the interface address used locally on the interfcae where the prefix has been delegated to. ID must be a decimal integer.

It will be combined with the delegated prefix and the sla-id to form a complete interface address. The default is to use the EUI-64 address of the interface.

Example: Delegate a /64 prefix to interface eth8 which will use a local address on this router of <prefix>::ffff, as the address 65534 will correspond to ffff in hexadecimal notation.

```
set interfaces macsec macsec0 dhcpv6-options pd 0 interface eth8 address 65534
```

set interfaces macsec <interface> dhcpv6-options pd <id> interface <delegatee> sla-id <id>

Specify the identifier value of the site-level aggregator (SLA) on the interface. ID must be a decimal number greater then 0 which fits in the length of SLA IDs (see below).

Example: If ID is 1 and the client is delegated an IPv6 prefix 2001:db8:ffff::/48, dhcp6c will combine the two values into a single IPv6 prefix, 2001:db8:ffff:1::/64, and will configure the prefix on the specified interface.

```
set interfaces macsec macsec0 dhcpv6-options pd 0 interface eth8 sla-id 1
```

MACsec options

set interfaces macsec <interface> security cipher <gcm-aes-128|gcm-aes-256>

Select cipher suite used for cryptographic operations. This setting is mandatory.

set interfaces macsec <interface> security encrypt

MACsec only provides authentication by default, encryption is optional. This command will enable encryption for all outgoing packets.

set interfaces macsec <interface> source-interface <physical-source>

A physical interface is required to connect this MACsec instance to. Traffic leaving this interface will now be authenticated/encrypted.

Key Management

MKA (MACsec Key Agreement protocol) is used to synchronize keys between individual peers.

set interfaces macsec <interface> security mka cak <key>

IEEE 802.1X/MACsec pre-shared key mode. This allows configuring MACsec with a pre-shared key using a CAK (MACsec connectivity association key) and CKN (MACsec connectivity association name) pair.

set interfaces macsec <interface> security mka ckn <key>

CKN key

set interfaces macsec <interface> security mka priority <priority>

The peer with lower priority will become the key server and start distributing SAKs.

Replay protection

set interfaces macsec <interface> security replay-window <window>

IEEE 802.1X/MACsec replay protection window. This determines a window in which replay is tolerated, to allow receipt of frames that have been misordered by the network.

- `0`: No replay window, strict check
- `1-4294967295`: Number of packets that could be misordered

Operation

run generate macsec mka-cak

Generate MKA CAK key

```
vyos@vyos:~$ generate macsec mka-cak
20693b6e08bfa482703a563898c9e3ad
```

run generate macsec mka-ckn

Generate MKA CAK key

```
vyos@vyos:~$ generate macsec mka-ckn
88737efef314ee319b2cbf30210a5f164957d884672c143aefdc0f5f6bc49eb2
```

show interfaces macsec

List all MACsec interfaces.

```
vyos@vyos:~$ show interfaces macsec
17: macsec1: protect on validate strict sc off sa off encrypt on send_sci on end_
↪station off scb off replay off
    cipher suite: GCM-AES-128, using ICV length 16
    TXSC: 005056bfefaa0001 on SA 0
20: macsec0: protect on validate strict sc off sa off encrypt off send_sci on end_
↪station off scb off replay off
    cipher suite: GCM-AES-128, using ICV length 16
    TXSC: 005056bfefaa0001 on SA 0
```

show interfaces macsec <interface>

Show specific MACsec interface information

```
vyos@vyos:~$ show interfaces macsec macsec1
17: macsec1: protect on validate strict sc off sa off encrypt on send_sci on end_
↪station off scb off replay off
    cipher suite: GCM-AES-128, using ICV length 16
    TXSC: 005056bfefaa0001 on SA 0
```

Examples

- Two routers connected both via eth1 through an untrusted switch
- R1 has 192.0.2.1/24 & 2001:db8::1/64
- R2 has 192.0.2.2/24 & 2001:db8::2/64

R1

```
set interfaces macsec macsec1 address '192.0.2.1/24'
set interfaces macsec macsec1 address '2001:db8::1/64'
set interfaces macsec macsec1 security cipher 'gcm-aes-128'
set interfaces macsec macsec1 security encrypt
set interfaces macsec macsec1 security mka cak '232e44b7fda6f8e2d88a07bf78a7aff4'
set interfaces macsec macsec1 security mka ckn
↪'40916f4b23e3d548ad27eedd2d10c6f98c2d21684699647d63d41b500dfe8836'
set interfaces macsec macsec1 source-interface 'eth1'
```

R2

```
set interfaces macsec macsec1 address '192.0.2.2/24'
set interfaces macsec macsec1 address '2001:db8::2/64'
set interfaces macsec macsec1 security cipher 'gcm-aes-128'
set interfaces macsec macsec1 security encrypt
set interfaces macsec macsec1 security mka cak '232e44b7fda6f8e2d88a07bf78a7aff4'
```

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```
set interfaces macsec macsec1 security mka ckn
↪'40916f4b23e3d548ad27eedd2d10c6f98c2d21684699647d63d41b500dfe8836'
set interfaces macsec macsec1 source-interface 'eth1'
```

Pinging (IPv6) the other host and intercepting the traffic in `eth1` will show you the content is encrypted.

```
17:35:44.586668 00:50:56:bf:ef:aa > 00:50:56:b3:ad:d6, ethertype Unknown (0x88e5),␣
↪length 150:
        0x0000:  2c00 0000 000a 0050 56bf efaa 0001 d9fb  ,......PV.......
        0x0010:  920a 8b8d 68ed 9609 29dd e767 25a4 4466  ....h...)..g%.Df
        0x0020:  5293 487b 9990 8517 3b15 22c7 ea5c ac83  R.H{....;."..\..
        0x0030:  4c6e 13cf 0743 f917 2c4e 694e 87d1 0f09  Ln...C..,NiN....
        0x0040:  0f77 5d53 ed75 cfe1 54df 0e5a c766 93cb  .w]S.u..T..Z.f..
        0x0050:  c4f2 6e23 f200 6dfe 3216 c858 dcaa a73b  ..n#..m.2..X...;
        0x0060:  4dd1 9358 d9e4 ed0e 072f 1acc 31c4 f669  M..X...../..1..i
        0x0070:  e93a 9f38 8a62 17c6 2857 6ac5 ec11 8b0e  .:.8.b..(Wj.....
        0x0080:  6b30 92a5 7ccc 720b                      k0..|.r.
```

Disabling the encryption on the link by removing `security encrypt` will show the unencrypted but authenticated content.

```
17:37:00.746155 00:50:56:bf:ef:aa > 00:50:56:b3:ad:d6, ethertype Unknown (0x88e5),␣
↪length 150:
        0x0000:  2000 0000 0009 0050 56bf efaa 0001 86dd  .......PV.......
        0x0010:  6009 86f3 0040 3a40 2001 0db8 0000 0000  `....@:@........
        0x0020:  0000 0000 0000 0001 2001 0db8 0000 0000  ................
        0x0030:  0000 0000 0000 0002 8100 d977 0f30 0003  ...........w.0..
        0x0040:  1ca0 c65e 0000 0000 8d93 0b00 0000 0000  ...^............
        0x0050:  1011 1213 1415 1617 1819 1a1b 1c1d 1e1f  ................
        0x0060:  2021 2223 2425 2627 2829 2a2b 2c2d 2e2f  .!"#$%&'()*+,-./
        0x0070:  3031 3233 3435 3637 87d5 eed3 3a39 d52b  01234567....:9.+
        0x0080:  a282 c842 5254 ef28                      ...BRT.(
```

8.4.9 OpenVPN

Traditionally hardware routers implement IPsec exclusively due to relative ease of implementing it in hardware and insufficient CPU power for doing encryption in software. Since VyOS is a software router, this is less of a concern. OpenVPN has been widely used on UNIX platform for a long time and is a popular option for remote access VPN, though it's also capable of site-to-site connections.

Advantages of OpenVPN are:

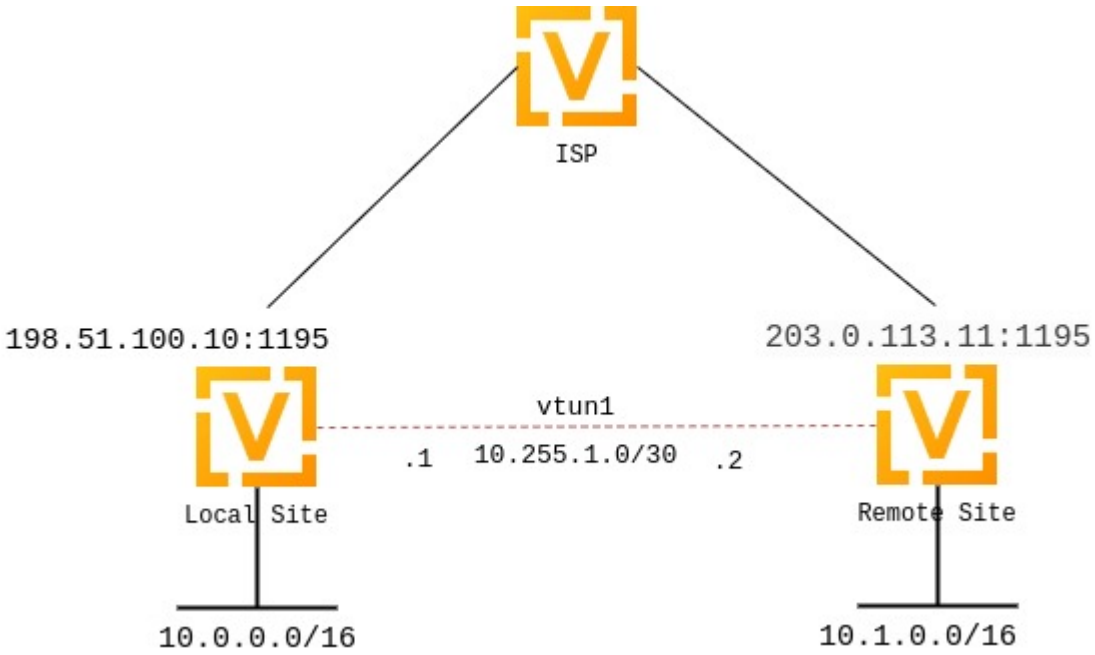
- It uses a single TCP or UDP connection and does not rely on packet source addresses, so it will work even through a double NAT: perfect for public hotspots and such
- It's easy to setup and offers very flexible split tunneling
- There's a variety of client GUI frontends for any platform

Disadvantages are:

- It's slower than IPsec due to higher protocol overhead and the fact it runs in user mode while IPsec, on Linux, is in kernel mode
- None of the operating systems have client software installed by default

In the VyOS CLI, a key point often overlooked is that rather than being configured using the *set vpn* stanza, OpenVPN is configured as a network interface using *set interfaces openvpn*.

Site-To-Site



While many are aware of OpenVPN as a Client VPN solution, it is often overlooked as a site-to-site VPN solution due to lack of support for this mode in many router platforms.

Site-to-site mode supports x.509 but doesn't require it and can also work with static keys, which is simpler in many cases. In this example, we'll configure a simple site-to-site OpenVPN tunnel using a 2048-bit pre-shared key.

First, one of the systems generate the key using the operational command `generate openvpn key <filename>`. This will generate a key with the name provided in the `/config/auth/` directory. Once generated, you will need to copy this key to the remote router.

In our example, we used the filename `openvpn-1.key` which we will reference in our configuration.

- The public IP address of the local side of the VPN will be 198.51.100.10.
- The public IP address of the remote side of the VPN will be 203.0.113.11.
- The tunnel will use 10.255.1.1 for the local IP and 10.255.1.2 for the remote.
- The local site will have a subnet of 10.0.0.0/16.
- The remote site will have a subnet of 10.1.0.0/16.
- Static Routing or other dynamic routing protocols can be used over the vtun interface
- OpenVPN allows for either TCP or UDP. UDP will provide the lowest latency, while TCP will work better for lossy connections; generally UDP is preferred when possible.
- The official port for OpenVPN is 1194, which we reserve for client VPN; we will use 1195 for site-to-site VPN.
- The `persistent-tunnel` directive will allow us to configure tunnel-related attributes, such as firewall policy as we would on any normal network interface.

- If known, the IP of the remote router can be configured using the `remote-host` directive; if unknown, it can be omitted. We will assume a dynamic IP for our remote router.

Local Configuration:

```
set interfaces openvpn vtun1 mode site-to-site
set interfaces openvpn vtun1 protocol udp
set interfaces openvpn vtun1 persistent-tunnel
set interfaces openvpn vtun1 remote-host '203.0.113.11'
set interfaces openvpn vtun1 local-port '1195'
set interfaces openvpn vtun1 remote-port '1195'
set interfaces openvpn vtun1 shared-secret-key-file '/config/auth/openvpn-1.key'
set interfaces openvpn vtun1 local-address '10.255.1.1'
set interfaces openvpn vtun1 remote-address '10.255.1.2'
```

Local Configuration - Annotated:

```
set interfaces openvpn vtun1 mode site-to-site
set interfaces openvpn vtun1 protocol udp
set interfaces openvpn vtun1 persistent-tunnel
set interfaces openvpn vtun1 remote-host '203.0.113.11'                         # Pub IP␣
↪of other site
set interfaces openvpn vtun1 local-port '1195'
set interfaces openvpn vtun1 remote-port '1195'
set interfaces openvpn vtun1 shared-secret-key-file '/config/auth/openvpn-1.key'
set interfaces openvpn vtun1 local-address '10.255.1.1'                         # Local␣
↪IP of vtun interface
set interfaces openvpn vtun1 remote-address '10.255.1.2'                        # Remote␣
↪IP of vtun interface
```

Remote Configuration:

```
set interfaces openvpn vtun1 mode site-to-site
set interfaces openvpn vtun1 protocol udp
set interfaces openvpn vtun1 persistent-tunnel
set interfaces openvpn vtun1 remote-host '198.51.100.10'
set interfaces openvpn vtun1 local-port '1195'
set interfaces openvpn vtun1 remote-port '1195'
set interfaces openvpn vtun1 shared-secret-key-file '/config/auth/openvpn-1.key'
set interfaces openvpn vtun1 local-address '10.255.1.2'
set interfaces openvpn vtun1 remote-address '10.255.1.1'
```

Remote Configuration - Annotated:

```
set interfaces openvpn vtun1 mode site-to-site
set interfaces openvpn vtun1 protocol udp
set interfaces openvpn vtun1 persistent-tunnel
set interfaces openvpn vtun1 remote-host '198.51.100.10'                         # Pub␣
↪IP of other site
set interfaces openvpn vtun1 local-port '1195'
set interfaces openvpn vtun1 remote-port '1195'
set interfaces openvpn vtun1 shared-secret-key-file '/config/auth/openvpn-1.key'
set interfaces openvpn vtun1 local-address '10.255.1.2'                          # Local␣
↪IP of vtun interface
```

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```
set interfaces openvpn vtun1 remote-address '10.255.1.1'                    #␣
↪Remote IP of vtun interface
```

Firewall Exceptions

For the OpenVPN traffic to pass through the WAN interface, you must create a firewall exception.

```
set firewall name OUTSIDE_LOCAL rule 10 action accept
set firewall name OUTSIDE_LOCAL rule 10 description 'Allow established/related'
set firewall name OUTSIDE_LOCAL rule 10 state established enable
set firewall name OUTSIDE_LOCAL rule 10 state related enable
set firewall name OUTSIDE_LOCAL rule 20 action accept
set firewall name OUTSIDE_LOCAL rule 20 description OpenVPN_IN
set firewall name OUTSIDE_LOCAL rule 20 destination port 1195
set firewall name OUTSIDE_LOCAL rule 20 log enable
set firewall name OUTSIDE_LOCAL rule 20 protocol udp
set firewall name OUTSIDE_LOCAL rule 20 source
```

You should also ensure that the OUTISDE_LOCAL firewall group is applied to the WAN interface and a direction (local).

```
set interfaces ethernet eth0 firewall local name 'OUTSIDE-LOCAL'
```

Static Routing:

Static routes can be configured referencing the tunnel interface; for example, the local router will use a network of 10.0.0.0/16, while the remote has a network of 10.1.0.0/16:

Local Configuration:

```
set protocols static interface-route 10.1.0.0/16 next-hop-interface vtun1
```

Remote Configuration:

```
set protocols static interface-route 10.0.0.0/16 next-hop-interface vtun1
```

The configurations above will default to using 256-bit AES in GCM mode for encryption (if both sides support NCP) and SHA-1 for HMAC authentication. SHA-1 is considered weak, but other hashing algorithms are available, as are encryption algorithms:

For Encryption:

This sets the cipher when NCP (Negotiable Crypto Parameters) is disabled or OpenVPN version < 2.4.0.

```
vyos@vyos# set interfaces openvpn vtun1 encryption cipher
Possible completions:
  des           DES algorithm
  3des          DES algorithm with triple encryption
  bf128         Blowfish algorithm with 128-bit key
  bf256         Blowfish algorithm with 256-bit key
  aes128        AES algorithm with 128-bit key CBC
  aes128gcm     AES algorithm with 128-bit key GCM
  aes192        AES algorithm with 192-bit key CBC
```

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```
  aes192gcm    AES algorithm with 192-bit key GCM
  aes256       AES algorithm with 256-bit key CBC
  aes256gcm    AES algorithm with 256-bit key GCM
```

This sets the accepted ciphers to use when version => 2.4.0 and NCP is enabled (which is the default). Default NCP cipher for versions >= 2.4.0 is aes256gcm. The first cipher in this list is what server pushes to clients.

```
vyos@vyos# set int open vtun0 encryption ncp-ciphers
Possible completions:
  des          DES algorithm
  3des         DES algorithm with triple encryption
  aes128       AES algorithm with 128-bit key CBC
  aes128gcm    AES algorithm with 128-bit key GCM
  aes192       AES algorithm with 192-bit key CBC
  aes192gcm    AES algorithm with 192-bit key GCM
  aes256       AES algorithm with 256-bit key CBC
  aes256gcm    AES algorithm with 256-bit key GCM
```

For Hashing:

```
vyos@vyos# set interfaces openvpn vtun1 hash
Possible completions:
  md5          MD5 algorithm
  sha1         SHA-1 algorithm
  sha256       SHA-256 algorithm
  sha512       SHA-512 algorithm
```

If you change the default encryption and hashing algorithms, be sure that the local and remote ends have matching configurations, otherwise the tunnel will not come up.

Firewall policy can also be applied to the tunnel interface for *local*, *in*, and *out* directions and functions identically to ethernet interfaces.

If making use of multiple tunnels, OpenVPN must have a way to distinguish between different tunnels aside from the pre-shared-key. This is either by referencing IP address or port number. One option is to dedicate a public IP to each tunnel. Another option is to dedicate a port number to each tunnel (e.g. 1195,1196,1197…).

OpenVPN status can be verified using the *show openvpn* operational commands. See the built-in help for a complete list of options.

Server

Multi-client server is the most popular OpenVPN mode on routers. It always uses x.509 authentication and therefore requires a PKI setup. Refer this section **Generate X.509 Certificate and Keys** to generate a CA certificate, a server certificate and key, a certificate revocation list, a Diffie-Hellman key exchange parameters file. You do not need client certificates and keys for the server setup.

In this example we will use the most complicated case: a setup where each client is a router that has its own subnet (think HQ and branch offices), since simpler setups are subsets of it.

Suppose you want to use 10.23.1.0/24 network for client tunnel endpoints and all client subnets belong to 10.23.0.0/20. All clients need access to the 192.168.0.0/16 network.

First we need to specify the basic settings. 1194/UDP is the default. The `persistent-tunnel` option is recommended, it prevents the TUN/TAP device from closing on connection resets or daemon reloads.

Note: Using **openvpn-option -reneg-sec** can be tricky. This option is used to renegotiate data channel after n seconds. When used at both server and client, the lower value will trigger the renegotiation. If you set it to 0 on one side of the connection (to disable it), the chosen value on the other side will determine when the renegotiation will occur.

```
set interfaces openvpn vtun10 mode server
set interfaces openvpn vtun10 local-port 1194
set interfaces openvpn vtun10 persistent-tunnel
set interfaces openvpn vtun10 protocol udp
```

Then we need to specify the location of the cryptographic materials. Suppose you keep the files in */config/auth/openvpn*

```
set interfaces openvpn vtun10 tls ca-cert-file /config/auth/openvpn/ca.crt
set interfaces openvpn vtun10 tls cert-file /config/auth/openvpn/server.crt
set interfaces openvpn vtun10 tls key-file /config/auth/openvpn/server.key
set interfaces openvpn vtun10 tls crl-file /config/auth/openvpn/crl.pem
set interfaces openvpn vtun10 tls dh-file /config/auth/openvpn/dh2048.pem
```

Now we need to specify the server network settings. In all cases we need to specify the subnet for client tunnel endpoints. Since we want clients to access a specific network behind out router, we will use a push-route option for installing that route on clients.

```
set interfaces openvpn vtun10 server push-route 192.168.0.0/16
set interfaces openvpn vtun10 server subnet 10.23.1.0/24
```

Since it's a HQ and branch offices setup, we will want all clients to have fixed addresses and we will route traffic to specific subnets through them. We need configuration for each client to achieve this.

Note: Clients are identified by the CN field of their x.509 certificates, in this example the CN is `client0`:

```
set interfaces openvpn vtun10 server client client0 ip 10.23.1.10
set interfaces openvpn vtun10 server client client0 subnet 10.23.2.0/25
```

OpenVPN **will not** automatically create routes in the kernel for client subnets when they connect and will only use client-subnet association internally, so we need to create a route to the 10.23.0.0/20 network ourselves:

```
set protocols static interface-route 10.23.0.0/20 next-hop-interface vtun10
```

Generate X.509 Certificate and Keys

OpenVPN ships with a set of scripts called Easy-RSA that can generate the appropriate files needed for an OpenVPN setup using X.509 certificates. Easy-RSA comes installed by default on VyOS routers.

Copy the Easy-RSA scripts to a new directory to modify the values.

```
cp -r /usr/share/easy-rsa/ /config/my-easy-rsa-config
cd /config/my-easy-rsa-config
```

To ensure the consistent use of values when generating the PKI, set default values to be used by the PKI generating scripts. Rename the vars.example filename to vars

```
mv vars.example vars
```

Following is the instance of the file after editing. You may also change other values in the file at your discretion/need, though for most cases the defaults should be just fine. (do not leave any of these parameters blank)

```
set_var EASYRSA_DN      "org"
set_var EASYRSA_REQ_COUNTRY     "US"
set_var EASYRSA_REQ_PROVINCE    "California"
set_var EASYRSA_REQ_CITY        "San Francisco"
set_var EASYRSA_REQ_ORG "Copyleft Certificate Co"
set_var EASYRSA_REQ_EMAIL       "me@example.net"
set_var EASYRSA_REQ_OU          "My Organizational Unit"
set_var EASYRSA_KEY_SIZE        2048
```

init-pki option will create a new pki directory or will delete any previously generated certificates stored in that folder. The term 'central' is used to refer server and 'branch' for client

---

Note: Remember the "CA Key Passphrase" prompted in build-ca command, as it will be asked in signing the server/client certificate.

```
vyos@vyos:/config/my-easy-rsa-config$./easyrsa init-pki
vyos@vyos:/config/my-easy-rsa-config$./easyrsa build-ca
vyos@vyos:/config/my-easy-rsa-config$./easyrsa gen-req central nopass
vyos@vyos:/config/my-easy-rsa-config$./easyrsa sign-req server central
vyos@vyos:/config/my-easy-rsa-config$./easyrsa gen-dh
vyos@vyos:/config/my-easy-rsa-config$./easyrsa build-client-full branch1 nopass
```

To generate a certificate revocation list for any client, execute these commands:

```
vyos@vyos:/config/my-easy-rsa-config$./easyrsa revoke client1
vyos@vyos:/config/my-easy-rsa-config$ ./easyrsa gen-crl
```

Copy the files to /config/auth/openvpn/ to use in OpenVPN tunnel creation

```
vyos@vyos:/config/my-easy-rsa-config$ sudo mkdir /config/auth/openvpn
vyos@vyos:/config/my-easy-rsa-config$ sudo cp pki/ca.crt /config/auth/openvpn
vyos@vyos:/config/my-easy-rsa-config$ sudo cp pki/dh.pem  /config/auth/openvpn
vyos@vyos:/config/my-easy-rsa-config$ sudo cp pki/private/central.key /config/auth/
↪openvpn
vyos@vyos:/config/my-easy-rsa-config$ sudo cp pki/issued/central.crt  /config/auth/
↪openvpn
vyos@vyos:/config/my-easy-rsa-config$ sudo cp pki/crl.pem /config/auth/openvpn
```

Additionally, each client needs a copy of ca.crt and its own client key and cert files. The files are plaintext so they may be copied either manually, or through a remote file transfer tool like scp. Whichever method you use, the files need to end up in the proper location on each router. For example, Branch 1's router might have the following files:

```
vyos@branch1-rtr:$ ls /config/auth/openvpn
ca.crt branch1.crt branch1.key
```

Client Authentication

LDAP

Enterprise installations usually ship a kind of directory service which is used to have a single password store for all employees. VyOS and OpenVPN support using LDAP/AD as single user backend.

Authentication is done by using the `openvpn-auth-ldap.so` plugin which is shipped with every VyOS installation. A dedicated configuration file is required. It is best practise to store it in `/config` to survive image updates

```
set interfaces openvpn vtun0 openvpn-option "--plugin /usr/lib/openvpn/openvpn-auth-ldap.
↪so /config/auth/ldap-auth.config"
```

The required config file may look like this:

```
<LDAP>
# LDAP server URL
URL             ldap://ldap.example.com
# Bind DN (If your LDAP server doesn't support anonymous binds)
BindDN          cn=LDAPUser,dc=example,dc=com
# Bind Password password
Password        S3cr3t
# Network timeout (in seconds)
Timeout         15
</LDAP>

<Authorization>
# Base DN
BaseDN          "ou=people,dc=example,dc=com"
# User Search Filter
SearchFilter    "(&(uid=%u)(objectClass=shadowAccount))"
# Require Group Membership - allow all users
RequireGroup    false
</Authorization>
```

Active Directory

Despite the fact that AD is a superset of LDAP

```
<LDAP>
  # LDAP server URL
  URL ldap://dc01.example.com
  # Bind DN (If your LDAP server doesn't support anonymous binds)
  BindDN CN=LDAPUser,DC=example,DC=com
  # Bind Password
  Password mysecretpassword
  # Network timeout (in seconds)
  Timeout  15
  # Enable Start TLS
  TLSEnable no
  # Follow LDAP Referrals (anonymously)
  FollowReferrals no
```

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```
</LDAP>

<Authorization>
  # Base DN
  BaseDN        "DC=example,DC=com"
  # User Search Filter, user must be a member of the VPN AD group
  SearchFilter  "(&(sAMAccountName=%u)(memberOf=CN=VPN,OU=Groups,DC=example,DC=com))"
  # Require Group Membership
  RequireGroup    false # already handled by SearchFilter
  <Group>
    BaseDN        "OU=Groups,DC=example,DC=com"
    SearchFilter  "(|(cn=VPN))"
    MemberAttribute  memberOf
  </Group>
</Authorization>
```

If you only want to check if the user account is enabled and can authenticate (against the primary group) the following snipped is sufficient:

```
<LDAP>
  URL ldap://dc01.example.com
  BindDN CN=SA_OPENVPN,OU=ServiceAccounts,DC=example,DC=com
  Password ThisIsTopSecret
  Timeout  15
  TLSEnable no
  FollowReferrals no
</LDAP>

<Authorization>
  BaseDN          "DC=example,DC=com"
  SearchFilter    "sAMAccountName=%u"
  RequireGroup    false
</Authorization>
```

A complete LDAP auth OpenVPN configuration could look like the following example:

```
vyos@vyos# show interfaces openvpn
 openvpn vtun0 {
     mode server
     openvpn-option "--tun-mtu 1500 --fragment 1300 --mssfix"
     openvpn-option "--plugin /usr/lib/openvpn/openvpn-auth-ldap.so /config/auth/ldap-
↪auth.config"
     openvpn-option "--push redirect-gateway"
     openvpn-option --duplicate-cn
     openvpn-option --client-cert-not-required
     openvpn-option --comp-lzo
     openvpn-option --persist-key
     openvpn-option --persist-tun
     server {
         domain-name example.com
         max-connections 5
         name-server 203.0.113.0.10
```

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```
        name-server 198.51.100.3
        subnet 172.18.100.128/29
    }
    tls {
        ca-cert-file /config/auth/ca.crt
        cert-file /config/auth/server.crt
        dh-file /config/auth/dh1024.pem
        key-file /config/auth/server.key
    }
}
```

Client

VyOS can not only act as an OpenVPN site-to-site or server for multiple clients. You can indeed also configure any VyOS OpenVPN interface as an OpenVPN client connecting to a VyOS OpenVPN server or any other OpenVPN server.

Given the following example we have one VyOS router acting as OpenVPN server and another VyOS router acting as OpenVPN client. The server also pushes a static client IP address to the OpenVPN client. Remember, clients are identified using their CN attribute in the SSL certificate.

Server

```
set interfaces openvpn vtun10 encryption cipher 'aes256'
set interfaces openvpn vtun10 hash 'sha512'
set interfaces openvpn vtun10 local-host '172.18.201.10'
set interfaces openvpn vtun10 local-port '1194'
set interfaces openvpn vtun10 mode 'server'
set interfaces openvpn vtun10 persistent-tunnel
set interfaces openvpn vtun10 protocol 'udp'
set interfaces openvpn vtun10 server client client1 ip '10.10.0.10'
set interfaces openvpn vtun10 server domain-name 'vyos.net'
set interfaces openvpn vtun10 server max-connections '250'
set interfaces openvpn vtun10 server name-server '172.16.254.30'
set interfaces openvpn vtun10 server subnet '10.10.0.0/24'
set interfaces openvpn vtun10 server topology 'subnet'
set interfaces openvpn vtun10 tls ca-cert-file '/config/auth/ca.crt'
set interfaces openvpn vtun10 tls cert-file '/config/auth/server.crt'
set interfaces openvpn vtun10 tls dh-file '/config/auth/dh.pem'
set interfaces openvpn vtun10 tls key-file '/config/auth/server.key'
set interfaces openvpn vtun10 use-lzo-compression
```

Client

```
set interfaces openvpn vtun10 encryption cipher 'aes256'
set interfaces openvpn vtun10 hash 'sha512'
set interfaces openvpn vtun10 mode 'client'
set interfaces openvpn vtun10 persistent-tunnel
set interfaces openvpn vtun10 protocol 'udp'
set interfaces openvpn vtun10 remote-host '172.18.201.10'
set interfaces openvpn vtun10 remote-port '1194'
set interfaces openvpn vtun10 tls ca-cert-file '/config/auth/ca.crt'
set interfaces openvpn vtun10 tls cert-file '/config/auth/client1.crt'
set interfaces openvpn vtun10 tls key-file '/config/auth/client1.key'
set interfaces openvpn vtun10 use-lzo-compression
```

Options

We do not have CLI nodes for every single OpenVPN option. If an option is missing, a feature request should be opened at Phabricator so all users can benefit from it (see *Issues/Feature requests*).

If you are a hacker or want to try on your own we support passing raw OpenVPN options to OpenVPN.

set interfaces openvpn vtun10 openvpn-option 'persistent-key'

Will add `persistent-key` at the end of the generated OpenVPN configuration. Please use this only as last resort - things might break and OpenVPN won't start if you pass invalid options/syntax.

set interfaces openvpn vtun10 openvpn-option 'push "keepalive 1 10"'

Will add `push "keepalive 1 10"` to the generated OpenVPN config file.

Note: Sometimes option lines in the generated OpenVPN configuration require quotes. This is done through a hack on our config generator. You can pass quotes using the `"` statement.

Troubleshooting

VyOS provides some operational commands on OpenVPN.

Check status

The following commands let you check tunnel status.

show openvpn client

Use this command to check the tunnel status for OpenVPN client interfaces.

show openvpn server

Use this command to check the tunnel status for OpenVPN server interfaces.

show openvpn site-to-site

Use this command to check the tunnel status for OpenVPN site-to-site interfaces.

Reset OpenVPN

The following commands let you reset OpenVPN.

reset openvpn client <text>

Use this command to reset the specified OpenVPN client.

reset openvpn interface <interface>

Use this command to reset the OpenVPN process on a specific interface.

8.4.10 PPPoE

PPPoE (Point-to-Point Protocol over Ethernet) is a network protocol for encapsulating PPP frames inside Ethernet frames. It appeared in 1999, in the context of the boom of DSL as the solution for tunneling packets over the DSL connection to the ISPs (Internet Service Providers) IP network, and from there to the rest of the Internet. A 2005 networking book noted that "Most DSL providers use PPPoE, which provides authentication, encryption, and compression." Typical use of PPPoE involves leveraging the PPP facilities for authenticating the user with a username and password, predominately via the PAP protocol and less often via CHAP.

Operating Modes

VyOS supports setting up PPPoE in two different ways to a PPPoE internet connection. This is because most ISPs provide a modem that is also a wireless router.

Home Users

In this method, the DSL Modem/Router connects to the ISP for you with your credentials preprogrammed into the device. This gives you an **RFC 1918** address, such as `192.168.1.0/24` by default.

For a simple home network using just the ISP's equipment, this is usually desirable. But if you want to run VyOS as your firewall and router, this will result in having a double NAT and firewall setup. This results in a few extra layers of complexity, particularly if you use some NAT or tunnel features.

Business Users

In order to have full control and make use of multiple static public IP addresses, your VyOS will have to initiate the PPPoE connection and control it. In order for this method to work, you will have to figure out how to make your DSL Modem/Router switch into a Bridged Mode so it only acts as a DSL Transceiver device to connect between the Ethernet link of your VyOS and the phone cable. Once your DSL Transceiver is in Bridge Mode, you should get no IP address from it. Please make sure you connect to the Ethernet Port 1 if your DSL Transceiver has a switch, as some of them only work this way.

Once you have an Ethernet device connected, i.e. *eth0*, then you can configure it to open the PPPoE session for you and your DSL Transceiver (Modem/Router) just acts to translate your messages in a way that vDSL/aDSL understands.

Configuration

Common interface configuration

set interfaces pppoe <interface> description <description>

Set a human readable, descriptive alias for this connection. Alias is used by e.g. the `show interfaces` command or SNMP based monitoring tools.

Example:

```
set interfaces pppoe pppoe0 description 'This is an awesome interface running on␣
↪VyOS'
```

set interfaces pppoe <interface> disable

Disable given *<interface>*. It will be placed in administratively down (`A/D`) state.

Example:

```
set interfaces pppoe pppoe0 disable
```

set interfaces pppoe <interface> vrf <vrf>

Place interface in given VRF instance.

See also:

There is an entire chapter about how to configure a *VRF*, please check this for additional information.

Example:

```
set interfaces pppoe pppoe0 vrf red
```

PPPoE options

set interfaces pppoe <interface> access-concentrator <name>

Use this command to restrict the PPPoE session on a given access concentrator. Normally, a host sends a PPPoE initiation packet to start the PPPoE discovery process, a number of access concentrators respond with offer packets and the host selects one of the responding access concentrators to serve this session.

This command allows you to select a specific access concentrator when you know the access concentrators *<name>*.

set interfaces pppoe <interface> authentication user <username>

Use this command to set the username for authenticating with a remote PPPoE endpoint. Authentication is optional from the system's point of view but most service providers require it.

set interfaces pppoe <interface> authentication password <password>

Use this command to set the password for authenticating with a remote PPPoE endpoint. Authentication is optional from the system's point of view but most service providers require it.

set interfaces pppoe <interface> connect-on-demand

When set the interface is enabled for "dial-on-demand".

Use this command to instruct the system to establish a PPPoE connection automatically once traffic passes through the interface. A disabled on-demand connection is established at boot time and remains up. If the link fails for any reason, the link is brought back up immediately.

Enabled on-demand PPPoE connections bring up the link only when traffic needs to pass this link. If the link fails for any reason, the link is brought back up automatically once traffic passes the interface again. If you configure an on-demand PPPoE connection, you must also configure the idle timeout period, after which an idle PPPoE link will be disconnected. A non-zero idle timeout will never disconnect the link after it first came up.

`set interfaces pppoe <interface> default-route [auto | force | none]`

Use this command to specify whether to automatically add a default route pointing to the endpoint of the PPPoE when the link comes up. The default route is only added if no other default route already exists in the system.

default: A default route to the remote endpoint is automatically added when the link comes up (i.e. auto).

- auto: A default route is added if no other default route (From any source) already exists.
- force: A default route is added after removing *all* existing default routes.
- none: No default route is installed.

Note: In all modes except 'none', all default routes using this interface will be removed when the interface is torn down - even manually installed static interface-routes.

`set interfaces pppoe <interface> mru <mru>`

Set the MRU (Maximum Receive Unit) to *mru*. PPPd will ask the peer to send packets of no more than *mru* bytes. The value of *mru* must be between 128 and 16384.

A value of 296 works well on very slow links (40 bytes for TCP/IP header + 256 bytes of data).

The default is 1492.

Note: When using the IPv6 protocol, MRU must be at least 1280 bytes.

`set interfaces pppoe <interface> idle-timeout <time>`

Use this command to set the idle timeout interval to be used with on-demand PPPoE sessions. When an on-demand connection is established, the link is brought up only when traffic is sent and is disabled when the link is idle for the interval specified.

If this parameter is not set or 0, an on-demand link will not be taken down when it is idle and after the initial establishment of the connection. It will stay up forever.

`set interfaces pppoe <interface> local-address <address>`

Use this command to set the IP address of the local endpoint of a PPPoE session. If it is not set it will be negotiated.

`set interfaces pppoe <interface> mtu <mtu>`

Configure MTU on given <*interface*>. It is the size (in bytes) of the largest ethernet frame sent on this link.

`set interfaces pppoe <interface> no-peer-dns`

Use this command to not install advertised DNS nameservers into the local system.

`set interfaces pppoe <interface> remote-address <address>`

Use this command to set the IP address of the remote endpoint of a PPPoE session. If it is not set it will be negotiated.

set interfaces pppoe <interface> service-name <name>

Use this command to specify a service name by which the local PPPoE interface can select access concentrators to connect with. It will connect to any access concentrator if not set.

set interfaces pppoe <interface> source-interface <source-interface>

Use this command to link the PPPoE connection to a physical interface. Each PPPoE connection must be established over a physical interface. Interfaces can be regular Ethernet interfaces, VIFs or bonding interfaces/VIFs.

IPv6

set interfaces pppoe <interface> ipv6 address autoconf

Use this command to enable acquisition of IPv6 address using stateless autoconfig (SLAAC).

DHCPv6 Prefix Delegation (PD)

VyOS 1.3 (equuleus) supports DHCPv6-PD (**RFC 3633**). DHCPv6 Prefix Delegation is supported by most ISPs who provide native IPv6 for consumers on fixed networks.

set interfaces pppoe <interface> dhcpv6-options pd <id> length <length>

Some ISPs by default only delegate a /64 prefix. To request for a specific prefix size use this option to request for a bigger delegation for this pd <*id*>. This value is in the range from 32 - 64 so you could request up to a /32 prefix (if your ISP allows this) down to a /64 delegation.

The default value corresponds to 64.

To request a /56 prefix from your ISP use:

```
set interfaces pppoe pppoe0 dhcpv6-options pd 0 length 56
```

set interfaces pppoe <interface> dhcpv6-options pd <id> interface <delegatee> address <address>

Specify the interface address used locally on the interfcae where the prefix has been delegated to. ID must be a decimal integer.

It will be combined with the delegated prefix and the sla-id to form a complete interface address. The default is to use the EUI-64 address of the interface.

Example: Delegate a /64 prefix to interface eth8 which will use a local address on this router of <prefix>::ffff, as the address 65534 will correspond to ffff in hexadecimal notation.

```
set interfaces pppoe pppoe0 dhcpv6-options pd 0 interface eth8 address 65534
```

set interfaces pppoe <interface> dhcpv6-options pd <id> interface <delegatee> sla-id <id>

Specify the identifier value of the site-level aggregator (SLA) on the interface. ID must be a decimal number greater then 0 which fits in the length of SLA IDs (see below).

Example: If ID is 1 and the client is delegated an IPv6 prefix 2001:db8:ffff::/48, dhcp6c will combine the two values into a single IPv6 prefix, 2001:db8:ffff:1::/64, and will configure the prefix on the specified interface.

```
set interfaces pppoe pppoe0 dhcpv6-options pd 0 interface eth8 sla-id 1
```

Operation

show interfaces pppoe <interface>

Show detailed information on given <*interface*>

```
vyos@vyos:~$ show interfaces pppoe pppoe0
pppoe0: <POINTOPOINT,MULTICAST,NOARP,UP,LOWER_UP> mtu 1492 qdisc pfifo_fast state␣
↪UNKNOWN group default qlen 3
    link/ppp
    inet 192.0.2.1 peer 192.0.2.255/32 scope global pppoe0
       valid_lft forever preferred_lft forever

    RX:  bytes    packets     errors    dropped    overrun      mcast
    7002658233    5064967          0          0          0          0
    TX:  bytes    packets     errors    dropped    carrier collisions
     533822843    1620173          0          0          0          0
```

show interfaces pppoe <interface> queue

Displays queue information for a PPPoE interface.

```
vyos@vyos:~$ show interfaces pppoe pppoe0 queue
qdisc pfifo_fast 0: root refcnt 2 bands 3 priomap  1 2 2 2 1 2 0 0 1 1 1 1 1 1 1 1
 Sent 534625359 bytes 1626761 pkt (dropped 62, overlimits 0 requeues 0)
 backlog 0b 0p requeues 0
```

Connect/Disconnect

disconnect interface <interface>

Test disconnecting given connection-oriented interface. <*interface*> can be `pppoe0` as the example.

connect interface <interface>

Test connecting given connection-oriented interface. <*interface*> can be `pppoe0` as the example.

Example

Requirements:

- Your ISPs modem is connected to port `eth0` of your VyOS box.
- No VLAN tagging required by your ISP.
- You need your PPPoE credentials from your DSL ISP in order to configure this. The usual username is in the form of name@host.net but may vary depending on ISP.
- The largest MTU size you can use with DSL is 1492 due to PPPoE overhead. If you are switching from a DHCP based ISP like cable then be aware that things like VPN links may need to have their MTU sizes adjusted to work within this limit.
- With the `default-route` option set to `auto`, VyOS will only add the default gateway you receive from your DSL ISP to the routing table if you have no other WAN connections. If you wish to use a dual WAN connection, change the `default-route` option to `force`. You could also install a static interface-route and set the `default-route` option to `none`.

- With the `name-server` option set to `none`, VyOS will ignore the nameservers your ISP sends you and thus you can fully rely on the ones you have configured statically.

Note: Syntax has changed from VyOS 1.2 (crux) and it will be automatically migrated during an upgrade.

```
set interfaces pppoe pppoe0 default-route 'auto'
set interfaces pppoe pppoe0 mtu 1492
set interfaces pppoe pppoe0 authentication user 'userid'
set interfaces pppoe pppoe0 authentication password 'secret'
set interfaces pppoe pppoe0 source-interface 'eth0'
```

You should add a firewall to your configuration above as well by assigning it to the pppoe0 itself as shown here:

```
set interfaces pppoe pppoe0 firewall in name NET-IN
set interfaces pppoe pppoe0 firewall local name NET-LOCAL
set interfaces pppoe pppoe0 firewall out name NET-OUT
```

VLAN Example

Some recent ISPs require you to build the PPPoE connection through a VLAN interface. One of those ISPs is e.g. Deutsche Telekom in Germany. VyOS can easily create a PPPoE session through an encapsulated VLAN interface. The following configuration will run your PPPoE connection through VLAN7 which is the default VLAN for Deutsche Telekom:

```
set interfaces pppoe pppoe0 default-route 'auto'
set interfaces pppoe pppoe0 mtu 1492
set interfaces pppoe pppoe0 authentication user 'userid'
set interfaces pppoe pppoe0 authentication password 'secret'
set interfaces pppoe pppoe0 source-interface 'eth0.7'
```

IPv6 DHCPv6-PD Example

The following configuration will assign a /64 prefix out of a /56 delegation to eth0. The IPv6 address assigned to eth0 will be <prefix>::ffff/64. If you do not know the prefix size delegated to you, start with sla-len 0.

```
set interfaces pppoe pppoe0 authentication user vyos
set interfaces pppoe pppoe0 authentication password vyos
set interfaces pppoe pppoe0 dhcpv6-options pd 0 interface eth0 address '1'
set interfaces pppoe pppoe0 dhcpv6-options pd 0 interface eth0 sla-id '0'
set interfaces pppoe pppoe0 dhcpv6-options pd 0 length '56'
set interfaces pppoe pppoe0 ipv6 address autoconf
set interfaces pppoe pppoe0 source-interface eth1
```

8.4.11 MACVLAN - Pseudo Ethernet

Pseudo-Ethernet or MACVLAN interfaces can be seen as subinterfaces to regular ethernet interfaces. Each and every subinterface is created a different media access control (MAC) address, for a single physical Ethernet port. Pseudo-Ethernet interfaces have most of their application in virtualized environments,

By using Pseudo-Ethernet interfaces there will be less system overhead compared to running a traditional bridging approach. Pseudo-Ethernet interfaces can also be used to workaround the general limit of 4096 virtual LANs (VLANs) per physical Ethernet port, since that limit is with respect to a single MAC address.

Every Virtual Ethernet interfaces behaves like a real Ethernet interface. They can have IPv4/IPv6 addresses configured, or can request addresses by DHCP/ DHCPv6 and are associated/mapped with a real ethernet port. This also makes Pseudo-Ethernet interfaces interesting for testing purposes. A Pseudo-Ethernet device will inherit characteristics (speed, duplex, ...) from its physical parent (the so called link) interface.

Once created in the system, Pseudo-Ethernet interfaces can be referenced in the exact same way as other Ethernet interfaces. Notes about using Pseudo- Ethernet interfaces:

- Pseudo-Ethernet interfaces can not be reached from your internal host. This means that you can not try to ping a Pseudo-Ethernet interface from the host system on which it is defined. The ping will be lost.
- Loopbacks occurs at the IP level the same way as for other interfaces, ethernet frames are not forwarded between Pseudo-Ethernet interfaces.
- Pseudo-Ethernet interfaces may not work in environments which expect a NIC (Network Interface Card) to only have a single address. This applies to: - VMware machines using default settings - Network switches with security settings allowing only a single MAC address - xDSL modems that try to learn the MAC address of the NIC

Configuration

Common interface configuration

set interfaces pseudo-ethernet <interface> address <address | dhcp | dhcpv6>

Configure interface <*interface*> with one or more interface addresses.

- **address** can be specified multiple times as IPv4 and/or IPv6 address, e.g. 192.0.2.1/24 and/or 2001:db8::1/64
- **dhcp** interface address is received by DHCP from a DHCP server on this segment.
- **dhcpv6** interface address is received by DHCPv6 from a DHCPv6 server on this segment.

Example:

```
set interfaces pseudo-ethernet peth0 address 192.0.2.1/24
set interfaces pseudo-ethernet peth0 address 2001:db8::1/64
set interfaces pseudo-ethernet peth0 address dhcp
set interfaces pseudo-ethernet peth0 address dhcpv6
```

set interfaces pseudo-ethernet <interface> description <description>

Set a human readable, descriptive alias for this connection. Alias is used by e.g. the `show interfaces` command or SNMP based monitoring tools.

Example:

```
set interfaces pseudo-ethernet peth0 description 'This is an awesome interface␣
↪running on VyOS'
```

set interfaces pseudo-ethernet <interface> disable

Disable given <*interface*>. It will be placed in administratively down (A/D) state.

Example:

```
set interfaces pseudo-ethernet peth0 disable
```

set interfaces pseudo-ethernet <interface> disable-flow-control

Ethernet flow control is a mechanism for temporarily stopping the transmission of data on Ethernet family computer networks. The goal of this mechanism is to ensure zero packet loss in the presence of network congestion.

The first flow control mechanism, the pause frame, was defined by the IEEE 802.3x standard.

A sending station (computer or network switch) may be transmitting data faster than the other end of the link can accept it. Using flow control, the receiving station can signal the sender requesting suspension of transmissions until the receiver catches up.

Use this command to disable the generation of Ethernet flow control (pause frames).

Example:

```
set interfaces pseudo-ethernet peth0 disable-flow-control
```

set interfaces pseudo-ethernet <interface> disable-link-detect

Use this command to direct an interface to not detect any physical state changes on a link, for example, when the cable is unplugged.

Default is to detects physical link state changes.

Example:

```
set interfaces pseudo-ethernet peth0 disable-link-detect
```

set interfaces pseudo-ethernet <interface> mac <xx:xx:xx:xx:xx:xx>

Configure user defined MAC address on given <*interface*>.

Example:

```
set interfaces pseudo-ethernet peth0 mac '00:01:02:03:04:05'
```

set interfaces pseudo-ethernet <interface> mtu <mtu>

Configure MTU on given <*interface*>. It is the size (in bytes) of the largest ethernet frame sent on this link.

Example:

```
set interfaces pseudo-ethernet peth0 mtu 9000
```

set interfaces pseudo-ethernet <interface> ip arp-cache-timeout

Once a neighbor has been found, the entry is considered to be valid for at least for this specifc time. An entry's validity will be extended if it receives positive feedback from higher level protocols.

This defaults to 30 seconds.

Example:

```
set interfaces pseudo-ethernet peth0 ip arp-cache-timeout 180
```

set interfaces pseudo-ethernet <interface> ip disable-arp-filter

If set the kernel can respond to arp requests with addresses from other interfaces. This may seem wrong but it usually makes sense, because it increases the chance of successful communication. IP addresses are owned by the complete host on Linux, not by particular interfaces. Only for more complex setups like load-balancing, does this behaviour cause problems.

If not set (default) allows you to have multiple network interfaces on the same subnet, and have the ARPs for each interface be answered based on whether or not the kernel would route a packet from the ARP'd IP out that interface (therefore you must use source based routing for this to work).

In other words it allows control of which cards (usually 1) will respond to an arp request.

Example:

```
set interfaces pseudo-ethernet peth0 ip disable-arp-filter
```

set interfaces pseudo-ethernet <interface> ip disable-forwarding

Configure interface-specific Host/Router behaviour. If set, the interface will switch to host mode and IPv6 forwarding will be disabled on this interface.

```
set interfaces pseudo-ethernet peth0 ip disable-forwarding
```

set interfaces pseudo-ethernet <interface> ip enable-arp-accept

Define behavior for gratuitous ARP frames who's IP is not already present in the ARP table. If configured create new entries in the ARP table.

Both replies and requests type gratuitous arp will trigger the ARP table to be updated, if this setting is on.

If the ARP table already contains the IP address of the gratuitous arp frame, the arp table will be updated regardless if this setting is on or off.

```
set interfaces pseudo-ethernet peth0 ip enable-arp-accept
```

set interfaces pseudo-ethernet <interface> ip enable-arp-announce

Define different restriction levels for announcing the local source IP address from IP packets in ARP requests sent on interface.

Use any local address, configured on any interface if this is not set.

If configured, try to avoid local addresses that are not in the target's subnet for this interface. This mode is useful when target hosts reachable via this interface require the source IP address in ARP requests to be part of their logical network configured on the receiving interface. When we generate the request we will check all our subnets that include the target IP and will preserve the source address if it is from such subnet. If there is no such subnet we select source address according to the rules for level 2.

```
set interfaces pseudo-ethernet peth0 ip enable-arp-announce
```

set interfaces pseudo-ethernet <interface> ip enable-arp-ignore

Define different modes for sending replies in response to received ARP requests that resolve local target IP addresses:

If configured, reply only if the target IP address is local address configured on the incoming interface.

If this option is unset (default), reply for any local target IP address, configured on any interface.

```
set interfaces pseudo-ethernet peth0 ip enable-arp-ignore
```

set interfaces pseudo-ethernet <interface> ip enable-proxy-arp

Use this command to enable proxy Address Resolution Protocol (ARP) on this interface. Proxy ARP allows an Ethernet interface to respond with its own MAC address to ARP requests for destination IP addresses on subnets attached to other interfaces on the system. Subsequent packets sent to those destination IP addresses are forwarded appropriately by the system.

Example:

```
set interfaces pseudo-ethernet peth0 ip enable-proxy-arp
```

set interfaces pseudo-ethernet <interface> ip proxy-arp-pvlan

Private VLAN proxy arp. Basically allow proxy arp replies back to the same interface (from which the ARP request/solicitation was received).

This is done to support (ethernet) switch features, like RFC 3069, where the individual ports are NOT allowed to communicate with each other, but they are allowed to talk to the upstream router. As described in RFC 3069, it is possible to allow these hosts to communicate through the upstream router by proxy_arp'ing.

Note: Don't need to be used together with proxy_arp.

This technology is known by different names:

- In RFC 3069 it is called VLAN Aggregation
- Cisco and Allied Telesyn call it Private VLAN
- Hewlett-Packard call it Source-Port filtering or port-isolation
- Ericsson call it MAC-Forced Forwarding (RFC Draft)

set interfaces pseudo-ethernet <interface> ip source-validation <strict | loose | disable>

Enable policy for source validation by reversed path, as specified in RFC 3704. Current recommended practice in RFC 3704 is to enable strict mode to prevent IP spoofing from DDos attacks. If using asymmetric routing or other complicated routing, then loose mode is recommended.

- strict: Each incoming packet is tested against the FIB and if the interface is not the best reverse path the packet check will fail. By default failed packets are discarded.
- loose: Each incoming packet's source address is also tested against the FIB and if the source address is not reachable via any interface the packet check will fail.
- disable: No source validation

set interfaces pseudo-ethernet <interface> ipv6 address autoconf

SLAAC RFC 4862. IPv6 hosts can configure themselves automatically when connected to an IPv6 network using the Neighbor Discovery Protocol via ICMPv6 router discovery messages. When first connected to a network, a host sends a link-local router solicitation multicast request for its configuration parameters; routers respond to such a request with a router advertisement packet that contains Internet Layer configuration parameters.

Note: This method automatically disables IPv6 traffic forwarding on the interface in question.

Example:

```
set interfaces pseudo-ethernet peth0 ipv6 address autoconf
```

set interfaces pseudo-ethernet <interface> ipv6 address eui64 <prefix>

EUI-64 as specified in RFC 4291 allows a host to assign iteslf a unique 64-Bit IPv6 address.

Example:

```
set interfaces pseudo-ethernet peth0 ipv6 address eui64 2001:db8:beef::/64
```

set interfaces pseudo-ethernet <interface> ipv6 address no-default-link-local

Do not assign a link-local IPv6 address to this interface.

Example:

```
set interfaces pseudo-ethernet peth0 ipv6 address no-default-link-local
```

set interfaces pseudo-ethernet <interface> ipv6 disable-forwarding

Configure interface-specific Host/Router behaviour. If set, the interface will switch to host mode and IPv6 forwarding will be disabled on this interface.

Example:

```
set interfaces pseudo-ethernet peth0 ipv6 disable-forwarding
```

set interfaces pseudo-ethernet <interface> vrf <vrf>

Place interface in given VRF instance.

See also:

There is an entire chapter about how to configure a *VRF*, please check this for additional information.

Example:

```
set interfaces pseudo-ethernet peth0 vrf red
```

DHCP(v6)

set interfaces pseudo-ethernet <interface> dhcp-options client-id <description>

RFC 2131 states: The client MAY choose to explicitly provide the identifier through the 'client identifier' option. If the client supplies a 'client identifier', the client MUST use the same 'client identifier' in all subsequent messages, and the server MUST use that identifier to identify the client.

Example:

```
set interfaces pseudo-ethernet peth0 dhcp-options client-id 'foo-bar'
```

set interfaces pseudo-ethernet <interface> dhcp-options host-name <hostname>

Instead of sending the real system hostname to the DHCP server, overwrite the host-name with this given-value.

Example:

```
set interfaces pseudo-ethernet peth0 dhcp-options host-name 'VyOS'
```

set interfaces pseudo-ethernet <interface> dhcp-options vendor-class-id <vendor-id>

The vendor-class-id option can be used to request a specific class of vendor options from the server.

Example:

```
set interfaces pseudo-ethernet peth0 dhcp-options vendor-class-id 'VyOS'
```

set interfaces pseudo-ethernet <interface> dhcp-options no-default-route

Only request an address from the DHCP server but do not request a default gateway.

Example:

```
set interfaces pseudo-ethernet peth0 dhcp-options no-default-route
```

set interfaces pseudo-ethernet <interface> dhcpv6-options duid <duid>

The DHCP unique identifier (DUID) is used by a client to get an IP address from a DHCPv6 server. It has a 2-byte DUID type field, and a variable-length identifier field up to 128 bytes. Its actual length depends on its type. The server compares the DUID with its database and delivers configuration data (address, lease times, DNS servers, etc.) to the client.

```
set interfaces pseudo-ethernet peth0 duid
↪'0e:00:00:01:00:01:27:71:db:f0:00:50:56:bf:c5:6d'
```

set interfaces pseudo-ethernet <interface> dhcpv6-options parameters-only

This statement specifies dhcp6c to only exchange informational configuration parameters with servers. A list of DNS server addresses is an example of such parameters. This statement is useful when the client does not need stateful configuration parameters such as IPv6 addresses or prefixes.

```
set interfaces pseudo-ethernet peth0 dhcpv6-options parameters-only
```

set interfaces pseudo-ethernet <interface> dhcpv6-options rapid-commit

When rapid-commit is specified, dhcp6c will include a rapid-commit option in solicit messages and wait for an immediate reply instead of advertisements.

```
set interfaces pseudo-ethernet peth0 dhcpv6-options rapid-commit
```

set interfaces pseudo-ethernet <interface> dhcpv6-options temporary

Request only a temporary address and not form an IA_NA (Identity Association for Non-temporary Addresses) partnership.

```
set interfaces pseudo-ethernet peth0 dhcpv6-options temporary
```

DHCPv6 Prefix Delegation (PD)

VyOS 1.3 (equuleus) supports DHCPv6-PD (**RFC 3633**). DHCPv6 Prefix Delegation is supported by most ISPs who provide native IPv6 for consumers on fixed networks.

set interfaces pseudo-ethernet <interface> dhcpv6-options pd <id> length <length>

Some ISPs by default only delegate a /64 prefix. To request for a specific prefix size use this option to request for a bigger delegation for this pd *<id>*. This value is in the range from 32 - 64 so you could request up to a /32 prefix (if your ISP allows this) down to a /64 delegation.

The default value corresponds to 64.

To request a /56 prefix from your ISP use:

```
set interfaces pseudo-ethernet peth0 dhcpv6-options pd 0 length 56
```

set interfaces pseudo-ethernet <interface> dhcpv6-options pd <id> interface <delegatee> address <address>

Specify the interface address used locally on the interfcae where the prefix has been delegated to. ID must be a decimal integer.

It will be combined with the delegated prefix and the sla-id to form a complete interface address. The default is to use the EUI-64 address of the interface.

Example: Delegate a /64 prefix to interface eth8 which will use a local address on this router of `<prefix>::ffff`, as the address 65534 will correspond to `ffff` in hexadecimal notation.

```
set interfaces pseudo-ethernet peth0 dhcpv6-options pd 0 interface eth8 address␣
↪65534
```

set interfaces pseudo-ethernet <interface> dhcpv6-options pd <id> interface <delegatee> sla-id <id>

Specify the identifier value of the site-level aggregator (SLA) on the interface. ID must be a decimal number greater then 0 which fits in the length of SLA IDs (see below).

Example: If ID is 1 and the client is delegated an IPv6 prefix 2001:db8:ffff::/48, dhcp6c will combine the two values into a single IPv6 prefix, 2001:db8:ffff:1::/64, and will configure the prefix on the specified interface.

```
set interfaces pseudo-ethernet peth0 dhcpv6-options pd 0 interface eth8 sla-id 1
```

Pseudo Ethernet/MACVLAN options

set interfaces pseudo-ethernet <interface> source-interface <ethX>

Specifies the physical <*ethX*> Ethernet interface associated with a Pseudo Ethernet <*interface*>.

VLAN

IEEE 802.1q, often referred to as Dot1q, is the networking standard that supports virtual LANs (VLANs) on an IEEE 802.3 Ethernet network. The standard defines a system of VLAN tagging for Ethernet frames and the accompanying procedures to be used by bridges and switches in handling such frames. The standard also contains provisions for a quality-of-service prioritization scheme commonly known as IEEE 802.1p and defines the Generic Attribute Registration Protocol.

Portions of the network which are VLAN-aware (i.e., IEEE 802.1q conformant) can include VLAN tags. When a frame enters the VLAN-aware portion of the network, a tag is added to represent the VLAN membership. Each frame must be distinguishable as being within exactly one VLAN. A frame in the VLAN-aware portion of the network that does not contain a VLAN tag is assumed to be flowing on the native VLAN.

The standard was developed by IEEE 802.1, a working group of the IEEE 802 standards committee, and continues to be actively revised. One of the notable revisions is 802.1Q-2014 which incorporated IEEE 802.1aq (Shortest Path Bridging) and much of the IEEE 802.1d standard.

802.1q VLAN interfaces are represented as virtual sub-interfaces in VyOS. The term used for this is `vif`.

set interfaces pseudo-ethernet <interface> vif <vlan-id>

Create a new VLAN interface on interface <*interface*> using the VLAN number provided via <*vlan-id*>.

You can create multiple VLAN interfaces on a physical interface. The VLAN ID range is from 0 to 4094.

Note: Only 802.1Q-tagged packets are accepted on Ethernet vifs.

---

set interfaces pseudo-ethernet <interface> vif <vlan-id> address <address | dhcp | dhcpv6>

Configure interface <*interface*> with one or more interface addresses.

- **address** can be specified multiple times as IPv4 and/or IPv6 address, e.g. 192.0.2.1/24 and/or 2001:db8::1/64
- **dhcp** interface address is received by DHCP from a DHCP server on this segment.
- **dhcpv6** interface address is received by DHCPv6 from a DHCPv6 server on this segment.

Example:

```
set interfaces pseudo-ethernet peth0 vif 10 address 192.0.2.1/24
set interfaces pseudo-ethernet peth0 vif 10 address 2001:db8::1/64
set interfaces pseudo-ethernet peth0 vif 10 address dhcp
set interfaces pseudo-ethernet peth0 vif 10 address dhcpv6
```

set interfaces pseudo-ethernet <interface> vif <vlan-id> description <description>

Set a human readable, descriptive alias for this connection. Alias is used by e.g. the `show interfaces` command or SNMP based monitoring tools.

Example:

```
set interfaces pseudo-ethernet peth0 vif 10 description 'This is an awesome␣
↪interface running on VyOS'
```

set interfaces pseudo-ethernet <interface> vif <vlan-id> disable

Disable given <*interface*>. It will be placed in administratively down (`A/D`) state.

Example:

```
set interfaces pseudo-ethernet peth0 vif 10 disable
```

set interfaces pseudo-ethernet <interface> vif <vlan-id> disable-link-detect

Use this command to direct an interface to not detect any physical state changes on a link, for example, when the cable is unplugged.

Default is to detects physical link state changes.

Example:

```
set interfaces pseudo-ethernet peth0 vif 10 disable-link-detect
```

set interfaces pseudo-ethernet <interface> vif <vlan-id> mac <xx:xx:xx:xx:xx:xx>

Configure user defined MAC address on given <*interface*>.

Example:

```
set interfaces pseudo-ethernet peth0 vif 10 mac '00:01:02:03:04:05'
```

set interfaces pseudo-ethernet <interface> vif <vlan-id> mtu <mtu>

Configure MTU on given <*interface*>. It is the size (in bytes) of the largest ethernet frame sent on this link.

Example:

```
set interfaces pseudo-ethernet peth0 vif 10 mtu 9000
```

set interfaces pseudo-ethernet <interface> vif <vlan-id> ip arp-cache-timeout

Once a neighbor has been found, the entry is considered to be valid for at least for this specifc time. An entry's validity will be extended if it receives positive feedback from higher level protocols.

This defaults to 30 seconds.

Example:

```
set interfaces pseudo-ethernet peth0 vif 10 ip arp-cache-timeout 180
```

set interfaces pseudo-ethernet <interface> vif <vlan-id> ip disable-arp-filter

If set the kernel can respond to arp requests with addresses from other interfaces. This may seem wrong but it usually makes sense, because it increases the chance of successful communication. IP addresses are owned by the complete host on Linux, not by particular interfaces. Only for more complex setups like load-balancing, does this behaviour cause problems.

If not set (default) allows you to have multiple network interfaces on the same subnet, and have the ARPs for each interface be answered based on whether or not the kernel would route a packet from the ARP'd IP out that interface (therefore you must use source based routing for this to work).

In other words it allows control of which cards (usually 1) will respond to an arp request.

Example:

```
set interfaces pseudo-ethernet peth0 vif 10 ip disable-arp-filter
```

set interfaces pseudo-ethernet <interface> vif <vlan-id> ip disable-forwarding

Configure interface-specific Host/Router behaviour. If set, the interface will switch to host mode and IPv6 forwarding will be disabled on this interface.

```
set interfaces pseudo-ethernet peth0 vif 10 ip disable-forwarding
```

set interfaces pseudo-ethernet <interface> vif <vlan-id> ip enable-arp-accept

Define behavior for gratuitous ARP frames who's IP is not already present in the ARP table. If configured create new entries in the ARP table.

Both replies and requests type gratuitous arp will trigger the ARP table to be updated, if this setting is on.

If the ARP table already contains the IP address of the gratuitous arp frame, the arp table will be updated regardless if this setting is on or off.

```
set interfaces pseudo-ethernet peth0 vif 10 ip enable-arp-accept
```

set interfaces pseudo-ethernet <interface> vif <vlan-id> ip enable-arp-announce

Define different restriction levels for announcing the local source IP address from IP packets in ARP requests sent on interface.

Use any local address, configured on any interface if this is not set.

If configured, try to avoid local addresses that are not in the target's subnet for this interface. This mode is useful when target hosts reachable via this interface require the source IP address in ARP requests to be part of their logical network configured on the receiving interface. When we generate the request we will check all our subnets that include the target IP and will preserve the source address if it is from such subnet. If there is no such subnet we select source address according to the rules for level 2.

```
set interfaces pseudo-ethernet peth0 vif 10 ip enable-arp-announce
```

set interfaces pseudo-ethernet <interface> vif <vlan-id> ip enable-arp-ignore

Define different modes for sending replies in response to received ARP requests that resolve local target IP addresses:

If configured, reply only if the target IP address is local address configured on the incoming interface.

If this option is unset (default), reply for any local target IP address, configured on any interface.

```
set interfaces pseudo-ethernet peth0 vif 10 ip enable-arp-ignore
```

set interfaces pseudo-ethernet <interface> vif <vlan-id> ip enable-proxy-arp

Use this command to enable proxy Address Resolution Protocol (ARP) on this interface. Proxy ARP allows an Ethernet interface to respond with its own MAC address to ARP requests for destination IP addresses on subnets attached to other interfaces on the system. Subsequent packets sent to those destination IP addresses are forwarded appropriately by the system.

Example:

```
set interfaces pseudo-ethernet peth0 vif 10 ip enable-proxy-arp
```

set interfaces pseudo-ethernet <interface> vif <vlan-id> ip proxy-arp-pvlan

Private VLAN proxy arp. Basically allow proxy arp replies back to the same interface (from which the ARP request/solicitation was received).

This is done to support (ethernet) switch features, like **RFC 3069**, where the individual ports are NOT allowed to communicate with each other, but they are allowed to talk to the upstream router. As described in **RFC 3069**, it is possible to allow these hosts to communicate through the upstream router by proxy_arp'ing.

Note: Don't need to be used together with proxy_arp.

This technology is known by different names:

- In **RFC 3069** it is called VLAN Aggregation
- Cisco and Allied Telesyn call it Private VLAN
- Hewlett-Packard call it Source-Port filtering or port-isolation
- Ericsson call it MAC-Forced Forwarding (RFC Draft)

set interfaces pseudo-ethernet <interface> vif <vlan-id> ip source-validation <strict | loose | disable>

Enable policy for source validation by reversed path, as specified in **RFC 3704**. Current recommended practice in **RFC 3704** is to enable strict mode to prevent IP spoofing from DDos attacks. If using asymmetric routing or other complicated routing, then loose mode is recommended.

- strict: Each incoming packet is tested against the FIB and if the interface is not the best reverse path the packet check will fail. By default failed packets are discarded.
- loose: Each incoming packet's source address is also tested against the FIB and if the source address is not reachable via any interface the packet check will fail.
- disable: No source validation

set interfaces pseudo-ethernet <interface> vif <vlan-id> ipv6 address autoconf

SLAAC **RFC 4862**. IPv6 hosts can configure themselves automatically when connected to an IPv6 network using the Neighbor Discovery Protocol via ICMPv6 router discovery messages. When first connected to a network, a host sends a link-local router solicitation multicast request for its configuration parameters; routers respond to such a request with a router advertisement packet that contains Internet Layer configuration parameters.

Note: This method automatically disables IPv6 traffic forwarding on the interface in question.

Example:

```
set interfaces pseudo-ethernet peth0 vif 10 ipv6 address autoconf
```

set interfaces pseudo-ethernet <interface> vif <vlan-id> ipv6 address eui64 <prefix>

EUI-64 as specified in **RFC 4291** allows a host to assign iteslf a unique 64-Bit IPv6 address.

Example:

```
set interfaces pseudo-ethernet peth0 vif 10 ipv6 address eui64 2001:db8:beef::/64
```

set interfaces pseudo-ethernet <interface> vif <vlan-id> ipv6 address no-default-link-local

Do not assign a link-local IPv6 address to this interface.

Example:

```
set interfaces pseudo-ethernet peth0 vif 10 ipv6 address no-default-link-local
```

set interfaces pseudo-ethernet <interface> vif <vlan-id> ipv6 disable-forwarding

Configure interface-specific Host/Router behaviour. If set, the interface will switch to host mode and IPv6 forwarding will be disabled on this interface.

Example:

```
set interfaces pseudo-ethernet peth0 vif 10 ipv6 disable-forwarding
```

set interfaces pseudo-ethernet <interface> vif <vlan-id> vrf <vrf>

Place interface in given VRF instance.

See also:

There is an entire chapter about how to configure a *VRF*, please check this for additional information.

Example:

```
set interfaces pseudo-ethernet peth0 vif 10 vrf red
```

DHCP(v6)

set interfaces pseudo-ethernet <interface> vif <vlan-id> dhcp-options client-id <description>

RFC 2131 states: The client MAY choose to explicitly provide the identifier through the 'client identifier' option. If the client supplies a 'client identifier', the client MUST use the same 'client identifier' in all subsequent messages, and the server MUST use that identifier to identify the client.

Example:

```
set interfaces pseudo-ethernet peth0 vif 10 dhcp-options client-id 'foo-bar'
```

set interfaces pseudo-ethernet <interface> vif <vlan-id> dhcp-options host-name <hostname>

Instead of sending the real system hostname to the DHCP server, overwrite the host-name with this given-value.

Example:

```
set interfaces pseudo-ethernet peth0 vif 10 dhcp-options host-name 'VyOS'
```

set interfaces pseudo-ethernet <interface> vif <vlan-id> dhcp-options vendor-class-id <vendor-id>

The vendor-class-id option can be used to request a specific class of vendor options from the server.

Example:

```
set interfaces pseudo-ethernet peth0 vif 10 dhcp-options vendor-class-id 'VyOS'
```

set interfaces pseudo-ethernet <interface> vif <vlan-id> dhcp-options no-default-route

Only request an address from the DHCP server but do not request a default gateway.

Example:

```
set interfaces pseudo-ethernet peth0 vif 10 dhcp-options no-default-route
```

set interfaces pseudo-ethernet <interface> vif <vlan-id> dhcpv6-options duid <duid>

The DHCP unique identifier (DUID) is used by a client to get an IP address from a DHCPv6 server. It has a 2-byte DUID type field, and a variable-length identifier field up to 128 bytes. Its actual length depends on its type. The server compares the DUID with its database and delivers configuration data (address, lease times, DNS servers, etc.) to the client.

```
set interfaces pseudo-ethernet peth0 vif 10 duid
↪'0e:00:00:01:00:01:27:71:db:f0:00:50:56:bf:c5:6d'
```

set interfaces pseudo-ethernet <interface> vif <vlan-id> dhcpv6-options parameters-only

This statement specifies dhcp6c to only exchange informational configuration parameters with servers. A list of DNS server addresses is an example of such parameters. This statement is useful when the client does not need stateful configuration parameters such as IPv6 addresses or prefixes.

```
set interfaces pseudo-ethernet peth0 vif 10 dhcpv6-options parameters-only
```

set interfaces pseudo-ethernet <interface> vif <vlan-id> dhcpv6-options rapid-commit

When rapid-commit is specified, dhcp6c will include a rapid-commit option in solicit messages and wait for an immediate reply instead of advertisements.

```
set interfaces pseudo-ethernet peth0 vif 10 dhcpv6-options rapid-commit
```

set interfaces pseudo-ethernet <interface> vif <vlan-id> dhcpv6-options temporary

Request only a temporary address and not form an IA_NA (Identity Association for Non-temporary Addresses) partnership.

```
set interfaces pseudo-ethernet peth0 vif 10 dhcpv6-options temporary
```

DHCPv6 Prefix Delegation (PD)

VyOS 1.3 (equuleus) supports DHCPv6-PD (**RFC 3633**). DHCPv6 Prefix Delegation is supported by most ISPs who provide native IPv6 for consumers on fixed networks.

set interfaces pseudo-ethernet <interface> vif <vlan-id> dhcpv6-options pd <id> length <length>

Some ISPs by default only delegate a /64 prefix. To request for a specific prefix size use this option to request for a bigger delegation for this pd *<id>*. This value is in the range from 32 - 64 so you could request up to a /32 prefix (if your ISP allows this) down to a /64 delegation.

The default value corresponds to 64.

To request a /56 prefix from your ISP use:

```
set interfaces pseudo-ethernet peth0 vif 10 dhcpv6-options pd 0 length 56
```

set interfaces pseudo-ethernet <interface> vif <vlan-id> dhcpv6-options pd <id> interface <delegatee> address <address>

Specify the interface address used locally on the interfcae where the prefix has been delegated to. ID must be a decimal integer.

It will be combined with the delegated prefix and the sla-id to form a complete interface address. The default is to use the EUI-64 address of the interface.

Example: Delegate a /64 prefix to interface eth8 which will use a local address on this router of `<prefix>::ffff`, as the address 65534 will correspond to `ffff` in hexadecimal notation.

```
set interfaces pseudo-ethernet peth0 vif 10 dhcpv6-options pd 0 interface eth8␣
↪address 65534
```

set interfaces pseudo-ethernet <interface> vif <vlan-id> dhcpv6-options pd <id> interface <delegatee> sla-id <id>

Specify the identifier value of the site-level aggregator (SLA) on the interface. ID must be a decimal number greater then 0 which fits in the length of SLA IDs (see below).

Example: If ID is 1 and the client is delegated an IPv6 prefix 2001:db8:ffff::/48, dhcp6c will combine the two values into a single IPv6 prefix, 2001:db8:ffff:1::/64, and will configure the prefix on the specified interface.

```
set interfaces pseudo-ethernet peth0 vif 10 dhcpv6-options pd 0 interface eth8 sla-
↪id 1
```

8.4.12 Tunnel

This article touches on 'classic' IP tunneling protocols.

GRE is often seen as a one size fits all solution when it comes to classic IP tunneling protocols, and for a good reason. However, there are more specialized options, and many of them are supported by VyOS. There are also rather obscure GRE options that can be useful.

All those protocols are grouped under `interfaces tunnel` in VyOS. Let's take a closer look at the protocols and options currently supported by VyOS.

Common interface configuration

set interfaces tunnel <interface> address <address>

Configure interface <*interface*> with one or more interface addresses.

- **address** can be specified multiple times as IPv4 and/or IPv6 address, e.g. 192.0.2.1/24 and/or 2001:db8::1/64

Example:

```
set interfaces tunnel tun0 address 192.0.2.1/24
set interfaces tunnel tun0 address 2001:db8::1/64
```

set interfaces tunnel <interface> description <description>

Set a human readable, descriptive alias for this connection. Alias is used by e.g. the `show interfaces` command or SNMP based monitoring tools.

Example:

```
set interfaces tunnel tun0 description 'This is an awesome interface running on VyOS
↪'
```

set interfaces tunnel <interface> disable

Disable given <*interface*>. It will be placed in administratively down (`A/D`) state.

Example:

```
set interfaces tunnel tun0 disable
```

set interfaces tunnel <interface> disable-flow-control

Ethernet flow control is a mechanism for temporarily stopping the transmission of data on Ethernet family computer networks. The goal of this mechanism is to ensure zero packet loss in the presence of network congestion.

The first flow control mechanism, the pause frame, was defined by the IEEE 802.3x standard.

A sending station (computer or network switch) may be transmitting data faster than the other end of the link can accept it. Using flow control, the receiving station can signal the sender requesting suspension of transmissions until the receiver catches up.

Use this command to disable the generation of Ethernet flow control (pause frames).

Example:

```
set interfaces tunnel tun0 disable-flow-control
```

set interfaces tunnel <interface> disable-link-detect

Use this command to direct an interface to not detect any physical state changes on a link, for example, when the cable is unplugged.

Default is to detects physical link state changes.

Example:

```
set interfaces tunnel tun0 disable-link-detect
```

set interfaces tunnel <interface> mtu <mtu>

Configure MTU on given <*interface*>. It is the size (in bytes) of the largest ethernet frame sent on this link.

Example:

```
set interfaces tunnel tun0 mtu 9000
```

set interfaces tunnel <interface> ip arp-cache-timeout

Once a neighbor has been found, the entry is considered to be valid for at least for this specifc time. An entry's validity will be extended if it receives positive feedback from higher level protocols.

This defaults to 30 seconds.

Example:

```
set interfaces tunnel tun0 ip arp-cache-timeout 180
```

set interfaces tunnel <interface> ip disable-arp-filter

If set the kernel can respond to arp requests with addresses from other interfaces. This may seem wrong but it usually makes sense, because it increases the chance of successful communication. IP addresses are owned by the complete host on Linux, not by particular interfaces. Only for more complex setups like load-balancing, does this behaviour cause problems.

If not set (default) allows you to have multiple network interfaces on the same subnet, and have the ARPs for each interface be answered based on whether or not the kernel would route a packet from the ARP'd IP out that interface (therefore you must use source based routing for this to work).

In other words it allows control of which cards (usually 1) will respond to an arp request.

Example:

```
set interfaces tunnel tun0 ip disable-arp-filter
```

set interfaces tunnel <interface> ip disable-forwarding

Configure interface-specific Host/Router behaviour. If set, the interface will switch to host mode and IPv6 forwarding will be disabled on this interface.

```
set interfaces tunnel tun0 ip disable-forwarding
```

set interfaces tunnel <interface> ip enable-arp-accept

Define behavior for gratuitous ARP frames who's IP is not already present in the ARP table. If configured create new entries in the ARP table.

Both replies and requests type gratuitous arp will trigger the ARP table to be updated, if this setting is on.

If the ARP table already contains the IP address of the gratuitous arp frame, the arp table will be updated regardless if this setting is on or off.

```
set interfaces tunnel tun0 ip enable-arp-accept
```

set interfaces tunnel <interface> ip enable-arp-announce

Define different restriction levels for announcing the local source IP address from IP packets in ARP requests sent on interface.

Use any local address, configured on any interface if this is not set.

If configured, try to avoid local addresses that are not in the target's subnet for this interface. This mode is useful when target hosts reachable via this interface require the source IP address in ARP requests to be part of their logical network configured on the receiving interface. When we generate the request we will check all our subnets that include the target IP and will preserve the source address if it is from such subnet. If there is no such subnet we select source address according to the rules for level 2.

```
set interfaces tunnel tun0 ip enable-arp-announce
```

set interfaces tunnel <interface> ip enable-arp-ignore

Define different modes for sending replies in response to received ARP requests that resolve local target IP addresses:

If configured, reply only if the target IP address is local address configured on the incoming interface.

If this option is unset (default), reply for any local target IP address, configured on any interface.

```
set interfaces tunnel tun0 ip enable-arp-ignore
```

set interfaces tunnel <interface> ip enable-proxy-arp

Use this command to enable proxy Address Resolution Protocol (ARP) on this interface. Proxy ARP allows an Ethernet interface to respond with its own MAC address to ARP requests for destination IP addresses on subnets attached to other interfaces on the system. Subsequent packets sent to those destination IP addresses are forwarded appropriately by the system.

Example:

```
set interfaces tunnel tun0 ip enable-proxy-arp
```

set interfaces tunnel <interface> ip proxy-arp-pvlan

Private VLAN proxy arp. Basically allow proxy arp replies back to the same interface (from which the ARP request/solicitation was received).

This is done to support (ethernet) switch features, like **RFC 3069**, where the individual ports are NOT allowed to communicate with each other, but they are allowed to talk to the upstream router. As described in **RFC 3069**, it is possible to allow these hosts to communicate through the upstream router by proxy_arp'ing.

Note: Don't need to be used together with proxy_arp.

This technology is known by different names:

- In **RFC 3069** it is called VLAN Aggregation
- Cisco and Allied Telesyn call it Private VLAN
- Hewlett-Packard call it Source-Port filtering or port-isolation
- Ericsson call it MAC-Forced Forwarding (RFC Draft)

set interfaces tunnel <interface> ip source-validation <strict | loose | disable>

Enable policy for source validation by reversed path, as specified in RFC 3704. Current recommended practice in RFC 3704 is to enable strict mode to prevent IP spoofing from DDos attacks. If using asymmetric routing or other complicated routing, then loose mode is recommended.

- strict: Each incoming packet is tested against the FIB and if the interface is not the best reverse path the packet check will fail. By default failed packets are discarded.
- loose: Each incoming packet's source address is also tested against the FIB and if the source address is not reachable via any interface the packet check will fail.
- disable: No source validation

set interfaces tunnel <interface> ipv6 address autoconf

SLAAC RFC 4862. IPv6 hosts can configure themselves automatically when connected to an IPv6 network using the Neighbor Discovery Protocol via ICMPv6 router discovery messages. When first connected to a network, a host sends a link-local router solicitation multicast request for its configuration parameters; routers respond to such a request with a router advertisement packet that contains Internet Layer configuration parameters.

Note: This method automatically disables IPv6 traffic forwarding on the interface in question.

Example:

```
set interfaces tunnel tun0 ipv6 address autoconf
```

set interfaces tunnel <interface> ipv6 address eui64 <prefix>

EUI-64 as specified in RFC 4291 allows a host to assign iteslf a unique 64-Bit IPv6 address.

Example:

```
set interfaces tunnel tun0 ipv6 address eui64 2001:db8:beef::/64
```

set interfaces tunnel <interface> ipv6 address no-default-link-local

Do not assign a link-local IPv6 address to this interface.

Example:

```
set interfaces tunnel tun0 ipv6 address no-default-link-local
```

set interfaces tunnel <interface> ipv6 disable-forwarding

Configure interface-specific Host/Router behaviour. If set, the interface will switch to host mode and IPv6 forwarding will be disabled on this interface.

Example:

```
set interfaces tunnel tun0 ipv6 disable-forwarding
```

set interfaces tunnel <interface> vrf <vrf>

Place interface in given VRF instance.

See also:

There is an entire chapter about how to configure a *VRF*, please check this for additional information.

Example:

```
set interfaces tunnel tun0 vrf red
```

IPIP

This is one of the simplest types of tunnels, as defined by **RFC 2003**. It takes an IPv4 packet and sends it as a payload of another IPv4 packet. For this reason, there are no other configuration options for this kind of tunnel.

An example:

```
set interfaces tunnel tun0 encapsulation ipip
set interfaces tunnel tun0 source-address 192.0.2.10
set interfaces tunnel tun0 remote 203.0.113.20
set interfaces tunnel tun0 address 192.168.100.200/24
```

IP6IP6

This is the IPv6 counterpart of IPIP. I'm not aware of an RFC that defines this encapsulation specifically, but it's a natural specific case of IPv6 encapsulation mechanisms described in :rfc:2473`.

It's not likely that anyone will need it any time soon, but it does exist.

An example:

```
set interfaces tunnel tun0 encapsulation ip6ip6
set interfaces tunnel tun0 source-address 2001:db8:aa::1
set interfaces tunnel tun0 remote 2001:db8:aa::2
set interfaces tunnel tun0 address 2001:db8:bb::1/64
```

IPIP6

In the future this is expected to be a very useful protocol (though there are other proposals).

As the name implies, it's IPv4 encapsulated in IPv6, as simple as that.

An example:

```
set interfaces tunnel tun0 encapsulation ipip6
set interfaces tunnel tun0 source-address 2001:db8:aa::1
set interfaces tunnel tun0 remote 2001:db8:aa::2
set interfaces tunnel tun0 address 192.168.70.80/24
```

6in4 (SIT)

6in4 uses tunneling to encapsulate IPv6 traffic over IPv4 links as defined in **RFC 4213**. The 6in4 traffic is sent over IPv4 inside IPv4 packets whose IP headers have the IP protocol number set to 41. This protocol number is specifically designated for IPv6 encapsulation, the IPv4 packet header is immediately followed by the IPv6 packet being carried. The encapsulation overhead is the size of the IPv4 header of 20 bytes, therefore with an MTU of 1500 bytes, IPv6 packets of 1480 bytes can be sent without fragmentation. This tunneling technique is frequently used by IPv6 tunnel brokers like Hurricane Electric.

An example:

```
set interfaces tunnel tun0 encapsulation sit
set interfaces tunnel tun0 source-address 192.0.2.10
set interfaces tunnel tun0 remote 192.0.2.20
set interfaces tunnel tun0 address 2001:db8:bb::1/64
```

A full example of a Tunnelbroker.net config can be found at *here*.

Generic Routing Encapsulation (GRE)

A GRE tunnel operates at layer 3 of the OSI model and is represented by IP protocol 47. The main benefit of a GRE tunnel is that you are able to carry multiple protocols inside the same tunnel. GRE also supports multicast traffic and supports routing protocols that leverage multicast to form neighbor adjacencies.

A VyOS GRE tunnel can carry both IPv4 and IPv6 traffic and can also be created over either IPv4 (gre) or IPv6 (ip6gre).

Configuration

A basic configuration requires a tunnel source (source-address), a tunnel destination (remote), an encapsulation type (gre), and an address (ipv4/ipv6). Below is a basic IPv4 only configuration example taken from a VyOS router and a Cisco IOS router. The main difference between these two configurations is that VyOS requires you explicitly configure the encapsulation type. The Cisco router defaults to GRE IP otherwise it would have to be configured as well.

VyOS Router:

```
set interfaces tunnel tun100 address '10.0.0.1/30'
set interfaces tunnel tun100 encapsulation 'gre'
set interfaces tunnel tun100 source-address '198.51.100.2'
set interfaces tunnel tun100 remote '203.0.113.10'
```

Cisco IOS Router:

```
interface Tunnel100
ip address 10.0.0.2 255.255.255.252
tunnel source 203.0.113.10
tunnel destination 198.51.100.2
```

Here is a second example of a dual-stack tunnel over IPv6 between a VyOS router and a Linux host using systemd-networkd.

VyOS Router:

```
set interfaces tunnel tun101 address '2001:db8:feed:beef::1/126'
set interfaces tunnel tun101 address '192.168.5.1/30'
set interfaces tunnel tun101 encapsulation 'ip6gre'
set interfaces tunnel tun101 source-address '2001:db8:babe:face::3afe:3'
set interfaces tunnel tun101 remote '2001:db8:9bb:3ce::5'
```

Linux systemd-networkd:

This requires two files, one to create the device (XXX.netdev) and one to configure the network on the device (XXX.network)

```
# cat /etc/systemd/network/gre-example.netdev
[NetDev]
Name=gre-example
Kind=ip6gre
MTUBytes=14180

[Tunnel]
Remote=2001:db8:babe:face::3afe:3


# cat /etc/systemd/network/gre-example.network
[Match]
Name=gre-example

[Network]
Address=2001:db8:feed:beef::2/126

[Address]
Address=192.168.5.2/30
```

Tunnel keys

GRE is also the only classic protocol that allows creating multiple tunnels with the same source and destination due to its support for tunnel keys. Despite its name, this feature has nothing to do with security: it's simply an identifier that allows routers to tell one tunnel from another.

An example:

```
set interfaces tunnel tun0 source-address 192.0.2.10
set interfaces tunnel tun0 remote 192.0.2.20
set interfaces tunnel tun0 address 10.40.50.60/24
set interfaces tunnel tun0 parameters ip key 10
```

```
set interfaces tunnel tun0 source-address 192.0.2.10
set interfaces tunnel tun0 remote 192.0.2.20
set interfaces tunnel tun0 address 172.16.17.18/24
set interfaces tunnel tun0 parameters ip key 20
```

GRETAP

While normal GRE is for layer 3, GRETAP is for layer 2. GRETAP can encapsulate Ethernet frames, thus it can be bridged with other interfaces to create datalink layer segments that span multiple remote sites.

```
set interfaces bridge br0 member interface eth0
set interfaces bridge br0 member interface tun0
set interfaces tunnel tun0 encapsulation gretap
set interfaces tunnel tun0 source-address 198.51.100.2
set interfaces tunnel tun0 remote 203.0.113.10
```

Troubleshooting

GRE is a well defined standard that is common in most networks. While not inherently difficult to configure there are a couple of things to keep in mind to make sure the configuration performs as expected. A common cause for GRE tunnels to fail to come up correctly include ACL or Firewall configurations that are discarding IP protocol 47 or blocking your source/destination traffic.

1. Confirm IP connectivity between tunnel source-address and remote:

```
vyos@vyos:~$ ping 203.0.113.10 interface 198.51.100.2 count 4
PING 203.0.113.10 (203.0.113.10) from 198.51.100.2 : 56(84) bytes of data.
64 bytes from 203.0.113.10: icmp_seq=1 ttl=254 time=0.807 ms
64 bytes from 203.0.113.10: icmp_seq=2 ttl=254 time=1.50 ms
64 bytes from 203.0.113.10: icmp_seq=3 ttl=254 time=0.624 ms
64 bytes from 203.0.113.10: icmp_seq=4 ttl=254 time=1.41 ms

--- 203.0.113.10 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3007ms
rtt min/avg/max/mdev = 0.624/1.087/1.509/0.381 ms
```

2. Confirm the link type has been set to GRE:

```
vyos@vyos:~$ show interfaces tunnel tun100
tun100@NONE: <POINTOPOINT,NOARP,UP,LOWER_UP> mtu 1476 qdisc noqueue state UNKNOWN group␣
↪default qlen 1000
  link/gre 198.51.100.2 peer 203.0.113.10
  inet 10.0.0.1/30 brd 10.0.0.3 scope global tun100
     valid_lft forever preferred_lft forever
  inet6 fe80::5efe:c612:2/64 scope link
     valid_lft forever preferred_lft forever

  RX:  bytes    packets     errors    dropped    overrun      mcast
       2183         27          0          0          0          0
  TX:  bytes    packets     errors    dropped    carrier collisions
        836          9          0          0          0          0
```

3. Confirm IP connectivity across the tunnel:

```
vyos@vyos:~$ ping 10.0.0.2 interface 10.0.0.1 count 4
PING 10.0.0.2 (10.0.0.2) from 10.0.0.1 : 56(84) bytes of data.
64 bytes from 10.0.0.2: icmp_seq=1 ttl=255 time=1.05 ms
64 bytes from 10.0.0.2: icmp_seq=2 ttl=255 time=1.88 ms
64 bytes from 10.0.0.2: icmp_seq=3 ttl=255 time=1.98 ms
64 bytes from 10.0.0.2: icmp_seq=4 ttl=255 time=1.98 ms

--- 10.0.0.2 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3008ms
rtt min/avg/max/mdev = 1.055/1.729/1.989/0.395 ms
```

Note: There is also a GRE over IPv6 encapsulation available, it is called: `ip6gre`.

8.4.13 VTI - Virtual Tunnel Interface

Set Virtual Tunnel Interface

```
set interfaces vti vti0 address 192.168.2.249/30
set interfaces vti vti0 address 2001:db8:2::249/64
```

Results in:

```
vyos@vyos# show interfaces vti
vti vti0 {
    address 192.168.2.249/30
    address 2001:db8:2::249/64
    description "Description"
}
```

Warning: When using site-to-site IPsec with VTI interfaces, be sure to disable route autoinstall

```
set vpn ipsec options disable-route-autoinstall
```

More details about the IPsec and VTI issue and option disable-route-autoinstall https://blog.vyos.io/vyos-1-dot-2-0-development-news-in-july

The root cause of the problem is that for VTI tunnels to work, their traffic selectors have to be set to 0.0.0.0/0 for traffic to match the tunnel, even though actual routing decision is made according to netfilter marks. Unless route insertion is disabled entirely, StrongSWAN thus mistakenly inserts a default route through the VTI peer address, which makes all traffic routed to nowhere.

8.4.14 VXLAN

VXLAN is a network virtualization technology that attempts to address the scalability problems associated with large cloud computing deployments. It uses a VLAN-like encapsulation technique to encapsulate OSI layer 2 Ethernet frames within layer 4 UDP datagrams, using 4789 as the default IANA-assigned destination UDP port number. VXLAN endpoints, which terminate VXLAN tunnels and may be either virtual or physical switch ports, are known as VTEPs (VXLAN tunnel endpoints).

VXLAN is an evolution of efforts to standardize an overlay encapsulation protocol. It increases the scalability up to 16 million logical networks and allows for layer 2 adjacency across IP networks. Multicast or unicast with head-end replication (HER) is used to flood broadcast, unknown unicast, and multicast (BUM) traffic.

The VXLAN specification was originally created by VMware, Arista Networks and Cisco. Other backers of the VXLAN technology include Huawei, Broadcom, Citrix, Pica8, Big Switch Networks, Cumulus Networks, Dell EMC, Ericsson, Mellanox, FreeBSD, OpenBSD, Red Hat, Joyent, and Juniper Networks.

VXLAN was officially documented by the IETF in **RFC 7348**.

If configuring VXLAN in a VyOS virtual machine, ensure that MAC spoofing (Hyper-V) or Forged Transmits (ESX) are permitted, otherwise forwarded frames may be blocked by the hypervisor.

Note: As VyOS is based on Linux and there was no official IANA port assigned for VXLAN, VyOS uses a default port of 8472. You can change the port on a per VXLAN interface basis to get it working across multiple vendors.

Configuration

Common interface configuration

set interfaces vxlan <interface> address <address>

Configure interface <*interface*> with one or more interface addresses.

- **address** can be specified multiple times as IPv4 and/or IPv6 address, e.g. 192.0.2.1/24 and/or 2001:db8::1/64

Example:

```
set interfaces vxlan vxlan0 address 192.0.2.1/24
set interfaces vxlan vxlan0 address 2001:db8::1/64
```

set interfaces vxlan <interface> description <description>

Set a human readable, descriptive alias for this connection. Alias is used by e.g. the `show interfaces` command or SNMP based monitoring tools.

Example:

```
set interfaces vxlan vxlan0 description 'This is an awesome interface running on␣
↪VyOS'
```

set interfaces vxlan <interface> disable

Disable given <*interface*>. It will be placed in administratively down (`A/D`) state.

Example:

```
set interfaces vxlan vxlan0 disable
```

set interfaces vxlan <interface> disable-flow-control

Ethernet flow control is a mechanism for temporarily stopping the transmission of data on Ethernet family computer networks. The goal of this mechanism is to ensure zero packet loss in the presence of network congestion.

The first flow control mechanism, the pause frame, was defined by the IEEE 802.3x standard.

A sending station (computer or network switch) may be transmitting data faster than the other end of the link can accept it. Using flow control, the receiving station can signal the sender requesting suspension of transmissions until the receiver catches up.

Use this command to disable the generation of Ethernet flow control (pause frames).

Example:

```
set interfaces vxlan vxlan0 disable-flow-control
```

set interfaces vxlan <interface> disable-link-detect

Use this command to direct an interface to not detect any physical state changes on a link, for example, when the cable is unplugged.

Default is to detects physical link state changes.

Example:

```
set interfaces vxlan vxlan0 disable-link-detect
```

set interfaces vxlan <interface> mac <xx:xx:xx:xx:xx:xx>

Configure user defined MAC address on given <*interface*>.

Example:

```
set interfaces vxlan vxlan0 mac '00:01:02:03:04:05'
```

set interfaces vxlan <interface> mtu <mtu>

Configure MTU on given <*interface*>. It is the size (in bytes) of the largest ethernet frame sent on this link.

Example:

```
set interfaces vxlan vxlan0 mtu 9000
```

set interfaces vxlan <interface> ip arp-cache-timeout

Once a neighbor has been found, the entry is considered to be valid for at least for this specifc time. An entry's validity will be extended if it receives positive feedback from higher level protocols.

This defaults to 30 seconds.

Example:

```
set interfaces vxlan vxlan0 ip arp-cache-timeout 180
```

set interfaces vxlan <interface> ip disable-arp-filter

If set the kernel can respond to arp requests with addresses from other interfaces. This may seem wrong but it usually makes sense, because it increases the chance of successful communication. IP addresses are owned by the complete host on Linux, not by particular interfaces. Only for more complex setups like load-balancing, does this behaviour cause problems.

If not set (default) allows you to have multiple network interfaces on the same subnet, and have the ARPs for each interface be answered based on whether or not the kernel would route a packet from the ARP'd IP out that interface (therefore you must use source based routing for this to work).

In other words it allows control of which cards (usually 1) will respond to an arp request.

Example:

```
set interfaces vxlan vxlan0 ip disable-arp-filter
```

set interfaces vxlan <interface> ip disable-forwarding

Configure interface-specific Host/Router behaviour. If set, the interface will switch to host mode and IPv6 forwarding will be disabled on this interface.

```
set interfaces vxlan vxlan0 ip disable-forwarding
```

set interfaces vxlan <interface> ip enable-arp-accept

Define behavior for gratuitous ARP frames who's IP is not already present in the ARP table. If configured create new entries in the ARP table.

Both replies and requests type gratuitous arp will trigger the ARP table to be updated, if this setting is on.

If the ARP table already contains the IP address of the gratuitous arp frame, the arp table will be updated regardless if this setting is on or off.

```
set interfaces vxlan vxlan0 ip enable-arp-accept
```

set interfaces vxlan <interface> ip enable-arp-announce

Define different restriction levels for announcing the local source IP address from IP packets in ARP requests sent on interface.

Use any local address, configured on any interface if this is not set.

If configured, try to avoid local addresses that are not in the target's subnet for this interface. This mode is useful when target hosts reachable via this interface require the source IP address in ARP requests to be part of their logical network configured on the receiving interface. When we generate the request we will check all our subnets that include the target IP and will preserve the source address if it is from such subnet. If there is no such subnet we select source address according to the rules for level 2.

```
set interfaces vxlan vxlan0 ip enable-arp-announce
```

set interfaces vxlan <interface> ip enable-arp-ignore

Define different modes for sending replies in response to received ARP requests that resolve local target IP addresses:

If configured, reply only if the target IP address is local address configured on the incoming interface.

If this option is unset (default), reply for any local target IP address, configured on any interface.

```
set interfaces vxlan vxlan0 ip enable-arp-ignore
```

set interfaces vxlan <interface> ip enable-proxy-arp

Use this command to enable proxy Address Resolution Protocol (ARP) on this interface. Proxy ARP allows an Ethernet interface to respond with its own MAC address to ARP requests for destination IP addresses on subnets attached to other interfaces on the system. Subsequent packets sent to those destination IP addresses are forwarded appropriately by the system.

Example:

```
set interfaces vxlan vxlan0 ip enable-proxy-arp
```

set interfaces vxlan <interface> ip proxy-arp-pvlan

Private VLAN proxy arp. Basically allow proxy arp replies back to the same interface (from which the ARP request/solicitation was received).

This is done to support (ethernet) switch features, like **RFC 3069**, where the individual ports are NOT allowed to communicate with each other, but they are allowed to talk to the upstream router. As described in **RFC 3069**, it is possible to allow these hosts to communicate through the upstream router by proxy_arp'ing.

Note: Don't need to be used together with proxy_arp.

This technology is known by different names:

- In **RFC 3069** it is called VLAN Aggregation
- Cisco and Allied Telesyn call it Private VLAN
- Hewlett-Packard call it Source-Port filtering or port-isolation
- Ericsson call it MAC-Forced Forwarding (RFC Draft)

set interfaces vxlan <interface> ip source-validation <strict | loose | disable>

Enable policy for source validation by reversed path, as specified in **RFC 3704**. Current recommended practice in **RFC 3704** is to enable strict mode to prevent IP spoofing from DDos attacks. If using asymmetric routing or other complicated routing, then loose mode is recommended.

- strict: Each incoming packet is tested against the FIB and if the interface is not the best reverse path the packet check will fail. By default failed packets are discarded.
- loose: Each incoming packet's source address is also tested against the FIB and if the source address is not reachable via any interface the packet check will fail.
- disable: No source validation

set interfaces vxlan <interface> ipv6 address autoconf

SLAAC **RFC 4862**. IPv6 hosts can configure themselves automatically when connected to an IPv6 network using the Neighbor Discovery Protocol via ICMPv6 router discovery messages. When first connected to a network, a host sends a link-local router solicitation multicast request for its configuration parameters; routers respond to such a request with a router advertisement packet that contains Internet Layer configuration parameters.

Note: This method automatically disables IPv6 traffic forwarding on the interface in question.

Example:

```
set interfaces vxlan vxlan0 ipv6 address autoconf
```

set interfaces vxlan <interface> ipv6 address eui64 <prefix>

EUI-64 as specified in **RFC 4291** allows a host to assign iteslf a unique 64-Bit IPv6 address.

Example:

```
set interfaces vxlan vxlan0 ipv6 address eui64 2001:db8:beef::/64
```

set interfaces vxlan <interface> ipv6 address no-default-link-local

Do not assign a link-local IPv6 address to this interface.

Example:

```
set interfaces vxlan vxlan0 ipv6 address no-default-link-local
```

set interfaces vxlan <interface> ipv6 disable-forwarding

Configure interface-specific Host/Router behaviour. If set, the interface will switch to host mode and IPv6 forwarding will be disabled on this interface.

Example:

```
set interfaces vxlan vxlan0 ipv6 disable-forwarding
```

set interfaces vxlan <interface> vrf <vrf>

Place interface in given VRF instance.

See also:

There is an entire chapter about how to configure a *VRF*, please check this for additional information.

Example:

```
set interfaces vxlan vxlan0 vrf red
```

VXLAN specific options

set interfaces vxlan <interface> vni <number>

Each VXLAN segment is identified through a 24-bit segment ID, termed the VNI, This allows up to 16M VXLAN segments to coexist within the same administrative domain.

set interfaces vxlan <interface> port <port>

Configure port number of remote VXLAN endpoint.

Note: As VyOS is Linux based the default port used is not using 4789 as the default IANA-assigned destination UDP port number. Instead VyOS uses the Linux default port of 8472.

---

set interfaces vxlan <interface> source-address <interface>

Source IP address used for VXLAN underlay. This is mandatory when using VXLAN via L2VPN/EVPN.

Unicast

set interfaces vxlan <interface> remote <address>

IPv4/IPv6 remote address of the VXLAN tunnel. Alternative to multicast, the remote IPv4/IPv6 address can set directly.

Multicast

set interfaces vxlan <interface> source-interface <interface>

Interface used for VXLAN underlay. This is mandatory when using VXLAN via a multicast network. VXLAN traffic will always enter and exit this interface.

set interfaces vxlan <interface> group <address>

Multicast group address for VXLAN interface. VXLAN tunnels can be built either via Multicast or via Unicast.

Both IPv4 and IPv6 multicast is possible.

Multicast VXLAN

Topology: PC4 - Leaf2 - Spine1 - Leaf3 - PC5

PC4 has IP 10.0.0.4/24 and PC5 has IP 10.0.0.5/24, so they believe they are in the same broadcast domain.

Let's assume PC4 on Leaf2 wants to ping PC5 on Leaf3. Instead of setting Leaf3 as our remote end manually, Leaf2 encapsulates the packet into a UDP-packet and sends it to its designated multicast-address via Spine1. When Spine1 receives this packet it forwards it to all other leaves who has joined the same multicast-group, in this case Leaf3. When Leaf3 receives the packet it forwards it, while at the same time learning that PC4 is reachable behind Leaf2, because the encapsulated packet had Leaf2's IP address set as source IP.

PC5 receives the ping echo, responds with an echo reply that Leaf3 receives and this time forwards to Leaf2's unicast address directly because it learned the location of PC4 above. When Leaf2 receives the echo reply from PC5 it sees that it came from Leaf3 and so remembers that PC5 is reachable via Leaf3.

Thanks to this discovery, any subsequent traffic between PC4 and PC5 will not be using the multicast-address between the leaves as they both know behind which Leaf the PCs are connected. This saves traffic as less multicast packets sent reduces the load on the network, which improves scalability when more leaves are added.

For optimal scalability, Multicast shouldn't be used at all, but instead use BGP to signal all connected devices between leaves. Unfortunately, VyOS does not yet support this.

Example

The setup is this: Leaf2 - Spine1 - Leaf3

Spine1 is a Cisco IOS router running version 15.4, Leaf2 and Leaf3 is each a VyOS router running 1.2.

This topology was built using GNS3.

Topology:

```
Spine1:
fa0/2 towards Leaf2, IP-address: 10.1.2.1/24
fa0/3 towards Leaf3, IP-address: 10.1.3.1/24

Leaf2:
Eth0 towards Spine1, IP-address: 10.1.2.2/24
Eth1 towards a vlan-aware switch

Leaf3:
Eth0 towards Spine1, IP-address 10.1.3.3/24
Eth1 towards a vlan-aware switch
```

Spine1 Configuration:

```
conf t
ip multicast-routing
!
interface fastethernet0/2
 ip address 10.1.2.1 255.255.255.0
 ip pim sparse-dense-mode
!
interface fastethernet0/3
 ip address 10.1.3.1 255.255.255.0
 ip pim sparse-dense-mode
!
router ospf 1
 network 10.0.0.0 0.255.255.255 area 0
```

Multicast-routing is required for the leaves to forward traffic between each other in a more scalable way. This also requires PIM to be enabled towards the leaves so that the Spine can learn what multicast groups each Leaf expects traffic from.

Leaf2 configuration:

```
set interfaces ethernet eth0 address '10.1.2.2/24'
set protocols ospf area 0 network '10.0.0.0/8'

! Our first vxlan interface
set interfaces bridge br241 address '172.16.241.1/24'
set interfaces bridge br241 member interface 'eth1.241'
set interfaces bridge br241 member interface 'vxlan241'

set interfaces vxlan vxlan241 group '239.0.0.241'
set interfaces vxlan vxlan241 source-interface 'eth0'
set interfaces vxlan vxlan241 vni '241'

! Our seconds vxlan interface
set interfaces bridge br242 address '172.16.242.1/24'
set interfaces bridge br242 member interface 'eth1.242'
set interfaces bridge br242 member interface 'vxlan242'

set interfaces vxlan vxlan242 group '239.0.0.242'
set interfaces vxlan vxlan242 source-interface 'eth0'
set interfaces vxlan vxlan242 vni '242'
```

Leaf3 configuration:

```
set interfaces ethernet eth0 address '10.1.3.3/24'
set protocols ospf area 0 network '10.0.0.0/8'

! Our first vxlan interface
set interfaces bridge br241 address '172.16.241.1/24'
set interfaces bridge br241 member interface 'eth1.241'
set interfaces bridge br241 member interface 'vxlan241'

set interfaces vxlan vxlan241 group '239.0.0.241'
set interfaces vxlan vxlan241 source-interface 'eth0'
set interfaces vxlan vxlan241 vni '241'

! Our seconds vxlan interface
set interfaces bridge br242 address '172.16.242.1/24'
set interfaces bridge br242 member interface 'eth1.242'
set interfaces bridge br242 member interface 'vxlan242'

set interfaces vxlan vxlan242 group '239.0.0.242'
set interfaces vxlan vxlan242 source-interface 'eth0'
set interfaces vxlan vxlan242 vni '242'
```

As you can see, Leaf2 and Leaf3 configuration is almost identical. There are lots of commands above, I'll try to into more detail below, command descriptions are placed under the command boxes:

```
set interfaces bridge br241 address '172.16.241.1/24'
```

This commands creates a bridge that is used to bind traffic on eth1 vlan 241 with the vxlan241-interface. The IP address is not required. It may however be used as a default gateway for each Leaf which allows devices on the vlan to reach other subnets. This requires that the subnets are redistributed by OSPF so that the Spine will learn how to reach it. To do this you need to change the OSPF network from '10.0.0.0/8' to '0.0.0.0/0' to allow 172.16/12-networks to be advertised.

```
set interfaces bridge br241 member interface 'eth1.241'
set interfaces bridge br241 member interface 'vxlan241'
```

Binds eth1.241 and vxlan241 to each other by making them both member interfaces of the same bridge.

```
set interfaces vxlan vxlan241 group '239.0.0.241'
```

The multicast-group used by all leaves for this vlan extension. Has to be the same on all leaves that has this interface.

```
set interfaces vxlan vxlan241 source-interface 'eth0'
```

Sets the interface to listen for multicast packets on. Could be a loopback, not yet tested.

```
set interfaces vxlan vxlan241 vni '241'
```

Sets the unique id for this vxlan-interface. Not sure how it correlates with multicast-address.

```
set interfaces vxlan vxlan241 port 12345
```

The destination port used for creating a VXLAN interface in Linux defaults to its pre-standard value of 8472 to preserve backward compatibility. A configuration directive to support a user-specified destination port to override that behavior is available using the above command.

Unicast VXLAN

Alternative to multicast, the remote IPv4 address of the VXLAN tunnel can be set directly. Let's change the Multicast example from above:

```
# leaf2 and leaf3
delete interfaces vxlan vxlan241 group '239.0.0.241'
delete interfaces vxlan vxlan241 source-interface 'eth0'

# leaf2
set interface vxlan vxlan241 remote 10.1.3.3

# leaf3
set interface vxlan vxlan241 remote 10.1.2.2
```

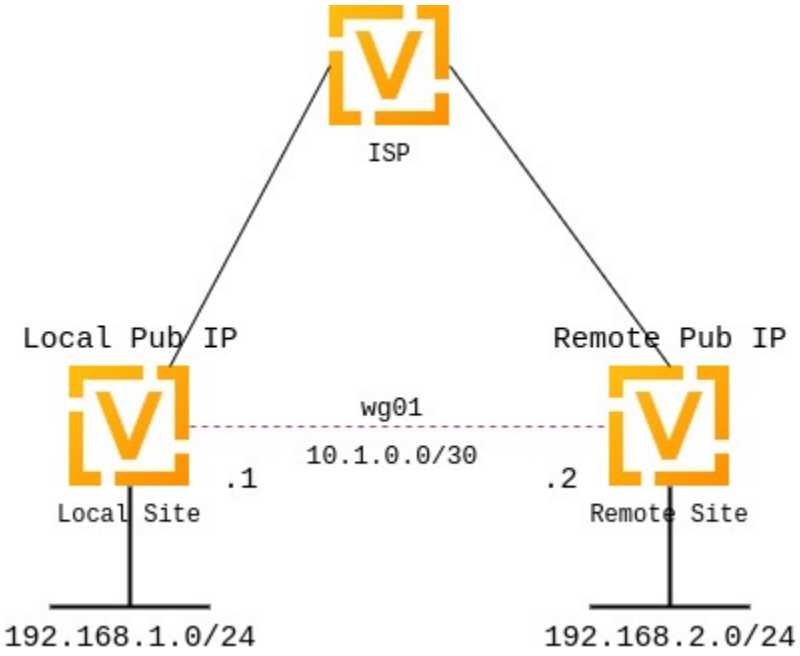
The default port udp is set to 8472. It can be changed with `set interface vxlan <vxlanN> port <port>`

8.4.15 WireGuard

WireGuard is an extremely simple yet fast and modern VPN that utilizes state-of-the-art cryptography. See https://www.wireguard.com for more information.

Site to Site VPN

This diagram corresponds with the example site to site configuration below.



Keypairs

WireGuard requires the generation of a keypair, which includes a private key to decrypt incoming traffic, and a public key for peer(s) to encrypt traffic.

Generate Keypair

generate wireguard default-keypair

It generates the keypair, which includes the public and private parts, and stores it within VyOS. It will be used per default on any configured WireGuard interface, even if multiple interfaces are being configured.

show wireguard keypairs pubkey default

It shows the public key to be shared with your peer(s). Your peer will encrypt all traffic to your system using this public key.

```
vyos@vyos:~$ show wireguard keypairs pubkey default
hW17UxY7zeydJNPIyo3UtGnBHkzTK/NeBOrDSIU9Tx0=
```

Generate Named Keypair

Named keypairs can be used on a interface basis when configured. If multiple WireGuard interfaces are being configured, each can have their own keypairs.

generate wireguard named-keypairs <name>

The commands below generates 2 keypairs unrelated to each other.

```
vyos@vyos:~$ generate wireguard named-keypairs KP01
vyos@vyos:~$ generate wireguard named-keypairs KP02
```

Interface configuration

The next step is to configure your local side as well as the policy based trusted destination addresses. If you only initiate a connection, the listen port and address/port is optional; however, if you act like a server and endpoints initiate the connections to your system, you need to define a port your clients can connect to, otherwise the port is randomly chosen and may make connection difficult with firewall rules, since the port may be different each time the system is rebooted.

You will also need the public key of your peer as well as the network(s) you want to tunnel (allowed-ips) to configure a WireGuard tunnel. The public key below is always the public key from your peer, not your local one.

local side - commands

- WireGuard interface itself uses address 10.1.0.1/30
- We only allow the 192.168.2.0/24 subnet to travel over the tunnel
- Our remote end of the tunnel for peer *to-wg02* is reachable at 192.0.2.1 port 51820
- The remote peer *to-wg02* uses XMrlPykaxhdAAiSjhtPlvi30NVkvLQliQuKP7AI7CyI= as its public key portion
- We listen on port 51820
- We route all traffic for the 192.168.2.0/24 network to interface *wg01*

```
set interfaces wireguard wg01 address '10.1.0.1/30'
set interfaces wireguard wg01 description 'VPN-to-wg02'
set interfaces wireguard wg01 peer to-wg02 allowed-ips '192.168.2.0/24'
set interfaces wireguard wg01 peer to-wg02 address '192.0.2.1'
set interfaces wireguard wg01 peer to-wg02 port '51820'
set interfaces wireguard wg01 peer to-wg02 pubkey
↪'XMrlPykaxhdAAiSjhtPlvi30NVkvLQliQuKP7AI7CyI='
set interfaces wireguard wg01 port '51820'

set protocols static interface-route 192.168.2.0/24 next-hop-interface wg01
```

The last step is to define an interface route for 192.168.2.0/24 to get through the WireGuard interface *wg01*. Multiple IPs or networks can be defined and routed. The last check is allowed-ips which either prevents or allows the traffic.

> **Warning:** You can not assign the same allowed-ips statement to multiple WireGuard peers. This a design decision. For more information please check the WireGuard mailing list.

set interfaces wireguard <interface> private-key <name>

To use a named key on an interface, the option private-key needs to be set.

```
set interfaces wireguard wg01 private-key KP01
```

The command `show wireguard keypairs pubkey KP01` will then show the public key, which needs to be shared with the peer.

remote side - commands

```
set interfaces wireguard wg01 address '10.1.0.2/30'
set interfaces wireguard wg01 description 'VPN-to-wg01'
set interfaces wireguard wg01 peer to-wg01 allowed-ips '192.168.1.0/24'
set interfaces wireguard wg01 peer to-wg01 address '192.0.2.2'
set interfaces wireguard wg01 peer to-wg01 port '51820'
set interfaces wireguard wg01 peer to-wg01 pubkey
↪'EKY0dxRrSD98QHjfHOK13mZ5PJ7hnddRZt5woB3szyw='
set interfaces wireguard wg01 port '51820'

set protocols static interface-route 192.168.1.0/24 next-hop-interface wg01
```

Firewall Exceptions

For the WireGuard traffic to pass through the WAN interface, you must create a firewall exception.

```
set firewall name OUTSIDE_LOCAL rule 10 action accept
set firewall name OUTSIDE_LOCAL rule 10 description 'Allow established/related'
set firewall name OUTSIDE_LOCAL rule 10 state established enable
set firewall name OUTSIDE_LOCAL rule 10 state related enable
set firewall name OUTSIDE_LOCAL rule 20 action accept
set firewall name OUTSIDE_LOCAL rule 20 description WireGuard_IN
set firewall name OUTSIDE_LOCAL rule 20 destination port 51820
set firewall name OUTSIDE_LOCAL rule 20 log enable
set firewall name OUTSIDE_LOCAL rule 20 protocol udp
set firewall name OUTSIDE_LOCAL rule 20 source
```

You should also ensure that the OUTISDE_LOCAL firewall group is applied to the WAN interface and a direction (local).

```
set interfaces ethernet eth0 firewall local name 'OUTSIDE-LOCAL'
```

Assure that your firewall rules allow the traffic, in which case you have a working VPN using WireGuard.

```
wg01# ping 192.168.1.1
PING 192.168.1.1 (192.168.1.1) 56(84) bytes of data.
64 bytes from 192.168.1.1: icmp_seq=1 ttl=64 time=1.16 ms
64 bytes from 192.168.1.1: icmp_seq=2 ttl=64 time=1.77 ms

wg02# ping 192.168.2.1
PING 192.168.2.1 (192.168.2.1) 56(84) bytes of data.
64 bytes from 192.168.2.1: icmp_seq=1 ttl=64 time=4.40 ms
64 bytes from 192.168.2.1: icmp_seq=2 ttl=64 time=1.02 ms
```

An additional layer of symmetric-key crypto can be used on top of the asymmetric crypto. This is optional.

```
wg01# run generate wireguard preshared-key
rvVDOoc2IYEnV+k5p7TNAmHBMEGTHbPU8Qqg8c/sUqc=
```

Copy the key, as it is not stored on the local filesystem. Because it is a symmetric key, only you and your peer should have knowledge of its content. Make sure you distribute the key in a safe manner,

```
wg01# set interfaces wireguard wg01 peer to-wg02 preshared-key
↪'rvVDOoc2IYEnV+k5p7TNAmHBMEGTHbPU8Qqg8c/sUqc='
wg02# set interfaces wireguard wg01 peer to-wg01 preshared-key
↪'rvVDOoc2IYEnV+k5p7TNAmHBMEGTHbPU8Qqg8c/sUqc='
```

Remote Access "RoadWarrior" Example

With WireGuard, a Road Warrior VPN config is similar to a site-to-site VPN. It just lacks the `address` and `port` statements.

In the following example, the IPs for the remote clients are defined in the peers. This allows the peers to interact with one another. In comparison to the site-to-site example the `persistent-keepalive` flag is set to 15 seconds to assure the connection is kept alive. This is mainly relevant if one of the peers is behind NAT and can't be connected to if the connection is lost. To be effective this value needs to be lower than the UDP timeout.

```
wireguard wg01 {
    address 10.172.24.1/24
    address 2001:db8:470:22::1/64
    description RoadWarrior
    peer MacBook {
        allowed-ips 10.172.24.30/32
        allowed-ips 2001:db8:470:22::30/128
        persistent-keepalive 15
        pubkey F5MbW7ye7DsoxdOaixjdrudshjjxN5UdNV+pGFHqehc=
    }
    peer iPhone {
        allowed-ips 10.172.24.20/32
        allowed-ips 2001:db8:470:22::20/128
        persistent-keepalive 15
        pubkey BknHcLFo8nOo8Dwq2CjaC/TedchKQ0ebxC7GYn7Al00=
    }
    port 2224
}
```

The following is the config for the iPhone peer above. It's important to note that the `AllowedIPs` wildcard setting directs all IPv4 and IPv6 traffic through the connection.

```
[Interface]
PrivateKey = ARAKLSDJsadlkfjasdfiowqeruriowqeuasdf=
Address = 10.172.24.20/24, 2001:db8:470:22::20/64
DNS = 10.0.0.53, 10.0.0.54

[Peer]
PublicKey = RIbtUTCfgzNjnLNPQ/ulkGnnB2vMWHm7l2H/xUfbyjc=
AllowedIPs = 0.0.0.0/0, ::/0
Endpoint = 192.0.2.1:2224
PersistentKeepalive = 25
```

However, split-tunneling can be achieved by specifying the remote subnets. This ensures that only traffic destined for the remote site is sent over the tunnel. All other traffic is unaffected.

```
[Interface]
PrivateKey = 8Iasdfweirousd1EVGUk5XsT+wYFZ9mhPnQhmjzaJE6Go=
Address = 10.172.24.30/24, 2001:db8:470:22::30/64

[Peer]
PublicKey = RIbtUTCfgzNjnLNPQ/ulkGnnB2vMWHm7l2H/xUfbyjc=
AllowedIPs = 10.172.24.30/24, 2001:db8:470:22::/64
Endpoint = 192.0.2.1:2224
PersistentKeepalive = 25
```

Operational Commands

Status

show interfaces wireguard

Get a list of all wireguard interfaces

```
Codes: S - State, L - Link, u - Up, D - Down, A - Admin Down
Interface        IP Address                        S/L  Description
---------        ----------                        ---  -----------
wg01             10.0.0.1/24                       u/u
```

show interfaces wireguard <interface>

Show general information about specific WireGuard interface

```
vyos@vyos:~$ show interfaces wireguard wg01
interface: wg01
  address: 10.0.0.1/24
  public key: h1HkYlSuHdJN6Qv4Hz4bBzjGg5WUty+U1L7DJsZy1iE=
  private key: (hidden)
  listening port: 41751

    RX:  bytes  packets  errors  dropped  overrun       mcast
              0        0       0        0        0           0
    TX:  bytes  packets  errors  dropped  carrier  collisions
              0        0       0        0        0           0
```

Encryption Keys

show wireguard keypair pubkey <name>

Show public key portion for specified key. This can be either the `default` key, or any other named key-pair.

The `default` keypair

```
vyos@vyos:~$ show wireguard keypair pubkey default
FAXCPb6EbTlSH5200J5zTopt9AYXneBthAySPBLbZwM=
```

Name keypair `KP01`

```
vyos@vyos:~$ show wireguard keypair pubkey KP01
HUtsu198toEnm1poGoRTyqkUKfKUdyh54f45dtcahDM=
```

delete wireguard keypair pubkey <name>

Delete a keypair, this can be either the `default` key, or any other named key-pair.

```
vyos@vyos:~$ delete wireguard keypair default
```

Remote Access "RoadWarrior" clients

Some users tend to connect their mobile devices using WireGuard to their VyOS router. To ease deployment one can generate a "per mobile" configuration from the VyOS CLI.

Warning: From a security perspective, it is not recommended to let a third party create and share the private key for a secured connection. You should create the private portion on your own and only hand out the public key. Please keep this in mind when using this convenience feature.

generate wireguard client-config <name> interface <interface> server <ip|fqdn> address <client-ip>

Using this command, you will create a new client configuration which can connect to `interface` on this router. The public key from the specified interface is automatically extracted and embedded into the configuration.

The command also generates a configuration snipped which can be copy/pasted into the VyOS CLI if needed. The supplied <name> on the CLI will become the peer name in the snippet.

In addition you will specifiy the IP address or FQDN for the client where it will connect to. The address parameter can be used up to two times and is used to assign the clients specific IPv4 (/32) or IPv6 (/128) address.

8.4.16 WLAN/WIFI - Wireless LAN

WLAN (Wireless LAN) interface provide 802.11 (a/b/g/n/ac) wireless support (commonly referred to as Wi-Fi) by means of compatible hardware. If your hardware supports it, VyOS supports multiple logical wireless interfaces per physical device.

There are three modes of operation for a wireless interface:

- WAP (Wireless Access-Point) provides network access to connecting stations if the physical hardware supports acting as a WAP
- A station acts as a Wi-Fi client accessing the network through an available WAP
- Monitor, the system passively monitors any kind of wireless traffic

If the system detects an unconfigured wireless device, it will be automatically added the configuration tree, specifying any detected settings (for example, its MAC address) and configured to run in monitor mode.

```
WireGuard client configuration for interface: wg0

To enable this configuration on a VyOS router you can use the following commands:

=== VyOS (server) configurtation ===

set interfaces wireguard wg0 peer foo allowed-ips '10.0.1.10/32'
set interfaces wireguard wg0 peer foo allowed-ips '2001:db8::10/128'
set interfaces wireguard wg0 peer foo pubkey 'Hk62WnBsZawKaBnucwmI8ZHZs6ABnr5M8OAC6vch/F4='

=== RoadWarrior (client) configuration ===

[Interface]
PrivateKey = kL1YfiTO+VrF8rzoBIs19DrylDniwJUQie5jwWIXLFs=
Address = 10.0.1.10/32, 2001:db8::10/128
DNS = 1.1.1.1

[Peer]
PublicKey = hlHkYlSuHdJN6Qv4Hz4bBzjGg5WUty+UlL7DJsZyliE=
Endpoint = wireguard.vyos.net:41751
AllowedIPs = 0.0.0.0/0, ::/0
```

Configuration

Common interface configuration

set interfaces wireless <interface> address <address | dhcp | dhcpv6>

Configure interface <*interface*> with one or more interface addresses.

- **address** can be specified multiple times as IPv4 and/or IPv6 address, e.g. 192.0.2.1/24 and/or 2001:db8::1/64
- **dhcp** interface address is received by DHCP from a DHCP server on this segment.
- **dhcpv6** interface address is received by DHCPv6 from a DHCPv6 server on this segment.

Example:

```
set interfaces wireless wlan0 address 192.0.2.1/24
set interfaces wireless wlan0 address 2001:db8::1/64
set interfaces wireless wlan0 address dhcp
set interfaces wireless wlan0 address dhcpv6
```

set interfaces wireless <interface> description <description>

Set a human readable, descriptive alias for this connection. Alias is used by e.g. the `show interfaces` command or SNMP based monitoring tools.

Example:

```
set interfaces wireless wlan0 description 'This is an awesome interface running on␣
↪VyOS'
```

set interfaces wireless <interface> disable

Disable given <*interface*>. It will be placed in administratively down (`A/D`) state.

Example:

```
set interfaces wireless wlan0 disable
```

set interfaces wireless <interface> disable-flow-control

Ethernet flow control is a mechanism for temporarily stopping the transmission of data on Ethernet family computer networks. The goal of this mechanism is to ensure zero packet loss in the presence of network congestion.

The first flow control mechanism, the pause frame, was defined by the IEEE 802.3x standard.

A sending station (computer or network switch) may be transmitting data faster than the other end of the link can accept it. Using flow control, the receiving station can signal the sender requesting suspension of transmissions until the receiver catches up.

Use this command to disable the generation of Ethernet flow control (pause frames).

Example:

```
set interfaces wireless wlan0 disable-flow-control
```

set interfaces wireless <interface> disable-link-detect

Use this command to direct an interface to not detect any physical state changes on a link, for example, when the cable is unplugged.

Default is to detects physical link state changes.

Example:

```
set interfaces wireless wlan0 disable-link-detect
```

set interfaces wireless <interface> mac <xx:xx:xx:xx:xx:xx>

Configure user defined MAC address on given <*interface*>.

Example:

```
set interfaces wireless wlan0 mac '00:01:02:03:04:05'
```

set interfaces wireless <interface> mtu <mtu>

Configure MTU on given <*interface*>. It is the size (in bytes) of the largest ethernet frame sent on this link.

Example:

```
set interfaces wireless wlan0 mtu 9000
```

set interfaces wireless <interface> ip arp-cache-timeout

Once a neighbor has been found, the entry is considered to be valid for at least for this specifc time. An entry's validity will be extended if it receives positive feedback from higher level protocols.

This defaults to 30 seconds.

Example:

```
set interfaces wireless wlan0 ip arp-cache-timeout 180
```

set interfaces wireless <interface> ip disable-arp-filter

If set the kernel can respond to arp requests with addresses from other interfaces. This may seem wrong but it usually makes sense, because it increases the chance of successful communication. IP addresses are owned by the complete host on Linux, not by particular interfaces. Only for more complex setups like load-balancing, does this behaviour cause problems.

If not set (default) allows you to have multiple network interfaces on the same subnet, and have the ARPs for each interface be answered based on whether or not the kernel would route a packet from the ARP'd IP out that interface (therefore you must use source based routing for this to work).

In other words it allows control of which cards (usually 1) will respond to an arp request.

Example:

```
set interfaces wireless wlan0 ip disable-arp-filter
```

set interfaces wireless <interface> ip disable-forwarding

Configure interface-specific Host/Router behaviour. If set, the interface will switch to host mode and IPv6 forwarding will be disabled on this interface.

```
set interfaces wireless wlan0 ip disable-forwarding
```

set interfaces wireless <interface> ip enable-arp-accept

Define behavior for gratuitous ARP frames who's IP is not already present in the ARP table. If configured create new entries in the ARP table.

Both replies and requests type gratuitous arp will trigger the ARP table to be updated, if this setting is on.

If the ARP table already contains the IP address of the gratuitous arp frame, the arp table will be updated regardless if this setting is on or off.

```
set interfaces wireless wlan0 ip enable-arp-accept
```

set interfaces wireless <interface> ip enable-arp-announce

Define different restriction levels for announcing the local source IP address from IP packets in ARP requests sent on interface.

Use any local address, configured on any interface if this is not set.

If configured, try to avoid local addresses that are not in the target's subnet for this interface. This mode is useful when target hosts reachable via this interface require the source IP address in ARP requests to be part of their logical network configured on the receiving interface. When we generate the request we will check all our subnets that include the target IP and will preserve the source address if it is from such subnet. If there is no such subnet we select source address according to the rules for level 2.

```
set interfaces wireless wlan0 ip enable-arp-announce
```

set interfaces wireless <interface> ip enable-arp-ignore

Define different modes for sending replies in response to received ARP requests that resolve local target IP addresses:

If configured, reply only if the target IP address is local address configured on the incoming interface.

If this option is unset (default), reply for any local target IP address, configured on any interface.

```
set interfaces wireless wlan0 ip enable-arp-ignore
```

set interfaces wireless <interface> ip enable-proxy-arp

Use this command to enable proxy Address Resolution Protocol (ARP) on this interface. Proxy ARP allows an Ethernet interface to respond with its own MAC address to ARP requests for destination IP addresses on subnets attached to other interfaces on the system. Subsequent packets sent to those destination IP addresses are forwarded appropriately by the system.

Example:

```
set interfaces wireless wlan0 ip enable-proxy-arp
```

set interfaces wireless <interface> ip proxy-arp-pvlan

Private VLAN proxy arp. Basically allow proxy arp replies back to the same interface (from which the ARP request/solicitation was received).

This is done to support (ethernet) switch features, like **RFC 3069**, where the individual ports are NOT allowed to communicate with each other, but they are allowed to talk to the upstream router. As described in **RFC 3069**, it is possible to allow these hosts to communicate through the upstream router by proxy_arp'ing.

Note: Don't need to be used together with proxy_arp.

This technology is known by different names:

- In **RFC 3069** it is called VLAN Aggregation
- Cisco and Allied Telesyn call it Private VLAN
- Hewlett-Packard call it Source-Port filtering or port-isolation

- Ericsson call it MAC-Forced Forwarding (RFC Draft)

set interfaces wireless <interface> ip source-validation <strict | loose | disable>

Enable policy for source validation by reversed path, as specified in **RFC 3704**. Current recommended practice in **RFC 3704** is to enable strict mode to prevent IP spoofing from DDos attacks. If using asymmetric routing or other complicated routing, then loose mode is recommended.

- strict: Each incoming packet is tested against the FIB and if the interface is not the best reverse path the packet check will fail. By default failed packets are discarded.
- loose: Each incoming packet's source address is also tested against the FIB and if the source address is not reachable via any interface the packet check will fail.
- disable: No source validation

set interfaces wireless <interface> ipv6 address autoconf

SLAAC **RFC 4862**. IPv6 hosts can configure themselves automatically when connected to an IPv6 network using the Neighbor Discovery Protocol via ICMPv6 router discovery messages. When first connected to a network, a host sends a link-local router solicitation multicast request for its configuration parameters; routers respond to such a request with a router advertisement packet that contains Internet Layer configuration parameters.

Note: This method automatically disables IPv6 traffic forwarding on the interface in question.

Example:

```
set interfaces wireless wlan0 ipv6 address autoconf
```

set interfaces wireless <interface> ipv6 address eui64 <prefix>

EUI-64 as specified in **RFC 4291** allows a host to assign iteslf a unique 64-Bit IPv6 address.

Example:

```
set interfaces wireless wlan0 ipv6 address eui64 2001:db8:beef::/64
```

set interfaces wireless <interface> ipv6 address no-default-link-local

Do not assign a link-local IPv6 address to this interface.

Example:

```
set interfaces wireless wlan0 ipv6 address no-default-link-local
```

set interfaces wireless <interface> ipv6 disable-forwarding

Configure interface-specific Host/Router behaviour. If set, the interface will switch to host mode and IPv6 forwarding will be disabled on this interface.

Example:

```
set interfaces wireless wlan0 ipv6 disable-forwarding
```

set interfaces wireless <interface> vrf <vrf>

Place interface in given VRF instance.

See also:

There is an entire chapter about how to configure a *VRF*, please check this for additional information.

Example:

```
set interfaces wireless wlan0 vrf red
```

DHCP(v6)

set interfaces wireless <interface> dhcp-options client-id <description>

RFC 2131 states: The client MAY choose to explicitly provide the identifier through the 'client identifier' option. If the client supplies a 'client identifier', the client MUST use the same 'client identifier' in all subsequent messages, and the server MUST use that identifier to identify the client.

Example:

```
set interfaces wireless wlan0 dhcp-options client-id 'foo-bar'
```

set interfaces wireless <interface> dhcp-options host-name <hostname>

Instead of sending the real system hostname to the DHCP server, overwrite the host-name with this given-value.

Example:

```
set interfaces wireless wlan0 dhcp-options host-name 'VyOS'
```

set interfaces wireless <interface> dhcp-options vendor-class-id <vendor-id>

The vendor-class-id option can be used to request a specific class of vendor options from the server.

Example:

```
set interfaces wireless wlan0 dhcp-options vendor-class-id 'VyOS'
```

set interfaces wireless <interface> dhcp-options no-default-route

Only request an address from the DHCP server but do not request a default gateway.

Example:

```
set interfaces wireless wlan0 dhcp-options no-default-route
```

set interfaces wireless <interface> dhcpv6-options duid <duid>

The DHCP unique identifier (DUID) is used by a client to get an IP address from a DHCPv6 server. It has a 2-byte DUID type field, and a variable-length identifier field up to 128 bytes. Its actual length depends on its type. The server compares the DUID with its database and delivers configuration data (address, lease times, DNS servers, etc.) to the client.

```
set interfaces wireless wlan0 duid '0e:00:00:01:00:01:27:71:db:f0:00:50:56:bf:c5:6d'
```

set interfaces wireless <interface> dhcpv6-options parameters-only

This statement specifies dhcp6c to only exchange informational configuration parameters with servers. A list of DNS server addresses is an example of such parameters. This statement is useful when the client does not need stateful configuration parameters such as IPv6 addresses or prefixes.

```
set interfaces wireless wlan0 dhcpv6-options parameters-only
```

set interfaces wireless <interface> dhcpv6-options rapid-commit

When rapid-commit is specified, dhcp6c will include a rapid-commit option in solicit messages and wait for an immediate reply instead of advertisements.

```
set interfaces wireless wlan0 dhcpv6-options rapid-commit
```

set interfaces wireless <interface> dhcpv6-options temporary

Request only a temporary address and not form an IA_NA (Identity Association for Non-temporary Addresses) partnership.

```
set interfaces wireless wlan0 dhcpv6-options temporary
```

DHCPv6 Prefix Delegation (PD)

VyOS 1.3 (equuleus) supports DHCPv6-PD (**RFC 3633**). DHCPv6 Prefix Delegation is supported by most ISPs who provide native IPv6 for consumers on fixed networks.

set interfaces wireless <interface> dhcpv6-options pd <id> length <length>

Some ISPs by default only delegate a /64 prefix. To request for a specific prefix size use this option to request for a bigger delegation for this pd <*id*>. This value is in the range from 32 - 64 so you could request up to a /32 prefix (if your ISP allows this) down to a /64 delegation.

The default value corresponds to 64.

To request a /56 prefix from your ISP use:

```
set interfaces wireless wlan0 dhcpv6-options pd 0 length 56
```

set interfaces wireless <interface> dhcpv6-options pd <id> interface <delegatee> address <address>

Specify the interface address used locally on the interfcae where the prefix has been delegated to. ID must be a decimal integer.

It will be combined with the delegated prefix and the sla-id to form a complete interface address. The default is to use the EUI-64 address of the interface.

Example: Delegate a /64 prefix to interface eth8 which will use a local address on this router of <prefix>::ffff, as the address 65534 will correspond to ffff in hexadecimal notation.

```
set interfaces wireless wlan0 dhcpv6-options pd 0 interface eth8 address 65534
```

set interfaces wireless <interface> dhcpv6-options pd <id> interface <delegatee> sla-id <id>

Specify the identifier value of the site-level aggregator (SLA) on the interface. ID must be a decimal number greater then 0 which fits in the length of SLA IDs (see below).

Example: If ID is 1 and the client is delegated an IPv6 prefix 2001:db8:ffff::/48, dhcp6c will combine the two values into a single IPv6 prefix, 2001:db8:ffff:1::/64, and will configure the prefix on the specified interface.

```
set interfaces wireless wlan0 dhcpv6-options pd 0 interface eth8 sla-id 1
```

Wireless options

set interfaces wireless <interface> channel <number>

Channel number (IEEE 802.11), for 2.4Ghz (802.11 b/g/n) channels range from 1-14. On 5Ghz (802.11 a/h/j/n/ac) channels available are 0, 34 to 173

set interfaces wireless <interface> country-code <cc>

Country code (ISO/IEC 3166-1). Used to set regulatory domain. Set as needed to indicate country in which device is operating. This can limit available channels and transmit power.

Note: This option is mandatory in Access-Point mode.

---

set interfaces wireless <interface> disable-broadcast-ssid

Send empty SSID in beacons and ignore probe request frames that do not specify full SSID, i.e., require stations to know SSID.

set interfaces wireless <interface> expunge-failing-stations

Disassociate stations based on excessive transmission failures or other indications of connection loss.

This depends on the driver capabilities and may not be available with all drivers.

set interfaces wireless <interface> isolate-stations

Client isolation can be used to prevent low-level bridging of frames between associated stations in the BSS.

By default, this bridging is allowed.

set interfaces wireless <interface> max-stations

Maximum number of stations allowed in station table. New stations will be rejected after the station table is full. IEEE 802.11 has a limit of 2007 different association IDs, so this number should not be larger than that.

This defaults to 2007.

set interfaces wireless <interface> mgmt-frame-protection

Management Frame Protection (MFP) according to IEEE 802.11w

set interfaces wireless <interface> mode <a | b | g | n | ac>

Operation mode of wireless radio.

- a - 802.11a - 54 Mbits/sec
- b - 802.11b - 11 Mbits/sec
- g - 802.11g - 54 Mbits/sec (default)
- n - 802.11n - 600 Mbits/sec
- ac - 802.11ac - 1300 Mbits/sec

set interfaces wireless <interface> physical-device <device>

Wireless hardware device used as underlay radio.

This defaults to phy0.

set interfaces wireless <interface> reduce-transmit-power <number>

Add Power Constraint element to Beacon and Probe Response frames.

This option adds Power Constraint element when applicable and Country element is added. Power Constraint element is required by Transmit Power Control.

Valid values are 0..255.

set interfaces wireless <interface> ssid <ssid>

SSID to be used in IEEE 802.11 management frames

set interfaces wireless <interface> type <access-point | station | monitor>

Wireless device type for this interface

- `access-point` - Access-point forwards packets between other nodes
- `station` - Connects to another access point
- `monitor` - Passively monitor all packets on the frequency/channel

PPDU

set interfaces wireless <interface> capabilities require-ht

set interfaces wireless <interface> capabilities require-hvt

HT (High Throughput) capabilities (802.11n)

set interfaces wireless <interface> capabilities ht 40mhz-incapable

Device is incapable of 40 MHz, do not advertise. This sets `[40-INTOLERANT]`

set interfaces wireless <interface> capabilities ht auto-powersave

WMM-PS Unscheduled Automatic Power Save Delivery [U-APSD]

set interfaces wireless <interface> capabilities ht channel-set-width <ht20 | ht40+ | ht40->

Supported channel width set.

- `ht40-` - Both 20 MHz and 40 MHz with secondary channel below the primary channel
- `ht40+` - Both 20 MHz and 40 MHz with secondary channel above the primary channel

---

Note: There are limits on which channels can be used with HT40- and HT40+. Following table shows the channels that may be available for HT40- and HT40+ use per IEEE 802.11n Annex J:

Depending on the location, not all of these channels may be available for use!

```
freq            HT40-           HT40+
2.4 GHz         5-13            1-7 (1-9 in Europe/Japan)
5 GHz           40,48,56,64     36,44,52,60
```

Note: 40 MHz channels may switch their primary and secondary channels if needed or creation of 40 MHz channel maybe rejected based on overlapping BSSes. These changes are done automatically when hostapd is setting up the 40 MHz channel.

---

set interfaces wireless <interface> capabilities ht delayed-block-ack

Enable HT-delayed Block Ack [DELAYED-BA]

set interfaces wireless <interface> capabilities ht dsss-cck-40

DSSS/CCK Mode in 40 MHz, this sets [DSSS_CCK-40]

set interfaces wireless <interface> capabilities ht greenfield

This enables the greenfield option which sets the [GF] option

set interfaces wireless <interface> capabilities ht ldpc

Enable LDPC coding capability

set interfaces wireless <interface> capabilities ht lsig-protection

Enable L-SIG TXOP protection capability

set interfaces wireless <interface> capabilities ht max-amsdu <3839 | 7935>

Maximum A-MSDU length 3839 (default) or 7935 octets

set interfaces wireless <interface> capabilities ht short-gi <20 | 40>

Short GI capabilities for 20 and 40 MHz

set interfaces wireless <interface> capabilities ht smps <static | dynamic>

Spatial Multiplexing Power Save (SMPS) settings

set interfaces wireless <interface> capabilities ht stbc rx <num>

Enable receiving PPDU using STBC (Space Time Block Coding)

set interfaces wireless <interface> capabilities ht stbc tx

Enable sending PPDU using STBC (Space Time Block Coding)

VHT (Very High Throughput) capabilities (802.11ac)

set interfaces wireless <interface> capabilities vht antenna-count

Number of antennas on this card

set interfaces wireless <interface> capabilities vht antenna-pattern-fixed

Set if antenna pattern does not change during the lifetime of an association

set interfaces wireless <interface> capabilities vht beamform <single-user-beamformer | single-user-beamformee | multi-user-beamformer | multi-user-beamformee>

Beamforming capabilities:

- single-user-beamformer - Support for operation as single user beamformer
- single-user-beamformee - Support for operation as single user beamformee
- multi-user-beamformer - Support for operation as single user beamformer
- multi-user-beamformee - Support for operation as single user beamformer

set interfaces wireless <interface> capabilities vht center-channel-freq <freq-1 | freq-2> <number>

VHT operating channel center frequency - center freq 1 (for use with 80, 80+80 and 160 modes)

VHT operating channel center frequency - center freq 2 (for use with the 80+80 mode)

<number> must be from 34 - 173. For 80 MHz channels it should be channel + 6.

set interfaces wireless <interface> capabilities vht channel-set-width <0 | 1 | 2 | 3>

- 0 - 20 or 40 MHz channel width (default)
- 1 - 80 MHz channel width
- 2 - 160 MHz channel width
- 3 - 80+80 MHz channel width

set interfaces wireless <interface> capabilities vht ldpc

Enable LDPC (Low Density Parity Check) coding capability

set interfaces wireless <interface> capabilities vht link-adaptation

VHT link adaptation capabilities

set interfaces wireless <interface> capabilities vht max-mpdu <value>

Increase Maximum MPDU length to 7991 or 11454 octets (default 3895 octets)

set interfaces wireless <interface> capabilities vht max-mpdu-exp <value>

Set the maximum length of A-MPDU pre-EOF padding that the station can receive

set interfaces wireless <interface> capabilities vht short-gi <80 | 160>

Short GI capabilities

set interfaces wireless <interface> capabilities vht stbc rx <num>

Enable receiving PPDU using STBC (Space Time Block Coding)

set interfaces wireless <interface> capabilities vht stbc tx

Enable sending PPDU using STBC (Space Time Block Coding)

set interfaces wireless <interface> capabilities vht tx-powersave

Enable VHT TXOP Power Save Mode

set interfaces wireless <interface> capabilities vht vht-cf

Station supports receiving VHT variant HT Control field

Wireless options (Station/Client)

The example creates a wireless station (commonly referred to as Wi-Fi client) that accesses the network through the WAP defined in the above example. The default physical device (phy0) is used.

```
set interfaces wireless wlan0 type station
set interfaces wireless wlan0 address dhcp
set interfaces wireless wlan0 ssid Test
set interfaces wireless wlan0 security wpa passphrase '12345678'
```

Resulting in

```
interfaces {
  [...]
  wireless wlan0 {
    address dhcp
    security {
      wpa {
        passphrase "12345678"
      }
    }
    ssid TEST
    type station
  }
```

Security

WPA (Wi-Fi Protected Access) and WPA2 Enterprise in combination with 802.1x based authentication can be used to authenticate users or computers in a domain.

The wireless client (supplicant) authenticates against the RADIUS server (authentication server) using an EAP method configured on the RADIUS server. The WAP (also referred to as authenticator) role is to send all authentication messages between the supplicant and the configured authentication server, thus the RADIUS server is responsible for authenticating the users.

The WAP in this example has the following characteristics:

- IP address `192.168.2.1/24`
- Network ID (SSID) `Enterprise-TEST`
- WPA passphrase `12345678`
- Use 802.11n protocol
- Wireless channel `1`
- RADIUS server at `192.168.3.10` with shared-secret `VyOSPassword`

```
set interfaces wireless wlan0 address '192.168.2.1/24'
set interfaces wireless wlan0 type access-point
set interfaces wireless wlan0 channel 1
set interfaces wireless wlan0 mode n
set interfaces wireless wlan0 ssid 'TEST'
set interfaces wireless wlan0 security wpa mode wpa2
set interfaces wireless wlan0 security wpa cipher CCMP
set interfaces wireless wlan0 security wpa radius server 192.168.3.10 key 'VyOSPassword'
set interfaces wireless wlan0 security wpa radius server 192.168.3.10 port 1812
```

Resulting in

```
interfaces {
  [...]
  wireless wlan0 {
        address 192.168.2.1/24
        channel 1
        mode n
```

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```
        security {
            wpa {
                cipher CCMP
                mode wpa2
                radius {
                    server 192.168.3.10 {
                        key 'VyOSPassword'
                        port 1812
                    }
                }
            }
        }
        ssid "Enterprise-TEST"
        type access-point
    }
}
system {
  [...]
  wifi-regulatory-domain DE
}
```

VLAN

Regular VLANs (802.1q)

IEEE 802.1q, often referred to as Dot1q, is the networking standard that supports virtual LANs (VLANs) on an IEEE 802.3 Ethernet network. The standard defines a system of VLAN tagging for Ethernet frames and the accompanying procedures to be used by bridges and switches in handling such frames. The standard also contains provisions for a quality-of-service prioritization scheme commonly known as IEEE 802.1p and defines the Generic Attribute Registration Protocol.

Portions of the network which are VLAN-aware (i.e., IEEE 802.1q conformant) can include VLAN tags. When a frame enters the VLAN-aware portion of the network, a tag is added to represent the VLAN membership. Each frame must be distinguishable as being within exactly one VLAN. A frame in the VLAN-aware portion of the network that does not contain a VLAN tag is assumed to be flowing on the native VLAN.

The standard was developed by IEEE 802.1, a working group of the IEEE 802 standards committee, and continues to be actively revised. One of the notable revisions is 802.1Q-2014 which incorporated IEEE 802.1aq (Shortest Path Bridging) and much of the IEEE 802.1d standard.

802.1q VLAN interfaces are represented as virtual sub-interfaces in VyOS. The term used for this is `vif`.

set interfaces wireless <interface> vif <vlan-id>

Create a new VLAN interface on interface <*interface*> using the VLAN number provided via <*vlan-id*>.

You can create multiple VLAN interfaces on a physical interface. The VLAN ID range is from 0 to 4094.

Note: Only 802.1Q-tagged packets are accepted on Ethernet vifs.

---

set interfaces wireless <interface> vif <vlan-id> address <address | dhcp | dhcpv6>

Configure interface <*interface*> with one or more interface addresses.

- **address** can be specified multiple times as IPv4 and/or IPv6 address, e.g. 192.0.2.1/24 and/or 2001:db8::1/64
- **dhcp** interface address is received by DHCP from a DHCP server on this segment.
- **dhcpv6** interface address is received by DHCPv6 from a DHCPv6 server on this segment.

Example:

```
set interfaces wireless wlan0 vif 10 address 192.0.2.1/24
set interfaces wireless wlan0 vif 10 address 2001:db8::1/64
set interfaces wireless wlan0 vif 10 address dhcp
set interfaces wireless wlan0 vif 10 address dhcpv6
```

set interfaces wireless <interface> vif <vlan-id> description <description>

Set a human readable, descriptive alias for this connection. Alias is used by e.g. the `show interfaces` command or SNMP based monitoring tools.

Example:

```
set interfaces wireless wlan0 vif 10 description 'This is an awesome interface␣
↪running on VyOS'
```

set interfaces wireless <interface> vif <vlan-id> disable

Disable given <*interface*>. It will be placed in administratively down (`A/D`) state.

Example:

```
set interfaces wireless wlan0 vif 10 disable
```

set interfaces wireless <interface> vif <vlan-id> disable-link-detect

Use this command to direct an interface to not detect any physical state changes on a link, for example, when the cable is unplugged.

Default is to detects physical link state changes.

Example:

```
set interfaces wireless wlan0 vif 10 disable-link-detect
```

set interfaces wireless <interface> vif <vlan-id> mac <xx:xx:xx:xx:xx:xx>

Configure user defined MAC address on given <*interface*>.

Example:

```
set interfaces wireless wlan0 vif 10 mac '00:01:02:03:04:05'
```

set interfaces wireless <interface> vif <vlan-id> mtu <mtu>

Configure MTU on given <*interface*>. It is the size (in bytes) of the largest ethernet frame sent on this link.

Example:

```
set interfaces wireless wlan0 vif 10 mtu 9000
```

set interfaces wireless <interface> vif <vlan-id> ip arp-cache-timeout

Once a neighbor has been found, the entry is considered to be valid for at least for this specifc time. An entry's validity will be extended if it receives positive feedback from higher level protocols.

This defaults to 30 seconds.

Example:

```
set interfaces wireless wlan0 vif 10 ip arp-cache-timeout 180
```

set interfaces wireless <interface> vif <vlan-id> ip disable-arp-filter

If set the kernel can respond to arp requests with addresses from other interfaces. This may seem wrong but it usually makes sense, because it increases the chance of successful communication. IP addresses are owned by the complete host on Linux, not by particular interfaces. Only for more complex setups like load-balancing, does this behaviour cause problems.

If not set (default) allows you to have multiple network interfaces on the same subnet, and have the ARPs for each interface be answered based on whether or not the kernel would route a packet from the ARP'd IP out that interface (therefore you must use source based routing for this to work).

In other words it allows control of which cards (usually 1) will respond to an arp request.

Example:

```
set interfaces wireless wlan0 vif 10 ip disable-arp-filter
```

set interfaces wireless <interface> vif <vlan-id> ip disable-forwarding

Configure interface-specific Host/Router behaviour. If set, the interface will switch to host mode and IPv6 forwarding will be disabled on this interface.

```
set interfaces wireless wlan0 vif 10 ip disable-forwarding
```

set interfaces wireless <interface> vif <vlan-id> ip enable-arp-accept

Define behavior for gratuitous ARP frames who's IP is not already present in the ARP table. If configured create new entries in the ARP table.

Both replies and requests type gratuitous arp will trigger the ARP table to be updated, if this setting is on.

If the ARP table already contains the IP address of the gratuitous arp frame, the arp table will be updated regardless if this setting is on or off.

```
set interfaces wireless wlan0 vif 10 ip enable-arp-accept
```

set interfaces wireless <interface> vif <vlan-id> ip enable-arp-announce

Define different restriction levels for announcing the local source IP address from IP packets in ARP requests sent on interface.

Use any local address, configured on any interface if this is not set.

If configured, try to avoid local addresses that are not in the target's subnet for this interface. This mode is useful when target hosts reachable via this interface require the source IP address in ARP requests to be part of their logical network configured on the receiving interface. When we generate the request we will check all our subnets that include the target IP and will preserve the source address if it is from such subnet. If there is no such subnet we select source address according to the rules for level 2.

```
set interfaces wireless wlan0 vif 10 ip enable-arp-announce
```

set interfaces wireless <interface> vif <vlan-id> ip enable-arp-ignore

Define different modes for sending replies in response to received ARP requests that resolve local target IP addresses:

If configured, reply only if the target IP address is local address configured on the incoming interface.

If this option is unset (default), reply for any local target IP address, configured on any interface.

```
set interfaces wireless wlan0 vif 10 ip enable-arp-ignore
```

set interfaces wireless <interface> vif <vlan-id> ip enable-proxy-arp

Use this command to enable proxy Address Resolution Protocol (ARP) on this interface. Proxy ARP allows an Ethernet interface to respond with its own MAC address to ARP requests for destination IP addresses on subnets attached to other interfaces on the system. Subsequent packets sent to those destination IP addresses are forwarded appropriately by the system.

Example:

```
set interfaces wireless wlan0 vif 10 ip enable-proxy-arp
```

set interfaces wireless <interface> vif <vlan-id> ip proxy-arp-pvlan

Private VLAN proxy arp. Basically allow proxy arp replies back to the same interface (from which the ARP request/solicitation was received).

This is done to support (ethernet) switch features, like RFC 3069, where the individual ports are NOT allowed to communicate with each other, but they are allowed to talk to the upstream router. As described in RFC 3069, it is possible to allow these hosts to communicate through the upstream router by proxy_arp'ing.

Note: Don't need to be used together with proxy_arp.

This technology is known by different names:

- In RFC 3069 it is called VLAN Aggregation
- Cisco and Allied Telesyn call it Private VLAN
- Hewlett-Packard call it Source-Port filtering or port-isolation
- Ericsson call it MAC-Forced Forwarding (RFC Draft)

set interfaces wireless <interface> vif <vlan-id> ip source-validation <strict | loose | disable>

Enable policy for source validation by reversed path, as specified in RFC 3704. Current recommended practice in RFC 3704 is to enable strict mode to prevent IP spoofing from DDos attacks. If using asymmetric routing or other complicated routing, then loose mode is recommended.

- strict: Each incoming packet is tested against the FIB and if the interface is not the best reverse path the packet check will fail. By default failed packets are discarded.
- loose: Each incoming packet's source address is also tested against the FIB and if the source address is not reachable via any interface the packet check will fail.
- disable: No source validation

set interfaces wireless <interface> vif <vlan-id> ipv6 address autoconf

SLAAC RFC 4862. IPv6 hosts can configure themselves automatically when connected to an IPv6 network using the Neighbor Discovery Protocol via ICMPv6 router discovery messages. When first connected to a network, a host sends a link-local router solicitation multicast request for its configuration parameters; routers respond to such a request with a router advertisement packet that contains Internet Layer configuration parameters.

Note: This method automatically disables IPv6 traffic forwarding on the interface in question.

Example:

```
set interfaces wireless wlan0 vif 10 ipv6 address autoconf
```

set interfaces wireless <interface> vif <vlan-id> ipv6 address eui64 <prefix>

EUI-64 as specified in **RFC 4291** allows a host to assign iteslf a unique 64-Bit IPv6 address.

Example:

```
set interfaces wireless wlan0 vif 10 ipv6 address eui64 2001:db8:beef::/64
```

set interfaces wireless <interface> vif <vlan-id> ipv6 address no-default-link-local

Do not assign a link-local IPv6 address to this interface.

Example:

```
set interfaces wireless wlan0 vif 10 ipv6 address no-default-link-local
```

set interfaces wireless <interface> vif <vlan-id> ipv6 disable-forwarding

Configure interface-specific Host/Router behaviour. If set, the interface will switch to host mode and IPv6 forwarding will be disabled on this interface.

Example:

```
set interfaces wireless wlan0 vif 10 ipv6 disable-forwarding
```

set interfaces wireless <interface> vif <vlan-id> vrf <vrf>

Place interface in given VRF instance.

See also:

There is an entire chapter about how to configure a *VRF*, please check this for additional information.

Example:

```
set interfaces wireless wlan0 vif 10 vrf red
```

DHCP(v6)

set interfaces wireless <interface> vif <vlan-id> dhcp-options client-id <description>

RFC 2131 states: The client MAY choose to explicitly provide the identifier through the 'client identifier' option. If the client supplies a 'client identifier', the client MUST use the same 'client identifier' in all subsequent messages, and the server MUST use that identifier to identify the client.

Example:

```
set interfaces wireless wlan0 vif 10 dhcp-options client-id 'foo-bar'
```

set interfaces wireless <interface> vif <vlan-id> dhcp-options host-name <hostname>

Instead of sending the real system hostname to the DHCP server, overwrite the host-name with this given-value.

Example:

```
set interfaces wireless wlan0 vif 10 dhcp-options host-name 'VyOS'
```

set interfaces wireless <interface> vif <vlan-id> dhcp-options vendor-class-id <vendor-id>

The vendor-class-id option can be used to request a specific class of vendor options from the server.

Example:

```
set interfaces wireless wlan0 vif 10 dhcp-options vendor-class-id 'VyOS'
```

set interfaces wireless <interface> vif <vlan-id> dhcp-options no-default-route

Only request an address from the DHCP server but do not request a default gateway.

Example:

```
set interfaces wireless wlan0 vif 10 dhcp-options no-default-route
```

set interfaces wireless <interface> vif <vlan-id> dhcpv6-options duid <duid>

The DHCP unique identifier (DUID) is used by a client to get an IP address from a DHCPv6 server. It has a 2-byte DUID type field, and a variable-length identifier field up to 128 bytes. Its actual length depends on its type. The server compares the DUID with its database and delivers configuration data (address, lease times, DNS servers, etc.) to the client.

```
set interfaces wireless wlan0 vif 10 duid
↪'0e:00:00:01:00:01:27:71:db:f0:00:50:56:bf:c5:6d'
```

set interfaces wireless <interface> vif <vlan-id> dhcpv6-options parameters-only

This statement specifies dhcp6c to only exchange informational configuration parameters with servers. A list of DNS server addresses is an example of such parameters. This statement is useful when the client does not need stateful configuration parameters such as IPv6 addresses or prefixes.

```
set interfaces wireless wlan0 vif 10 dhcpv6-options parameters-only
```

set interfaces wireless <interface> vif <vlan-id> dhcpv6-options rapid-commit

When rapid-commit is specified, dhcp6c will include a rapid-commit option in solicit messages and wait for an immediate reply instead of advertisements.

```
set interfaces wireless wlan0 vif 10 dhcpv6-options rapid-commit
```

set interfaces wireless <interface> vif <vlan-id> dhcpv6-options temporary

Request only a temporary address and not form an IA_NA (Identity Association for Non-temporary Addresses) partnership.

```
set interfaces wireless wlan0 vif 10 dhcpv6-options temporary
```

DHCPv6 Prefix Delegation (PD)

VyOS 1.3 (equuleus) supports DHCPv6-PD (**RFC 3633**). DHCPv6 Prefix Delegation is supported by most ISPs who provide native IPv6 for consumers on fixed networks.

set interfaces wireless <interface> vif <vlan-id> dhcpv6-options pd <id> length <length>

Some ISPs by default only delegate a /64 prefix. To request for a specific prefix size use this option to request for a bigger delegation for this pd <*id*>. This value is in the range from 32 - 64 so you could request up to a /32 prefix (if your ISP allows this) down to a /64 delegation.

The default value corresponds to 64.

To request a /56 prefix from your ISP use:

```
set interfaces wireless wlan0 vif 10 dhcpv6-options pd 0 length 56
```

set interfaces wireless <interface> vif <vlan-id> dhcpv6-options pd <id> interface <delegatee> address <address>

Specify the interface address used locally on the interfcae where the prefix has been delegated to. ID must be a decimal integer.

It will be combined with the delegated prefix and the sla-id to form a complete interface address. The default is to use the EUI-64 address of the interface.

Example: Delegate a /64 prefix to interface eth8 which will use a local address on this router of <prefix>::ffff, as the address 65534 will correspond to ffff in hexadecimal notation.

```
set interfaces wireless wlan0 vif 10 dhcpv6-options pd 0 interface eth8 address␣
↪65534
```

set interfaces wireless <interface> vif <vlan-id> dhcpv6-options pd <id> interface <delegatee> sla-id <id>

Specify the identifier value of the site-level aggregator (SLA) on the interface. ID must be a decimal number greater then 0 which fits in the length of SLA IDs (see below).

Example: If ID is 1 and the client is delegated an IPv6 prefix 2001:db8:ffff::/48, dhcp6c will combine the two values into a single IPv6 prefix, 2001:db8:ffff:1::/64, and will configure the prefix on the specified interface.

```
set interfaces wireless wlan0 vif 10 dhcpv6-options pd 0 interface eth8 sla-id 1
```

QinQ (802.1ad)

IEEE 802.1ad was an Ethernet networking standard informally known as QinQ as an amendment to IEEE standard 802.1q VLAN interfaces as described above. 802.1ad was incorporated into the base 802.1q standard in 2011. The technique is also known as provider bridging, Stacked VLANs, or simply QinQ or Q-in-Q. "Q-in-Q" can for supported devices apply to C-tag stacking on C-tag (Ethernet Type = 0x8100).

The original 802.1q specification allows a single Virtual Local Area Network (VLAN) header to be inserted into an Ethernet frame. QinQ allows multiple VLAN tags to be inserted into a single frame, an essential capability for implementing Metro Ethernet network topologies. Just as QinQ extends 802.1Q, QinQ itself is extended by other Metro Ethernet protocols.

In a multiple VLAN header context, out of convenience the term "VLAN tag" or just "tag" for short is often used in place of "802.1q VLAN header". QinQ allows multiple VLAN tags in an Ethernet frame; together these tags constitute a tag stack. When used in the context of an Ethernet frame, a QinQ frame is a frame that has 2 VLAN 802.1q headers (double-tagged).

In VyOS the terms `vif-s` and `vif-c` stand for the ethertype tags that are used.

The inner tag is the tag which is closest to the payload portion of the frame. It is officially called C-TAG (customer tag, with ethertype 0x8100). The outer tag is the one closer/closest to the Ethernet header, its name is S-TAG (service tag with Ethernet Type = 0x88a8).

set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> address <address | dhcp | dhcpv6>

Configure interface <*interface*> with one or more interface addresses.

- **address** can be specified multiple times as IPv4 and/or IPv6 address, e.g. 192.0.2.1/24 and/or 2001:db8::1/64
- **dhcp** interface address is received by DHCP from a DHCP server on this segment.
- **dhcpv6** interface address is received by DHCPv6 from a DHCPv6 server on this segment.

Example:

```
set interfaces wireless wlan0 vif-s 1000 vif-c 20 address 192.0.2.1/24
set interfaces wireless wlan0 vif-s 1000 vif-c 20 address 2001:db8::1/64
set interfaces wireless wlan0 vif-s 1000 vif-c 20 address dhcp
set interfaces wireless wlan0 vif-s 1000 vif-c 20 address dhcpv6
```

set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> description <description>

Set a human readable, descriptive alias for this connection. Alias is used by e.g. the `show interfaces` command or SNMP based monitoring tools.

Example:

```
set interfaces wireless wlan0 vif-s 1000 vif-c 20 description 'This is an awesome␣
↪interface running on VyOS'
```

set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> disable

Disable given <*interface*>. It will be placed in administratively down (`A/D`) state.

Example:

```
set interfaces wireless wlan0 vif-s 1000 vif-c 20 disable
```

set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> disable-link-detect

Use this command to direct an interface to not detect any physical state changes on a link, for example, when the cable is unplugged.

Default is to detects physical link state changes.

Example:

```
set interfaces wireless wlan0 vif-s 1000 vif-c 20 disable-link-detect
```

set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> mac <xx:xx:xx:xx:xx:xx>

Configure user defined MAC address on given <*interface*>.

Example:

```
set interfaces wireless wlan0 vif-s 1000 vif-c 20 mac '00:01:02:03:04:05'
```

set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> mtu <mtu>

Configure MTU on given <*interface*>. It is the size (in bytes) of the largest ethernet frame sent on this link.

Example:

```
set interfaces wireless wlan0 vif-s 1000 vif-c 20 mtu 9000
```

set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> ip arp-cache-timeout

Once a neighbor has been found, the entry is considered to be valid for at least for this specifc time. An entry's validity will be extended if it receives positive feedback from higher level protocols.

This defaults to 30 seconds.

Example:

```
set interfaces wireless wlan0 vif-s 1000 vif-c 20 ip arp-cache-timeout 180
```

set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> ip disable-arp-filter

If set the kernel can respond to arp requests with addresses from other interfaces. This may seem wrong but it usually makes sense, because it increases the chance of successful communication. IP addresses are owned by the complete host on Linux, not by particular interfaces. Only for more complex setups like load-balancing, does this behaviour cause problems.

If not set (default) allows you to have multiple network interfaces on the same subnet, and have the ARPs for each interface be answered based on whether or not the kernel would route a packet from the ARP'd IP out that interface (therefore you must use source based routing for this to work).

In other words it allows control of which cards (usually 1) will respond to an arp request.

Example:

```
set interfaces wireless wlan0 vif-s 1000 vif-c 20 ip disable-arp-filter
```

set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> ip disable-forwarding

Configure interface-specific Host/Router behaviour. If set, the interface will switch to host mode and IPv6 forwarding will be disabled on this interface.

```
set interfaces wireless wlan0 vif-s 1000 vif-c 20 ip disable-forwarding
```

set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> ip enable-arp-accept

Define behavior for gratuitous ARP frames who's IP is not already present in the ARP table. If configured create new entries in the ARP table.

Both replies and requests type gratuitous arp will trigger the ARP table to be updated, if this setting is on.

If the ARP table already contains the IP address of the gratuitous arp frame, the arp table will be updated regardless if this setting is on or off.

```
set interfaces wireless wlan0 vif-s 1000 vif-c 20 ip enable-arp-accept
```

set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> ip enable-arp-announce

Define different restriction levels for announcing the local source IP address from IP packets in ARP requests sent on interface.

Use any local address, configured on any interface if this is not set.

If configured, try to avoid local addresses that are not in the target's subnet for this interface. This mode is useful when target hosts reachable via this interface require the source IP address in ARP requests to be part of their logical network configured on the receiving interface. When we generate the request we will check all our

subnets that include the target IP and will preserve the source address if it is from such subnet. If there is no such subnet we select source address according to the rules for level 2.

```
set interfaces wireless wlan0 vif-s 1000 vif-c 20 ip enable-arp-announce
```

set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> ip enable-arp-ignore

Define different modes for sending replies in response to received ARP requests that resolve local target IP addresses:

If configured, reply only if the target IP address is local address configured on the incoming interface.

If this option is unset (default), reply for any local target IP address, configured on any interface.

```
set interfaces wireless wlan0 vif-s 1000 vif-c 20 ip enable-arp-ignore
```

set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> ip enable-proxy-arp

Use this command to enable proxy Address Resolution Protocol (ARP) on this interface. Proxy ARP allows an Ethernet interface to respond with its own MAC address to ARP requests for destination IP addresses on subnets attached to other interfaces on the system. Subsequent packets sent to those destination IP addresses are forwarded appropriately by the system.

Example:

```
set interfaces wireless wlan0 vif-s 1000 vif-c 20 ip enable-proxy-arp
```

set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> ip proxy-arp-pvlan

Private VLAN proxy arp. Basically allow proxy arp replies back to the same interface (from which the ARP request/solicitation was received).

This is done to support (ethernet) switch features, like **RFC 3069**, where the individual ports are NOT allowed to communicate with each other, but they are allowed to talk to the upstream router. As described in **RFC 3069**, it is possible to allow these hosts to communicate through the upstream router by proxy_arp'ing.

Note: Don't need to be used together with proxy_arp.

This technology is known by different names:

- In **RFC 3069** it is called VLAN Aggregation
- Cisco and Allied Telesyn call it Private VLAN
- Hewlett-Packard call it Source-Port filtering or port-isolation
- Ericsson call it MAC-Forced Forwarding (RFC Draft)

set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> ip source-validation <strict | loose | disable>

Enable policy for source validation by reversed path, as specified in **RFC 3704**. Current recommended practice in **RFC 3704** is to enable strict mode to prevent IP spoofing from DDos attacks. If using asymmetric routing or other complicated routing, then loose mode is recommended.

- strict: Each incoming packet is tested against the FIB and if the interface is not the best reverse path the packet check will fail. By default failed packets are discarded.
- loose: Each incoming packet's source address is also tested against the FIB and if the source address is not reachable via any interface the packet check will fail.
- disable: No source validation

set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> ipv6 address autoconf

SLAAC **RFC 4862**. IPv6 hosts can configure themselves automatically when connected to an IPv6 network using the Neighbor Discovery Protocol via ICMPv6 router discovery messages. When first connected to a network, a host sends a link-local router solicitation multicast request for its configuration parameters; routers respond to such a request with a router advertisement packet that contains Internet Layer configuration parameters.

Note: This method automatically disables IPv6 traffic forwarding on the interface in question.

Example:

```
set interfaces wireless wlan0 vif-s 1000 vif-c 20 ipv6 address autoconf
```

set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> ipv6 address eui64 <prefix>

EUI-64 as specified in **RFC 4291** allows a host to assign iteslf a unique 64-Bit IPv6 address.

Example:

```
set interfaces wireless wlan0 vif-s 1000 vif-c 20 ipv6 address eui64␣
↪2001:db8:beef::/64
```

set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> ipv6 address no-default-link-local

Do not assign a link-local IPv6 address to this interface.

Example:

```
set interfaces wireless wlan0 vif-s 1000 vif-c 20 ipv6 address no-default-link-local
```

set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> ipv6 disable-forwarding

Configure interface-specific Host/Router behaviour. If set, the interface will switch to host mode and IPv6 forwarding will be disabled on this interface.

Example:

```
set interfaces wireless wlan0 vif-s 1000 vif-c 20 ipv6 disable-forwarding
```

set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> vrf <vrf>

Place interface in given VRF instance.

See also:

There is an entire chapter about how to configure a *VRF*, please check this for additional information.

Example:

```
set interfaces wireless wlan0 vif-s 1000 vif-c 20 vrf red
```

DHCP(v6)

set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> dhcp-options client-id <description>

RFC 2131 states: The client MAY choose to explicitly provide the identifier through the 'client identifier' option. If the client supplies a 'client identifier', the client MUST use the same 'client identifier' in all subsequent messages, and the server MUST use that identifier to identify the client.

Example:

```
set interfaces wireless wlan0 vif-s 1000 vif-c 20 dhcp-options client-id 'foo-bar'
```

set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> dhcp-options host-name <hostname>

Instead of sending the real system hostname to the DHCP server, overwrite the host-name with this given-value.

Example:

```
set interfaces wireless wlan0 vif-s 1000 vif-c 20 dhcp-options host-name 'VyOS'
```

set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> dhcp-options vendor-class-id <vendor-id>

The vendor-class-id option can be used to request a specific class of vendor options from the server.

Example:

```
set interfaces wireless wlan0 vif-s 1000 vif-c 20 dhcp-options vendor-class-id 'VyOS
↪'
```

set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> dhcp-options no-default-route

Only request an address from the DHCP server but do not request a default gateway.

Example:

```
set interfaces wireless wlan0 vif-s 1000 vif-c 20 dhcp-options no-default-route
```

set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> dhcpv6-options duid <duid>

The DHCP unique identifier (DUID) is used by a client to get an IP address from a DHCPv6 server. It has a 2-byte DUID type field, and a variable-length identifier field up to 128 bytes. Its actual length depends on its type. The server compares the DUID with its database and delivers configuration data (address, lease times, DNS servers, etc.) to the client.

```
set interfaces wireless wlan0 vif-s 1000 vif-c 20 duid
↪'0e:00:00:01:00:01:27:71:db:f0:00:50:56:bf:c5:6d'
```

set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> dhcpv6-options parameters-only

This statement specifies dhcp6c to only exchange informational configuration parameters with servers. A list of DNS server addresses is an example of such parameters. This statement is useful when the client does not need stateful configuration parameters such as IPv6 addresses or prefixes.

```
set interfaces wireless wlan0 vif-s 1000 vif-c 20 dhcpv6-options parameters-only
```

set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> dhcpv6-options rapid-commit

When rapid-commit is specified, dhcp6c will include a rapid-commit option in solicit messages and wait for an immediate reply instead of advertisements.

```
set interfaces wireless wlan0 vif-s 1000 vif-c 20 dhcpv6-options rapid-commit
```

set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> dhcpv6-options temporary

Request only a temporary address and not form an IA_NA (Identity Association for Non-temporary Addresses) partnership.

```
set interfaces wireless wlan0 vif-s 1000 vif-c 20 dhcpv6-options temporary
```

DHCPv6 Prefix Delegation (PD)

VyOS 1.3 (equuleus) supports DHCPv6-PD (**RFC 3633**). DHCPv6 Prefix Delegation is supported by most ISPs who provide native IPv6 for consumers on fixed networks.

set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> dhcpv6-options pd <id> length <length>

Some ISPs by default only delegate a /64 prefix. To request for a specific prefix size use this option to request for a bigger delegation for this pd *<id>*. This value is in the range from 32 - 64 so you could request up to a /32 prefix (if your ISP allows this) down to a /64 delegation.

The default value corresponds to 64.

To request a /56 prefix from your ISP use:

```
set interfaces wireless wlan0 vif-s 1000 vif-c 20 dhcpv6-options pd 0 length 56
```

set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> dhcpv6-options pd <id> interface <delegatee> address <address>

Specify the interface address used locally on the interfcae where the prefix has been delegated to. ID must be a decimal integer.

It will be combined with the delegated prefix and the sla-id to form a complete interface address. The default is to use the EUI-64 address of the interface.

Example: Delegate a /64 prefix to interface eth8 which will use a local address on this router of `<prefix>::ffff`, as the address 65534 will correspond to `ffff` in hexadecimal notation.

```
set interfaces wireless wlan0 vif-s 1000 vif-c 20 dhcpv6-options pd 0 interface␣
↪eth8 address 65534
```

set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> dhcpv6-options pd <id> interface <delegatee> sla-id <id>

Specify the identifier value of the site-level aggregator (SLA) on the interface. ID must be a decimal number greater then 0 which fits in the length of SLA IDs (see below).

Example: If ID is 1 and the client is delegated an IPv6 prefix 2001:db8:ffff::/48, dhcp6c will combine the two values into a single IPv6 prefix, 2001:db8:ffff:1::/64, and will configure the prefix on the specified interface.

```
set interfaces wireless wlan0 vif-s 1000 vif-c 20 dhcpv6-options pd 0 interface␣
↪eth8 sla-id 1
```

Operation

show interfaces wireless info

Use this command to view operational status and wireless-specific information about all wireless interfaces.

```
vyos@vyos:~$ show interfaces wireless info
Interface  Type          SSID                        Channel
wlan0      access-point  VyOS-TEST-0                       1
```

show interfaces wireless detail

Use this command to view operational status and details wireless-specific information about all wireless interfaces.

```
vyos@vyos:~$ show interfaces wireless detail
wlan0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default␣
↪qlen 1000
    link/ether XX:XX:XX:XX:XX:c3 brd XX:XX:XX:XX:XX:ff
    inet xxx.xxx.99.254/24 scope global wlan0
       valid_lft forever preferred_lft forever
    inet6 fe80::xxxx:xxxx:fe54:2fc3/64 scope link
       valid_lft forever preferred_lft forever

    RX:  bytes    packets     errors    dropped    overrun      mcast
         66072        282          0          0          0          0
    TX:  bytes    packets     errors    dropped    carrier collisions
         83413        430          0          0          0          0

wlan1: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default␣
↪qlen 1000
    link/ether XX:XX:XX:XX:XX:c3 brd XX:XX:XX:XX:XX:ff
    inet xxx.xxx.100.254/24 scope global wlan0
       valid_lft forever preferred_lft forever
    inet6 fe80::xxxx:xxxx:ffff:2ed3/64 scope link
       valid_lft forever preferred_lft forever

    RX:  bytes    packets     errors    dropped    overrun      mcast
         166072      5282          0          0          0          0
    TX:  bytes    packets     errors    dropped    carrier collisions
         183413      5430          0          0          0          0
```

show interfaces wireless <wlanX>

This command shows both status and statistics on the specified wireless interface. The wireless interface identifier can range from wlan0 to wlan999.

```
vyos@vyos:~$ show interfaces wireless wlan0
wlan0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default␣
↪qlen 1000
    link/ether XX:XX:XX:XX:XX:c3 brd XX:XX:XX:XX:XX:ff
    inet xxx.xxx.99.254/24 scope global wlan0
       valid_lft forever preferred_lft forever
    inet6 fe80::xxxx:xxxx:fe54:2fc3/64 scope link
       valid_lft forever preferred_lft forever
```

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```
    RX:  bytes    packets     errors    dropped    overrun      mcast
         66072        282          0          0          0          0
    TX:  bytes    packets     errors    dropped    carrier collisions
         83413        430          0          0          0          0
```

show interfaces wireless <wlanX> brief

This command gives a brief status overview of a specified wireless interface. The wireless interface identifier can range from wlan0 to wlan999.

```
vyos@vyos:~$ show interfaces wireless wlan0 brief
Codes: S - State, L - Link, u - Up, D - Down, A - Admin Down
Interface        IP Address                     S/L  Description
---------        ----------                     ---  -----------
wlan0            192.168.2.254/24                 u/u
```

show interfaces wireless <wlanX> queue

Use this command to view wireless interface queue information. The wireless interface identifier can range from wlan0 to wlan999.

```
vyos@vyos:~$ show interfaces wireless wlan0 queue
qdisc pfifo_fast 0: root bands 3 priomap 1 2 2 2 1 2 0 0 1 1 1 1 1 1 1 1
 Sent 810323 bytes 6016 pkt (dropped 0, overlimits 0 requeues 0)
 rate 0bit 0pps backlog 0b 0p requeues 0
```

show interfaces wireless <wlanX> scan

This command is used to retrieve information about WAP within the range of your wireless interface. This command is useful on wireless interfaces configured in station mode.

Note: Scanning is not supported on all wireless drivers and wireless hardware. Refer to your driver and wireless hardware documentation for further details.

```
vyos@vyos:~$ show interfaces wireless wlan0 scan
Address            SSID                          Channel  Signal (dbm)
00:53:3b:88:6e:d8  WLAN-576405                         1  -64.00
00:53:3b:88:6e:da  Telekom_FON                        1  -64.00
00:53:00:f2:c2:a4  BabyView_F2C2A4                    6  -60.00
00:53:3b:88:6e:d6  Telekom_FON                      100  -72.00
00:53:3b:88:6e:d4  WLAN-576405                      100  -71.00
00:53:44:a4:96:ec  KabelBox-4DC8                     56  -81.00
00:53:d9:7a:67:c2  WLAN-741980                       1  -75.00
00:53:7c:99:ce:76  Vodafone Homespot                  1  -86.00
00:53:44:a4:97:21  KabelBox-4DC8                     1  -78.00
00:53:44:a4:97:21  Vodafone Hotspot                  1  -79.00
00:53:44:a4:97:21  Vodafone Homespot                 1  -79.00
00:53:86:40:30:da  Telekom_FON                       1  -86.00
00:53:7c:99:ce:76  Vodafone Hotspot                  1  -86.00
00:53:44:46:d2:0b  Vodafone Hotspot                  1  -87.00
```

Examples

The following example creates a WAP. When configuring multiple WAP interfaces, you must specify unique IP addresses, channels, Network IDs commonly referred to as SSID (Service Set Identifier), and MAC addresses.

The WAP in this example has the following characteristics:

- IP address `192.168.2.1/24`
- Network ID (SSID) `TEST`
- WPA passphrase `12345678`
- Use 802.11n protocol
- Wireless channel 1

```
set interfaces wireless wlan0 address '192.168.2.1/24'
set interfaces wireless wlan0 type access-point
set interfaces wireless wlan0 channel 1
set interfaces wireless wlan0 mode n
set interfaces wireless wlan0 ssid 'TEST'
set interfaces wireless wlan0 security wpa mode wpa2
set interfaces wireless wlan0 security wpa cipher CCMP
set interfaces wireless wlan0 security wpa passphrase '12345678'
```

Resulting in

```
interfaces {
  [...]
  wireless wlan0 {
        address 192.168.2.1/24
        channel 1
        mode n
        security {
            wpa {
                cipher CCMP
                mode wpa2
                passphrase "12345678"
            }
        }
        ssid "TEST"
        type access-point
    }
}
system {
  [...]
  wifi-regulatory-domain DE
}
```

To get it to work as an access point with this configuration you will need to set up a DHCP server to work with that network. You can - of course - also bridge the Wireless interface with any configured bridge (*Bridge*) on the system.

Intel AX200

The Intel AX200 card does not work out of the box in AP mode, see https://unix.stackexchange.com/questions/598275/intel-ax200-ap-mode. You can still put this card into AP mode using the following configuration:

```
set interfaces wireless wlan0 channel '1'
set interfaces wireless wlan0 country-code 'us'
set interfaces wireless wlan0 mode 'n'
set interfaces wireless wlan0 physical-device 'phy0'
set interfaces wireless wlan0 ssid 'VyOS'
set interfaces wireless wlan0 type 'access-point'
```

8.4.17 WWAN - Wireless Wide-Area-Network

The Wireless Wide-Area-Network interface provides access (through a wireless modem/wwan) to wireless networks provided by various cellular providers.

VyOS uses the *interfaces wwan* subsystem for configuration.

Configuration

Common interface configuration

set interfaces wwan <interface> address <address | dhcp | dhcpv6>

Configure interface <*interface*> with one or more interface addresses.

- **address** can be specified multiple times as IPv4 and/or IPv6 address, e.g. 192.0.2.1/24 and/or 2001:db8::1/64
- **dhcp** interface address is received by DHCP from a DHCP server on this segment.
- **dhcpv6** interface address is received by DHCPv6 from a DHCPv6 server on this segment.

Example:

```
set interfaces wwan wwan0 address 192.0.2.1/24
set interfaces wwan wwan0 address 2001:db8::1/64
set interfaces wwan wwan0 address dhcp
set interfaces wwan wwan0 address dhcpv6
```

set interfaces wwan <interface> description <description>

Set a human readable, descriptive alias for this connection. Alias is used by e.g. the `show interfaces` command or SNMP based monitoring tools.

Example:

```
set interfaces wwan wwan0 description 'This is an awesome interface running on VyOS'
```

set interfaces wwan <interface> disable

Disable given <*interface*>. It will be placed in administratively down (`A/D`) state.

Example:

```
set interfaces wwan wwan0 disable
```

set interfaces wwan <interface> disable-link-detect

Use this command to direct an interface to not detect any physical state changes on a link, for example, when the cable is unplugged.

Default is to detects physical link state changes.

Example:

```
set interfaces wwan wwan0 disable-link-detect
```

set interfaces wwan <interface> mtu <mtu>

Configure MTU on given <*interface*>. It is the size (in bytes) of the largest ethernet frame sent on this link.

Example:

```
set interfaces wwan wwan0 mtu 9000
```

set interfaces wwan <interface> ip arp-cache-timeout

Once a neighbor has been found, the entry is considered to be valid for at least for this specifc time. An entry's validity will be extended if it receives positive feedback from higher level protocols.

This defaults to 30 seconds.

Example:

```
set interfaces wwan wwan0 ip arp-cache-timeout 180
```

set interfaces wwan <interface> ip disable-arp-filter

If set the kernel can respond to arp requests with addresses from other interfaces. This may seem wrong but it usually makes sense, because it increases the chance of successful communication. IP addresses are owned by the complete host on Linux, not by particular interfaces. Only for more complex setups like load-balancing, does this behaviour cause problems.

If not set (default) allows you to have multiple network interfaces on the same subnet, and have the ARPs for each interface be answered based on whether or not the kernel would route a packet from the ARP'd IP out that interface (therefore you must use source based routing for this to work).

In other words it allows control of which cards (usually 1) will respond to an arp request.

Example:

```
set interfaces wwan wwan0 ip disable-arp-filter
```

set interfaces wwan <interface> ip disable-forwarding

Configure interface-specific Host/Router behaviour. If set, the interface will switch to host mode and IPv6 forwarding will be disabled on this interface.

```
set interfaces wwan wwan0 ip disable-forwarding
```

set interfaces wwan <interface> ip enable-arp-accept

Define behavior for gratuitous ARP frames who's IP is not already present in the ARP table. If configured create new entries in the ARP table.

Both replies and requests type gratuitous arp will trigger the ARP table to be updated, if this setting is on.

If the ARP table already contains the IP address of the gratuitous arp frame, the arp table will be updated regardless if this setting is on or off.

```
set interfaces wwan wwan0 ip enable-arp-accept
```

set interfaces wwan <interface> ip enable-arp-announce

Define different restriction levels for announcing the local source IP address from IP packets in ARP requests sent on interface.

Use any local address, configured on any interface if this is not set.

If configured, try to avoid local addresses that are not in the target's subnet for this interface. This mode is useful when target hosts reachable via this interface require the source IP address in ARP requests to be part of their logical network configured on the receiving interface. When we generate the request we will check all our subnets that include the target IP and will preserve the source address if it is from such subnet. If there is no such subnet we select source address according to the rules for level 2.

```
set interfaces wwan wwan0 ip enable-arp-announce
```

set interfaces wwan <interface> ip enable-arp-ignore

Define different modes for sending replies in response to received ARP requests that resolve local target IP addresses:

If configured, reply only if the target IP address is local address configured on the incoming interface.

If this option is unset (default), reply for any local target IP address, configured on any interface.

```
set interfaces wwan wwan0 ip enable-arp-ignore
```

set interfaces wwan <interface> ip enable-proxy-arp

Use this command to enable proxy Address Resolution Protocol (ARP) on this interface. Proxy ARP allows an Ethernet interface to respond with its own MAC address to ARP requests for destination IP addresses on subnets attached to other interfaces on the system. Subsequent packets sent to those destination IP addresses are forwarded appropriately by the system.

Example:

```
set interfaces wwan wwan0 ip enable-proxy-arp
```

set interfaces wwan <interface> ip proxy-arp-pvlan

Private VLAN proxy arp. Basically allow proxy arp replies back to the same interface (from which the ARP request/solicitation was received).

This is done to support (ethernet) switch features, like **RFC 3069**, where the individual ports are NOT allowed to communicate with each other, but they are allowed to talk to the upstream router. As described in **RFC 3069**, it is possible to allow these hosts to communicate through the upstream router by proxy_arp'ing.

Note: Don't need to be used together with proxy_arp.

This technology is known by different names:

- In **RFC 3069** it is called VLAN Aggregation
- Cisco and Allied Telesyn call it Private VLAN
- Hewlett-Packard call it Source-Port filtering or port-isolation

- Ericsson call it MAC-Forced Forwarding (RFC Draft)

set interfaces wwan <interface> ip source-validation <strict | loose | disable>

Enable policy for source validation by reversed path, as specified in **RFC 3704**. Current recommended practice in **RFC 3704** is to enable strict mode to prevent IP spoofing from DDos attacks. If using asymmetric routing or other complicated routing, then loose mode is recommended.

- strict: Each incoming packet is tested against the FIB and if the interface is not the best reverse path the packet check will fail. By default failed packets are discarded.
- loose: Each incoming packet's source address is also tested against the FIB and if the source address is not reachable via any interface the packet check will fail.
- disable: No source validation

set interfaces wwan <interface> ipv6 address autoconf

SLAAC **RFC 4862**. IPv6 hosts can configure themselves automatically when connected to an IPv6 network using the Neighbor Discovery Protocol via ICMPv6 router discovery messages. When first connected to a network, a host sends a link-local router solicitation multicast request for its configuration parameters; routers respond to such a request with a router advertisement packet that contains Internet Layer configuration parameters.

Note: This method automatically disables IPv6 traffic forwarding on the interface in question.

Example:

```
set interfaces wwan wwan0 ipv6 address autoconf
```

set interfaces wwan <interface> ipv6 address eui64 <prefix>

EUI-64 as specified in **RFC 4291** allows a host to assign iteslf a unique 64-Bit IPv6 address.

Example:

```
set interfaces wwan wwan0 ipv6 address eui64 2001:db8:beef::/64
```

set interfaces wwan <interface> ipv6 address no-default-link-local

Do not assign a link-local IPv6 address to this interface.

Example:

```
set interfaces wwan wwan0 ipv6 address no-default-link-local
```

set interfaces wwan <interface> ipv6 disable-forwarding

Configure interface-specific Host/Router behaviour. If set, the interface will switch to host mode and IPv6 forwarding will be disabled on this interface.

Example:

```
set interfaces wwan wwan0 ipv6 disable-forwarding
```

set interfaces wwan <interface> vrf <vrf>

Place interface in given VRF instance.

See also:

There is an entire chapter about how to configure a *VRF*, please check this for additional information.

Example:

```
set interfaces wwan wwan0 vrf red
```

DHCP(v6)

set interfaces wwan <interface> dhcp-options client-id <description>

RFC 2131 states: The client MAY choose to explicitly provide the identifier through the 'client identifier' option. If the client supplies a 'client identifier', the client MUST use the same 'client identifier' in all subsequent messages, and the server MUST use that identifier to identify the client.

Example:

```
set interfaces wwan wwan0 dhcp-options client-id 'foo-bar'
```

set interfaces wwan <interface> dhcp-options host-name <hostname>

Instead of sending the real system hostname to the DHCP server, overwrite the host-name with this given-value.

Example:

```
set interfaces wwan wwan0 dhcp-options host-name 'VyOS'
```

set interfaces wwan <interface> dhcp-options vendor-class-id <vendor-id>

The vendor-class-id option can be used to request a specific class of vendor options from the server.

Example:

```
set interfaces wwan wwan0 dhcp-options vendor-class-id 'VyOS'
```

set interfaces wwan <interface> dhcp-options no-default-route

Only request an address from the DHCP server but do not request a default gateway.

Example:

```
set interfaces wwan wwan0 dhcp-options no-default-route
```

set interfaces wwan <interface> dhcpv6-options duid <duid>

The DHCP unique identifier (DUID) is used by a client to get an IP address from a DHCPv6 server. It has a 2-byte DUID type field, and a variable-length identifier field up to 128 bytes. Its actual length depends on its type. The server compares the DUID with its database and delivers configuration data (address, lease times, DNS servers, etc.) to the client.

```
set interfaces wwan wwan0 duid '0e:00:00:01:00:01:27:71:db:f0:00:50:56:bf:c5:6d'
```

set interfaces wwan <interface> dhcpv6-options parameters-only

This statement specifies dhcp6c to only exchange informational configuration parameters with servers. A list of DNS server addresses is an example of such parameters. This statement is useful when the client does not need stateful configuration parameters such as IPv6 addresses or prefixes.

```
set interfaces wwan wwan0 dhcpv6-options parameters-only
```

set interfaces wwan <interface> dhcpv6-options rapid-commit

When rapid-commit is specified, dhcp6c will include a rapid-commit option in solicit messages and wait for an immediate reply instead of advertisements.

```
set interfaces wwan wwan0 dhcpv6-options rapid-commit
```

set interfaces wwan <interface> dhcpv6-options temporary

Request only a temporary address and not form an IA_NA (Identity Association for Non-temporary Addresses) partnership.

```
set interfaces wwan wwan0 dhcpv6-options temporary
```

DHCPv6 Prefix Delegation (PD)

VyOS 1.3 (equuleus) supports DHCPv6-PD (**RFC 3633**). DHCPv6 Prefix Delegation is supported by most ISPs who provide native IPv6 for consumers on fixed networks.

set interfaces wwan <interface> dhcpv6-options pd <id> length <length>

Some ISPs by default only delegate a /64 prefix. To request for a specific prefix size use this option to request for a bigger delegation for this pd *<id>*. This value is in the range from 32 - 64 so you could request up to a /32 prefix (if your ISP allows this) down to a /64 delegation.

The default value corresponds to 64.

To request a /56 prefix from your ISP use:

```
set interfaces wwan wwan0 dhcpv6-options pd 0 length 56
```

set interfaces wwan <interface> dhcpv6-options pd <id> interface <delegatee> address <address>

Specify the interface address used locally on the interfcae where the prefix has been delegated to. ID must be a decimal integer.

It will be combined with the delegated prefix and the sla-id to form a complete interface address. The default is to use the EUI-64 address of the interface.

Example: Delegate a /64 prefix to interface eth8 which will use a local address on this router of `<prefix>::ffff`, as the address 65534 will correspond to `ffff` in hexadecimal notation.

```
set interfaces wwan wwan0 dhcpv6-options pd 0 interface eth8 address 65534
```

set interfaces wwan <interface> dhcpv6-options pd <id> interface <delegatee> sla-id <id>

Specify the identifier value of the site-level aggregator (SLA) on the interface. ID must be a decimal number greater then 0 which fits in the length of SLA IDs (see below).

Example: If ID is 1 and the client is delegated an IPv6 prefix 2001:db8:ffff::/48, dhcp6c will combine the two values into a single IPv6 prefix, 2001:db8:ffff:1::/64, and will configure the prefix on the specified interface.

```
set interfaces wwan wwan0 dhcpv6-options pd 0 interface eth8 sla-id 1
```

WirelessModem (WWAN) options

set interfaces wwan <interface> apn <apn>

Every WWAN connection requires an APN (Access Point Name) which is used by the client to dial into the ISPs network. This is a mandatory parameter. Contact your Service Provider for correct APN.

Operation

show interfaces wwan <interface>

Show detailed information on given <*interface*>

```
vyos@vyos:~$ show interfaces wwan wwan0
wwan0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UNKNOWN␣
↪group default qlen 1000
    link/ether 02:c2:f3:00:01:02 brd ff:ff:ff:ff:ff:ff
    inet 10.155.144.12/30 brd 10.155.144.15 scope global dynamic wwan0
       valid_lft 7012sec preferred_lft 7012sec
    inet6 fe80::c2:f3ff:fe00:0102/64 scope link
       valid_lft forever preferred_lft forever

    RX:  bytes  packets  errors  dropped  overrun       mcast
          640        2       0        0        0           0
    TX:  bytes  packets  errors  dropped  carrier  collisions
         3229       16       0        0        0           0
```

show interfaces wwan <interface> summary

Show detailed information summary on given <*interface*>

```
vyos@vyos:~$ show interfaces wwan wwan0 summary
  ---------------------------------
  General  |            dbus path: /org/freedesktop/ModemManager1/Modem/0
           |            device id: 79f4e9cc2e9fc8d4a3b8c8f6327c2e363170194d
  ---------------------------------
  Hardware |         manufacturer: Sierra Wireless, Incorporated
           |                model: MC7710
           |             revision: SWI9200X_03.05.29.03ap r6485 CNSHZ-ED-XP0031␣
↪2014/12/02 17:53:15
           |         h/w revision: 1.0
           |            supported: gsm-umts, lte
           |              current: gsm-umts, lte
           |         equipment id: 358xxxxxxxxxxx
  ---------------------------------
  System   |               device: /sys/devices/pci0000:00/0000:00:13.0/usb3/3-1/3-
↪1.3
           |              drivers: qcserial, qmi_wwan
           |               plugin: Generic
           |         primary port: cdc-wdm0
           |                ports: ttyUSB0 (qcdm), ttyUSB2 (at), cdc-wdm0 (qmi),␣
↪wwan0 (net)
  ---------------------------------
  Numbers  |                  own: 4917xxxxxxxx
```

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```
  --------------------------------
  Status    |                 lock: sim-pin2
            |       unlock retries: sim-pin (3), sim-pin2 (3), sim-puk (10), sim-
↪puk2 (10)
            |                state: connected
            |          power state: on
            |          access tech: lte
            |       signal quality: 63% (recent)
  --------------------------------
  Modes     |            supported: allowed: 2g; preferred: none
            |                       allowed: 3g; preferred: none
            |                       allowed: 4g; preferred: none
            |                       allowed: 2g, 3g; preferred: 3g
            |                       allowed: 2g, 3g; preferred: 2g
            |                       allowed: 2g, 4g; preferred: 4g
            |                       allowed: 2g, 4g; preferred: 2g
            |                       allowed: 3g, 4g; preferred: 3g
            |                       allowed: 3g, 4g; preferred: 4g
            |                       allowed: 2g, 3g, 4g; preferred: 4g
            |                       allowed: 2g, 3g, 4g; preferred: 3g
            |                       allowed: 2g, 3g, 4g; preferred: 2g
            |              current: allowed: 2g, 3g, 4g; preferred: 2g
  --------------------------------
  Bands     |            supported: egsm, dcs, pcs, utran-1, utran-8, eutran-1,␣
↪eutran-3,
            |                       eutran-7, eutran-8, eutran-20
            |              current: egsm, dcs, pcs, utran-1, utran-8, eutran-1,␣
↪eutran-3,
            |                       eutran-7, eutran-8, eutran-20
  --------------------------------
  IP        |            supported: ipv4, ipv6, ipv4v6
  --------------------------------
  3GPP      |                 imei: 358xxxxxxxxxxx
            |          operator id: 26201
            |        operator name: Telekom.de
            |         registration: home
  --------------------------------
  3GPP EPS | ue mode of operation: ps-1
  --------------------------------
  SIM       |            dbus path: /org/freedesktop/ModemManager1/SIM/0
  --------------------------------
  Bearer    |            dbus path: /org/freedesktop/ModemManager1/Bearer/0
```

show interfaces wwan <interface> capabilities

Show WWAN module hardware capabilities.

```
vyos@vyos:~$ show interfaces wwan wwan0 capabilities
Max TX channel rate: '50000000'
Max RX channel rate: '100000000'
Data Service: 'simultaneous-cs-ps'
SIM: 'supported'
Networks: 'gsm, umts, lte'
```

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```
Bands: 'gsm-dcs-1800, gsm-900-extended, gsm-900-primary, gsm-pcs-1900, wcdma-2100,␣
↪wcdma-900'
LTE bands: '1, 3, 7, 8, 20'
```

show interfaces wwan <interface> firmware

Show WWAN module firmware.

```
vyos@vyos:~$ show interfaces wwan wwan0 firmware
Model: MC7710
Boot version: SWI9200X_03.05.29.03bt r6485 CNSHZ-ED-XP0031 2014/12/02 17:33:08
AMSS version: SWI9200X_03.05.29.03ap r6485 CNSHZ-ED-XP0031 2014/12/02 17:53:15
SKU ID: unknown
Package ID: unknown
Carrier ID: 0
Config version: unknown
```

show interfaces wwan <interface> imei

Show WWAN module IMEI.

```
vyos@vyos:~$ show interfaces wwan wwan0 imei
ESN: '0'
IMEI: '358xxxxxxxxxxx'
MEID: 'unknown'
```

show interfaces wwan <interface> imsi

Show WWAN module IMSI.

```
vyos@vyos:~$ show interfaces wwan wwan0 imsi
IMSI: '262xxxxxxxxxxx'
```

show interfaces wwan <interface> model

Show WWAN module model.

```
vyos@vyos:~$ show interfaces wwan wwan0 model
Model: 'MC7710'
```

show interfaces wwan <interface> msisdn

Show WWAN module MSISDN.

```
vyos@vyos:~$ show interfaces wwan wwan0 msisdn
MSISDN: '4917xxxxxxxx'
```

show interfaces wwan <interface> revision

Show WWAN module hardware revision.

```
vyos@vyos:~$ show interfaces wwan wwan0 revision
Revision: 'SWI9200X_03.05.29.03ap r6485 CNSHZ-ED-XP0031 2014/12/02 17:53:15'
```

show interfaces wwan <interface> signal

Show WWAN module signal strength.

```
vyos@vyos:~$ show interfaces wwan wwan0 signal
LTE:
RSSI: '-74 dBm'
RSRQ: '-7 dB'
RSRP: '-100 dBm'
SNR: '13.0 dB'
Radio Interface:   'lte'
Active Band Class: 'eutran-3'
Active Channel:    '1300'
```

show interfaces wwan <interface> sim

Show WWAN module SIM card information.

```
vyos@vyos:~$ show interfaces wwan wwan0 sim
Provisioning applications:
Primary GW:   slot '1', application '1'
Primary 1X:   session doesn't exist
Secondary GW: session doesn't exist
Secondary 1X: session doesn't exist
Slot [1]:
Card state: 'present'
UPIN state: 'not-initialized'
UPIN retries: '0'
UPUK retries: '0'
Application [1]:
Application type:  'usim (2)'
Application state: 'ready'
Application ID:
A0:00:00:00:87:10:02:FF:49:94:20:89:03:10:00:00
Personalization state: 'ready'
UPIN replaces PIN1: 'no'
PIN1 state: 'disabled'
PIN1 retries: '3'
PUK1 retries: '10'
PIN2 state: 'enabled-not-verified'
PIN2 retries: '3'
PUK2 retries: '10'
```

Example

The following example is based on a Sierra Wireless MC7710 miniPCIe card (only the form factor in reality it runs UBS) and Deutsche Telekom as ISP. The card is assembled into a *PC Engines APU4*.

```
set interfaces wwan wwan0 apn 'internet.telekom'
set interfaces wwan wwan0 address 'dhcp'
```

Supported Modules

The following hardware modules have been tested successfully in an *PC Engines APU4* board:

- Sierra Wireless AirPrime MC7304 miniPCIe card (LTE)
- Sierra Wireless AirPrime MC7430 miniPCIe card (LTE)
- Sierra Wireless AirPrime MC7455 miniPCIe card (LTE)
- Sierra Wireless AirPrime MC7710 miniPCIe card (LTE)
- Huawei ME909u-521 miniPCIe card (LTE)
- Huawei ME909s-120 miniPCIe card (LTE)

Firmware Update

All available WWAN cards have a build in, reprogrammable firmware. Most of the vendors provide a regular update to the firmware used in the baseband chip.

As VyOS makes use of the QMI interface to connect to the WWAN modem cards, also the firmware can be reprogrammed.

To update the firmware, VyOS also ships the *qmi-firmware-update* binary. To upgrade the firmware of an e.g. Sierra Wireless MC7710 module to the firmware provided in the file `9999999_9999999_9200_03.05.14.00_00_generic_000.000_001_SPKG_MC.cwe` use the following command:

```
$ sudo qmi-firmware-update --update -d 1199:68a2 \
   9999999_9999999_9200_03.05.14.00_00_generic_000.000_001_SPKG_MC.cwe
```

8.5 WAN load balancing

Outbound traffic can be balanced between two or more outbound interfaces. If a path fails, traffic is balanced across the remaining healthy paths, a recovered path is automatically added back to the routing table and used by the load balancer. The load balancer automatically adds routes for each path to the routing table and balances traffic across the configured interfaces, determined by interface health and weight.

In a minimal configuration, the following must be provided:

- an interface with a nexthop
- one rule with a LAN (inbound-interface) and the WAN (interface).

Let's assume we have two DHCP WAN interfaces and one LAN (eth2):

```
set load-balancing wan interface-health eth0 nexthop 'dhcp'
set load-balancing wan interface-health eth1 nexthop 'dhcp'
set load-balancing wan rule 1 inbound-interface 'eth2'
set load-balancing wan rule 1 interface eth0
set load-balancing wan rule 1 interface eth1
```

Note: WAN Load Balacing should not be used when dynamic routing protocol is used/needed. This feature creates customized routing tables and firewall rules, that makes it incompatible to use with routing protocols.

8.5.1 Balancing Rules

Interfaces, their weight and the type of traffic to be balanced are defined in numbered balancing rule sets. The rule sets are executed in numerical order against outgoing packets. In case of a match the packet is sent through an interface specified in the matching rule. If a packet doesn't match any rule it is sent by using the system routing table. Rule numbers can't be changed.

Create a load balancing rule, it can be a number between 1 and 9999:

```
vyos@vyos# set load-balancing wan rule 1
Possible completions:
description             Description for this rule
> destination           Destination
exclude                 Exclude packets matching this rule from wan load balance
failover                Enable failover for packets matching this rule from wan load␣
↪balance
inbound-interface       Inbound interface name (e.g., "eth0") [REQUIRED]
+> interface            Interface name [REQUIRED]
> limit                 Enable packet limit for this rule
per-packet-balancing    Option to match traffic per-packet instead of the default, per-
↪flow
protocol                Protocol to match
> source                Source information
```

Interface weight

Let's expand the example from above and add weight to the interfaces. The bandwidth from eth0 is larger than eth1. Per default, outbound traffic is distributed randomly across available interfaces. Weights can be assigned to interfaces to influence the balancing.

```
set load-balancing wan rule 1 interface eth0 weight 2
set load-balancing wan rule 1 interface eth1 weight 1
```

66% of traffic is routed to eth0, eth1 gets 33% of traffic.

Rate limit

A packet rate limit can be set for a rule to apply the rule to traffic above or below a specified threshold. To configure the rate limiting use:

```
set load-balancing wan rule <rule> limit <parameter>
```

- `burst`: Number of packets allowed to overshoot the limit within `period`. Default 5.
- `period`: Time window for rate calculation. Possible values: `second` (one second), `minute` (one minute), `hour` (one hour). Default is `second`.
- `rate`: Number of packets. Default 5.
- `threshold`: `below` or `above` the specified rate limit.

Flow and packet-based balancing

Outgoing traffic is balanced in a flow-based manner. A connection tracking table is used to track flows by their source address, destination address and port. Each flow is assigned to an interface according to the defined balancing rules and subsequent packets are sent through the same interface. This has the advantage that packets always arrive in order if links with different speeds are in use.

Packet-based balancing can lead to a better balance across interfaces when out of order packets are no issue. Per-packet-based balancing can be set for a balancing rule with:

```
set load-balancing wan rule <rule> per-packet-balancing
```

Exclude traffic

To exclude traffic from load balancing, traffic matching an exclude rule is not balanced but routed through the system routing table instead:

```
set load-balancing wan rule <rule> exclude
```

8.5.2 Health checks

The health of interfaces and paths assigned to the load balancer is periodically checked by sending ICMP packets (ping) to remote destinations, a TTL test or the execution of a user defined script. If an interface fails the health check it is removed from the load balancer's pool of interfaces. To enable health checking for an interface:

```
vyos@vyos# set load-balancing wan interface-health <interface>
Possible completions:
failure-count    Failure count
nexthop          Outbound interface nexthop address. Can be 'dhcp or ip address'␣
↪[REQUIRED]
success-count    Success count
+> test          Rule number
```

Specify nexthop on the path to the destination, `ipv4-address` can be set to `dhcp`

```
set load-balancing wan interface-health <interface> nexthop <ipv4-address>
```

Set the number of health check failures before an interface is marked as unavailable, range for number is 1 to 10, default 1. Or set the number of successful health checks before an interface is added back to the interface pool, range for number is 1 to 10, default 1.

```
set load-balancing wan interface-health <interface> failure-count <number>
set load-balancing wan interface-health <interface> success-count <number>
```

Each health check is configured in its own test, tests are numbered and processed in numeric order. For multi target health checking multiple tests can be defined:

```
vyos@vyos# set load-balancing wan interface-health eth1 test 0
Possible completions:
resp-time    Ping response time (seconds)
target       Health target address
test-script  Path to user defined script
```

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```
ttl-limit    Ttl limit (hop count)
type         WLB test type
```

- `resp-time`: the maximum response time for ping in seconds. Range 1…30, default 5
- `target`: the target to be sent ICMP packets to, address can be an IPv4 address or hostname
- `test-script`: A user defined script must return 0 to be considered successful and non-zero to fail. Scripts are located in /config/scripts, for different locations the full path needs to be provided
- `ttl-limit`: For the UDP TTL limit test the hop count limit must be specified. The limit must be shorter than the path length, an ICMP time expired message is needed to be returned for a successful test. default 1
- `type`: Specify the type of test. type can be ping, ttl or a user defined script

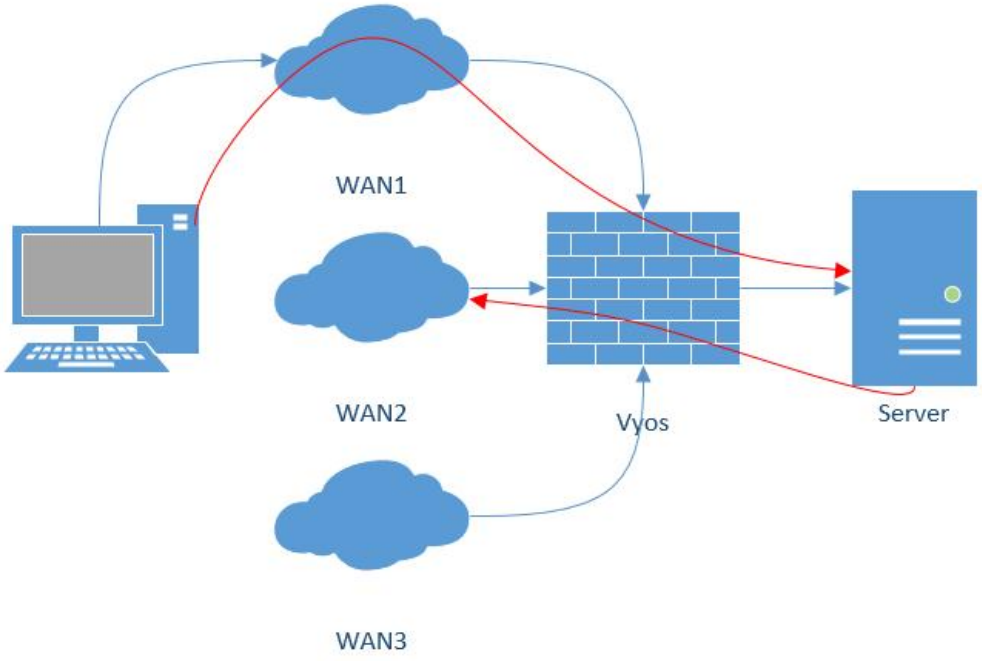
8.5.3 Source NAT rules

Per default, interfaces used in a load balancing pool replace the source IP of each outgoing packet with its own address to ensure that replies arrive on the same interface. This works through automatically generated source NAT (SNAT) rules, these rules are only applied to balanced traffic. In cases where this behaviour is not desired, the automatic generation of SNAT rules can be disabled:

```
set load-balancing wan disable-source-nat
```

8.5.4 Sticky Connections

Inbound connections to a WAN interface can be improperly handled when the reply is sent back to the client.



Upon reception of an incoming packet, when a response is sent, it might be desired to ensure that it leaves from the same interface as the inbound one. This can be achieved by enabling sticky connections in the load balancing:

```
set load-balancing wan sticky-connections inbound
```

8.5.5 Failover

In failover mode, one interface is set to be the primary interface and other interfaces are secondary or spare. Instead of balancing traffic across all healthy interfaces, only the primary interface is used and in case of failure, a secondary interface selected from the pool of available interfaces takes over. The primary interface is selected based on its weight and health, others become secondary interfaces. Secondary interfaces to take over a failed primary interface are chosen from the load balancer's interface pool, depending on their weight and health. Interface roles can also be selected based on rule order by including interfaces in balancing rules and ordering those rules accordingly. To put the load balancer in failover mode, create a failover rule:

```
set load-balancing wan rule <number> failover
```

Because existing sessions do not automatically fail over to a new path, the session table can be flushed on each connection state change:

```
set load-balancing wan flush-connections
```

Warning: Flushing the session table will cause other connections to fall back from flow-based to packet-based balancing until each flow is reestablished.

8.5.6 Script execution

A script can be run when an interface state change occurs. Scripts are run from /config/scripts, for a different location specify the full path:

```
set load-balancing wan hook script-name
```

Two environment variables are available:

- `WLB_INTERFACE_NAME=[interfacename]`: Interface to be monitored
- `WLB_INTERFACE_STATE=[ACTIVE|FAILED]`: Interface state

Warning: Blocking call with no timeout. System will become unresponsive if script does not return!

8.5.7 Handling and monitoring

Show WAN load balancer information including test types and targets. A character at the start of each line depicts the state of the test

- + successful
- - failed
- a blank indicates that no test has been carried out

```
vyos@vyos:~$ show wan-load-balance
Interface:  eth0
Status:  failed
Last Status Change:  Tue Jun 11 20:12:19 2019
-Test:  ping  Target:
    Last Interface Success:  55s
    Last Interface Failure:  0s
    # Interface Failure(s):  5

Interface:  eth1
Status:  active
Last Status Change:  Tue Jun 11 20:06:42 2019
+Test:  ping  Target:
    Last Interface Success:  0s
    Last Interface Failure:  6m26s
    # Interface Failure(s):  0
```

Show connection data of load balanced traffic:

```
vyos@vyos:~$ show wan-load-balance connection
conntrack v1.4.2 (conntrack-tools): 3 flow entries have been shown.
Type    State           Src                     Dst                     Packets Bytes
tcp     TIME_WAIT       10.1.1.13:38040         203.0.113.2:80          203.0.113.2  192.
↪168.188.71
udp                     10.1.1.13:41891         198.51.100.3:53         198.51.100.3 192.
↪168.188.71
udp                     10.1.1.13:55437         198.51.100.3:53         198.51.100.3 192.
↪168.188.71
```

Restart

```
restart wan-load-balance
```

8.6 NAT

8.6.1 NPTv6

NPTv6 (Network Prefix Translation) is a form of NAT for IPv6. It's described in **RFC 6296**.

Usage

NPTv6 is very useful for IPv6 multihoming. It is also commonly used when the external IPv6 prefix is dynamic, as it prevents the need for renumbering of internal hosts when the extern prefix changes.

Let's assume the following network configuration:

- eth0 : LAN
- eth1 : WAN1, with 2001:db8:e1::/48 routed towards it
- eth2 : WAN2, with 2001:db8:e2::/48 routed towards it

Regarding LAN hosts addressing, why would you choose 2001:db8:e1::/48 over 2001:db8:e2::/48? What happens when you get a new provider with a different routed IPv6 subnet?

The solution here is to assign to your hosts ULAs and to prefix-translate their address to the right subnet when going through your router.

- LAN Subnet : fc00:dead:beef::/48
- WAN 1 Subnet : 2001:db8:e1::/48
- WAN 2 Subnet : 2001:db8:e2::/48
- eth0 addr : fc00:dead:beef::1/48
- eth1 addr : 2001:db8:e1::1/48
- eth2 addr : 2001:db8:e2::1/48

VyOS Support

NPTv6 support has been added in VyOS 1.2 (Crux) and is available through *nat nptv6* configuration nodes.

```
set nat nptv6 rule 10 source prefix 'fc00:dead:beef::/48'
set nat nptv6 rule 10 outbound-interface 'eth1'
set nat nptv6 rule 10 translation prefix '2001:db8:e1::/48'
set nat nptv6 rule 20 source prefix 'fc00:dead:beef::/48'
set nat nptv6 rule 20 outbound-interface 'eth2'
set nat nptv6 rule 20 translation prefix '2001:db8:e2::/48'
```

Resulting in the following ip6tables rules:

```
Chain VYOS_DNPT_HOOK (1 references)
 pkts bytes target   prot opt in   out   source              destination
    0     0 NETMAP   all    eth1   any   anywhere            2001:db8:e1::/48 ␣
↪to:fc00:dead:beef::/48
    0     0 NETMAP   all    eth2   any   anywhere            2001:db8:e2::/48 ␣
↪to:fc00:dead:beef::/48
    0     0 RETURN   all    any    any   anywhere            anywhere
Chain VYOS_SNPT_HOOK (1 references)
 pkts bytes target   prot opt in   out   source              destination
    0     0 NETMAP   all    any    eth1  fc00:dead:beef::/48 anywhere         ␣
↪to:2001:db8:e1::/48
    0     0 NETMAP   all    any    eth2  fc00:dead:beef::/48 anywhere         ␣
↪to:2001:db8:e2::/48
    0     0 RETURN   all    any    any   anywhere            anywhere
```

NAT (Network Address Translation) is a common method of remapping one IP address space into another by modifying network address information in the IP header of packets while they are in transit across a traffic routing device. The technique was originally used as a shortcut to avoid the need to readdress every host when a network was moved. It has become a popular and essential tool in conserving global address space in the face of IPv4 address exhaustion. One Internet-routable IP address of a NAT gateway can be used for an entire private network.

IP masquerading is a technique that hides an entire IP address space, usually consisting of private IP addresses, behind a single IP address in another, usually public address space. The hidden addresses are changed into a single (public) IP address as the source address of the outgoing IP packets so they appear as originating not from the hidden host but from the routing device itself. Because of the popularity of this technique to conserve IPv4 address space, the term NAT has become virtually synonymous with IP masquerading.

As network address translation modifies the IP address information in packets, NAT implementations may vary in their specific behavior in various addressing cases and their effect on network traffic. The specifics of NAT behavior are not commonly documented by vendors of equipment containing NAT implementations.

The computers on an internal network can use any of the addresses set aside by the IANA (Internet Assigned Numbers Authority) for private addressing (see **RFC 1918**). These reserved IP addresses are not in use on the Internet, so an external machine will not directly route to them. The following addresses are reserved for private use:

- 10.0.0.0 to 10.255.255.255 (CIDR: 10.0.0.0/8)
- 172.16.0.0 to 172.31.255.255 (CIDR: 172.16.0.0/12)
- 192.168.0.0 to 192.168.255.255 (CIDR: 192.168.0.0/16)

If an ISP deploys a CGN (Carrier-grade NAT), and uses **RFC 1918** address space to number customer gateways, the risk of address collision, and therefore routing failures, arises when the customer network already uses an **RFC 1918** address space.

This prompted some ISPs to develop a policy within the ARIN (American Registry for Internet Numbers) to allocate new private address space for CGNs, but ARIN deferred to the IETF before implementing the policy indicating that the matter was not a typical allocation issue but a reservation of addresses for technical purposes (per **RFC 2860**).

IETF published **RFC 6598**, detailing a shared address space for use in ISP CGN deployments that can handle the same network prefixes occurring both on inbound and outbound interfaces. ARIN returned address space to the IANA for this allocation.

The allocated address block is 100.64.0.0/10.

Devices evaluating whether an IPv4 address is public must be updated to recognize the new address space. Allocating more private IPv4 address space for NAT devices might prolong the transition to IPv6.

8.6.2 Overview

Different NAT Types

SNAT

SNAT (Source Network Address Translation) is the most common form of NAT and is typically referred to simply as NAT. To be more correct, what most people refer to as NAT is actually the process of PAT (Port Address Translation), or NAT overload. SNAT is typically used by internal users/private hosts to access the Internet - the source address is translated and thus kept private.

DNAT

DNAT (Destination Network Address Translation) changes the destination address of packets passing through the router, while *SNAT* changes the source address of packets. DNAT is typically used when an external (public) host needs to initiate a session with an internal (private) host. A customer needs to access a private service behind the routers public IP. A connection is established with the routers public IP address on a well known port and thus all traffic for this port is rewritten to address the internal (private) host.

Bidirectional NAT

This is a common scenario where both *SNAT* and *DNAT* are configured at the same time. It's commonly used then internal (private) hosts need to establish a connection with external resources and external systems need to access internal (private) resources.

NAT, Routing, Firewall Interaction

There is a very nice picture/explanation in the Vyatta documentation which should be rewritten here.

NAT Ruleset

NAT is configured entirely on a series of so called *rules*. Rules are numbered and evaluated by the underlying OS in numerical order! The rule numbers can be changes by utilizing the `rename` and `copy` commands.

Note: Changes to the NAT system only affect newly established connections. Already established connections are not affected.

Hint: When designing your NAT ruleset leave some space between consecutive rules for later extension. Your ruleset could start with numbers 10, 20, 30. You thus can later extend the ruleset and place new rules between existing ones.

Rules will be created for both *SNAT* and *DNAT*.

For *Bidirectional NAT* a rule for both *SNAT* and *DNAT* needs to be created.

Traffic Filters

Traffic Filters are used to control which packets will have the defined NAT rules applied. Five different filters can be applied within a NAT rule.

- **outbound-interface** - applicable only to *SNAT*. It configures the interface which is used for the outside traffic that this translation rule applies to.

  Example:

  ```
  set nat source rule 20 outbound-interface eth0
  ```

- **inbound-interface** - applicable only to *DNAT*. It configures the interface which is used for the inside traffic the translation rule applies to.

  Example:

  ```
  set nat destination rule 20 inbound-interface eth1
  ```

- **protocol** - specify which types of protocols this translation rule applies to. Only packets matching the specified protocol are NATed. By default this applies to *all* protocols.

  Example:

  - Set SNAT rule 20 to only NAT TCP and UDP packets
  - Set DNAT rule 20 to only NAT UDP packets

```
set nat source rule 20 protocol tcp_udp
set nat destination rule 20 protocol udp
```

- **source** - specifies which packets the NAT translation rule applies to based on the packets source IP address and/or source port. Only matching packets are considered for NAT.

  Example:

  - Set SNAT rule 20 to only NAT packets arriving from the 192.0.2.0/24 network
  - Set SNAT rule 30 to only NAT packets arriving from the 203.0.113.0/24 network with a source port of 80 and 443

```
set nat source rule 20 source address 192.0.2.0/24
set nat source rule 30 source address 203.0.113.0/24
set nat source rule 30 source port 80,443
```

- **destination** - specify which packets the translation will be applied to, only based on the destination address and/or port number configured.

  Note: If no destination is specified the rule will match on any destination address and port.

  Example:

  - Configure SNAT rule (40) to only NAT packets with a destination address of 192.0.2.1.

```
set nat source rule 40 destination address 192.0.2.1
```

Address Conversion

Every NAT rule has a translation command defined. The address defined for the translation is the address used when the address information in a packet is replaced.

Source Address

For *SNAT* rules the packets source address will be replaced with the address specified in the translation command. A port translation can also be specified and is part of the translation address.

Note: The translation address must be set to one of the available addresses on the configured *outbound-interface* or it must be set to *masquerade* which will use the primary IP address of the *outbound-interface* as its translation address.

Note: When using NAT for a large number of host systems it recommended that a minimum of 1 IP address is used to NAT every 256 private host systems. This is due to the limit of 65,000 port numbers available for unique translations and a reserving an average of 200-300 sessions per host system.

Example:

- Define a discrete source IP address of 100.64.0.1 for SNAT rule 20
- Use address *masquerade* (the interfaces primary address) on rule 30

- For a large amount of private machines behind the NAT your address pool might to be bigger. Use any address in the range 100.64.0.10 - 100.64.0.20 on SNAT rule 40 when doing the translation

```
set nat source rule 20 translation address 100.64.0.1
set nat source rule 30 translation address 'masquerade'
set nat source rule 40 translation address 100.64.0.10-100.64.0.20
```

Destination Address

For *DNAT* rules the packets destination address will be replaced by the specified address in the *translation address* command.

Example:

- DNAT rule 10 replaces the destination address of an inbound packet with 192.0.2.10

```
set nat destination rule 10 translation address 192.0.2.10
```

8.6.3 Configuration Examples

To setup SNAT, we need to know:

- The internal IP addresses we want to translate
- The outgoing interface to perform the translation on
- The external IP address to translate to

In the example used for the Quick Start configuration above, we demonstrate the following configuration:

```
set nat source rule 100 outbound-interface 'eth0'
set nat source rule 100 source address '192.168.0.0/24'
set nat source rule 100 translation address 'masquerade'
```

Which generates the following configuration:

```
rule 100 {
    outbound-interface eth0
    source {
        address 192.168.0.0/24
    }
    translation {
        address masquerade
    }
}
```

In this example, we use **masquerade** as the translation address instead of an IP address. The **masquerade** target is effectively an alias to say "use whatever IP address is on the outgoing interface", rather than a statically configured IP address. This is useful if you use DHCP for your outgoing interface and do not know what the external address will be.

When using NAT for a large number of host systems it recommended that a minimum of 1 IP address is used to NAT every 256 host systems. This is due to the limit of 65,000 port numbers available for unique translations and a reserving an average of 200-300 sessions per host system.

Example: For an ~8,000 host network a source NAT pool of 32 IP addresses is recommended.

A pool of addresses can be defined by using a hyphen between two IP addresses:

```
set nat source rule 100 translation address '203.0.113.32-203.0.113.63'
```

Avoiding "leaky" NAT

Linux netfilter will not NAT traffic marked as INVALID. This often confuses people into thinking that Linux (or specifically VyOS) has a broken NAT implementation because non-NATed traffic is seen leaving an external interface. This is actually working as intended, and a packet capture of the "leaky" traffic should reveal that the traffic is either an additional TCP "RST", "FIN,ACK", or "RST,ACK" sent by client systems after Linux netfilter considers the connection closed. The most common is the additional TCP RST some host implementations send after terminating a connection (which is implementation-specific).

In other words, connection tracking has already observed the connection be closed and has transition the flow to INVALID to prevent attacks from attempting to reuse the connection.

You can avoid the "leaky" behavior by using a firewall policy that drops "invalid" state packets.

Having control over the matching of INVALID state traffic, e.g. the ability to selectively log, is an important troubleshooting tool for observing broken protocol behavior. For this reason, VyOS does not globally drop invalid state traffic, instead allowing the operator to make the determination on how the traffic is handled.

Hairpin NAT/NAT Reflection

A typical problem with using NAT and hosting public servers is the ability for internal systems to reach an internal server using it's external IP address. The solution to this is usually the use of split-DNS to correctly point host systems to the internal address when requests are made internally. Because many smaller networks lack DNS infrastructure, a work-around is commonly deployed to facilitate the traffic by NATing the request from internal hosts to the source address of the internal interface on the firewall.

This technique is commonly referred to as NAT Reflection or Hairpin NAT.

Example:

- Redirect Microsoft RDP traffic from the outside (WAN, external) world via *DNAT* in rule 100 to the internal, private host 192.0.2.40.
- Redirect Microsoft RDP traffic from the internal (LAN, private) network via *DNAT* in rule 110 to the internal, private host 192.0.2.40. We also need a *SNAT* rule 110 for the reverse path of the traffic. The internal network 192.0.2.0/24 is reachable via interface *eth0.10*.

```
set nat destination rule 100 description 'Regular destination NAT from external'
set nat destination rule 100 destination port '3389'
set nat destination rule 100 inbound-interface 'pppoe0'
set nat destination rule 100 protocol 'tcp'
set nat destination rule 100 translation address '192.0.2.40'

set nat destination rule 110 description 'NAT Reflection: INSIDE'
set nat destination rule 110 destination port '3389'
set nat destination rule 110 inbound-interface 'eth0.10'
set nat destination rule 110 protocol 'tcp'
set nat destination rule 110 translation address '192.0.2.40'

set nat source rule 110 description 'NAT Reflection: INSIDE'
set nat source rule 110 destination address '192.0.2.0/24'
set nat source rule 110 outbound-interface 'eth0.10'
```

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```
set nat source rule 110 protocol 'tcp'
set nat source rule 110 source address '192.0.2.0/24'
set nat source rule 110 translation address 'masquerade'
```

Which results in a configuration of:

```
vyos@vyos# show nat
 destination {
     rule 100 {
         description "Regular destination NAT from external"
         destination {
             port 3389
         }
         inbound-interface pppoe0
         protocol tcp
         translation {
             address 192.0.2.40
         }
     }
     rule 110 {
         description "NAT Reflection: INSIDE"
         destination {
             port 3389
         }
         inbound-interface eth0.10
         protocol tcp
         translation {
             address 192.0.2.40
         }
     }
 }
 source {
     rule 110 {
         description "NAT Reflection: INSIDE"
         destination {
             address 192.0.2.0/24
         }
         outbound-interface eth0.10
         protocol tcp
         source {
             address 192.0.2.0/24
         }
         translation {
             address masquerade
         }
     }
 }
```

Destination NAT

DNAT is typically referred to as a **Port Forward**. When using VyOS as a NAT router and firewall, a common configuration task is to redirect incoming traffic to a system behind the firewall.

In this example, we will be using the example Quick Start configuration above as a starting point.

To setup a destination NAT rule we need to gather:

- The interface traffic will be coming in on;
- The protocol and port we wish to forward;
- The IP address of the internal system we wish to forward traffic to.

In our example, we will be forwarding web server traffic to an internal web server on 192.168.0.100. HTTP traffic makes use of the TCP protocol on port 80. For other common port numbers, see: https://en.wikipedia.org/wiki/List_of_TCP_and_UDP_port_numbers

Our configuration commands would be:

```
set nat destination rule 10 description 'Port Forward: HTTP to 192.168.0.100'
set nat destination rule 10 destination port '80'
set nat destination rule 10 inbound-interface 'eth0'
set nat destination rule 10 protocol 'tcp'
set nat destination rule 10 translation address '192.168.0.100'
```

Which would generate the following NAT destination configuration:

```
nat {
    destination {
        rule 10 {
            description "Port Forward: HTTP to 192.168.0.100"
            destination {
                port 80
            }
            inbound-interface eth0
            protocol tcp
            translation {
                address 192.168.0.100
            }
        }
    }
}
```

Note: If forwarding traffic to a different port than it is arriving on, you may also configure the translation port using *set nat destination rule [n] translation port*.

This establishes our Port Forward rule, but if we created a firewall policy it will likely block the traffic.

It is important to note that when creating firewall rules that the DNAT translation occurs **before** traffic traverses the firewall. In other words, the destination address has already been translated to 192.168.0.100.

So in our firewall policy, we want to allow traffic coming in on the outside interface, destined for TCP port 80 and the IP address of 192.168.0.100.

```
set firewall name OUTSIDE-IN rule 20 action 'accept'
set firewall name OUTSIDE-IN rule 20 destination address '192.168.0.100'
set firewall name OUTSIDE-IN rule 20 destination port '80'
set firewall name OUTSIDE-IN rule 20 protocol 'tcp'
set firewall name OUTSIDE-IN rule 20 state new 'enable'
```

This would generate the following configuration:

```
rule 20 {
    action accept
    destination {
        address 192.168.0.100
        port 80
    }
    protocol tcp
    state {
        new enable
    }
}
```

Note: If you have configured the *INSIDE-OUT* policy, you will need to add additional rules to permit inbound NAT traffic.

1-to-1 NAT

Another term often used for DNAT is **1-to-1 NAT**. For a 1-to-1 NAT configuration, both DNAT and SNAT are used to NAT all traffic from an external IP address to an internal IP address and vice-versa.

Typically, a 1-to-1 NAT rule omits the destination port (all ports) and replaces the protocol with either **all** or **ip**.

Then a corresponding SNAT rule is created to NAT outgoing traffic for the internal IP to a reserved external IP. This dedicates an external IP address to an internal IP address and is useful for protocols which don't have the notion of ports, such as GRE.

Here's an extract of a simple 1-to-1 NAT configuration with one internal and one external interface:

```
set interfaces ethernet eth0 address '192.168.1.1/24'
set interfaces ethernet eth0 description 'Inside interface'
set interfaces ethernet eth1 address '192.0.2.30/24'
set interfaces ethernet eth1 description 'Outside interface'
set nat destination rule 2000 description '1-to-1 NAT example'
set nat destination rule 2000 destination address '192.0.2.30'
set nat destination rule 2000 inbound-interface 'eth1'
set nat destination rule 2000 translation address '192.168.1.10'
set nat source rule 2000 description '1-to-1 NAT example'
set nat source rule 2000 outbound-interface 'eth1'
set nat source rule 2000 source address '192.168.1.10'
set nat source rule 2000 translation address '192.0.2.30'
```

Firewall rules are written as normal, using the internal IP address as the source of outbound rules and the destination of inbound rules.

NAT before VPN

Some application service providers (ASPs) operate a VPN gateway to provide access to their internal resources, and require that a connecting organisation translate all traffic to the service provider network to a source address provided by the ASP.

Example Network

Here's one example of a network environment for an ASP. The ASP requests that all connections from this company should come from 172.29.41.89 - an address that is assigned by the ASP and not in use at the customer site.

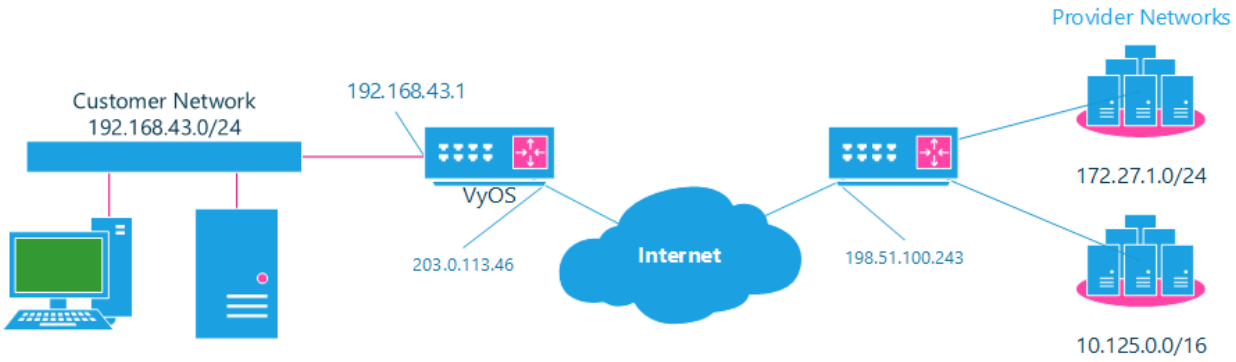

Fig. 1: NAT before VPN Topology

Configuration

The required configuration can be broken down into 4 major pieces:

- A dummy interface for the provider-assigned IP;
- NAT (specifically, Source NAT);
- IPSec IKE and ESP Groups;
- IPSec VPN tunnels.

Dummy interface

The dummy interface allows us to have an equivalent of the Cisco IOS Loopback interface - a router-internal interface we can use for IP addresses the router must know about, but which are not actually assigned to a real network.

We only need a single step for this interface:

```
set interfaces dummy dum0 address '172.29.41.89/32'
```

NAT Configuration

```
set nat source rule 110 description 'Internal to ASP'
set nat source rule 110 destination address '172.27.1.0/24'
set nat source rule 110 outbound-interface 'any'
set nat source rule 110 source address '192.168.43.0/24'
set nat source rule 110 translation address '172.29.41.89'
set nat source rule 120 description 'Internal to ASP'
set nat source rule 120 destination address '10.125.0.0/16'
set nat source rule 120 outbound-interface 'any'
set nat source rule 120 source address '192.168.43.0/24'
set nat source rule 120 translation address '172.29.41.89'
```

IPSec IKE and ESP

The ASP has documented their IPSec requirements:

- IKE Phase:
  - aes256 Encryption
  - sha256 Hashes
- ESP Phase:
  - aes256 Encryption
  - sha256 Hashes
  - DH Group 14

Additionally, we want to use VPNs only on our eth1 interface (the external interface in the image above)

```
set vpn ipsec ike-group my-ike ikev2-reauth 'no'
set vpn ipsec ike-group my-ike key-exchange 'ikev1'
set vpn ipsec ike-group my-ike lifetime '7800'
set vpn ipsec ike-group my-ike proposal 1 dh-group '14'
set vpn ipsec ike-group my-ike proposal 1 encryption 'aes256'
set vpn ipsec ike-group my-ike proposal 1 hash 'sha256'

set vpn ipsec esp-group my-esp compression 'disable'
set vpn ipsec esp-group my-esp lifetime '3600'
set vpn ipsec esp-group my-esp mode 'tunnel'
set vpn ipsec esp-group my-esp pfs 'disable'
set vpn ipsec esp-group my-esp proposal 1 encryption 'aes256'
set vpn ipsec esp-group my-esp proposal 1 hash 'sha256'

set vpn ipsec ipsec-interfaces interface 'eth1'
```

IPSec VPN Tunnels

We'll use the IKE and ESP groups created above for this VPN. Because we need access to 2 different subnets on the far side, we will need two different tunnels. If you changed the names of the ESP group and IKE group in the previous step, make sure you use the correct names here too.

```
set vpn ipsec site-to-site peer 198.51.100.243 authentication mode 'pre-shared-secret'
set vpn ipsec site-to-site peer 198.51.100.243 authentication pre-shared-secret
↪'PASSWORD IS HERE'
set vpn ipsec site-to-site peer 198.51.100.243 connection-type 'initiate'
set vpn ipsec site-to-site peer 198.51.100.243 default-esp-group 'my-esp'
set vpn ipsec site-to-site peer 198.51.100.243 ike-group 'my-ike'
set vpn ipsec site-to-site peer 198.51.100.243 ikev2-reauth 'inherit'
set vpn ipsec site-to-site peer 198.51.100.243 local-address '203.0.113.46'
set vpn ipsec site-to-site peer 198.51.100.243 tunnel 0 local prefix '172.29.41.89/32'
set vpn ipsec site-to-site peer 198.51.100.243 tunnel 0 remote prefix '172.27.1.0/24'
set vpn ipsec site-to-site peer 198.51.100.243 tunnel 1 local prefix '172.29.41.89/32'
set vpn ipsec site-to-site peer 198.51.100.243 tunnel 1 remote prefix '10.125.0.0/16'
```

Testing and Validation

If you've completed all the above steps you no doubt want to see if it's all working.

Start by checking for IPSec SAs (Security Associations) with:

```
$ show vpn ipsec sa

Peer ID / IP                            Local ID / IP
------------                            -------------
198.51.100.243                          203.0.113.46

    Tunnel  State  Bytes Out/In   Encrypt  Hash    NAT-T  A-Time  L-Time  Proto
    ------  -----  -------------  -------  ----    -----  ------  ------  -----
    0       up     0.0/0.0        aes256   sha256  no     1647    3600    all
    1       up     0.0/0.0        aes256   sha256  no     865     3600    all
```

That looks good - we defined 2 tunnels and they're both up and running.

8.7 Policy

Routing Policies could be used to tell the router (self or neighbors) what routes and their attributes needs to be put into the routing table.

There could be a wide range of routing policies. Some examples are below:

- Set some metric to routes learned from a particular neighbor
- Set some attributes (like AS PATH or Community value) to advertised routes to neighbors
- Prefer a specific routing protocol routes over another routing protocol running on the same router

8.7.1 Example

Policy definition:

```
# Create policy
set policy route-map setmet rule 2 action 'permit'
set policy route-map setmet rule 2 set as-path-prepend '2 2 2'

# Apply policy to BGP
set protocols bgp 1 neighbor 203.0.113.2 address-family ipv4-unicast route-map import
↪'setmet'
set protocols bgp 1 neighbor 203.0.113.2 address-family ipv4-unicast soft-
↪reconfiguration 'inbound'
```

Using 'soft-reconfiguration' we get the policy update without bouncing the neighbor.

Routes learned before routing policy applied:

```
vyos@vos1:~$ show ip bgp
BGP table version is 0, local router ID is 192.168.56.101
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
              r RIB-failure, S Stale, R Removed
Origin codes: i - IGP, e - EGP, ? - incomplete

   Network          Next Hop            Metric LocPrf Weight Path
*> 198.51.100.3/32   203.0.113.2           1             0 2 i  < Path

Total number of prefixes 1
```

Routes learned after routing policy applied:

```
vyos@vos1:~$ sho ip b
BGP table version is 0, local router ID is 192.168.56.101
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
              r RIB-failure, S Stale, R Removed
Origin codes: i - IGP, e - EGP, ? - incomplete

   Network          Next Hop            Metric LocPrf Weight Path
*> 198.51.100.3/32   203.0.113.2           1             0 2 2 2 2 i

Total number of prefixes 1
vyos@vos1:~$
```

You now see the longer AS path.

8.8 PBR

PBR (Policy-Based Routing) allowing traffic to be assigned to different routing tables. Traffic can be matched using standard 5-tuple matching (source address, destination address, protocol, source port, destination port).

8.8.1 Transparent Proxy

The following example will show how VyOS can be used to redirect web traffic to an external transparent proxy:

```
set policy route FILTER-WEB rule 1000 destination port 80
set policy route FILTER-WEB rule 1000 protocol tcp
set policy route FILTER-WEB rule 1000 set table 100
```

This creates a route policy called FILTER-WEB with one rule to set the routing table for matching traffic (TCP port 80) to table ID 100 instead of the default routing table.

To create routing table 100 and add a new default gateway to be used by traffic matching our route policy:

```
set protocols static table 100 route 0.0.0.0/0 next-hop 10.255.0.2
```

This can be confirmed using the `show ip route table 100` operational command.

Finally, to apply the policy route to ingress traffic on our LAN interface, we use:

```
set interfaces ethernet eth1 policy route FILTER-WEB
```

8.8.2 Multiple Uplinks

VyOS Policy-Based Routing (PBR) works by matching source IP address ranges and forwarding the traffic using different routing tables.

Routing tables that will be used in this example are:

- `table 10` Routing table used for VLAN 10 (192.168.188.0/24)
- `table 11` Routing table used for VLAN 11 (192.168.189.0/24)
- `main` Routing table used by VyOS and other interfaces not participating in PBR

Add default routes for routing `table 10` and `table 11`

```
set protocols static table 10 route 0.0.0.0/0 next-hop 192.0.2.1
set protocols static table 11 route 0.0.0.0/0 next-hop 192.0.2.2
```

Add policy route matching VLAN source addresses

```
set policy route PBR rule 20 set table '10'
set policy route PBR rule 20 description 'Route VLAN10 traffic to table 10'
set policy route PBR rule 20 source address '192.168.188.0/24'

set policy route PBR rule 30 set table '11'
set policy route PBR rule 30 description 'Route VLAN11 traffic to table 11'
set policy route PBR rule 30 source address '192.168.189.0/24'
```

Apply routing policy to **inbound** direction of out VLAN interfaces

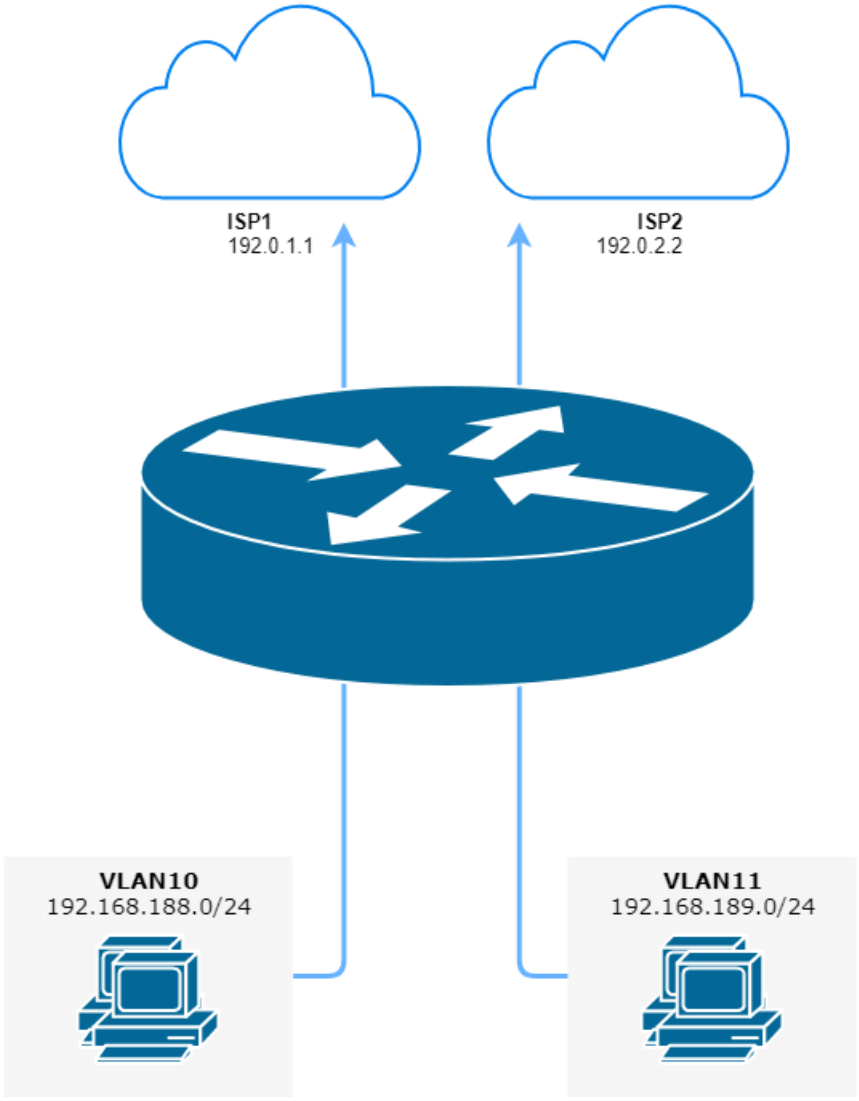

Fig. 2: Policy-Based Routing with multiple ISP uplinks (source ./draw.io/pbr_example_1.drawio)

```
set interfaces ethernet eth0 vif 10 policy route 'PBR'
set interfaces ethernet eth0 vif 11 policy route 'PBR'
```

OPTIONAL: Exclude Inter-VLAN traffic (between VLAN10 and VLAN11) from PBR

```
set policy route PBR rule 10 description 'VLAN10 <-> VLAN11 shortcut'
set policy route PBR rule 10 destination address '192.168.188.0/24'
set policy route PBR rule 10 destination address '192.168.189.0/24'
set policy route PBR rule 10 set table 'main'
```

These commands allow the VLAN10 and VLAN20 hosts to communicate with each other using the main routing table.

8.8.3 Local route

The following example allows VyOS to use PBR for traffic, which originated from the router itself. That solution for multiple ISP's and VyOS router will respond from the same interface that the packet was received. Also, it used, if we want that one VPN tunnel to be through one provider, and the second through another.

- `203.0.113.0.254` IP addreess on VyOS eth1 from ISP1
- `192.168.2.254` IP addreess on VyOS eth2 from ISP2
- `table 10` Routing table used for ISP1
- `table 11` Routing table used for ISP2

```
set policy local-route rule 101 set table '10'
set policy local-route rule 101 source '203.0.113.0.254'
set policy local-route rule 102 set table '11'
set policy local-route rule 102 source '192.0.2.254'
set protocols static table 10 route '0.0.0.0/0' next-hop '203.0.113.0.1'
set protocols static table 11 route '0.0.0.0/0' next-hop '192.0.2.2'
```

Add multiple source IP in one rule with same priority

```
set policy local-route rule 101 set table '10'
set policy local-route rule 101 source '203.0.113.0.254'
set policy local-route rule 101 source '203.0.113.0.253'
set policy local-route rule 101 source '198.51.100.0/24'
```

8.9 Protocols

8.9.1 BFD

BFD (Bidirectional Forwarding Detection) is described and extended by the following RFCs: **RFC 5880**, **RFC 5881** and **RFC 5883**.

In the age of very fast networks, a second of unreachability may equal millions of lost packets. The idea behind BFD is to detect very quickly when a peer is down and take action extremely fast.

BFD sends lots of small UDP packets very quickly to ensures that the peer is still alive.

This allows avoiding the timers defined in BGP and OSPF protocol to expires.

Configure BFD

set protocols bfd peer <address>

Set BFD peer IPv4 address or IPv6 address

set protocols bfd peer <address> echo-mode

Enables the echo transmission mode

set protocols bfd peer <address> multihop

Allow this BFD peer to not be directly connected

set protocols bfd peer <address> source [address <address> | interface <interface>]

Bind listener to specific interface/address, mandatory for IPv6

set protocols bfd peer <address> interval echo-interval <10-60000>

The minimal echo receive transmission interval that this system is capable of handling

set protocols bfd peer <address> interval multiplier <2-255>

Remote transmission interval will be multiplied by this value

set protocols bfd peer <address> interval [receive | transmit] <10-60000>

Interval in milliseconds

set protocols bfd peer <address> shutdown

Disable a BFD peer

Enable BFD in BGP

set protocols bgp <asn> neighbor <address> bfd

Enable BFD on a single BGP neighbor

set protocols bgp <asn> peer-group <group> bfd

Enable BFD on a BGP peer group

Enable BFD in OSPF

set interfaces ethernet <interface> ip ospf bfd

Enable BFD for OSPF on an interface

set interfaces ethernet <interface> ipv6 ospfv3 bfd

Enable BFD for OSPFv3 on an interface

Enable BFD in ISIS

set protocols isis <name> interface <interface> bfd

Enable BFD for ISIS on an interface

Operational Commands

show protocols bfd peer

Show all BFD peers

```
BFD Peers:
     peer 198.51.100.33 vrf default interface eth4.100
             ID: 4182341893
             Remote ID: 12678929647
             Status: up
             Uptime: 1 month(s), 16 hour(s), 29 minute(s), 38 second(s)
             Diagnostics: ok
             Remote diagnostics: ok
             Local timers:
                     Receive interval: 300ms
                     Transmission interval: 300ms
                     Echo transmission interval: 50ms
             Remote timers:
                     Receive interval: 300ms
                     Transmission interval: 300ms
                     Echo transmission interval: 0ms

     peer 198.51.100.55 vrf default interface eth4.101
             ID: 4618932327
             Remote ID: 3312345688
             Status: up
             Uptime: 20 hour(s), 16 minute(s), 19 second(s)
             Diagnostics: ok
             Remote diagnostics: ok
             Local timers:
                     Receive interval: 300ms
                     Transmission interval: 300ms
                     Echo transmission interval: 50ms
             Remote timers:
                     Receive interval: 300ms
                     Transmission interval: 300ms
                     Echo transmission interval: 0ms
```

8.9.2 BGP

BGP (Border Gateway Protocol) is one of the Exterior Gateway Protocols and the de facto standard interdomain routing protocol. The latest BGP version is 4. BGP-4 is described in **RFC 1771** and updated by **RFC 4271**. **RFC 2858** adds multiprotocol support to BGP.

VyOS makes use of FRR (Free Range Routing) and we would like to thank them for their effort!

Basic Concepts

Autonomous Systems

From **RFC 1930**:

> An AS is a connected group of one or more IP prefixes run by one or more network operators which has a SINGLE and CLEARLY DEFINED routing policy.

Each AS has an identifying number associated with it called an ASN (Autonomous System Number). This is a two octet value ranging in value from 1 to 65535. The AS numbers 64512 through 65535 are defined as private AS numbers. Private AS numbers must not be advertised on the global Internet. The 2-byte AS number range has been exhausted. 4-byte AS numbers are specified in **RFC 6793**, and provide a pool of 4294967296 AS numbers.

The ASN is one of the essential elements of BGP. BGP is a distance vector routing protocol, and the AS-Path framework provides distance vector metric and loop detection to BGP.

Address Families

Multiprotocol extensions enable BGP to carry routing information for multiple network layer protocols. BGP supports an Address Family Identifier (AFI) for IPv4 and IPv6.

Route Selection

The route selection process used by FRR's BGP implementation uses the following decision criterion, starting at the top of the list and going towards the bottom until one of the factors can be used.

1. **Weight check**

   Prefer higher local weight routes to lower routes.

2. **Local preference check**

   Prefer higher local preference routes to lower.

3. **Local route check**

   Prefer local routes (statics, aggregates, redistributed) to received routes.

4. **AS path length check**

   Prefer shortest hop-count AS_PATHs.

5. **Origin check**

   Prefer the lowest origin type route. That is, prefer IGP origin routes to EGP, to Incomplete routes.

6. **MED check**

   Where routes with a MED were received from the same AS, prefer the route with the lowest MED.

7. **External check**

   Prefer the route received from an external, eBGP peer over routes received from other types of peers.

8. **IGP cost check**

   Prefer the route with the lower IGP cost.

9. **Multi-path check**

   If multi-pathing is enabled, then check whether the routes not yet distinguished in preference may be considered equal. If `bgp bestpath as-path multipath-relax` is set, all such routes are considered equal, otherwise routes received via iBGP with identical AS_PATHs or routes received from eBGP neighbours in the same AS are considered equal.

10. **Already-selected external check**

    Where both routes were received from eBGP peers, then prefer the route which is already selected. Note that this check is not applied if `bgp bestpath compare-routerid` is configured. This check can prevent some cases of oscillation.

11. **Router-ID check**

    Prefer the route with the lowest *router-ID*. If the route has an *ORIGINATOR_ID* attribute, through iBGP reflection, then that router ID is used, otherwise the *router-ID* of the peer the route was received from is used.

12. **Cluster-List length check**

    The route with the shortest cluster-list length is used. The cluster-list reflects the iBGP reflection path the route has taken.

13. **Peer address**

    Prefer the route received from the peer with the higher transport layer address, as a last-resort tie-breaker.

Capability Negotiation

When adding IPv6 routing information exchange feature to BGP. There were some proposals. IETF (Internet Engineering Task Force) IDR (Inter Domain Routing) adopted a proposal called Multiprotocol Extension for BGP. The specification is described in **RFC 2283**. The protocol does not define new protocols. It defines new attributes to existing BGP. When it is used exchanging IPv6 routing information it is called BGP-4+. When it is used for exchanging multicast routing information it is called MBGP.

bgpd supports Multiprotocol Extension for BGP. So if a remote peer supports the protocol, *bgpd* can exchange IPv6 and/or multicast routing information.

Traditional BGP did not have the feature to detect a remote peer's capabilities, e.g. whether it can handle prefix types other than IPv4 unicast routes. This was a big problem using Multiprotocol Extension for BGP in an operational network. **RFC 2842** adopted a feature called Capability Negotiation. *bgpd* use this Capability Negotiation to detect the remote peer's capabilities. If a peer is only configured as an IPv4 unicast neighbor, *bgpd* does not send these Capability Negotiation packets (at least not unless other optional BGP features require capability negotiation).

By default, FRR will bring up peering with minimal common capability for the both sides. For example, if the local router has unicast and multicast capabilities and the remote router only has unicast capability the local router will establish the connection with unicast only capability. When there are no common capabilities, FRR sends Unsupported Capability error and then resets the connection.

BGP Router Configuration

First of all you must configure BGP router with the ASN. The AS number is an identifier for the autonomous system. The BGP protocol uses the AS number for detecting whether the BGP connection is internal or external. VyOS does not have a special command to start the BGP process. The BGP process starts when the first neighbor is configured.

Peers Configuration

Defining Peers

set protocols bgp <asn> neighbor <address|interface> remote-as <nasn>

This command creates a new neighbor whose remote-as is <nasn>. The neighbor address can be an IPv4 address or an IPv6 address or an interface to use for the connection. The command it applicable for peer and peer group.

set protocols bgp <asn> neighbor <address|interface> remote-as internal

Create a peer as you would when you specify an ASN, except that if the peers ASN is different than mine as specified under the `protocols bgp <asn>` command the connection will be denied.

set protocols bgp <asn> neighbor <address|interface> remote-as external

Create a peer as you would when you specify an ASN, except that if the peers ASN is the same as mine as specified under the `protocols bgp <asn>` command the connection will be denied.

set protocols bgp <asn> neighbor <address|interface> shutdown

This command disable the peer or peer group. To reenable the peer use the delete form of this command.

set protocols bgp <asn> neighbor <address|interface> description <text>

Set description of the peer or peer group.

set protocols bgp <asn> neighbor <address|interface> update-source <address|interface>

Specify the IPv4 source address to use for the BGP session to this neighbor, may be specified as either an IPv4 address directly or as an interface name.

Capability Negotiation

set protocols bgp <asn> neighbor <address|interface> capability dynamic

This command would allow the dynamic update of capabilities over an established BGP session.

set protocols bgp <asn> neighbor <address|interface> capability extended-nexthop

Allow bgp to negotiate the extended-nexthop capability with it's peer. If you are peering over a IPv6 Link-Local address then this capability is turned on automatically. If you are peering over a IPv6 Global Address then turning on this command will allow BGP to install IPv4 routes with IPv6 nexthops if you do not have IPv4 configured on interfaces.

set protocols bgp <asn> neighbor <address|interface> disable-capability-negotiation

Suppress sending Capability Negotiation as OPEN message optional parameter to the peer. This command only affects the peer is configured other than IPv4 unicast configuration.

When remote peer does not have capability negotiation feature, remote peer will not send any capabilities at all. In that case, bgp configures the peer with configured capabilities.

You may prefer locally configured capabilities more than the negotiated capabilities even though remote peer sends capabilities. If the peer is configured by `override-capability`, VyOS ignores received capabilities then override negotiated capabilities with configured values.

Additionally you should keep in mind that this feature fundamentally disables the ability to use widely deployed BGP features. BGP unnumbered, hostname support, AS4, Addpath, Route Refresh, ORF, Dynamic Capabilities, and graceful restart.

set protocols bgp <asn> neighbor <address|interface> override-capability

This command allow override the result of Capability Negotiation with local configuration. Ignore remote peer's capability value.

set protocols bgp <asn> neighbor <address|interface> strict-capability-match

This command forces strictly compare remote capabilities and local capabilities. If capabilities are different, send Unsupported Capability error then reset connection.

You may want to disable sending Capability Negotiation OPEN message optional parameter to the peer when remote peer does not implement Capability Negotiation. Please use `disable-capability-negotiation` command to disable the feature.

Peer Parameters

set protocols bgp <asn> neighbor <address|interface> address-family <ipv4-unicast|ipv6-unicast> allowas-in number <number>

This command accept incoming routes with AS path containing AS number with the same value as the current system AS. This is used when you want to use the same AS number in your sites, but you can't connect them directly.

The number parameter (1-10) configures the amount of accepted occurences of the system AS number in AS path.

This command is only allowed for eBGP peers. It is not applicable for peer groups.

set protocols bgp <asn> neighbor <address|interface> address-family <ipv4-unicast|ipv6-unicast> as-override

This command override AS number of the originating router with the local AS number.

Usually this configuration is used in PEs (Provider Edge) to replace the incoming customer AS number so the connected CE (Customer Edge) can use the same AS number as the other customer sites. This allows customers of the provider network to use the same AS number across their sites.

This command is only allowed for eBGP peers.

set protocols bgp <asn> neighbor <address|interface> address-family <ipv4-unicast|ipv6-unicast> attribute-unchanged <as-path|med|next-hop>

This command specifies attributes to be left unchanged for advertisements sent to a peer or peer group.

set protocols bgp <asn> neighbor <address|interface> address-family <ipv4-unicast|ipv6-unicast> maximum-prefix <number>

This command specifies a maximum number of prefixes we can receive from a given peer. If this number is exceeded, the BGP session will be destroyed. The number range is 1 to 4294967295.

set protocols bgp <asn> neighbor <address|interface> address-family <ipv4-unicast|ipv6-unicast> nexthop-self

This command forces the BGP speaker to report itself as the next hop for an advertised route it advertised to a neighbor.

set protocols bgp <asn> neighbor <address|interface> address-family <ipv4-unicast|ipv6-unicast> remove-private-as

This command removes the private ASN of routes that are advertised to the configured peer. It removes only private ASNs on routes advertised to EBGP peers.

If the AS-Path for the route has only private ASNs, the private ASNs are removed.

If the AS-Path for the route has a private ASN between public ASNs, it is assumed that this is a design choice, and the private ASN is not removed.

set protocols bgp <asn> neighbor <address|interface> address-family <ipv4-unicast|ipv6-unicast> soft-reconfiguration inbound

Changes in BGP policies require the BGP session to be cleared. Clearing has a large negative impact on network operations. Soft reconfiguration enables you to generate inbound updates from a neighbor, change and activate BGP policies without clearing the BGP session.

This command specifies that route updates received from this neighbor will be stored unmodified, regardless of the inbound policy. When inbound soft reconfiguration is enabled, the stored updates are processed by the new policy configuration to create new inbound updates.

Note: Storage of route updates uses memory. If you enable soft reconfiguration inbound for multiple neighbors, the amount of memory used can become significant.

---

set protocols bgp <asn> neighbor <address|interface> address-family <ipv4-unicast|ipv6-unicast> weight <number>

This command specifies a default weight value for the neighbor's routes. The number range is 1 to 65535.

set protocols bgp <asn> neighbor <address|interface> advertisement-interval <seconds>

This command specifies the minimum route advertisement interval for the peer. The interval value is 0 to 600 seconds, with the default advertisement interval being 0.

set protocols bgp <asn> neighbor <address|interface> disable-connected-check

This command allows peerings between directly connected eBGP peers using loopback addresses without adjusting the default TTL of 1.

set protocols bgp <asn> neighbor <address|interface> disable-send-community <extended|standard>

This command specifies that the community attribute should not be sent in route updates to a peer. By default community attribute is sent.

set protocols bgp <asn> neighbor <address|interface> ebgp-multihop <number>

This command allows sessions to be established with eBGP neighbors when they are multiple hops away. When the neighbor is not directly connected and this knob is not enabled, the session will not establish. The number of hops range is 1 to 255. This command is mutually exclusive with `ttl-security hops`.

set protocols bgp <asn> neighbor <address|interface> local-as <asn> [no-prepend] [replace-as]

Specify an alternate AS for this BGP process when interacting with the specified peer or peer group. With no modifiers, the specified local-as is prepended to the received AS_PATH when receiving routing updates from the peer, and prepended to the outgoing AS_PATH (after the process local AS) when transmitting local routes to the peer.

If the `no-prepend` attribute is specified, then the supplied local-as is not prepended to the received AS_PATH.

If the `replace-as` attribute is specified, then only the supplied local-as is prepended to the AS_PATH when transmitting local-route updates to this peer.

Note: This command is only allowed for eBGP peers.

---

set protocols bgp <asn> neighbor <address|interface> passive

Configures the BGP speaker so that it only accepts inbound connections from, but does not initiate outbound connections to the peer or peer group.

set protocols bgp <asn> neighbor <address|interface> password <text>

This command specifies a MD5 password to be used with the tcp socket that is being used to connect to the remote peer.

set protocols bgp <asn> neighbor <address|interface> ttl-security hops <number>

This command enforces Generalized TTL Security Mechanism (GTSM), as specified in **RFC 5082**. With this command, only neighbors that are the specified number of hops away will be allowed to become neighbors. The number of hops range is 1 to 254. This command is mutually exclusive with `ebgp-multihop`.

Peer Groups

Peer groups are used to help improve scaling by generating the same update information to all members of a peer group. Note that this means that the routes generated by a member of a peer group will be sent back to that originating peer with the originator identifier attribute set to indicated the originating peer. All peers not associated with a specific peer group are treated as belonging to a default peer group, and will share updates.

set protocols bgp <asn> peer-group <name>

This command defines a new peer group. You can specify to the group the same parameters that you can specify for specific neighbors.

Note: If you apply a parameter to an individual neighbor IP address, you override the action defined for a peer group that includes that IP address.

---

set protocols bgp <asn> neighbor <address|interface> peer-group <name>

This command bind specific peer to peer group with a given name.

Network Advertisement Configuration

set protocols bgp <asn> address-family <ipv4-unicast|ipv6-unicast> network <prefix>

This command is used for advertising IPv4 or IPv6 networks.

Note: By default, the BGP prefix is advertised even if it's not present in the routing table. This behaviour differs from the implementation of some vendors.

---

set protocols bgp <asn> parameters network-import-check

This configuration modifies the behavior of the network statement. If you have this configured the underlying network must exist in the routing table.

set protocols bgp <asn> neighbor <address|interface> address-family <ipv4-unicast|ipv6-unicast> default-originate [route-map <name>]

By default, VyOS does not advertise a default route (0.0.0.0/0) even if it is in routing table. When you want to announce default routes to the peer, use this command. Using optional argument `route-map` you can inject the default route to given neighbor only if the conditions in the route map are met.

Route Aggregation Configuration

set protocols bgp <asn> address-family <ipv4-unicast|ipv6-unicast> aggregate-address <prefix>

This command specifies an aggregate address. The router will also announce longer-prefixes inside of the aggregate address.

set protocols bgp <asn> address-family <ipv4-unicast|ipv6-unicast> aggregate-address <prefix> as-set

This command specifies an aggregate address with a mathematical set of autonomous systems. This command summarizes the AS_PATH attributes of all the individual routes.

set protocols bgp <asn> address-family <ipv4-unicast|ipv6-unicast> aggregate-address <prefix> summary-only

This command specifies an aggregate address and provides that longer-prefixes inside of the aggregate address are suppressed before sending BGP updates out to peers.

set protocols bgp <asn> neighbor <address|interface> address-family <ipv4-unicast|ipv6-unicast> unsuppress-map <name>

This command applies route-map to selectively unsuppress prefixes suppressed by summarisation.

Redistribution Configuration

set protocols bgp <asn> address-family <ipv4-unicast|ipv6-unicast> redistribute <route source>

This command redistributes routing information from the given route source to the BGP process. There are six modes available for route source: connected, kernel, ospf, rip, static, table.

set protocols bgp <asn> address-family <ipv4-unicast|ipv6-unicast> redistribute <route source> metric <number>

This command specifies metric (MED) for redistributed routes. The metric range is 0 to 4294967295. There are six modes available for route source: connected, kernel, ospf, rip, static, table.

set protocols bgp <asn> address-family <ipv4-unicast|ipv6-unicast> redistribute <route source> route-map <name>

This command allows to use route map to filter redistributed routes. There are six modes available for route source: connected, kernel, ospf, rip, static, table.

General Configuration

Common parametrs

set protocols bgp <asn> parameters router-id <id>

This command specifies the router-ID. If router ID is not specified it will use the highest interface IP address.

set protocols bgp <asn> address-family <ipv4-unicast|ipv6-unicast> maximum-paths <ebgp|ibgp> <number>

This command defines the maximum number of parallel routes that the BGP can support. In order for BGP to use the second path, the following attributes have to match: Weight, Local Preference, AS Path (both AS number and AS path length), Origin code, MED, IGP metric. Also, the next hop address for each path must be different.

set protocols bgp <asn> parameters default no-ipv4-unicast

This command allows the user to specify that IPv4 peering is turned off by default.

set protocols bgp <asn> parameters log-neighbor-changes

Tis command enable logging neighbor up/down changes and reset reason.

set protocols bgp <asn> parameters no-client-to-client-reflection

Tis command disables route reflection between route reflector clients. By default, the clients of a route reflector are not required to be fully meshed and the routes from a client are reflected to other clients. However, if the clients are fully meshed, route reflection is not required. In this case, use the `no-client-to-client-reflection` command to disable client-to-client reflection.

set protocols bgp <asn> parameters no-fast-external-failover

Disable immediate sesison reset if peer's connected link goes down.

Administrative Distance

set protocols bgp <asn> parameters distance global <external|internal|local> <distance>

This command change distance value of BGP. The arguments are the distance values for external routes, internal routes and local routes respectively. The distance range is 1 to 255.

set protocols bgp <asn> parameters distance prefix <subnet> distance <distance>

This command sets the administrative distance for a particular route. The distance range is 1 to 255.

Note: Routes with a distance of 255 are effectively disabled and not installed into the kernel.

Timers

set protocols bgp <asn> timers holdtime <seconds>

This command specifies hold-time in seconds. The timer range is 4 to 65535. The default value is 180 second. If you set value to 0 VyOS will not hold routes.

set protocols bgp <asn> timers keepalive <seconds>

This command specifies keep-alive time in seconds. The timer can range from 4 to 65535. The default value is 60 second.

Route Dampening

When a route fails, a routing update is sent to withdraw the route from the network's routing tables. When the route is re-enabled, the change in availability is also advertised. A route that continually fails and returns requires a great deal of network traffic to update the network about the route's status.

Route dampening wich described in **RFC 2439** enables you to identify routes that repeatedly fail and return. If route dampening is enabled, an unstable route accumulates penalties each time the route fails and returns. If the accumulated penalties exceed a threshold, the route is no longer advertised. This is route suppression. Routes that have been suppressed are re-entered into the routing table only when the amount of their penalty falls below a threshold.

A penalty of 1000 is assessed each time the route fails. When the penalties reach a predefined threshold (suppress-value), the router stops advertising the route.

Once a route is assessed a penalty, the penalty is decreased by half each time a predefined amount of time elapses (half-life-time). When the accumulated penalties fall below a predefined threshold (reuse-value), the route is unsuppressed and added back into the BGP routing table.

No route is suppressed indefinitely. Maximum-suppress-time defines the maximum time a route can be suppressed before it is re-advertised.

set protocols bgp <asn> parameters dampening half-life <minutes>

This command defines the amount of time in minutes after which a penalty is reduced by half. The timer range is 10 to 45 minutes.

set protocols bgp <asn> parameters dampening re-use <seconds>

This command defines the accumulated penalty amount at which the route is re-advertised. The penalty range is 1 to 20000.

set protocols bgp <asn> parameters dampening start-suppress-time <seconds>

This command defines the accumulated penalty amount at which the route is suppressed. The penalty range is 1 to 20000.

set protocols bgp <asn> parameters dampening max-suppress-time <seconds>

This command defines the maximum time in minutes that a route is suppressed. The timer range is 1 to 255 minutes.

Route Selection Configuration

set protocols bgp <asn> parameters always-compare-med

This command provides to compare the MED on routes, even when they were received from different neighbouring ASes. Setting this option makes the order of preference of routes more defined, and should eliminate MED induced oscillations.

set protocols bgp <asn> parameters bestpath as-path confed

This command specifies that the length of confederation path sets and sequences should be taken into account during the BGP best path decision process.

set protocols bgp <asn> parameters bestpath as-path multipath-relax

This command specifies that BGP decision process should consider paths of equal AS_PATH length candidates for multipath computation. Without the knob, the entire AS_PATH must match for multipath computation.

set protocols bgp <asn> parameters bestpath as-path ignore

Ignore AS_PATH length when selecting a route

set protocols bgp <asn> parameters bestpath compare-routerid

Ensure that when comparing routes where both are equal on most metrics, including local-pref, AS_PATH length, IGP cost, MED, that the tie is broken based on router-ID.

If this option is enabled, then the already-selected check, where already selected eBGP routes are preferred, is skipped.

If a route has an ORIGINATOR_ID attribute because it has been reflected, that ORIGINATOR_ID will be used. Otherwise, the router-ID of the peer the route was received from will be used.

The advantage of this is that the route-selection (at this point) will be more deterministic. The disadvantage is that a few or even one lowest-ID router may attract all traffic to otherwise-equal paths because of this check. It may increase the possibility of MED or IGP oscillation, unless other measures were taken to avoid these. The exact behaviour will be sensitive to the iBGP and reflection topology.

set protocols bgp <asn> parameters bestpath med confed

This command specifies that BGP considers the MED when comparing routes originated from different sub-ASs within the confederation to which this BGP speaker belongs. The default state, where the MED attribute is not considered.

set protocols bgp <asn> parameters bestpath med missing-as-worst

This command specifies that a route with a MED is always considered to be better than a route without a MED by causing the missing MED attribute to have a value of infinity. The default state, where the missing MED attribute is considered to have a value of zero.

set protocols bgp <asn> parameters default local-pref <local-pref value>

This command specifies the default local preference value. The local preference range is 0 to 4294967295.

set protocols bgp <asn> parameters deterministic-med

This command provides to compare different MED values that advertised by neighbours in the same AS for routes selection. When this command is enabled, routes from the same autonomous system are grouped together, and the best entries of each group are compared.

set protocols bgp <asn> address-family ipv4-unicast network <prefix> backdoor

This command allows the router to prefer route to specified prefix learned via IGP through backdoor link instead of a route to the same prefix learned via EBGP.

Route Filtering Configuration

In order to control and modify routing information that is exchanged between peers you can use route-map, filter-list, prefix-list, distribute-list.

For inbound updates the order of preference is:

- route-map
- filter-list
- prefix-list, distribute-list

For outbound updates the order of preference is:

- prefix-list, distribute-list
- filter-list
- route-map

Note: The attributes `prefix-list` and `distribute-list` are mutually exclusive, and only one command (distribute-list or prefix-list) can be applied to each inbound or outbound direction for a particular neighbor.

---

set protocols bgp <asn> neighbor <address|interface> address-family <ipv4-unicast|ipv6-unicast> distribute-list <export|import> <number>

This command applys the access list filters named in <number> to the specified BGP neighbor to restrict the routing information that BGP learns and/or advertises. The arguments `export` and `import` specify the direction in which the access list are applied.

set protocols bgp <asn> neighbor <address|interface> address-family <ipv4-unicast|ipv6-unicast> prefix-list <export|import> <name>

This command applys the prfefix list filters named in <name> to the specified BGP neighbor to restrict the routing information that BGP learns and/or advertises. The arguments `export` and `import` specify the direction in which the prefix list are applied.

set protocols bgp <asn> neighbor <address|interface> address-family <ipv4-unicast|ipv6-unicast> route-map <export|import> <name>

This command applys the route map named in <name> to the specified BGP neighbor to control and modify routing information that is exchanged between peers. The arguments `export` and `import` specify the direction in which the route map are applied.

set protocols bgp <asn> neighbor <address|interface> address-family <ipv4-unicast|ipv6-unicast> filter-list <export|import> <name>

This command applys the AS path access list filters named in <name> to the specified BGP neighbor to restrict the routing information that BGP learns and/or advertises. The arguments `export` and `import` specify the direction in which the AS path access list are applied.

set protocols bgp <asn> neighbor <address|interface> address-family <ipv4-unicast|ipv6-unicast> capability orf <receive|send>

This command enables the ORF capability (described in **RFC 5291**) on the local router, and enables ORF capability advertisement to the specified BGP peer. The `receive` keyword configures a router to advertise ORF receive capabilities. The `send` keyword configures a router to advertise ORF send capabilities. To advertise a filter from a sender, you must create an IP prefix list for the specified BGP peer applied in inbound derection.

BGP Scaling Configuration

BGP routers connected inside the same AS through BGP belong to an internal BGP session, or IBGP. In order to prevent routing table loops, IBGP speaker does not advertise IBGP-learned routes to other IBGP speaker (Split Horizon mechanism). As such, IBGP requires a full mesh of all peers. For large networks, this quickly becomes unscalable.

There are two ways that help us to mitigate the BGPs full-mesh requirement in a network:

- Using BGP route-reflectors
- Using BGP confederation

Route Reflector Configuration

Introducing route reflectors removes the need for the full-mesh. When you configure a route reflector you have to tell the router whether the other IBGP router is a client or non-client. A client is an IBGP router that the route reflector will "reflect" routes to, the non-client is just a regular IBGP neighbor. Route reflectors mechanism is described in **RFC 4456** and updated by **RFC 7606**.

set protocols bgp <asn> neighbor <address> address-family <ipv4-unicast|ipv6-unicast> route-reflector-client

This command specifies the given neighbor as route reflector client.

set protocols bgp <asn> parameters cluster-id <id>

This command specifies cluster ID which identifies a collection of route reflectors and their clients, and is used by route reflectors to avoid looping. By default cluster ID is set to the BGP router id value, but can be set to an arbitrary 32-bit value.

Confederation Configuration

A BGP confederation divides our AS into sub-ASes to reduce the number of required IBGP peerings. Within a sub-AS we still require full-mesh IBGP but between these sub-ASes we use something that looks like EBGP but behaves like IBGP (called confederation BGP). Confederation mechanism is described in **RFC 5065**

set protocols bgp <subasn> parameters confederation identifier <asn>

This command specifies a BGP confederation identifier. <asn> is the number of the autonomous system that internally includes multiple sub-autonomous systems (a confederation). <subasn> is the number sub-autonomous system inside <asn>.

set protocols bgp <subasn> parameters confederation confederation peers <nsubasn>

This command sets other confederations <nsubasn> as members of autonomous system specified by `confederation identifier` <asn>.

Operational Mode Commands

Show

show <ip|ipv6> bgp

This command displays all entries in BGP routing table.

```
BGP table version is 10, local router ID is 10.0.35.3, vrf id 0
Default local pref 100, local AS 65000
Status codes:  s suppressed, d damped, h history, * valid, > best, = multipath,
               i internal, r RIB-failure, S Stale, R Removed
Nexthop codes: @NNN nexthop's vrf id, < announce-nh-self
Origin codes:  i - IGP, e - EGP, ? - incomplete

   Network          Next Hop            Metric LocPrf Weight Path
*> 198.51.100.0/24  10.0.34.4                0             0 65004 i
*> 203.0.113.0/24   10.0.35.5                0             0 65005 i

Displayed  2 routes and 2 total paths
```

show <ip|ipv6> bgp <address|prefix>

This command displays information about the particular entry in the BGP routing table.

```
BGP routing table entry for 198.51.100.0/24
Paths: (1 available, best #1, table default)
  Advertised to non peer-group peers:
  10.0.13.1 10.0.23.2 10.0.34.4 10.0.35.5
  65004
    10.0.34.4 from 10.0.34.4 (10.0.34.4)
      Origin IGP, metric 0, valid, external, best (First path received)
      Last update: Wed Jan  6 12:18:53 2021
```

show ip bgp cidr-only

This command displays routes with classless interdomain routing (CIDR).

show <ip|ipv6> bgp community <value>

This command displays routes that belong to specified BGP communities. Valid value is a community number in the range from 1 to 4294967200, or AA:NN (autonomous system-community number/2-byte number), no-export, local-as, or no-advertise.

show <ip|ipv6> bgp community-list <name>

This command displays routes that are permitted by the BGP community list.

show ip bgp dampened-paths

This command displays BGP dampened routes.

show ip bgp flap-statistics

This command displays information about flapping BGP routes.

show ip bgp filter-list <name>

This command displays BGP routes allowed by by the specified AS Path access list.

show <ip|ipv6> bgp neighbors <address> advertised-routes

This command displays BGP routes advertised to a neighbor.

show <ip|ipv6> bgp neighbors <address> received-routes

This command displays BGP routes originating from the specified BGP neighbor before inbound policy is applied. To use this command inbound soft reconfiguration must be enabled.

show <ip|ipv6> bgp neighbors <address> routes

This command displays BGP received-routes that are accepted after filtering.

show <ip|ipv6> bgp neighbors <address> dampened-routes

This command displays dampened routes received from BGP neighbor.

show <ip|ipv6> bgp regexp <text>

This command displays information about BGP routes whose AS path matches the specified regular expression.

show <ip|ipv6> bgp summary

This command displays the status of all BGP connections.

```
IPv4 Unicast Summary:
BGP router identifier 10.0.35.3, local AS number 65000 vrf-id 0
BGP table version 11
RIB entries 5, using 920 bytes of memory
Peers 4, using 82 KiB of memory

Neighbor        V         AS MsgRcvd MsgSent   TblVer  InQ OutQ  Up/Down State/PfxRcd
10.0.13.1       4      65000     148     159        0    0    0 02:16:01            0
10.0.23.2       4      65000     136     143        0    0    0 02:13:21            0
10.0.34.4       4      65004     161     163        0    0    0 02:16:01            1
10.0.35.5       4      65005     162     166        0    0    0 02:16:01            1

Total number of neighbors 4
```

Reset

reset <ip|ipv6> bgp <address> [soft [in|out]]

This command resets BGP connections to the specified neighbor IP address. With argument `soft` this command initiates a soft reset. If you do not specify the `in` or `out` options, both inbound and outbound soft reconfiguration are triggered.

reset ip bgp all

This command resets all BGP connections of given router.

reset ip bgp dampening

This command uses to clear BGP route dampening information and to unsuppress suppressed routes.

reset ip bgp external

This command resets all external BGP peers of given router.

reset ip bgp peer-group <name> [soft [in|out]]

This command resets BGP connections to the specified peer group. With argument `soft` this command initiates a soft reset. If you do not specify the `in` or `out` options, both inbound and outbound soft reconfiguration are triggered.

Configuration Examples

IPv4

A simple eBGP configuration:

Node 1:

```
set protocols bgp 65534 neighbor 192.168.0.2 ebgp-multihop '2'
set protocols bgp 65534 neighbor 192.168.0.2 remote-as '65535'
set protocols bgp 65534 neighbor 192.168.0.2 update-source '192.168.0.1'
set protocols bgp 65534 address-family ipv4-unicast network '172.16.0.0/16'
set protocols bgp 65534 parameters router-id '192.168.0.1'
```

Node 2:

```
set protocols bgp 65535 neighbor 192.168.0.1 ebgp-multihop '2'
set protocols bgp 65535 neighbor 192.168.0.1 remote-as '65534'
set protocols bgp 65535 neighbor 192.168.0.1 update-source '192.168.0.2'
set protocols bgp 65535 address-family ipv4-unicast network '172.17.0.0/16'
set protocols bgp 65535 parameters router-id '192.168.0.2'
```

By default the prefix declared in the network statement does not need to exist in your routing table, but it is conventional to add it to prevent routing loops. The best way to do that is to creat a static route:

Node 1:

```
set protocols static route 172.16.0.0/16 blackhole distance '254'
```

Node 2:

```
set protocols static route 172.17.0.0/16 blackhole distance '254'
```

IPv6

A simple BGP configuration via IPv6.

Node 1:

```
set protocols bgp 65534 neighbor 2001:db8::2 ebgp-multihop '2'
set protocols bgp 65534 neighbor 2001:db8::2 remote-as '65535'
set protocols bgp 65534 neighbor 2001:db8::2 update-source '2001:db8::1'
set protocols bgp 65534 neighbor 2001:db8::2 address-family ipv6-unicast
set protocols bgp 65534 address-family ipv6-unicast network '2001:db8:1::/48'
set protocols bgp 65534 parameters router-id '10.1.1.1'
```

Node 2:

```
set protocols bgp 65535 neighbor 2001:db8::1 ebgp-multihop '2'
set protocols bgp 65535 neighbor 2001:db8::1 remote-as '65534'
set protocols bgp 65535 neighbor 2001:db8::1 update-source '2001:db8::2'
set protocols bgp 65535 neighbor 2001:db8::1 address-family ipv6-unicast
set protocols bgp 65535 address-family ipv6-unicast network '2001:db8:2::/48'
set protocols bgp 65535 parameters router-id '10.1.1.2'
```

By default the prefix declared in the network statement does not need to exist in your routing table, but it is conventional to add it to prevent routing loops. The best way to do that is to creat a static route:

Node 1:

```
set protocols static route6 2001:db8:1::/48 blackhole distance '254'
```

Node 2:

```
set protocols static route6 2001:db8:2::/48 blackhole distance '254'
```

Route Filter

Route filter can be applied using a route-map:

Node1:

```
set policy prefix-list AS65535-IN rule 10 action 'permit'
set policy prefix-list AS65535-IN rule 10 prefix '172.16.0.0/16'
set policy prefix-list AS65535-OUT rule 10 action 'deny'
set policy prefix-list AS65535-OUT rule 10 prefix '172.16.0.0/16'
set policy prefix-list6 AS65535-IN rule 10 action 'permit'
set policy prefix-list6 AS65535-IN rule 10 prefix '2001:db8:2::/48'
set policy prefix-list6 AS65535-OUT rule 10 action 'deny'
set policy prefix-list6 AS65535-OUT rule 10 prefix '2001:db8:2::/48'
set policy route-map AS65535-IN rule 10 action 'permit'
set policy route-map AS65535-IN rule 10 match ip address prefix-list 'AS65535-IN'
set policy route-map AS65535-IN rule 10 match ipv6 address prefix-list 'AS65535-IN'
set policy route-map AS65535-IN rule 20 action 'deny'
set policy route-map AS65535-OUT rule 10 action 'deny'
set policy route-map AS65535-OUT rule 10 match ip address prefix-list 'AS65535-OUT'
set policy route-map AS65535-OUT rule 10 match ipv6 address prefix-list 'AS65535-OUT'
set policy route-map AS65535-OUT rule 20 action 'permit'
set protocols bgp 65534 neighbor 2001:db8::2 address-family ipv4-unicast route-map␣
↪export 'AS65535-OUT'
set protocols bgp 65534 neighbor 2001:db8::2 address-family ipv4-unicast route-map␣
↪import 'AS65535-IN'
set protocols bgp 65534 neighbor 2001:db8::2 address-family ipv6-unicast route-map␣
↪export 'AS65535-OUT'
set protocols bgp 65534 neighbor 2001:db8::2 address-family ipv6-unicast route-map␣
↪import 'AS65535-IN'
```

Node2:

```
set policy prefix-list AS65534-IN rule 10 action 'permit'
set policy prefix-list AS65534-IN rule 10 prefix '172.17.0.0/16'
set policy prefix-list AS65534-OUT rule 10 action 'deny'
set policy prefix-list AS65534-OUT rule 10 prefix '172.17.0.0/16'
set policy prefix-list6 AS65534-IN rule 10 action 'permit'
set policy prefix-list6 AS65534-IN rule 10 prefix '2001:db8:1::/48'
set policy prefix-list6 AS65534-OUT rule 10 action 'deny'
set policy prefix-list6 AS65534-OUT rule 10 prefix '2001:db8:1::/48'
set policy route-map AS65534-IN rule 10 action 'permit'
set policy route-map AS65534-IN rule 10 match ip address prefix-list 'AS65534-IN'
```

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```
set policy route-map AS65534-IN rule 10 match ipv6 address prefix-list 'AS65534-IN'
set policy route-map AS65534-IN rule 20 action 'deny'
set policy route-map AS65534-OUT rule 10 action 'deny'
set policy route-map AS65534-OUT rule 10 match ip address prefix-list 'AS65534-OUT'
set policy route-map AS65534-OUT rule 10 match ipv6 address prefix-list 'AS65534-OUT'
set policy route-map AS65534-OUT rule 20 action 'permit'
set protocols bgp 65535 neighbor 2001:db8::1 address-family ipv4-unicast route-map␣
↪export 'AS65534-OUT'
set protocols bgp 65535 neighbor 2001:db8::1 address-family ipv4-unicast route-map␣
↪import 'AS65534-IN'
set protocols bgp 65535 neighbor 2001:db8::1 address-family ipv6-unicast route-map␣
↪export 'AS65534-OUT'
set protocols bgp 65535 neighbor 2001:db8::1 address-family ipv6-unicast route-map␣
↪import 'AS65534-IN'
```

We could expand on this and also deny link local and multicast in the rule 20 action deny.

8.9.3 Multicast

VyOS facilitates IP Multicast by supporting **PIM Sparse Mode**, **IGMP** and **IGMP-Proxy**.

PIM and IGMP

PIM (Protocol Independent Multicast) must be configured in every interface of every participating router. Every router must also have the location of the Rendevouz Point manually configured. Then, unidirectional shared trees rooted at the Rendevouz Point will automatically be built for multicast distribution.

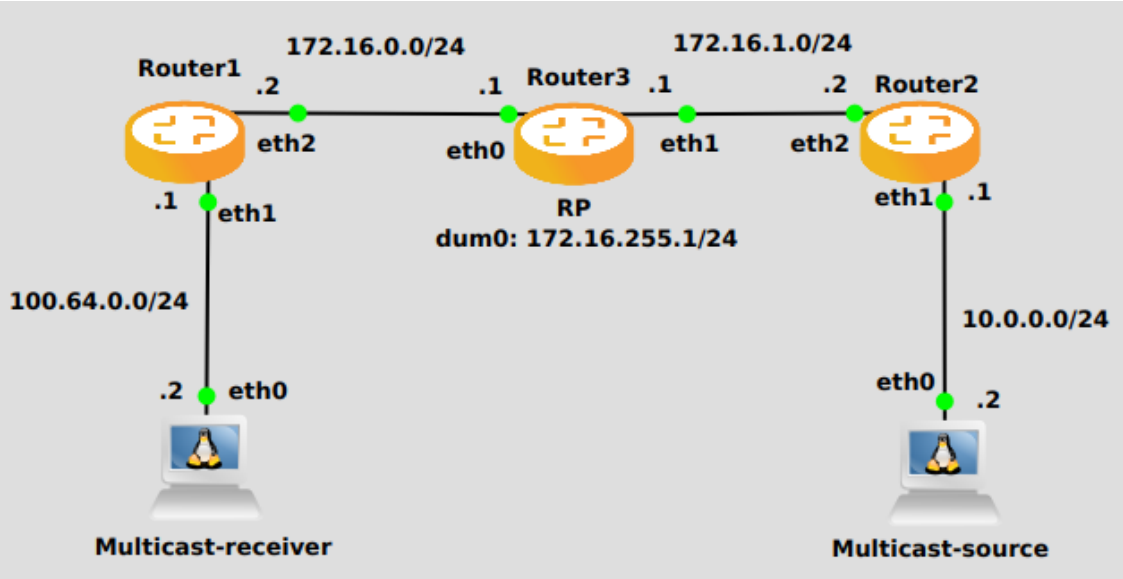
Traffic from multicast sources will go to the Rendezvous Point, and receivers will pull it from a shared tree using IGMP (Internet Group Management Protocol).

Multicast receivers will talk IGMP to their local router, so, besides having PIM configured in every router, IGMP must also be configured in any router where there could be a multicast receiver locally connected.

VyOS supports both IGMP version 2 and version 3 (which allows source-specific multicast).

Example

In the following example we can see a basic multicast setup:



Router 1

```
set interfaces ethernet eth2 address '172.16.0.2/24'
set interfaces ethernet eth1 address '100.64.0.1/24'
set protocols ospf area 0 network '172.16.0.0/24'
set protocols ospf area 0 network '100.64.0.0/24'
set protocols igmp interface eth1
set protocols pim interface eth1
set protocols pim interface eth2
set protocols pim rp address 172.16.255.1 group '224.0.0.0/4'
```

Router 3

```
set interfaces dummy dum0 address '172.16.255.1/24'
set interfaces ethernet eth0 address '172.16.0.1/24'
set interfaces ethernet eth1 address '172.16.1.1/24'
set protocols ospf area 0 network '172.16.0.0/24'
set protocols ospf area 0 network '172.16.255.0/24'
set protocols ospf area 0 network '172.16.1.0/24'
set protocols pim interface dum0
set protocols pim interface eth0
set protocols pim interface eth1
set protocols pim rp address 172.16.255.1 group '224.0.0.0/4'
```

Router 2

```
set interfaces ethernet eth1 address '10.0.0.1/24'
set interfaces ethernet eth2 address '172.16.1.2/24'
set protocols ospf area 0 network '10.0.0.0/24'
set protocols ospf area 0 network '172.16.1.0/24'
set protocols pim interface eth1
```

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```
set protocols pim interface eth2
set protocols pim rp address 172.16.255.1 group '224.0.0.0/4'
```

Basic commands

These are the commands for a basic setup.

set protocols pim interface <interface-name>

Use this command to enable PIM in the selected interface so that it can communicate with PIM neighbors.

set protocols pim rp address <address> group <multicast-address/mask-bits>

Use this command to manually configure a Rendezvous Point for PIM so that join messages can be sent there. Set the Rendevouz Point address and the matching prefix of group ranges covered. These values must be shared with every router participating in the PIM network.

set protocols igmp interface eth1

Use this command to configure an interface with IGMP so that PIM can receive IGMP reports and query on the selected interface. By default IGMP version 3 will be used.

Tuning commands

You can also tune multicast with the following commands.

set protocols pim interface <interface> dr-priority <value>

Use this PIM command in the selected interface to set the priority (1-4294967295) you want to influence in the election of a node to become the Designated Router for a LAN segment. The default priority is 1, set a higher value to give the router more preference in the DR election process.

set protocols pim int <interface> hello <seconds>

Use this command to configure the PIM hello interval in seconds (1-180) for the selected interface.

set protocols pim rp keep-alive-timer <seconds>

Use this PIM command to modify the time out value (31-60000 seconds) for an (S,G) flow. 31 seconds is chosen for a lower bound as some hardware platforms cannot see data flowing in better than 30 seconds chunks.

set protocols igmp interface <interface> join <multicast-address> source <IP-address>

Use this command to allow the selected interface to join a multicast group defining the multicast address you want to join and the source IP address too.

set protocols igmp interface <interface> query-interval <seconds>

Use this command to configure in the selected interface the IGMP host query interval (1-1800) in seconds that PIM will use.

set protocols igmp interface <interface> query-max-response-time <deciseconds>

Use this command to configure in the selected interface the IGMP query response timeout value (10-250) in deciseconds. If a report is not returned in the specified time, it will be assumed the (S,G) or (*,G) state has timed out.

set protocols igmp interface <interface> version <version-number>

Use this command to define in the selected interface whether you choose IGMP version 2 or 3. The default value is 3.

IGMP Proxy

IGMP (Internet Group Management Protocol) proxy sends IGMP host messages on behalf of a connected client. The configuration must define one, and only one upstream interface, and one or more downstream interfaces.

Configuration

set protocols igmp-proxy interface <interface> role <upstream | downstream>

- **upstream:** The upstream network interface is the outgoing interface which is responsible for communicating to available multicast data sources. There can only be one upstream interface.
- **downstream:** Downstream network interfaces are the distribution interfaces to the destination networks, where multicast clients can join groups and receive multicast data. One or more downstream interfaces must be configured.

set protocols igmp-proxy interface <interface> alt-subnet <network>

Defines alternate sources for multicasting and IGMP data. The network address must be on the following format 'a.b.c.d/n'. By default, the router will accept data from sources on the same network as configured on an interface. If the multicast source lies on a remote network, one must define from where traffic should be accepted.

This is especially useful for the upstream interface, since the source for multicast traffic is often from a remote location.

This option can be supplied multiple times.

set protocols igmp-proxy disable-quickleave

Disables quickleave mode. In this mode the daemon will not send a Leave IGMP message upstream as soon as it receives a Leave message for any downstream interface. The daemon will not ask for Membership reports on the downstream interfaces, and if a report is received the group is not joined again the upstream.

If it's vital that the daemon should act exactly like a real multicast client on the upstream interface, this function should be enabled.

Enabling this function increases the risk of bandwidth saturation.

set protocols igmp-proxy disable

Disable this service.

Example

Interface *eth1* LAN is behind NAT. In order to subscribe *10.0.0.0/23* subnet multicast which is in *eth0* WAN we need to configure igmp-proxy.

```
set protocols igmp-proxy interface eth0 role upstream
set protocols igmp-proxy interface eth0 alt-subnet 10.0.0.0/23
set protocols igmp-proxy interface eth1 role downstream
```

Operation

restart igmp-proxy

Restart the IGMP proxy process.

8.9.4 IS-IS

IS-IS (Intermediate System to Intermediate System) is a link-state interior gateway routing protocol which is described in ISO10589, **RFC 1195**, **RFC 5308**. Like OSPF, IS-IS runs the Dijkstra shortest-path first (SPF) algorithm to create a database of the network's topology and, from that database, to determine the best (that is, shortest) path to a destination. The routers exchange topology information with their nearest neighbors. IS-IS runs directly on the data link layer (Layer 2). IS-IS addresses are called NETs (Network Entity Titles) and can be 8 to 20 bytes long, but are generally 10 bytes long.

General

Configuration

Mandatory Settings

set protocols isis net <network-entity-title>

This commad also sets network entity title (NET) provided in ISO format.

For example NET (Network Entity Title)

```
49.0001.1921.6800.1002.00
```

The IS-IS address consists of the following parts:

- AFI (Address family authority identifier) - `49` The AFI value 49 is what IS-IS uses for private addressing.
- Area identifier: `0001` IS-IS area number (Area1)
- System identifier: `1921.6800.1002` - for system idetifiers we recommend to use IP address or MAC address of the router itself.
- NET selector: `00` Must always be 00, to indicate "this system".

set protocols isis interface <interface>

This command activates ISIS adjacency on this interface. Note that the name of ISIS instance must be the same as the one used to configure the ISIS process.

set protocols isis dynamic-hostname

This command enables support for dynamic hostname. Dynamic hostname mapping determined as described in **RFC 2763**, Dynamic Hostname Exchange Mechanism for IS-IS.

set protocols isis level <level-1|level-1-2|level-2>

This command defines the ISIS router behavior:

level-1 Act as a station router only. **level-1-2** Act as both a station router and an area router. **level-2-only** Act as an area router only.

set protocols isis lsp-mtu <size>

This command configures the maximum size of generated LSPs, in bytes. The size range is 128 to 4352.

set protocols isis metric-style <narrow|transition|wide>

This command sets old-style (ISO 10589) or new-style packet formats:

narrow Use old style of TLVs with narrow metric. **transition** Send and accept both styles of TLVs during transition. **wide** Use new style of TLVs to carry wider metric.

set protocols isis purge-originator

This command enables RFC 6232 purge originator identification. Enable purge originator identification (POI) by adding the type, length and value (TLV) with the Intermediate System (IS) identification to the LSPs that do not contain POI information. If an IS generates a purge, VyOS adds this TLV with the system ID of the IS to the purge.

set protocols isis set-attached-bit

This command sets ATT bit to 1 in Level1 LSPs. It is described in RFC 3787.

set protocols isis set-overload-bit

This command sets overload bit to avoid any transit traffic through this router. It is described in RFC 3787.

set protocols isis name default-information originate <ipv4|ipv6> level-1

This command will generate a default-route in L1 database.

set protocols isis name default-information originate <ipv4|ipv6> level-2

This command will generate a default-route in L2 database.

Interface Configuration

set protocols isis interface <interface> circuit-type <level-1|level-1-2|level-2-only>

This command specifies circuit type for interface:

- **level-1** Level-1 only adjacencies are formed.
- **level-1-2** Level-1-2 adjacencies are formed
- **level-2-only** Level-2 only adjacencies are formed

set protocols isis interface <interface> hello-interval <seconds>

This command sets hello interval in seconds on a given interface. The range is 1 to 600.

set protocols isis interface <interface> hello-multiplier <seconds>

This command sets multiplier for hello holding time on a given interface. The range is 2 to 100.

set protocols isis interface <interface> hello-padding

This command configures padding on hello packets to accommodate asymmetrical maximum transfer units (MTUs) from different hosts as described in RFC 3719. This helps to prevent a premature adjacency Up state when one routing devices MTU does not meet the requirements to establish the adjacency.

set protocols isis interface <interface> metric <metric>

This command set default metric for circuit.

The metric range is 1 to 16777215 (Max value depend if metric support narrow or wide value).

set protocols isis interface <interface> network point-to-point

This command specifies network type to Point-to-Point. The default network type is broadcast.

set protocols isis interface <interface> passive

This command configures the passive mode for this interface.

set protocols isis interface <interface> password plaintext-password <text>

This command configures the authentication password for the interface.

set protocols isis interface <interface> priority <number>

This command sets priority for the interface for DIS (Designated Intermediate System) election. The priority range is 0 to 127.

set protocols isis interface <interface> psnp-interval <number>

This command sets PSNP interval in seconds. The interval range is 0 to 127.

set protocols isis interface <interface> no-three-way-handshake

This command disables Three-Way Handshake for P2P adjacencies which described in **RFC 5303**. Three-Way Handshake is enabled by default.

Route Redistribution

set protocols isis redistribute ipv4 <route source> level-1

This command redistributes routing information from the given route source into the ISIS database as Level-1. There are six modes available for route source: bgp, connected, kernel, ospf, rip, static.

set protocols isis redistribute ipv4 <route source> level-2

This command redistributes routing information from the given route source into the ISIS database as Level-2. There are six modes available for route source: bgp, connected, kernel, ospf, rip, static.

set protocols isis redistribute ipv4 <route source> <level-1|level-2> metric <number>

This command specifies metric for redistributed routes from the given route source. There are six modes available for route source: bgp, connected, kernel, ospf, rip, static. The metric range is 1 to 16777215.

set protocols isis redistribute ipv4 <route source> <level-1|level-2> route-map <name>

This command allows to use route map to filter redistributed routes from the given route source. There are six modes available for route source: bgp, connected, kernel, ospf, rip, static.

Timers

set protocols isis lsp-gen-interval <seconds>

This command sets minimum interval in seconds between regenerating same LSP. The interval range is 1 to 120.

set protocols isis lsp-refresh-interval <seconds>

This command sets LSP refresh interval in seconds. IS-IS generates LSPs when the state of a link changes. However, to ensure that routing databases on all routers remain converged, LSPs in stable networks are generated on a regular basis even though there has been no change to the state of the links. The interval range is 1 to 65235. The default value is 900 seconds.

set protocols isis max-lsp-lifetime <seconds>

This command sets LSP maximum LSP lifetime in seconds. The interval range is 350 to 65535. LSPs remain in a database for 1200 seconds by default. If they are not refreshed by that time, they are deleted. You can change the LSP refresh interval or the LSP lifetime. The LSP refresh interval should be less than the LSP lifetime or else LSPs will time out before they are refreshed.

set protocols isis spf-interval <seconds>

This command sets minimum interval between consecutive SPF calculations in seconds.The interval range is 1 to 120.

set protocols isis spf-delay-ietf holddown <milliseconds>

set protocols isis spf-delay-ietf init-delay <milliseconds>

set protocols isis spf-delay-ietf long-delay <milliseconds>

set protocols isis spf-delay-ietf short-delay <milliseconds>

set protocols isis spf-delay-ietf time-to-learn <milliseconds>

This commands specifies the Finite State Machine (FSM) intended to control the timing of the execution of SPF calculations in response to IGP events. The process described in **RFC 8405**.

Example

Simple IS-IS configuration using 2 nodes and redistributing connected interfaces.

Node 1:

```
set interfaces dummy dum0 address '203.0.113.1/24'
set interfaces ethernet eth1 address '192.0.2.1/24'

set policy prefix-list EXPORT-ISIS rule 10 action 'permit'
set policy prefix-list EXPORT-ISIS rule 10 prefix '203.0.113.0/24'
set policy route-map EXPORT-ISIS rule 10 action 'permit'
set policy route-map EXPORT-ISIS rule 10 match ip address prefix-list 'EXPORT-ISIS'

set protocols isis interface eth1
set protocols isis net '49.0001.1921.6800.1002.00'
set protocols isis redistribute ipv4 connected level-2 route-map 'EXPORT-ISIS'
```

Node 2:

```
set interfaces ethernet eth1 address '192.0.2.2/24'

set protocols isis interface eth1
set protocols isis net '49.0001.1921.6800.2002.00'
```

Show ip routes on Node2:

```
vyos@r2:~$ show ip route isis
Codes: K - kernel route, C - connected, S - static, R - RIP,
       O - OSPF, I - IS-IS, B - BGP, E - EIGRP, N - NHRP,
       T - Table, v - VNC, V - VNC-Direct, A - Babel, D - SHARP,
       F - PBR, f - OpenFabric,
       > - selected route, * - FIB route, q - queued route, r - rejected route

I   203.0.113.0/24 [115/10] via 192.0.2.1, eth1, 00:03:42
```

8.9.5 MPLS

MPLS (Multi-Protocol Label Switching) is a packet forwarding paradigm which differs from regular IP forwarding. Instead of IP addresses being used to make the decision on finding the exit interface, a router will instead use an exact match on a 32 bit/4 byte header called the MPLS label. This label is inserted between the ethernet (layer 2) header and the IP (layer 3) header. One can statically or dynamically assign label allocations, but we will focus on dynamic allocation of labels using some sort of label distribution protocol (such as the aptly named Label Distribution Protocol / LDP, Resource Reservation Protocol / RSVP, or Segment Routing through OSPF/ISIS). These protocols allow for the creation of a unidirectional/unicast path called a labeled switched path (initialized as LSP) throughout the network that operates very much like a tunnel through the network. An easy way of thinking about how an MPLS LSP actually forwards traffic throughout a network is to think of a GRE tunnel. They are not the same in how they operate, but they are the same in how they handle the tunneled packet. It would be good to think of MPLS as a tunneling technology that can be used to transport many different types of packets, to aid in traffic engineering by allowing one to specify paths throughout the network (using RSVP or SR), and to generally allow for easier intra/inter network transport of data packets.

For more information on how MPLS label switching works, please go visit Wikipedia (MPLS).

Note: MPLS support in VyOS is not finished yet, and therefore its functionality is limited. Currently there is no support for MPLS enabled VPN services such as L3VPNs, L2VPNs, and mVPNs. RSVP support is also not present as the underlying routing stack (FRR) does not implement it. Currently VyOS can be configured as a label switched router (MPLS P router), in both penultimate and ultimate hop popping operations.

Label Distribution Protocol

The MPLS architecture does not assume a single protocol to create MPLS paths. VyOS supports the Label Distribution Protocol (LDP) as implemented by FRR, based on **RFC 5036**.

LDP (Label Distribution Protocol) is a TCP based MPLS signaling protocol that distributes labels creating MPLS label switched paths in a dynamic manner. LDP is not a routing protocol, as it relies on other routing protocols for forwarding decisions. LDP cannot bootstrap itself, and therefore relies on said routing protocols for communication with other routers that use LDP.

In order to allow for LDP on the local router to exchange label advertisements with other routers, a TCP session will be established between automatically discovered and statically assigned routers. LDP will try to establish a TCP session to the **transport address** of other routers. Therefore for LDP to function properly please make sure the transport address is shown in the routing table and reachable to traffic at all times.

It is highly recommended to use the same address for both the LDP router-id and the discovery transport address, but for VyOS MPLS LDP to work both parameters must be explicitly set in the configuration.

Another thing to keep in mind with LDP is that much like BGP, it is a protocol that runs on top of TCP. It however does not have an ability to do something like a refresh capability like BGPs route refresh capability. Therefore one might have to reset the neighbor for a capability change or a configuration change to work.

Configuration Options

set protocols mpls interface <interface>

Use this command to enable MPLS processing on the interface you define.

set protocols mpls ldp interface <interface>

Use this command to enable LDP on the interface you define.

set protocols mpls ldp router-id <address>

Use this command to configure the IP address used as the LDP router-id of the local device.

set protocols mpls ldp discovery transport-ipv4-address <address>

set protocols mpls ldp discovery transport-ipv6-address <address>

Use this command to set the IPv4 or IPv6 transport-address used by LDP.

set protocols mpls ldp neighbor <address> password <password>

Use this command to configure authentication for LDP peers. Set the IP address of the LDP peer and a password that should be shared in order to become neighbors.

set protocols mpls ldp neighbor <address> session-holdtime <seconds>

Use this command to configure a specific session hold time for LDP peers. Set the IP address of the LDP peer and a session hold time that should be configured for it. You may have to reset the neighbor for this to work.

set protocols mpls ldp neighbor <address> ttl-security <disable | hop count>

Use this command to enable, disable, or specify hop count for TTL security for LDP peers. By default the value is set to 255 (or max TTL).

set protocols mpls ldp discovery hello-ipv4-interval <seconds>

set protocols mpls ldp discovery hello-ipv4-holdtime <seconds>

set protocols mpls ldp discovery hello-ipv6-interval <seconds>

set protocols mpls ldp discovery hello-ipv6-holdtime <seconds>

Use these commands if you would like to set the discovery hello and hold time parameters.

set protocols mpls ldp discovery session-ipv4-holdtime <seconds>

set protocols mpls ldp discovery session-ipv6-holdtime <seconds>

Use this command if you would like to set the TCP session hold time intervals.

set protocols mpls ldp import ipv4 import-filter filter-access-list <access list number>

set protocols mpls ldp import ipv6 import-filter filter-access-list6 <access list number>

Use these commands to control the importing of forwarding equivalence classes (FECs) for LDP from neighbors. This would be useful for example on only accepting the labeled routes that are needed and not ones that are not needed, such as accepting loopback interfaces and rejecting all others.

set protocols mpls ldp export ipv4 export-filter filter-access-list <access list number>

set protocols mpls ldp export ipv6 export-filter filter-access-list6 <access list number>

Use these commands to control the exporting of forwarding equivalence classes (FECs) for LDP to neighbors. This would be useful for example on only announcing the labeled routes that are needed and not ones that are not needed, such as announcing loopback interfaces and no others.

set protocols mpls ldp export ipv4 explicit-null

set protocols mpls ldp export ipv6 explicit-null

Use this command if you would like for the router to advertise FECs with a label of 0 for explicit null operations.

set protocols mpls ldp allocation ipv4 access-list <access list number>

set protocols mpls ldp allocation ipv6 access-list6 <access list number>

Use this command if you would like to control the local FEC allocations for LDP. A good example would be for your local router to not allocate a label for everything. Just a label for what it's useful. A good example would be just a loopback label.

set protocols mpls ldp parameters cisco-interop-tlv

Use this command to use a Cisco non-compliant format to send and interpret the Dual-Stack capability TLV for IPv6 LDP communications. This is related to **RFC 7552**.

set protocols mpls ldp parameters ordered-control

Use this command to use ordered label distribution control mode. FRR by default uses independent label distribution control mode for label distribution. This is related to **RFC 5036**.

set protocols mpls ldp parameters transport-prefer-ipv4

Use this command to prefer IPv4 for TCP peer transport connection for LDP when both an IPv4 and IPv6 LDP address are configured on the same interface.

set protocols mpls ldp targeted-neighbor ipv4 enable

set protocols mpls ldp targeted-neighbor ipv6 enable

Use this command to enable targeted LDP sessions to the local router. The router will then respond to any sessions that are trying to connect to it that are not a link local type of TCP connection.

set protocols mpls ldp targeted-neighbor ipv4 address <address>

set protocols mpls ldp targeted-neighbor ipv6 address <address>

Use this command to enable the local router to try and connect with a targeted LDP session to another router.

set protocols mpls ldp targeted-neighbor ipv4 hello-holdtime <seconds>

set protocols mpls ldp targeted-neighbor ipv4 hello-interval <seconds>

set protocols mpls ldp targeted-neighbor ipv6 hello-holdtime <seconds>

set protocols mpls ldp targeted-neighbor ipv6 hello-interval <seconds>

Use these commands if you would like to set the discovery hello and hold time parameters for the targeted LDP neighbors.

Sample configuration to setup LDP on VyOS

```
set protocols ospf area 0 network '192.168.255.252/32'                    <--- Routing␣
↪for loopback
set protocols ospf area 0 network '192.168.0.5/32'                        <--- Routing␣
↪for an interface connecting to the network
set protocols ospf parameters router-id '192.168.255.252'                 <--- Router␣
↪ID setting for OSPF
set protocols mpls interface 'eth1'                                       <--- Enable␣
↪MPLS for an interface connecting to network
set protocols mpls ldp discovery transport-ipv4-address '192.168.255.252'   <---␣
```

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```
↪Transport address for LDP for TCP sessions to connect to
set protocols mpls ldp interface 'eth1'                                    <--- Enable␣
↪LDP for an interface connecting to network
set protocols mpls ldp interface 'lo'                                      <--- Enable␣
↪LDP on loopback for future services connectivity
set protocols mpls ldp router-id '192.168.255.252'                         <--- Router␣
↪ID setting for LDP
set interfaces ethernet eth1 address '192.168.0.5/31'                      <---␣
↪Interface IP for connecting to network
set interfaces loopback lo address '192.168.255.252/32'                    <---␣
↪Interface loopback IP for router ID and other uses
```

Operational Mode Commands

When LDP is working, you will be able to see label information in the outcome of `show ip route`. Besides that information, there are also specific *show* commands for LDP:

Show

`show mpls ldp binding`

Use this command to see the Label Information Base.

`show mpls ldp discovery`

Use this command to see discovery hello information

`show mpls ldp interface`

Use this command to see LDP interface information

`show mpls ldp neighbor`

Use this command to see LDP neighbor information

`show mpls ldp neighbor detail`

Use this command to see detailed LDP neighbor information

Reset

`reset mpls ldp neighbor <IPv4 or IPv6 address>`

Use this command to reset an LDP neighbor/TCP session that is established

8.9.6 OSPF

OSPF (Open Shortest Path First) is a routing protocol for Internet Protocol (IP) networks. It uses a link state routing (LSR) algorithm and falls into the group of interior gateway protocols (IGPs), operating within a single autonomous system (AS). It is defined as OSPF Version 2 in **RFC 2328** (1998) for IPv4. Updates for IPv6 are specified as OSPF Version 3 in **RFC 5340** (2008). OSPF supports the CIDR (Classless Inter-Domain Routing) addressing model.

OSPF is a widely used IGP in large enterprise networks.

OSPFv2 (IPv4)

Configuration

General

VyOS does not have a special command to start the OSPF process. The OSPF process starts when the first ospf enabled interface is configured.

set protocols ospf area <number> network <A.B.C.D/M>

This command specifies the OSPF enabled interface(s). If the interface has an address from defined range then the command enables OSPF on this interface so router can provide network information to the other ospf routers via this interface.

This command is also used to enable the OSPF process. The area number can be specified in decimal notation in the range from 0 to 4294967295. Or it can be specified in dotted decimal notation similar to ip address.

set protocols ospf auto-cost reference-bandwidth <number>

This command sets the reference bandwidth for cost calculations, where bandwidth can be in range from 1 to 4294967, specified in Mbits/s. The default is 100Mbit/s (i.e. a link of bandwidth 100Mbit/s or higher will have a cost of 1. Cost of lower bandwidth links will be scaled with reference to this cost).

set protocols ospf parameters router-id <rid>

This command sets the router-ID of the OSPF process. The router-ID may be an IP address of the router, but need not be – it can be any arbitrary 32bit number. However it MUST be unique within the entire OSPF domain to the OSPF speaker – bad things will happen if multiple OSPF speakers are configured with the same router-ID!

Optional

set protocols ospf default-information originate [always] [metric <number>] [metric-type <1|2>] [route-map <name>]

Originate an AS-External (type-5) LSA describing a default route into all external-routing capable areas, of the specified metric and metric type. If the `always` keyword is given then the default is always advertised, even when there is no default present in the routing table. The argument `route-map` specifies to advertise the default route if the route map is satisfied.

set protocols ospf distance global <distance>

This command change distance value of OSPF globally. The distance range is 1 to 255.

set protocols ospf distance ospf <external|inter-area|intra-area> <distance>

This command change distance value of OSPF. The arguments are the distance values for external routes, inter-area routes and intra-area routes respectively. The distance range is 1 to 255.

Note: Routes with a distance of 255 are effectively disabled and not installed into the kernel.

set protocols ospf log-adjacency-changes [detail]

This command allows to log changes in adjacency. With the optional `detail` argument, all changes in adjacency status are shown. Without `detail`, only changes to full or regressions are shown.

set protocols ospf max-metric router-lsa <administrative|on-shutdown <seconds>|on-startup <seconds>>

This enables **RFC 3137** support, where the OSPF process describes its transit links in its router-LSA as having infinite distance so that other routers will avoid calculating transit paths through the router while still being able to reach networks through the router.

This support may be enabled administratively (and indefinitely) with the `administrative` command. It may also be enabled conditionally. Conditional enabling of max-metric router-lsas can be for a period of seconds after startup with the `on-startup <seconds>` command and/or for a period of seconds prior to shutdown with the `on-shutdown <seconds>` command. The time range is 5 to 86400.

set protocols ospf parameters abr-type <cisco|ibm|shortcut|standard>

This command selects ABR model. OSPF router supports four ABR models:

cisco – a router will be considered as ABR if it has several configured links to the networks in different areas one of which is a backbone area. Moreover, the link to the backbone area should be active (working). **ibm** – identical to "cisco" model but in this case a backbone area link may not be active. **standard** – router has several active links to different areas. **shortcut** – identical to "standard" but in this model a router is allowed to use a connected areas topology without involving a backbone area for inter-area connections.

Detailed information about "cisco" and "ibm" models differences can be found in **RFC 3509**. A "shortcut" model allows ABR to create routes between areas based on the topology of the areas connected to this router but not using a backbone area in case if non-backbone route will be cheaper. For more information about "shortcut" model, see *ospf-shortcut-abr-02.txt*

set protocols ospf parameters rfc1583-compatibility

RFC 2328, the successor to **RFC 1583**, suggests according to section G.2 (changes) in section 16.4.1 a change to the path preference algorithm that prevents possible routing loops that were possible in the old version of OSPFv2. More specifically it demands that inter-area paths and intra-area backbone path are now of equal preference but still both preferred to external paths.

This command should NOT be set normally.

set protocols ospf passive-interface <interface>

This command specifies interface as passive. Passive interface advertises its address, but does not run the OSPF protocol (adjacencies are not formed and hello packets are not generated).

set protocols ospf passive-interface default

This command specifies all interfaces as passive by default. Because this command changes the configuration logic to a default passive; therefore, interfaces where router adjacencies are expected need to be configured with the `passive-interface-exclude` command.

set protocols ospf passive-interface-exclude <interface>

This command allows exclude interface from passive state. This command is used if the command `passive-interface default` was configured.

set protocols ospf refresh timers <seconds>

The router automatically updates link-state information with its neighbors. Only an obsolete information is updated which age has exceeded a specific threshold. This parameter changes a threshold value, which by default is 1800 seconds (half an hour). The value is applied to the whole OSPF router. The timer range is 10 to 1800.

set protocols ospf timers throttle spf <delay|initial-holdtime|max-holdtime> <seconds>

This command sets the initial delay, the initial-holdtime and the maximum-holdtime between when SPF is calculated and the event which triggered the calculation. The times are specified in milliseconds and must be in the range of 0 to 600000 milliseconds. `delay` sets the initial SPF schedule delay in milliseconds. The default value is 200 ms. `initial-holdtime` sets the minimum hold time between two consecutive SPF calculations. The default value is 1000 ms. `max-holdtime` sets the maximum wait time between two consecutive SPF calculations. The default value is 10000 ms.

Area Configuration

set protocols ospf area <number> area-type stub

This command specifies the area to be a Stub Area. That is, an area where no router originates routes external to OSPF and hence an area where all external routes are via the ABR(s). Hence, ABRs for such an area do not need to pass AS-External LSAs (type-5) or ASBR-Summary LSAs (type-4) into the area. They need only pass Network-Summary (type-3) LSAs into such an area, along with a default-route summary.

set protocols ospf area <number> area-type stub no-summary

This command specifies the area to be a Totally Stub Area. In addition to stub area limitations this area type prevents an ABR from injecting Network-Summary (type-3) LSAs into the specified stub area. Only default summary route is allowed.

set protocols ospf area <number> area-type stub default-cost <number>

This command sets the cost of default-summary LSAs announced to stubby areas. The cost range is 0 to 16777215.

set protocols ospf area <number> area-type nssa

This command specifies the area to be a Not So Stubby Area. External routing information is imported into an NSSA in Type-7 LSAs. Type-7 LSAs are similar to Type-5 AS-external LSAs, except that they can only be flooded into the NSSA. In order to further propagate the NSSA external information, the Type-7 LSA must be translated to a Type-5 AS-external-LSA by the NSSA ABR.

set protocols ospf area <number> area-type nssa no-summary

This command specifies the area to be a NSSA Totally Stub Area. ABRs for such an area do not need to pass Network-Summary (type-3) LSAs (except the default summary route), ASBR-Summary LSAs (type-4) and AS-External LSAs (type-5) into the area. But Type-7 LSAs that convert to Type-5 at the NSSA ABR are allowed.

set protocols ospf area <number> area-type nssa default-cost <number>

This command sets the default cost of LSAs announced to NSSA areas. The cost range is 0 to 16777215.

set protocols ospf area <number> area-type nssa translate <always|candidate|never>

Specifies whether this NSSA border router will unconditionally translate Type-7 LSAs into Type-5 LSAs. When role is Always, Type-7 LSAs are translated into Type-5 LSAs regardless of the translator state of other NSSA border routers. When role is Candidate, this router participates in the translator election to determine if it will perform the translations duties. When role is Never, this router will never translate Type-7 LSAs into Type-5 LSAs.

set protocols ospf area <number> authentication plaintext-password

This command specifies that simple password authentication should be used for the given area. The password must also be configured on a per-interface basis.

set protocols ospf area <number> authentication md5

This command specify that OSPF packets must be authenticated with MD5 HMACs within the given area. Keying material must also be configured on a per-interface basis.

set protocols ospf area <number> range <A.B.C.D/M> [cost <number>]

This command summarizes intra area paths from specified area into one summary-LSA (Type-3) announced to other areas. This command can be used only in ABR and ONLY router-LSAs (Type-1) and network-LSAs (Type-2) (i.e. LSAs with scope area) can be summarized. AS-external-LSAs (Type-5) can't be summarized - their scope is AS. The optional argument `cost` specifies the aggregated link metric. The metric range is 0 to 16777215.

set protocols ospf area <number> range <A.B.C.D/M> not-advertise

This command instead of summarizing intra area paths filter them - i.e. intra area paths from this range are not advertised into other areas. This command makes sense in ABR only.

set protocols ospf area <number> range <A.B.C.D/M> substitute <E.F.G.H/M>

One Type-3 summary-LSA with routing info <E.F.G.H/M> is announced into backbone area if defined area contains at least one intra-area network (i.e. described with router-LSA or network-LSA) from range <A.B.C.D/M>. This command makes sense in ABR only.

set protocols ospf area <number> shortcut <default|disable|enable>

This parameter allows to "shortcut" routes (non-backbone) for inter-area routes. There are three modes available for routes shortcutting:

default – this area will be used for shortcutting only if ABR does not have a link to the backbone area or this link was lost. **enable** – the area will be used for shortcutting every time the route that goes through it is cheaper. **disable** – this area is never used by ABR for routes shortcutting.

set protocols ospf area <number> virtual-link <A.B.C.D>

Provides a backbone area coherence by virtual link establishment.

In general, OSPF protocol requires a backbone area (area 0) to be coherent and fully connected. I.e. any backbone area router must have a route to any other backbone area router. Moreover, every ABR must have a link to backbone area. However, it is not always possible to have a physical link to a backbone area. In this case between two ABR (one of them has a link to the backbone area) in the area (not stub area) a virtual link is organized.

<number> – area identifier through which a virtual link goes. <A.B.C.D> – ABR router-id with which a virtual link is established. Virtual link must be configured on both routers.

Formally, a virtual link looks like a point-to-point network connecting two ABR from one area one of which physically connected to a backbone area. This pseudo-network is considered to belong to a backbone area.

Interface Configuration

set interfaces <inttype> <interface> ip ospf authentication plaintext-password <text>

This command sets OSPF authentication key to a simple password. After setting, all OSPF packets are authenticated. Key has length up to 8 chars.

Simple text password authentication is insecure and deprecated in favour of MD5 HMAC authentication.

set interfaces <inttype> <interface> ip ospf authentication md5 key-id <id> md5-key <text>

This command specifys that MD5 HMAC authentication must be used on this interface. It sets OSPF authentication key to a cryptographic password. Key-id identifies secret key used to create the message digest. This ID is part of the protocol and must be consistent across routers on a link. The key can be long up to 16 chars (larger strings will be truncated), and is associated with the given key-id.

set interfaces <inttype> <interface> ip ospf bandwidth <number>

This command sets the interface bandwidth for cost calculations, where bandwidth can be in range from 1 to 100000, specified in Mbits/s.

set interfaces <inttype> <interface> ip ospf cost <number>

This command sets link cost for the specified interface. The cost value is set to router-LSA's metric field and used for SPF calculation. The cost range is 1 to 65535.

set interfaces <inttype> <interface> ip ospf dead-interval <number>

Set number of seconds for router Dead Interval timer value used for Wait Timer and Inactivity Timer. This value must be the same for all routers attached to a common network. The default value is 40 seconds. The interval range is 1 to 65535.

set interfaces <inttype> <interface> ip ospf hello-interval <number>

Set number of seconds for Hello Interval timer value. Setting this value, Hello packet will be sent every timer value seconds on the specified interface. This value must be the same for all routers attached to a common network. The default value is 10 seconds. The interval range is 1 to 65535.

set interfaces <inttype> <interface> ip ospf mtu-ignore

This command disables check of the MTU value in the OSPF DBD packets. Thus, use of this command allows the OSPF adjacency to reach the FULL state even though there is an interface MTU mismatch between two OSPF routers.

set interfaces <inttype> <interface> ip ospf network <type>

This command allows to specify the distribution type for the network connected to this interface:

broadcast – broadcast IP addresses distribution. **non-broadcast** – address distribution in NBMA networks topology. **point-to-multipoint** – address distribution in point-to-multipoint networks. **point-to-point** – address distribution in point-to-point networks.

set interfaces <inttype> <interface> ip ospf priority <number>

This command sets Router Priority integer value. The router with the highest priority will be more eligible to become Designated Router. Setting the value to 0, makes the router ineligible to become Designated Router. The default value is 1. The interval range is 0 to 255.

set interfaces <inttype> <interface> ip ospf retransmit-interval <number>

This command sets number of seconds for RxmtInterval timer value. This value is used when retransmitting Database Description and Link State Request packets if acknowledge was not received. The default value is 5 seconds. The interval range is 3 to 65535.

set interfaces <inttype> <interface> ip ospf transmit-delay <number>

This command sets number of seconds for InfTransDelay value. It allows to set and adjust for each interface the delay interval before starting the synchronizing process of the router's database with all neighbors. The default value is 1 seconds. The interval range is 3 to 65535.

Manual Neighbor Configuration

OSPF routing devices normally discover their neighbors dynamically by listening to the broadcast or multicast hello packets on the network. Because an NBMA network does not support broadcast (or multicast), the device cannot discover its neighbors dynamically, so you must configure all the neighbors statically.

set protocols ospf neighbor <A.B.C.D>

This command specifies the IP address of the neighboring device.

set protocols ospf neighbor <A.B.C.D> poll-interval <seconds>

This command specifies the length of time, in seconds, before the routing device sends hello packets out of the interface before it establishes adjacency with a neighbor. The range is 1 to 65535 seconds. The default value is 60 seconds.

set protocols ospf neighbor <A.B.C.D> priority <number>

This command specifies the router priority value of the nonbroadcast neighbor associated with the IP address specified. The default is 0. This keyword does not apply to point-to-multipoint interfaces.

Redistribution Configuration

set protocols ospf redistribute <route source>

This command redistributes routing information from the given route source to the OSPF process. There are five modes available for route source: bgp, connected, kernel, rip, static.

set protocols ospf default-metric <number>

This command specifies the default metric value of redistributed routes. The metric range is 0 to 16777214.

set protocols ospf redistribute <route source> metric <number>

This command specifies metric for redistributed routes from the given route source. There are five modes available for route source: bgp, connected, kernel, rip, static. The metric range is 1 to 16777214.

set protocols ospf redistribute <route source> metric-type <1|2>

This command specifies metric type for redistributed routes. Difference between two metric types that metric type 1 is a metric which is "commensurable" with inner OSPF links. When calculating a metric to the external destination, the full path metric is calculated as a metric sum path of a router which had advertised this link plus the link metric. Thus, a route with the least summary metric will be selected. If external link is advertised with metric type 2 the path is selected which lies through the router which advertised this link with the least metric despite of the fact that internal path to this router is longer (with more cost). However, if two routers advertised an external link and with metric type 2 the preference is given to the path which lies through the router with a shorter internal path. If two different routers advertised two links to the same external destination but with different metric type, metric type 1 is preferred. If type of a metric left undefined the router will consider these external links to have a default metric type 2.

set protocols ospf redistribute <route source> route-map <name>

This command allows to use route map to filter redistributed routes from the given route source. There are five modes available for route source: bgp, connected, kernel, rip, static.

Operational Mode Commands

show ip ospf neighbor

This command displays the neighbors status.

```
Neighbor ID     Pri State           Dead Time Address         Interface                ␣
↪       RXmtL RqstL DBsmL
10.0.13.1         1 Full/DR           38.365s 10.0.13.1       eth0:10.0.13.3           ␣
↪           0     0     0
10.0.23.2         1 Full/Backup       39.175s 10.0.23.2       eth1:10.0.23.3           ␣
↪           0     0     0
```

show ip ospf neighbor detail

This command displays the neighbors information in a detailed form, not just a summary table.

```
 Neighbor 10.0.13.1, interface address 10.0.13.1
    In the area 0.0.0.0 via interface eth0
    Neighbor priority is 1, State is Full, 5 state changes
    Most recent state change statistics:
      Progressive change 11m55s ago
    DR is 10.0.13.1, BDR is 10.0.13.3
    Options 2 *|-|-|-|-|-|E|-
    Dead timer due in 34.854s
    Database Summary List 0
    Link State Request List 0
    Link State Retransmission List 0
    Thread Inactivity Timer on
    Thread Database Description Retransmision off
    Thread Link State Request Retransmission on
    Thread Link State Update Retransmission on

Neighbor 10.0.23.2, interface address 10.0.23.2
   In the area 0.0.0.1 via interface eth1
   Neighbor priority is 1, State is Full, 4 state changes
   Most recent state change statistics:
     Progressive change 41.193s ago
   DR is 10.0.23.3, BDR is 10.0.23.2
   Options 2 *|-|-|-|-|-|E|-
   Dead timer due in 35.661s
   Database Summary List 0
   Link State Request List 0
   Link State Retransmission List 0
   Thread Inactivity Timer on
   Thread Database Description Retransmision off
   Thread Link State Request Retransmission on
   Thread Link State Update Retransmission on
```

show ip ospf neighbor <A.B.C.D>

This command displays the neighbors information in a detailed form for a neighbor whose IP address is specified.

show ip ospf neighbor <interface>

This command displays the neighbors status for a neighbor on the specified interface.

show ip ospf interface [<interface>]

This command displays state and configuration of OSPF the specified interface, or all interfaces if no interface is given.

```
eth0 is up
  ifindex 2, MTU 1500 bytes, BW 4294967295 Mbit <UP,BROADCAST,RUNNING,MULTICAST>
  Internet Address 10.0.13.3/24, Broadcast 10.0.13.255, Area 0.0.0.0
  MTU mismatch detection: enabled
  Router ID 10.0.23.3, Network Type BROADCAST, Cost: 1
  Transmit Delay is 1 sec, State Backup, Priority 1
  Backup Designated Router (ID) 10.0.23.3, Interface Address 10.0.13.3
  Multicast group memberships: OSPFAllRouters OSPFDesignatedRouters
  Timer intervals configured, Hello 10s, Dead 40s, Wait 40s, Retransmit 5
    Hello due in 4.470s
  Neighbor Count is 1, Adjacent neighbor count is 1
eth1 is up
  ifindex 3, MTU 1500 bytes, BW 4294967295 Mbit <UP,BROADCAST,RUNNING,MULTICAST>
  Internet Address 10.0.23.3/24, Broadcast 10.0.23.255, Area 0.0.0.1
  MTU mismatch detection: enabled
  Router ID 10.0.23.3, Network Type BROADCAST, Cost: 1
  Transmit Delay is 1 sec, State DR, Priority 1
  Backup Designated Router (ID) 10.0.23.2, Interface Address 10.0.23.2
  Saved Network-LSA sequence number 0x80000002
  Multicast group memberships: OSPFAllRouters OSPFDesignatedRouters
  Timer intervals configured, Hello 10s, Dead 40s, Wait 40s, Retransmit 5
    Hello due in 4.563s
  Neighbor Count is 1, Adjacent neighbor count is 1
```

show ip ospf route

This command displays the OSPF routing table, as determined by the most recent SPF calculation.

```
============ OSPF network routing table ============
N IA 10.0.12.0/24          [3] area: 0.0.0.0
                           via 10.0.13.3, eth0
N    10.0.13.0/24          [1] area: 0.0.0.0
                           directly attached to eth0
N IA 10.0.23.0/24          [2] area: 0.0.0.0
                           via 10.0.13.3, eth0
N    10.0.34.0/24          [2] area: 0.0.0.0
                           via 10.0.13.3, eth0

============ OSPF router routing table =============
R    10.0.23.3             [1] area: 0.0.0.0, ABR
                           via 10.0.13.3, eth0
R    10.0.34.4             [2] area: 0.0.0.0, ASBR
                           via 10.0.13.3, eth0

============ OSPF external routing table ===========
N E2 172.16.0.0/24         [2/20] tag: 0
                           via 10.0.13.3, eth0
```

The table consists of following data:

OSPF network routing table – includes a list of acquired routes for all accessible networks (or aggregated area ranges)

of OSPF system. "IA" flag means that route destination is in the area to which the router is not connected, i.e. it's an inter-area path. In square brackets a summary metric for all links through which a path lies to this network is specified. "via" prefix defines a router-gateway, i.e. the first router on the way to the destination (next hop). **OSPF router routing table** – includes a list of acquired routes to all accessible ABRs and ASBRs. **OSPF external routing table** – includes a list of acquired routes that are external to the OSPF process. "E" flag points to the external link metric type (E1 – metric type 1, E2 – metric type 2). External link metric is printed in the "<metric of the router which advertised the link>/<link metric>" format.

show ip ospf border-routers

This command displays a table of paths to area boundary and autonomous system boundary routers.

show ip ospf database

This command displays a summary table with a database contents (LSA).

```
       OSPF Router with ID (10.0.13.1)

                Router Link States (Area 0.0.0.0)

Link ID         ADV Router      Age  Seq#       CkSum  Link count
10.0.13.1       10.0.13.1        984 0x80000005 0xd915 1
10.0.23.3       10.0.23.3       1186 0x80000008 0xfe62 2
10.0.34.4       10.0.34.4       1063 0x80000004 0x4e3f 1

                Net Link States (Area 0.0.0.0)

Link ID         ADV Router      Age  Seq#       CkSum
10.0.13.1       10.0.13.1        994 0x80000003 0x30bb
10.0.34.4       10.0.34.4       1188 0x80000001 0x9411

                Summary Link States (Area 0.0.0.0)

Link ID         ADV Router      Age  Seq#       CkSum  Route
10.0.12.0       10.0.23.3       1608 0x80000001 0x6ab6 10.0.12.0/24
10.0.23.0       10.0.23.3        981 0x80000003 0xe232 10.0.23.0/24

                AS External Link States

Link ID         ADV Router      Age  Seq#       CkSum  Route
172.16.0.0      10.0.34.4       1063 0x80000001 0xc40d E2 172.16.0.0/24 [0x0]
```

show ip ospf database <type> [A.B.C.D] [adv-router <A.B.C.D>|self-originate]

This command displays a database contents for a specific link advertisement type.

The type can be the following: asbr-summary, external, network, nssa-external, opaque-area, opaque-as, opaque-link, router, summary.

[A.B.C.D] – link-state-id. With this specified the command displays portion of the network environment that is being described by the advertisement. The value entered depends on the advertisement's LS type. It must be entered in the form of an IP address.

`adv-router <A.B.C.D>` – router id, which link advertisements need to be reviewed.

`self-originate` displays only self-originated LSAs from the local router.

```
       OSPF Router with ID (10.0.13.1)

             Router Link States (Area 0.0.0.0)

LS age: 1213
Options: 0x2  : *|-|-|-|-|-|E|-
LS Flags: 0x3
Flags: 0x0
LS Type: router-LSA
Link State ID: 10.0.13.1
Advertising Router: 10.0.13.1
LS Seq Number: 80000009
Checksum: 0xd119
Length: 36

 Number of Links: 1

  Link connected to: a Transit Network
   (Link ID) Designated Router address: 10.0.13.1
   (Link Data) Router Interface address: 10.0.13.1
   Number of TOS metrics: 0
     TOS 0 Metric: 1
```

show ip ospf database max-age

This command displays LSAs in MaxAge list.

Configuration Example

Below you can see a typical configuration using 2 nodes, redistribute loopback address and the node 1 sending the default route:

Node 1

```
set interfaces loopback lo address 10.1.1.1/32
set protocols ospf area 0 network 192.168.0.0/24
set protocols ospf default-information originate always
set protocols ospf default-information originate metric 10
set protocols ospf default-information originate metric-type 2
set protocols ospf log-adjacency-changes
set protocols ospf parameters router-id 10.1.1.1
set protocols ospf redistribute connected metric-type 2
set protocols ospf redistribute connected route-map CONNECT

set policy route-map CONNECT rule 10 action permit
set policy route-map CONNECT rule 10 match interface lo
```

Node 2

```
set interfaces loopback lo address 10.2.2.2/32
set protocols ospf area 0 network 192.168.0.0/24
set protocols ospf log-adjacency-changes
set protocols ospf parameters router-id 10.2.2.2
```

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```
set protocols ospf redistribute connected metric-type 2
set protocols ospf redistribute connected route-map CONNECT

set policy route-map CONNECT rule 10 action permit
set policy route-map CONNECT rule 10 match interface lo
```

OSPFv3 (IPv6)

Configuration

General

VyOS does not have a special command to start the OSPFv3 process. The OSPFv3 process starts when the first ospf enabled interface is configured.

set protocols ospfv3 area <number> interface <interface>

This command specifies the OSPFv3 enabled interface. This command is also used to enable the OSPF process. The area number can be specified in decimal notation in the range from 0 to 4294967295. Or it can be specified in dotted decimal notation similar to ip address.

set protocols ospfv3 parameters router-id <rid>

This command sets the router-ID of the OSPFv3 process. The router-ID may be an IP address of the router, but need not be – it can be any arbitrary 32bit number. However it MUST be unique within the entire OSPFv3 domain to the OSPFv3 speaker – bad things will happen if multiple OSPFv3 speakers are configured with the same router-ID!

Optional

set protocols ospfv3 distance global <distance>

This command change distance value of OSPFv3 globally. The distance range is 1 to 255.

set protocols ospfv3 distance ospfv3 <external|inter-area|intra-area> <distance>

This command change distance value of OSPFv3. The arguments are the distance values for external routes, inter-area routes and intra-area routes respectively. The distance range is 1 to 255.

Area Configuration

set protocols ospfv3 area <number> range <prefix>

This command summarizes intra area paths from specified area into one Type-3 Inter-Area Prefix LSA announced to other areas. This command can be used only in ABR.

set protocols ospfv3 area <number> range <prefix> not-advertise

This command instead of summarizing intra area paths filter them - i.e. intra area paths from this range are not advertised into other areas. This command makes sense in ABR only.

Interface Configuration

set interfaces <inttype> <interface> ipv6 ospfv3 cost <number>

This command sets link cost for the specified interface. The cost value is set to router-LSA's metric field and used for SPF calculation. The cost range is 1 to 65535.

set interfaces <inttype> <interface> ipv6 ospfv3 dead-interval <number>

Set number of seconds for router Dead Interval timer value used for Wait Timer and Inactivity Timer. This value must be the same for all routers attached to a common network. The default value is 40 seconds. The interval range is 1 to 65535.

set interfaces <inttype> <interface> ipv6 ospfv3 hello-interval <number>

Set number of seconds for Hello Interval timer value. Setting this value, Hello packet will be sent every timer value seconds on the specified interface. This value must be the same for all routers attached to a common network. The default value is 10 seconds. The interval range is 1 to 65535.

set interfaces <inttype> <interface> ipv6 ospfv3 mtu-ignore

This command disables check of the MTU value in the OSPF DBD packets. Thus, use of this command allows the OSPF adjacency to reach the FULL state even though there is an interface MTU mismatch between two OSPF routers.

set interfaces <inttype> <interface> ipv6 ospfv3 network <type>

This command allows to specify the distribution type for the network connected to this interface:

broadcast – broadcast IP addresses distribution. **point-to-point** – address distribution in point-to-point networks.

set interfaces <inttype> <interface> ipv6 ospfv3 priority <number>

This command sets Router Priority integer value. The router with the highest priority will be more eligible to become Designated Router. Setting the value to 0, makes the router ineligible to become Designated Router. The default value is 1. The interval range is 0 to 255.

set interfaces <inttype> <interface> ipv6 ospfv3 passive

This command specifies interface as passive. Passive interface advertises its address, but does not run the OSPF protocol (adjacencies are not formed and hello packets are not generated).

set interfaces <inttype> <interface> ipv6 ospfv3 retransmit-interval <number>

This command sets number of seconds for RxmtInterval timer value. This value is used when retransmitting Database Description and Link State Request packets if acknowledge was not received. The default value is 5 seconds. The interval range is 3 to 65535.

set interfaces <inttype> <interface> ipv6 ospfv3 transmit-delay <number>

This command sets number of seconds for InfTransDelay value. It allows to set and adjust for each interface the delay interval before starting the synchronizing process of the router's database with all neighbors. The default value is 1 seconds. The interval range is 3 to 65535.

Redistribution Configuration

set protocols ospfv3 redistribute <route source>

This command redistributes routing information from the given route source to the OSPFv3 process. There are five modes available for route source: bgp, connected, kernel, ripng, static.

set protocols ospf redistribute <route source> route-map <name>

This command allows to use route map to filter redistributed routes from given route source. There are five modes available for route source: bgp, connected, kernel, ripng, static.

Operational Mode Commands

show ipv6 ospfv3 neighbor

This command displays the neighbors status.

show ipv6 ospfv3 neighbor detail

This command displays the neighbors information in a detailed form, not just a summary table.

show ipv6 ospfv3 neighbor <A.B.C.D>

This command displays the neighbors information in a detailed form for a neighbor whose IP address is specified.

show ipv6 ospfv3 neighbor <interface>

This command displays the neighbors status for a neighbor on the specified interface.

show ipv6 ospfv3 interface [prefix]|[<interface> [prefix]]

This command displays state and configuration of OSPF the specified interface, or all interfaces if no interface is given. Whith the argument `prefix` this command shows connected prefixes to advertise.

show ipv6 ospfv3 route

This command displays the OSPF routing table, as determined by the most recent SPF calculation.

show ipv6 ospfv3 border-routers

This command displays a table of paths to area boundary and autonomous system boundary routers.

show ipv6 ospfv3 database

This command displays a summary table with a database contents (LSA).

show ipv6 ospfv3 database <type> [A.B.C.D] [adv-router <A.B.C.D>|self-originate]

This command displays a database contents for a specific link advertisement type.

show ipv6 ospfv3 redistribute

This command displays external information redistributed into OSPFv3

Configuration Example

A typical configuration using 2 nodes.

Node 1:

```
set protocols ospfv3 area 0.0.0.0 interface eth1
set protocols ospfv3 area 0.0.0.0 range 2001:db8:1::/64
set protocols ospfv3 parameters router-id 192.168.1.1
set protocols ospfv3 redistribute connected
```

Node 2:

```
set protocols ospfv3 area 0.0.0.0 interface eth1
set protocols ospfv3 area 0.0.0.0 range 2001:db8:2::/64
set protocols ospfv3 parameters router-id 192.168.2.1
set protocols ospfv3 redistribute connected
```

To see the redistributed routes:

```
show ipv6 ospfv3 redistribute
```

Note: You cannot easily redistribute IPv6 routes via OSPFv3 on a WireGuard interface link. This requires you to configure link-local addresses manually on the WireGuard interfaces, see T1483.

Example configuration for WireGuard interfaces:

Node 1

```
set interfaces wireguard wg01 address 'fe80::216:3eff:fe51:fd8c/64'
set interfaces wireguard wg01 address '192.168.0.1/24'
set interfaces wireguard wg01 peer ospf02 allowed-ips '::/0'
set interfaces wireguard wg01 peer ospf02 allowed-ips '0.0.0.0/0'
set interfaces wireguard wg01 peer ospf02 endpoint '10.1.1.101:12345'
set interfaces wireguard wg01 peer ospf02 pubkey 'ie3...='
set interfaces wireguard wg01 port '12345'
set protocols ospfv3 parameters router-id 192.168.1.1
set protocols ospfv3 area 0.0.0.0 interface 'wg01'
set protocols ospfv3 area 0.0.0.0 interface 'lo'
```

Node 2

```
set interfaces wireguard wg01 address 'fe80::216:3eff:fe0a:7ada/64'
set interfaces wireguard wg01 address '192.168.0.2/24'
set interfaces wireguard wg01 peer ospf01 allowed-ips '::/0'
set interfaces wireguard wg01 peer ospf01 allowed-ips '0.0.0.0/0'
set interfaces wireguard wg01 peer ospf01 endpoint '10.1.1.100:12345'
set interfaces wireguard wg01 peer ospf01 pubkey 'NHI...='
set interfaces wireguard wg01 port '12345'
set protocols ospfv3 parameters router-id 192.168.1.2
set protocols ospfv3 area 0.0.0.0 interface 'wg01'
set protocols ospfv3 area 0.0.0.0 interface 'lo'
```

Status

```
vyos@ospf01:~$ sh ipv6 ospfv3 neighbor
Neighbor ID     Pri    DeadTime    State/IfState         Duration I/F[State]
192.168.0.2       1    00:00:37     Full/PointToPoint    00:18:03 wg01[PointToPoint]

vyos@ospf02# run sh ipv6 ospfv3 neighbor
Neighbor ID     Pri    DeadTime    State/IfState         Duration I/F[State]
192.168.0.1       1    00:00:39     Full/PointToPoint    00:19:44 wg01[PointToPoint]
```

8.9.7 RIP

RIP (Routing Information Protocol) is a widely deployed interior gateway protocol. RIP was developed in the 1970s at Xerox Labs as part of the XNS routing protocol. RIP is a distance-vector protocol and is based on the Bellman-Ford algorithms. As a distance-vector protocol, RIP router send updates to its neighbors periodically, thus allowing the convergence to a known topology. In each update, the distance to any given network will be broadcast to its neighboring router.

Supported versions of RIP are:

- RIPv1 as described in **RFC 1058**
- RIPv2 as described in **RFC 2453**

General Configuration

set protocols rip network <A.B.C.D/M>

This command enables RIP and sets the RIP enable interface by NETWORK. The interfaces which have addresses matching with NETWORK are enabled.

set protocols rip interface <interface>

This command specifies a RIP enabled interface by interface name. Both the sending and receiving of RIP packets will be enabled on the port specified in this command.

set protocols rip neighbor <A.B.C.D>

This command specifies a RIP neighbor. When a neighbor doesn't understand multicast, this command is used to specify neighbors. In some cases, not all routers will be able to understand multicasting, where packets are sent to a network or a group of addresses. In a situation where a neighbor cannot process multicast packets, it is necessary to establish a direct link between routers.

set protocols rip passive-interface interface <interface>

This command sets the specified interface to passive mode. On passive mode interface, all receiving packets are processed as normal and VyOS does not send either multicast or unicast RIP packets except to RIP neighbors specified with neighbor command.

set protocols rip passive-interface interface default

This command specifies all interfaces to passive mode.

Optional Configuration

set protocols rip default-distance <distance>

This command change the distance value of RIP. The distance range is 1 to 255.

> **Note:** Routes with a distance of 255 are effectively disabled and not installed into the kernel.

set protocols rip network-distance <A.B.C.D/M> distance <distance>

This command sets default RIP distance to a specified value when the routes source IP address matches the specified prefix.

set protocols rip network-distance <A.B.C.D/M> access-list <name>

This command can be used with previous command to sets default RIP distance to specified value when the route source IP address matches the specified prefix and the specified access-list.

set protocols rip default-information originate

This command generate a default route into the RIP.

set protocols rip distribute-list access-list <in|out> <number>

This command can be used to filter the RIP path using access lists. `in` and `out` this is the direction in which the access lists are applied.

set protocols rip distribute-list interface <interface> access-list <in|out> <number>

This command allows you apply access lists to a chosen interface to filter the RIP path.

set protocols rip distribute-list prefix-list <in|out> <name>

This command can be used to filter the RIP path using prefix lists. `in` and `out` this is the direction in which the prefix lists are applied.

set protocols rip distribute-list interface <interface> prefix-list <in|out> <name>

This command allows you apply prefix lists to a chosen interface to filter the RIP path.

set protocols rip route <A.B.C.D/M>

This command is specific to FRR and VyOS. The route command makes a static route only inside RIP. This command should be used only by advanced users who are particularly knowledgeable about the RIP protocol. In most cases, we recommend creating a static route in VyOS and redistributing it in RIP using `redistribute static`.

set protocols rip timers update <seconds>

This command specifies the update timer. Every update timer seconds, the RIP process is awakened to send an unsolicited response message containing the complete routing table to all neighboring RIP routers. The time range is 5 to 2147483647. The default value is 30 seconds.

set protocols rip timers timeout <seconds>

This command specifies the timeout timer. Upon expiration of the timeout, the route is no longer valid; however, it is retained in the routing table for a short time so that neighbors can be notified that the route has been dropped. The time range is 5 to 2147483647. The default value is 180 seconds.

set protocols rip timers garbage-collection <seconds>

This command specifies the garbage-collection timer. Upon expiration of the garbage-collection timer, the route is finally removed from the routing table. The time range is 5 to 2147483647. The default value is 120 seconds.

Redistribution Configuration

set protocols rip redistribute <route source>

This command redistributes routing information from the given route source into the RIP tables. There are five modes available for route source: bgp, connected, kernel, ospf, static.

set protocols rip redistribute <route source> metric <metric>

This command specifies metric for redistributed routes from the given route source. There are five modes available for route source: bgp, connected, kernel, ospf, static. The metric range is 1 to 16.

set protocols rip redistribute <route source> route-map <name>

This command allows to use route map to filter redistributed routes from the given route source. There are five modes available for route source: bgp, connected, kernel, ospf, static.

set protocols rip default-metric <metric>

This command modifies the default metric (hop count) value for redistributed routes. The metric range is 1 to 16. The default value is 1. This command does not affect connected route even if it is redistributed by `redistribute connected`. To modify connected routes metric value, please use `redistribute connected metric`.

Interfaces Configuration

set interfaces <inttype> <intname> ip rip authentication plaintext-password <text>

This command sets the interface with RIP simple password authentication. This command also sets authentication string. The string must be shorter than 16 characters.

set interfaces <inttype> <intname> ip rip authentication md5 <id> password <text>

This command sets the interface with RIP MD5 authentication. This command also sets MD5 Key. The key must be shorter than 16 characters.

set interfaces <inttype> <intname> ip rip split-horizon disable

This command disables split-horizon on the interface. By default, VyOS does not advertise RIP routes out the interface over which they were learned (split horizon).3

set interfaces <inttype> <intname> ip rip split-horizon poison-reverse

This command enables poison-reverse on the interface. If both poison reverse and split horizon are enabled, then VyOS advertises the learned routes as unreachable over the interface on which the route was learned.

Operational Mode Commands

show ip rip

This command displays RIP routes.

```
Codes: R - RIP, C - connected, S - Static, O - OSPF, B - BGP
Sub-codes:
      (n) - normal, (s) - static, (d) - default, (r) - redistribute,
      (i) - interface

     Network            Next Hop         Metric From            Tag Time
C(i) 10.0.12.0/24       0.0.0.0               1 self              0
```

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```
C(i) 10.0.13.0/24       0.0.0.0               1 self              0
R(n) 10.0.23.0/24       10.0.12.2             2 10.0.12.2         0 02:53
```

show ip rip status

The command displays current RIP status. It includes RIP timer, filtering, version, RIP enabled interface and RIP peer information.

```
Routing Protocol is "rip"
  Sending updates every 30 seconds with +/-50%, next due in 11 seconds
  Timeout after 180 seconds, garbage collect after 120 seconds
  Outgoing update filter list for all interface is not set
  Incoming update filter list for all interface is not set
  Default redistribution metric is 1
  Redistributing:
  Default version control: send version 2, receive any version
    Interface        Send  Recv   Key-chain
    eth0             2     1 2
    eth2             2     1 2
  Routing for Networks:
    10.0.12.0/24
    eth0
  Routing Information Sources:
    Gateway          BadPackets BadRoutes  Distance Last Update
    10.0.12.2                 0         0       120   00:00:11
  Distance: (default is 120)
```

Configuration Example

Simple RIP configuration using 2 nodes and redistributing connected interfaces.

Node 1:

```
set interfaces loopback address 10.1.1.1/32
set protocols rip network 192.168.0.0/24
set protocols rip redistribute connected
```

Node 2:

```
set interfaces loopback address 10.2.2.2/32
set protocols rip network 192.168.0.0/24
set protocols rip redistribute connected
```

8.9.8 RPKI

> There are two types of Network Admins who deal with BGP, those who have created an international incident and/or outage, and those who are lying
>
> —tweet by EvilMog, 2020-02-21

RPKI (Resource Public Key Infrastructure) is a framework designed to secure the Internet routing infrastructure. It associates BGP route announcements with the correct originating ASN which BGP routers can then use to check each route against the corresponding ROA (Route Origin Authorisation) for validity. RPKI is described in **RFC 6480**.

A BGP-speaking router like VyOS can retrieve ROA information from RPKI "Relying Party software" (often just called an "RPKI server" or "RPKI validator") by using RTR (RPKI to Router) protocol. There are several open source implementations to choose from, such as NLNetLabs' Routinator (written in Rust), OpenBSD's rpki-client (written in C), and StayRTR (written in Go). The RTR protocol is described in **RFC 8210**.

Tip: If you are new to these routing security technologies then there is an excellent guide to RPKI by NLnet Labs which will get you up to speed very quickly. Their documentation explains everything from what RPKI is to deploying it in production. It also has some help and operational guidance including "What can I do about my route having an Invalid state?"

Getting started

First you will need to deploy an RPKI validator for your routers to use. NLnet Labs provides a collection of software you can compare and settle on one. Once your server is running you can start validating announcements.

Imported prefixes during the validation may have values:

valid
: The prefix and ASN that originated it match a signed ROA. These are probably trustworthy route announcements.

invalid
: The prefix or prefix length and ASN that originated it doesn't match any existing ROA. This could be the result of a prefix hijack, or merely a misconfiguration, but should probably be treated as untrustworthy route announcements.

notfound
: No ROA exists which covers that prefix. Unfortunately this is the case for about 40%-50% of the prefixes which were announced to the DFZ (default-free zone) at the start of 2024.

Note: If you are responsible for the global addresses assigned to your network, please make sure that your prefixes have ROAs associated with them to avoid being *notfound* by RPKI. For most ASNs this will involve publishing ROAs via your RIR (Regional Internet Registry) (RIPE NCC, APNIC, ARIN, LACNIC, or AFRINIC), and is something you are encouraged to do whenever you plan to announce addresses into the DFZ.

Particularly large networks may wish to run their own RPKI certificate authority and publication server instead of publishing ROAs via their RIR. This is a subject far beyond the scope of VyOS' documentation. Consider reading about Krill if this is a rabbit hole you need or especially want to dive down.

Features of the Current Implementation

In a nutshell, the current implementation provides the following features:

- The BGP router can connect to one or more RPKI cache servers to receive validated prefix to origin AS mappings. Advanced failover can be implemented by server sockets with different preference values.
- If no connection to an RPKI cache server can be established after a pre-defined timeout, the router will process routes without prefix origin validation. It still will try to establish a connection to an RPKI cache server in the background.
- By default, enabling RPKI does not change best path selection. In particular, invalid prefixes will still be considered during best path selection. However, the router can be configured to ignore all invalid prefixes.
- Route maps can be configured to match a specific RPKI validation state. This allows the creation of local policies, which handle BGP routes based on the outcome of the Prefix Origin Validation.
- Updates from the RPKI cache servers are directly applied and path selection is updated accordingly. (Soft reconfiguration must be enabled for this to work).

Configuration

set protocols rpki polling-period <1-86400>

Define the time interval to update the local cache

The default value is 300 seconds.

set protocols rpki cache <address> port <port>

Defined the IPv4, IPv6 or FQDN and port number of the caching RPKI caching instance which is used.

This is a mandatory setting.

set protocols rpki cache <address> preference <preference>

Multiple RPKI caching instances can be supplied and they need a preference in which their result sets are used.

This is a mandatory setting.

SSH

Connections to the RPKI caching server can not only be established by HTTP/TLS but you can also rely on a secure SSH session to the server. To enable SSH you first need to create yoursels an SSH client keypair using `generate ssh client-key /config/auth/id_rsa_rpki`. Once your key is created you can setup the connection.

set protocols rpki cache <address> ssh username <user>

SSH username to establish an SSH connection to the cache server.

set protocols rpki cache <address> ssh known-hosts-file <filepath>

Local path that includes the known hosts file.

set protocols rpki cache <address> ssh private-key-file <filepath>

Local path that includes the private key file of the router.

set protocols rpki cache <address> ssh public-key-file <filepath>

Local path that includes the public key file of the router.

Note: When using SSH, known-hosts-file, private-key-file and public-key-file are mandatory options.

Example

We can build route-maps for import based on these states. Here is a simple RPKI configuration, where *routinator* is the RPKI-validating "cache" server with ip *192.0.2.1*:

```
set protocols rpki cache 192.0.2.1 port '3323'
set protocols rpki cache 192.0.2.1 preference '1'
```

Here is an example route-map to apply to routes learned at import. In this filter we reject prefixes with the state *invalid*, and set a higher *local-preference* if the prefix is RPKI *valid* rather than merely *notfound*.

```
set policy route-map ROUTES-IN rule 10 action 'permit'
set policy route-map ROUTES-IN rule 10 match rpki 'valid'
set policy route-map ROUTES-IN rule 10 set local-preference '300'
set policy route-map ROUTES-IN rule 20 action 'permit'
set policy route-map ROUTES-IN rule 20 match rpki 'notfound'
set policy route-map ROUTES-IN rule 20 set local-preference '125'
set policy route-map ROUTES-IN rule 30 action 'deny'
set policy route-map ROUTES-IN rule 30 match rpki 'invalid'
```

Once your routers are configured to reject RPKI-invalid prefixes, you can test whether the configuration is working correctly using Cloudflare's test website. Keep in mind that in order for this to work, you need to have no default routes or anything else that would still send traffic to RPKI-invalid destinations.

8.9.9 Static

Static routes are manually configured routes, which, in general, cannot be updated dynamically from information VyOS learns about the network topology from other routing protocols. However, if a link fails, the router will remove routes, including static routes, from the RIPB (Routing Information Base) that used this interface to reach the next hop. In general, static routes should only be used for very simple network topologies, or to override the behavior of a dynamic routing protocol for a small number of routes. The collection of all routes the router has learned from its configuration or from its dynamic routing protocols is stored in the RIB. Unicast routes are directly used to determine the forwarding table used for unicast packet forwarding.

Static Routes

set protocols static route <subnet> next-hop <address>

Configure next-hop <*address*> for an IPv4 static route. Multiple static routes can be created.

set protocols static route <subnet> next-hop <address> disable

Disable this IPv4 static route entry.

set protocols static route <subnet> next-hop <address> distance <distance>

Defines next-hop distance for this route, routes with smaller administrative distance are elected prior to those with a higher distance.

Range is 1 to 255, default is 1.

Note: Routes with a distance of 255 are effectively disabled and not installed into the kernel.

set protocols static route6 <subnet> next-hop <address>

Configure next-hop <*address*> for an IPv6 static route. Multiple static routes can be created.

set protocols static route6 <subnet> next-hop <address> disable

Disable this IPv6 static route entry.

set protocols static route6 <subnet> next-hop <address> distance <distance>

Defines next-hop distance for this route, routes with smaller administrative distance are elected prior to those with a higher distance.

Range is 1 to 255, default is 1.

Note: Routes with a distance of 255 are effectively disabled and not installed into the kernel.

Interface Routes

set protocols static interface-route <subnet> next-hop-interface <interface>

Allows you to configure the next-hop interface for an interface-based IPv4 static route. <*interface*> will be the next-hop interface where traffic is routed for the given <*subnet*>.

set protocols static interface-route <subnet> next-hop-interface <interface> disable

Disables interface-based IPv4 static route.

set protocols static interface-route <subnet> next-hop-interface <interface> distance <distance>

Defines next-hop distance for this route, routes with smaller administrative distance are elected prior to those with a higher distance.

Range is 1 to 255, default is 1.

set protocols static interface-route6 <subnet> next-hop-interface <interface>

Allows you to configure the next-hop interface for an interface-based IPv6 static route. <*interface*> will be the next-hop interface where traffic is routed for the given <*subnet*>.

set protocols static interface-route6 <subnet> next-hop-interface <interface> disable

Disables interface-based IPv6 static route.

set protocols static interface-route6 <subnet> next-hop-interface <interface> distance <distance>

Defines next-hop distance for this route, routes with smaller administrative distance are elected prior to those with a higher distance.

Range is 1 to 255, default is 1.

Blackhole

set protocols static route <subnet> blackhole

Use this command to configure a "black-hole" route on the router. A black-hole route is a route for which the system silently discard packets that are matched. This prevents networks leaking out public interfaces, but it does not prevent them from being used as a more specific route inside your network.

set protocols static route <subnet> blackhole distance <distance>

Defines blackhole distance for this route, routes with smaller administrative distance are elected prior to those with a higher distance.

set protocols static route6 <subnet> blackhole

Use this command to configure a "black-hole" route on the router. A black-hole route is a route for which the system silently discard packets that are matched. This prevents networks leaking out public interfaces, but it does not prevent them from being used as a more specific route inside your network.

set protocols static route6 <subnet> blackhole distance <distance>

Defines blackhole distance for this route, routes with smaller administrative distance are elected prior to those with a higher distance.

Alternate Routing Tables

TBD

Alternate routing tables are used with policy based routing by utilizing *VRF*.

8.9.10 ARP

ARP (Address Resolution Protocol) is a communication protocol used for discovering the link layer address, such as a MAC address, associated with a given internet layer address, typically an IPv4 address. This mapping is a critical function in the Internet protocol suite. ARP was defined in 1982 by **RFC 826** which is Internet Standard STD 37.

In Internet Protocol Version 6 (IPv6) networks, the functionality of ARP is provided by the Neighbor Discovery Protocol (NDP).

To manipulate or display ARP table entries, the following commands are implemented.

Configure

set protocols static arp <address> hwaddr <mac>

This will configure a static ARP entry always resolving <*address*> to <*mac*>.

Example:

```
set protocols static arp 192.0.2.100 hwaddr 00:53:27:de:23:aa
```

Operation

show protocols static arp

Display all known ARP table entries spanning across all interfaces

```
vyos@vyos:~$ show protocols static arp
Address                  HWtype  HWaddress           Flags Mask     Iface
10.1.1.1                 ether   00:53:00:de:23:2e   C              eth1
10.1.1.100               ether   00:53:00:de:23:aa   CM             eth1
```

show protocols static arp interface eth1

Display all known ARP table entries on a given interface only (*eth1*):

```
vyos@vyos:~$ show protocols static arp interface eth1
Address                  HWtype  HWaddress           Flags Mask     Iface
10.1.1.1                 ether   00:53:00:de:23:2e   C              eth1
10.1.1.100               ether   00:53:00:de:23:aa   CM             eth1
```

8.10 Service

8.10.1 UDP Broadcast Relay

Certain vendors use broadcasts to identify their equipment within one ethernet segment. Unfortunately if you split your network with multiple VLANs you loose the ability of identifying your equipment.

This is where "UDP broadcast relay" comes into play! It will forward received broadcasts to other configured networks.

Every UDP port which will be forward requires one unique ID. Currently we support 99 IDs!

Configuration

set service broadcast-relay id <n> description <description>

A description can be added for each and every unique relay ID. This is useful to distinguish between multiple different ports/appliactions.

set service broadcast-relay id <n> interface <interface>

The interface used to receive and relay individual broadcast packets. If you want to receive/relay packets on both *eth1* and *eth2* both interfaces need to be added.

set service broadcast-relay id <n> address <ipv4-address>

Set the source IP of forwarded packets, otherwise original senders address is used.

set service broadcast-relay id <n> port <port>

The UDP port number used by your apllication. It is mandatory for this kind of operation.

set service broadcast-relay id <n> disable

Each broadcast relay instance can be individually disabled without deleting the configured node by using the following command:

set service broadcast-relay disable

In addition you can also disable the whole service without the need to remove it from the current configuration.

Note: You can run the UDP broadcast relay service on multiple routers connected to a subnet. There is **NO** UDP broadcast relay packet storm!

Example

To forward all broadcast packets received on *UDP port 1900* on *eth3*, *eth4* or *eth5* to all other interfaces in this configuration.

```
set service broadcast-relay id 1 description 'SONOS'
set service broadcast-relay id 1 interface 'eth3'
set service broadcast-relay id 1 interface 'eth4'
set service broadcast-relay id 1 interface 'eth5'
set service broadcast-relay id 1 port '1900'
```

8.10.2 Conntrack Sync

One of the important features built on top of the Netfilter framework is connection tracking. Connection tracking allows the kernel to keep track of all logical network connections or sessions, and thereby relate all of the packets which may make up that connection. NAT relies on this information to translate all related packets in the same way, and iptables can use this information to act as a stateful firewall.

The connection state however is completely independent of any upper-level state, such as TCP's or SCTP's state. Part of the reason for this is that when merely forwarding packets, i.e. no local delivery, the TCP engine may not necessarily be invoked at all. Even connectionless-mode transmissions such as UDP, IPsec (AH/ESP), GRE and other tunneling protocols have, at least, a pseudo connection state. The heuristic for such protocols is often based upon a preset timeout value for inactivity, after whose expiration a Netfilter connection is dropped.

Each Netfilter connection is uniquely identified by a (layer-3 protocol, source address, destination address, layer-4 protocol, layer-4 key) tuple. The layer-4 key depends on the transport protocol; for TCP/UDP it is the port numbers, for tunnels it can be their tunnel ID, but otherwise is just zero, as if it were not part of the tuple. To be able to inspect the TCP port in all cases, packets will be mandatorily defragmented.

It is possible to use either Multicast or Unicast to sync conntrack traffic. Most examples below show Multicast, but unicast can be specified by using the "peer" keywork after the specificed interface, as in the following example:

```
set service conntrack-sync interface eth0 peer 192.168.0.250
```

Configuration

set service conntrack-sync accept-protocol

Accept only certain protocols: You may want to replicate the state of flows depending on their layer 4 protocol.

Protocols are: tcp, sctp, dccp, udp, icmp and ipv6-icmp.

set service conntrack-sync event-listen-queue-size <size>

The daemon doubles the size of the netlink event socket buffer size if it detects netlink event message dropping. This clause sets the maximum buffer size growth that can be reached.

Queue size for listening to local conntrack events in MB.

set service conntrack-sync expect-sync <all|ftp|h323|nfs|sip|sqlnet>

Protocol for which expect entries need to be synchronized.

set service conntrack-sync failover-mechanism vrrp sync-group <group>

Failover mechanism to use for conntrack-sync.

Only VRRP is supported. Required option.

set service conntrack-sync ignore-address <x.x.x.x>

IP addresses or networks for which local conntrack entries will not be synced

set service conntrack-sync interface <name>

Interface to use for syncing conntrack entries.

set service conntrack-sync interface <name> port <port>

Port number used by connection.

set service conntrack-sync listen-address <ipv4address>

Local IPv4 addresses for service to listen on.

set service conntrack-sync mcast-group <x.x.x.x>

Multicast group to use for syncing conntrack entries.

Defaults to 225.0.0.50.

set service conntrack-sync interface <name> peer <address>

Peer to send unicast UDP conntrack sync entires to, if not using Multicast configuration from above above.

set service conntrack-sync sync-queue-size <size>

Queue size for syncing conntrack entries in MB.

set service conntrack-sync disable-external-cache

This diable the external cache and directly injects the flow-states into the in-kernel Connection Tracking System of the backup firewall.

set service conntrack-sync startup-resync

Order conntrackd to request a complete conntrack table resync against the other node at startup.

Operation

show conntrack table ipv4

Make sure conntrack is enabled by running and show connection tracking table.

```
vyos@vyos:~$ show conntrack table ipv4
TCP state codes: SS - SYN SENT, SR - SYN RECEIVED, ES - ESTABLISHED,
                 FW - FIN WAIT, CW - CLOSE WAIT, LA - LAST ACK,
                 TW - TIME WAIT, CL - CLOSE, LI - LISTEN

CONN ID    Source                Destination           Protocol         TIMEOUT
1015736576 10.35.100.87:58172    172.31.20.12:22       tcp [6] ES       430279
1006235648 10.35.101.221:57483   172.31.120.21:22      tcp [6] ES       413310
1006237088 10.100.68.100         172.31.120.21         icmp [1]         29
1015734848 10.35.100.87:56282    172.31.20.12:22       tcp [6] ES       300
1015734272 172.31.20.12:60286    239.10.10.14:694      udp [17]         29
1006239392 10.35.101.221         172.31.120.21         icmp [1]         29
```

Note: If the table is empty and you have a warning message, it means conntrack is not enabled. To enable conntrack, just create a NAT or a firewall rule. `set firewall state-policy established action accept`

show conntrack-sync cache external

Show connection syncing external cache entries

show conntrack-sync cache internal

Show connection syncing internal cache entries

show conntrack-sync statistics

Retrieve current statistics of connection tracking subsystem.

```
vyos@vyos:~$ show conntrack-sync statistics
Main Table Statistics:

cache internal:
current active connections:            19606
connections created:                 6298470    failed:           0
connections updated:                 3786793    failed:           0
connections destroyed:               6278864    failed:           0

cache external:
current active connections:            15771
connections created:                 1660193    failed:           0
connections updated:                   77204    failed:           0
connections destroyed:               1644422    failed:           0

traffic processed:
                  0 Bytes                         0 Pckts

multicast traffic (active device=eth0.5):
           976826240 Bytes sent            212898000 Bytes recv
             8302333 Pckts sent              2009929 Pckts recv
                   0 Error send                    0 Error recv

message tracking:
                  0 Malformed msgs                263 Lost msgs
```

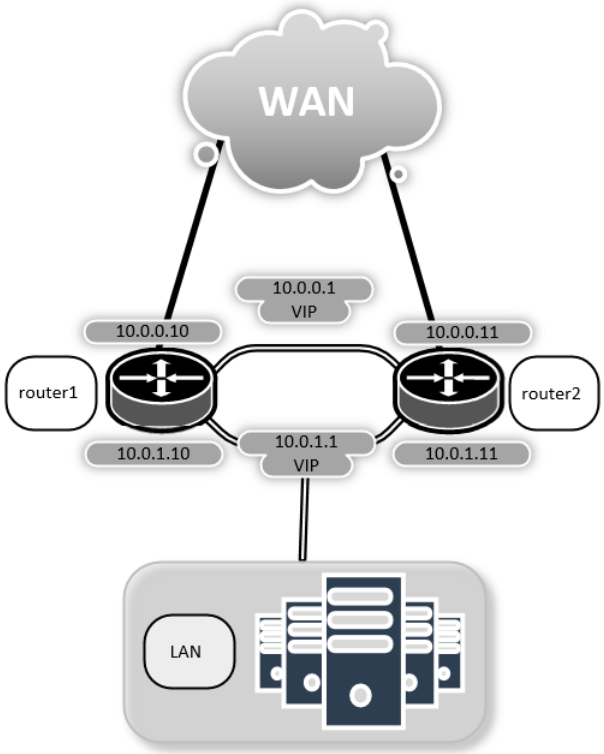
show conntrack-sync status

Retrieve current status of connection tracking subsystem.

```
vyos@vyos:~$ show conntrack-sync status
sync-interface        : eth0.5
failover-mechanism    : vrrp [sync-group GEFOEKOM]
last state transition : no transition yet!
ExpectationSync       : disabled
```

Example

The next example is a simple configuration of conntrack-sync.



Now configure conntrack-sync service on `router1` **and** `router2`

```
set high-availablilty vrrp group internal virtual-address ... etc ...
set high-availability vrrp sync-group syncgrp member 'internal'
set service conntrack-sync accept-protocol 'tcp'
set service conntrack-sync accept-protocol 'udp'
set service conntrack-sync accept-protocol 'icmp'
set service conntrack-sync failover-mechanism vrrp sync-group 'syncgrp'
set service conntrack-sync interface 'eth0'
set service conntrack-sync mcast-group '225.0.0.50'
```

On the active router, you should have information in the internal-cache of conntrack-sync. The same current active connections number should be shown in the external-cache of the standby router

On active router run:

```
$ show conntrack-sync statistics

Main Table Statistics:

cache internal:
current active connections:               10
connections created:                    8517    failed:           0
connections updated:                     127    failed:           0
```

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```
connections destroyed:                  8507    failed:           0

cache external:
current active connections:                0
connections created:                       0    failed:           0
connections updated:                       0    failed:           0
connections destroyed:                     0    failed:           0

traffic processed:
                   0 Bytes                         0 Pckts

multicast traffic (active device=eth0):
              868780 Bytes sent               224136 Bytes recv
               20595 Pckts sent                14034 Pckts recv
                   0 Error send                    0 Error recv

message tracking:
                   0 Malformed msgs                    0 Lost msgs
```

On standby router run:

```
$ show conntrack-sync statistics

Main Table Statistics:

cache internal:
current active connections:                0
connections created:                       0    failed:           0
connections updated:                       0    failed:           0
connections destroyed:                     0    failed:           0

cache external:
current active connections:               10
connections created:                     888    failed:           0
connections updated:                     134    failed:           0
connections destroyed:                   878    failed:           0

traffic processed:
                   0 Bytes                         0 Pckts

multicast traffic (active device=eth0):
              234184 Bytes sent               907504 Bytes recv
               14663 Pckts sent                21495 Pckts recv
                   0 Error send                    0 Error recv

message tracking:
                   0 Malformed msgs                    0 Lost msgs
```

8.10.3 Console Server

Starting of with VyOS 1.3 (equuleus) we added support for running VyOS as an Out-of-Band Management device which provides remote access by means of SSH to directly attached serial interfaces.

Serial interfaces can be any interface which is directly connected to the CPU or chipset (mostly known as a ttyS interface in Linux) or any other USB to serial converter (Prolific PL2303 or FTDI FT232/FT4232 based chips).

If you happened to use a Cisco NM-16A - Sixteen Port Async Network Module or NM-32A - Thirty-two Port Async Network Module - this is your VyOS replacement.

For USB port information please refor to: *USB*.

Configuration

Between computers, the most common configuration used was "8N1": eight bit characters, with one start bit, one stop bit, and no parity bit. Thus 10 Baud times are used to send a single character, and so dividing the signalling bit-rate by ten results in the overall transmission speed in characters per second. This is also the default setting if none of those options are defined.

set service console-server device <device> data-bits [7 | 8]

Configure either seven or eight data bits. This defaults to eight data bits if left unconfigured.

set service console-server device <device> description <string>

A user friendly description identifying the connected peripheral.

set service console-server device <device> parity [even | odd | none]

Set the parity option for the console. If unset this will default to none.

set service console-server device <device> stop-bits [1 | 2]

Configure either one or two stop bits. This defaults to one stop bits if left unconfigured.

set service console-server device <device> speed [300 | 1200 | 2400 | 4800 | 9600 | 19200 | 38400 | 57600 | 115200]

Note: USB to serial converters will handle most of their work in software so you should be carefull with the selected baudrate as some times they can't cope with the expected speed.

Remote Access

Each individual configured console-server device can be directly exposed to the outside world. A user can directly connect via SSH to the configured port.

set service console-server device <device> ssh port <port>

Accept SSH connections for the given <*device*> on TCP port <*port*>. After successfull authentication the user will be directly dropped to the connected serial device.

Hint: Multiple users can connect to the same serial device but only one is allowed to write to the console port.

Operation

show console-server ports

Show configured serial ports and their respective interface configuration.

```
vyos@vyos:~$ show console-server ports
 usb0b2.4p1.0             on /dev/serial/by-bus/usb0b2.4p1.0@ at   9600n
```

show console-server user

Show currently connected users.

```
vyos@vyos:~$ show console-server user
 usb0b2.4p1.0               up   vyos@localhost
```

connect console <device>

Locally connect to serial port identified by <*device*>.

```
vyos@vyos-r1:~$ connect console usb0b2.4p1.0
[Enter `^Ec?' for help]
[-- MOTD -- VyOS Console Server]

vyos-r2 login:
```

Hint: Multiple users can connect to the same serial device but only one is allowed to write to the console port.

Hint: The sequence ^Ec? translates to: `Ctrl+E c ?`. To quit the session use: `Ctrl+E c .`

show log console-server

Show the console server log.

8.10.4 DHCP Relay

If you want your router to forward DHCP requests to an external DHCP server you can configure the system to act as a DHCP relay agent. The DHCP relay agent works with IPv4 and IPv6 addresses.

All interfaces used for the DHCP relay must be configured. This includes the uplink to the DHCP server.

IPv4 relay

Configuration

set service dhcp-relay interface <interface>

Interfaces that participate in the DHCP relay process, including the uplink to the DHCP server.

set service dhcp-relay server <server>

Configure IP address of the DHCP <*server*> which will handle the relayed packets.

Options

set service dhcp-relay relay-options hop-count <count>

Set the maximum hop <*count*> before packets are discarded. Range 0...255, default 10.

set service dhcp-relay relay-options max-size <size>

Set maximum <*size*> of DHCP packets including relay agent information. If a DHCP packet size surpasses this value it will be forwarded without appending relay agent information. Range 64...1400, default 576.

set service dhcp-relay relay-options relay-agents-packets <append | discard | forward | replace>

Four policies for reforwarding DHCP packets exist:

- **append:** The relay agent is allowed to append its own relay information to a received DHCP packet, disregarding relay information already present in the packet.
- **discard:** Received packets which already contain relay information will be discarded.
- **forward:** All packets are forwarded, relay information already present will be ignored.
- **replace:** Relay information already present in a packet is stripped and replaced with the router's own relay information set.

Example

- Listen for DHCP requests on interface `eth1`.
- DHCP server is located at IPv4 address 10.0.1.4 on `eth2`.
- Router receives DHCP client requests on `eth1` and relays them to the server at 10.0.1.4 on `eth2`.

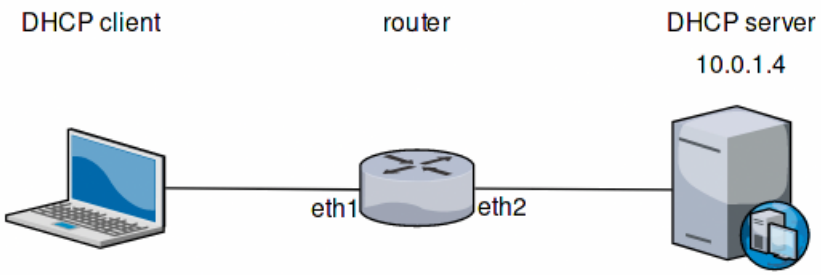

Fig. 3: DHCP relay example

The generated configuration will look like:

```
show service dhcp-relay
    interface eth1
    interface eth2
    server 10.0.1.4
    relay-options {
```

(continues on next page)

(continued from previous page)

```
      relay-agents-packets discard
   }
```

Operation

restart dhcp relay-agent

Restart DHCP relay service

IPv6 relay

Configuration

set service dhcpv6-relay listen-interface <interface>

Set eth1 to be the listening interface for the DHCPv6 relay.

Multiple interfaces may be specified.

set service dhcpv6-relay upstream-interface <interface> address <server>

Specifies an upstream network <*interface*> from which replies from <*server*> and other relay agents will be accepted.

Options

set service dhcpv6-relay max-hop-count <count>

Set maximum hop count before packets are discarded, default: 10

set service dhcpv6-relay use-interface-id-option

If this is set the relay agent will insert the interface ID. This option is set automatically if more than one listening interfaces are in use.

Example

- DHCPv6 requests are received by the router on *listening interface* `eth1`
- Requests are forwarded through `eth2` as the *upstream interface*
- External DHCPv6 server is at 2001:db8::4

The generated configuration will look like:

```
commit
show service dhcpv6-relay
    listen-interface eth1 {
    }
    upstream-interface eth2 {
       address 2001:db8::4
    }
```

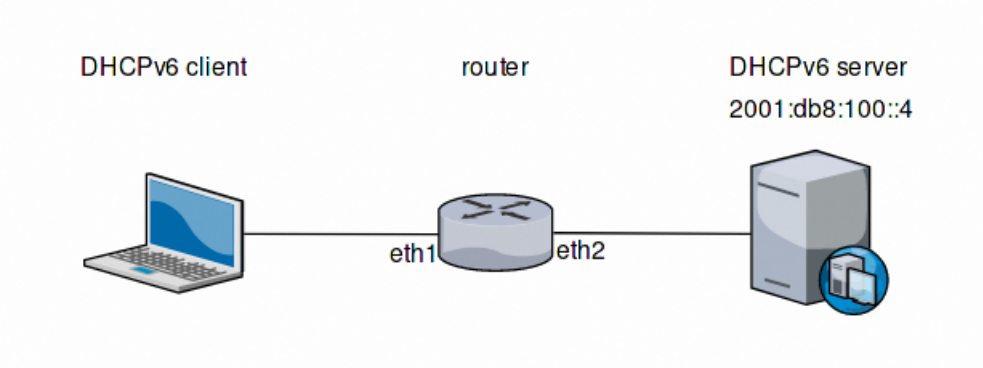

Fig. 4: DHCPv6 relay example

Operation

restart dhcpv6 relay-agent

Restart DHCPv6 relay agent immediately.

8.10.5 DHCP Server

VyOS uses ISC DHCP server for both IPv4 and IPv6 address assignment.

IPv4 server

The network topology is declared by shared-network-name and the subnet declarations. The DHCP service can serve multiple shared networks, with each shared network having 1 or more subnets. Each subnet must be present on an interface. A range can be declared inside a subnet to define a pool of dynamic addresses. Multiple ranges can be defined and can contain holes. Static mappings can be set to assign "static" addresses to clients based on their MAC address.

Configuration

set service dhcp-server hostfile-update

Create DNS record per client lease, by adding clients to /etc/hosts file. Entry will have format: *<shared-network-name>_<hostname>.<domain-name>*

set service dhcp-server host-decl-name

Will drop *<shared-network-name>_* from client DNS record, using only the host declaration name and domain: *<hostname>.<domain-name>*

set service dhcp-server shared-network-name <name> domain-name <domain-name>

The domain-name parameter should be the domain name that will be appended to the client's hostname to form a fully-qualified domain-name (FQDN) (DHCP Option 015).

This is the configuration parameter for the entire shared network definition. All subnets will inherit this configuration item if not specified locally.

set service dhcp-server shared-network-name <name> domain-search <domain-name>

The domain-name parameter should be the domain name used when completing DNS request where no full FQDN is passed. This option can be given multiple times if you need multiple search domains (DHCP Option 119).

This is the configuration parameter for the entire shared network definition. All subnets will inherit this configuration item if not specified locally.

set service dhcp-server shared-network-name <name> name-server <address>

Inform client that the DNS server can be found at <*address*>.

This is the configuration parameter for the entire shared network definition. All subnets will inherit this configuration item if not specified locally.

Multiple DNS servers can be defined.

set service dhcp-server shared-network-name <name> ping-check

When the DHCP server is considering dynamically allocating an IP address to a client, it first sends an ICMP Echo request (a ping) to the address being assigned. It waits for a second, and if no ICMP Echo response has been heard, it assigns the address.

If a response is heard, the lease is abandoned, and the server does not respond to the client. The lease will remain abandoned for a minimum of abandon-lease-time seconds (defaults to 24 hours).

If there are no free addresses but there are abandoned IP addresses, the DHCP server will attempt to reclaim an abandoned IP address regardless of the value of abandon-lease-time.

set service dhcp-server listen-address <address>

This configuration parameter lets the DHCP server to listen for DHCP requests sent to the specified address, it is only realistically useful for a server whose only clients are reached via unicasts, such as via DHCP relay agents.

Individual Client Subnet

set service dhcp-server shared-network-name <name> authoritative

This says that this device is the only DHCP server for this network. If other devices are trying to offer DHCP leases, this machine will send 'DHCPNAK' to any device trying to request an IP address that is not valid for this network.

set service dhcp-server shared-network-name <name> subnet <subnet> default-router <address>

This is a configuration parameter for the <*subnet*>, saying that as part of the response, tell the client that the default gateway can be reached at <*address*>.

set service dhcp-server shared-network-name <name> subnet <subnet> name-server <address>

This is a configuration parameter for the subnet, saying that as part of the response, tell the client that the DNS server can be found at <*address*>.

Multiple DNS servers can be defined.

set service dhcp-server shared-network-name <name> subnet <subnet> lease <time>

Assign the IP address to this machine for <*time*> seconds.

The default value is 86400 seconds which corresponds to one day.

set service dhcp-server shared-network-name <name> subnet <subnet> range <n> start <address>

Create DHCP address range with a range id of <*n*>. DHCP leases are taken from this pool. The pool starts at address <*address*>.

set service dhcp-server shared-network-name <name> subnet <subnet> range <n> stop <address>

Create DHCP address range with a range id of <*n*>. DHCP leases are taken from this pool. The pool stops with address <*address*>.

set service dhcp-server shared-network-name <name> subnet <subnet> exclude <address>

Always exclude this address from any defined range. This address will never be assigned by the DHCP server.

This option can be specified multiple times.

set service dhcp-server shared-network-name <name> subnet <subnet> domain-name <domain-name>

The domain-name parameter should be the domain name that will be appended to the client's hostname to form a fully-qualified domain-name (FQDN) (DHCP Option 015).

set service dhcp-server shared-network-name <name> subnet <subnet> domain-search <domain-name>

The domain-name parameter should be the domain name used when completing DNS request where no full FQDN is passed. This option can be given multiple times if you need multiple search domains (DHCP Option 119).

set service dhcp-server shared-network-name <name> subnet <subnet> ping-check

When the DHCP server is considering dynamically allocating an IP address to a client, it first sends an ICMP Echo request (a ping) to the address being assigned. It waits for a second, and if no ICMP Echo response has been heard, it assigns the address.

If a response is heard, the lease is abandoned, and the server does not respond to the client. The lease will remain abandoned for a minimum of abandon-lease-time seconds (defaults to 24 hours).

If a there are no free addresses but there are abandoned IP addresses, the DHCP server will attempt to reclaim an abandoned IP address regardless of the value of abandon-lease-time.

set service dhcp-server shared-network-name <name> subnet <subnet> enable-failover

Enable DHCP failover configuration for this address pool.

Failover

VyOS provides support for DHCP failover. DHCP failover must be configured explicitly by the following statements.

set service dhcp-server failover source-address <address>

Local IP <*address*> used when communicating to the failover peer.

set service dhcp-server failover remote <address>

Remote peer IP <*address*> of the second DHCP server in this failover cluster.

set service dhcp-server failover name <name>

A generic <*name*> referencing this sync service.

Note: <*name*> must be identical on both sides!

---

set service dhcp-server failover status <primary | secondary>

The primary and secondary statements determines whether the server is primary or secondary.

Note: In order for the primary and the secondary DHCP server to keep their lease tables in sync, they must be able to reach each other on TCP port 647. If you have firewall rules in effect, adjust them accordingly.

Hint: The dialogue between failover partners is neither encrypted nor authenticated. Since most DHCP servers exist within an organisation's own secure Intranet, this would be an unnecessary overhead. However, if you have DHCP failover peers whose communications traverse insecure networks, then we recommend that you consider the use of VPN tunneling between them to ensure that the failover partnership is immune to disruption (accidental or otherwise) via third parties.

Static mappings

You can specify a static DHCP assignment on a per host basis. You will need the MAC address of the station and your desired IP address. The address must be inside the subnet definition but can be outside of the range statement.

set service dhcp-server shared-network-name <name> subnet <subnet> static-mapping <description> mac-address <address>

Create a new DHCP static mapping named <*description*> which is valid for the host identified by its MAC <*address*>.

set service dhcp-server shared-network-name <name> subnet <subnet> static-mapping <description> ip-address <address>

Static DHCP IP address assign to host identified by <*description*>. IP address must be inside the <*subnet*> which is defined but can be outside the dynamic range created with `set service dhcp-server shared-network-name <name> subnet <subnet> range <n>`. If no ip-address is specified, an IP from the dynamic pool is used.

This is useful, for example, in combination with hostfile update.

Hint: This is the equivalent of the host block in dhcpd.conf of isc-dhcpd.

Options

Setting name	Option number	ISC-DHCP Option name	Option description	Multi
client-prefix-length	1	subnet-mask	Specifies the clients subnet mask as per RFC 950. If unset, subnet declaration is used.	N
time-offset	2	time-offset	Offset of the client's subnet in seconds from Coordinated Universal Time (UTC)	N
default-router	3	routers	IPv4 address of router on the client's subnet	N
time-server	4	time-servers	RFC 868 time server IPv4 address	Y
name-server	6	domain-name-servers	DNS server IPv4 address	Y
domain-name	15	domain-name	Client domain name	Y
ip-forwarding	19	ip-forwarding	Enable IP forwarding on client	N
ntp-server	42	ntp-servers	IP address of NTP server	Y
wins-server	44	netbios-name-servers	NetBIOS over TCP/IP name server	Y
server-identifier	54	dhcp-server-identifier	IP address for DHCP server identifier	N
bootfile-server	siaddr	next-server	IPv4 address of next bootstrap server	N
tftp-server-name	66	tftp-server-name	Name or IPv4 address of TFTP server	N
bootfile-name	67	bootfile-name, filename	Bootstrap file name	N
smtp-server	69	smtp-server	IP address of SMTP server	Y
pop-server	70	pop-server	IP address of POP3 server	Y
domain-search	119	domain-search	Client domain search	Y
static-route	121, 249	rfc3442-static-route, windows-static-route	Classless static route	N
wpad-url	252	wpad-url, wpad-url code 252 = text	Web Proxy Autodiscovery (WPAD) URL	N
lease		default-lease-time, max-lease-time	Lease timeout in seconds (default: 86400)	N
range		range	DHCP lease range	Y
exclude			IP address to exclude from DHCP lease range	Y
failover			DHCP failover parameters	
static-mapping			Name of static mapping	Y

Multi: can be specified multiple times.

Raw Parameters

Raw parameters can be passed to shared-network-name, subnet and static-mapping:

```
set service dhcp-server shared-network-name <name> shared-network-parameters
   <text>       Additional shared-network parameters for DHCP server.
set service dhcp-server shared-network-name <name> subnet <subnet> subnet-parameters
   <text>       Additional subnet parameters for DHCP server.
set service dhcp-server shared-network-name <name> subnet <subnet> static-mapping
↪<description> static-mapping-parameters
   <text>       Additional static-mapping parameters for DHCP server.
                Will be placed inside the "host" block of the mapping.
```

These parameters are passed as-is to isc-dhcp's dhcpd.conf under the configuration node they are defined in. They are not validated so an error in the raw parameters won't be caught by vyos's scripts and will cause dhcpd to fail to start. Always verify that the parameters are correct before committing the configuration. Refer to isc-dhcp's dhcpd.conf manual for more information: https://kb.isc.org/docs/isc-dhcp-44-manual-pages-dhcpdconf

Quotes can be used inside parameter values by replacing all quote characters with the string `"`. They will be replaced with literal quote characters when generating dhcpd.conf.

Example

Please see the *DHCP/DNS quick-start* configuration.

Failover

Configuration of a DHCP failover pair

- Setup DHCP failover for network 192.0.2.0/24
- Default gateway and DNS server is at *192.0.2.254*
- The primary DHCP server uses address *192.168.189.252*
- The secondary DHCP server uses address *192.168.189.253*
- DHCP range spans from *192.168.189.10 - 192.168.189.250*

Common configuration, valid for both primary and secondary node.

```
set service dhcp-server shared-network-name NET-VYOS subnet 192.0.2.0/24 default-router
↪'192.0.2.254'
set service dhcp-server shared-network-name NET-VYOS subnet 192.0.2.0/24 name-server
↪'192.0.2.254'
set service dhcp-server shared-network-name NET-VYOS subnet 192.0.2.0/24 domain-name
↪'vyos.net'
set service dhcp-server shared-network-name NET-VYOS subnet 192.0.2.0/24 range 0 start
↪'192.0.2.10'
set service dhcp-server shared-network-name NET-VYOS subnet 192.0.2.0/24 range 0 stop
↪'192.0.2.250'
set service dhcp-server shared-network-name NET-VYOS subnet 192.0.2.0/24 enable-failover
```

Primary

```
set service dhcp-server failover source-address '192.168.189.252'
set service dhcp-server failover name 'NET-VYOS'
set service dhcp-server failover remote '192.168.189.253'
set service dhcp-server failover status 'primary'
```

Secondary

```
set service dhcp-server failover source-address '192.168.189.253'
set service dhcp-server failover name 'NET-VYOS'
set service dhcp-server failover remote '192.168.189.252'
set service dhcp-server failover status 'secondary'
```

Raw Parameters

- Override static-mapping's name-server with a custom one that will be sent only to this host.
- An option that takes a quoted string is set by replacing all quote characters with the string `"` inside the static-mapping-parameters value. The resulting line in dhcpd.conf will be `option pxelinux.configfile "pxelinux.cfg/01-00-15-17-44-2d-aa";`.

```
set service dhcp-server shared-network-name dhcpexample subnet 192.0.2.0/24 static-
↪mapping example static-mapping-parameters "option domain-name-servers 192.0.2.11, 192.
↪0.2.12;"
set service dhcp-server shared-network-name dhcpexample subnet 192.0.2.0/24 static-
↪mapping example static-mapping-parameters "option pxelinux.configfile &quot;pxelinux.
↪cfg/01-00-15-17-44-2d-aa&quot;;"
```

Option 43 for UniFI

- These parameters need to be part of the DHCP global options. They stay unchanged.

```
set service dhcp-server global-parameters 'option space ubnt;'
set service dhcp-server global-parameters 'option ubnt.unifi-address code 1 = ip-address;
↪'
set service dhcp-server global-parameters 'class &quot;ubnt&quot; {'
set service dhcp-server global-parameters 'match if substring (option vendor-class-
↪identifier, 0, 4) = &quot;ubnt&quot;;'
set service dhcp-server global-parameters 'option vendor-class-identifier &quot;ubnt&
↪quot;;'
set service dhcp-server global-parameters 'vendor-option-space ubnt;'
set service dhcp-server global-parameters '}'
```

- Now we add the option to the scope, adapt to your setup

```
set service dhcp-server shared-network-name example-scope subnet 10.1.1.0/24 subnet-
↪parameters 'option ubnt.unifi-address 172.16.1.10;'
```

Operation Mode

show log dhcp server

Show DHCP server daemon log file

show log dhcp client

Show logs from all DHCP client processes.

show log dhcp client interface <interface>

Show logs from specific *interface* DHCP client process.

restart dhcp server

Restart the DHCP server

show dhcp server statistics

Show the DHCP server statistics:

```
vyos@vyos:~$ show dhcp server statistics
Pool           Size    Leases    Available  Usage
-----------  ------  --------  -----------  -------
dhcpexample      99         2           97  2%
```

show dhcp server statistics pool <pool>

Show the DHCP server statistics for the specified pool.

show dhcp server leases

Show statuses of all active leases:

```
vyos@vyos:~$ show dhcp server leases
IP address      Hardware address    State    Lease start          Lease expiration    ␣
↪Remaining   Pool         Hostname
--------------  ------------------  -------  -------------------  -------------------  --
↪--------  -----------  ---------
192.0.2.104     00:53:01:dd:ee:ff   active   2019/12/05 14:24:23  2019/12/06 02:24:23 ␣
↪6:05:35     dhcpexample  test1
192.0.2.115     00:53:01:ae:af:bf   active   2019/12/05 18:02:37  2019/12/06 06:02:37 ␣
↪9:43:49     dhcpexample  test2
```

Hint: Static mappings aren't shown. To show all states, use `show dhcp server leases state all`.

show dhcp server leases pool <pool>

Show only leases in the specified pool.

show dhcp server leases sort <key>

Sort the output by the specified key. Possible keys: ip, hardware_address, state, start, end, remaining, pool, hostname (default = ip)

show dhcp server leases state <state>

Show only leases with the specified state. Possible states: all, active, free, expired, released, abandoned, reset, backup (default = active)

IPv6 server

VyOS also provides DHCPv6 server functionality which is described in this section.

Configuration

set service dhcpv6-server preference <preference value>

Clients receiving advertise messages from multiple servers choose the server with the highest preference value. The range for this value is `0...255`.

set service dhcpv6-server shared-network-name <name> subnet <prefix> lease-time {default | maximum | minimum}

The default lease time for DHCPv6 leases is 24 hours. This can be changed by supplying a `default-time`, `maximum-time` and `minimum-time`. All values need to be supplied in seconds.

set service dhcpv6-server shared-network-name <name> subnet <prefix> nis-domain <domain-name>

A NIS (Network Information Service) domain can be set to be used for DHCPv6 clients.

set service dhcpv6-server shared-network-name <name> subnet <prefix> nisplus-domain <domain-name>

The procedure to specify a NIS+ (Network Information Service Plus) domain is similar to the NIS domain one:

set service dhcpv6-server shared-network-name <name> subnet <prefix> nis-server <address>

Specify a NIS server address for DHCPv6 clients.

set service dhcpv6-server shared-network-name <name> subnet <prefix> nisplus-server <address>

Specify a NIS+ server address for DHCPv6 clients.

set service dhcpv6-server shared-network-name <name> subnet <prefix> sip-server <address | fqdn>

Specify a SIP (Session Initiation Protocol) server by IPv6 address of Fully Qualified Domain Name for all DHCPv6 clients.

set service dhcpv6-server shared-network-name <name> subnet <prefix> sntp-server-address <address>

A SNTP server address can be specified for DHCPv6 clients.

Prefix Delegation

To hand out individual prefixes to your clients the following configuration is used:

set service dhcpv6-server shared-network-name <name> subnet <prefix> prefix-delegation start <address> prefix-length <length>

Hand out prefixes of size <*length*> to clients in subnet <*prefix*> when they request for prefix delegation.

set service dhcpv6-server shared-network-name <name> subnet <prefix> prefix-delegation start <address> stop <address>

Delegate prefixes from the range indicated by the start and stop qualifier.

Address pools

DHCPv6 address pools must be configured for the system to act as a DHCPv6 server. The following example describes a common scenario.

Example:

- A shared network named `NET1` serves subnet `2001:db8::/64`
- It is connected to `eth1`
- DNS server is located at `2001:db8::ffff`
- Address pool shall be `2001:db8::100` through `2001:db8::199`.
- Lease time will be left at the default value which is 24 hours

```
set service dhcpv6-server shared-network-name 'NET1' subnet 2001:db8::/64 address-range␣
↪start 2001:db8::100 stop 2001:db8::199
set service dhcpv6-server shared-network-name 'NET1' subnet 2001:db8::/64 name-server␣
↪2001:db8::ffff
```

The configuration will look as follows:

```
show service dhcpv6-server
    shared-network-name NET1 {
        subnet 2001:db8::/64 {
           address-range {
              start 2001:db8::100 {
                 stop 2001:db8::199
              }
           }
           name-server 2001:db8::ffff
        }
    }
```

Static mappings

In order to map specific IPv6 addresses to specific hosts static mappings can be created. The following example explains the process.

Example:

- IPv6 address `2001:db8::101` shall be statically mapped
- IPv6 prefix `2001:db8:0:101::/64` shall be statically mapped
- Host specific mapping shall be named `client1`

Hint: The identifier is the device's DUID: colon-separated hex list (as used by isc-dhcp option dhcpv6.client-id). If the device already has a dynamic lease from the DHCPv6 server, its DUID can be found with `show service dhcpv6 server leases`. The DUID begins at the 5th octet (after the 4th colon) of IAID_DUID.

```
set service dhcpv6-server shared-network-name 'NET1' subnet 2001:db8::/64 static-mapping␣
↪client1 ipv6-address 2001:db8::101
```

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```
set service dhcpv6-server shared-network-name 'NET1' subnet 2001:db8::/64 static-mapping␣
↪client1 ipv6-prefix 2001:db8:0:101::/64
set service dhcpv6-server shared-network-name 'NET1' subnet 2001:db8::/64 static-mapping␣
↪client1 identifier 00:01:00:01:12:34:56:78:aa:bb:cc:dd:ee:ff
```

The configuration will look as follows:

```
show service dhcp-server shared-network-name NET1
   shared-network-name NET1 {
       subnet 2001:db8::/64 {
          name-server 2001:db8:111::111
          address-range {
              start 2001:db8::100 {
                 stop 2001:db8::199 {
              }
          }
          static-mapping client1 {
             ipv6-address 2001:db8::101
             identifier 00:01:00:01:12:34:56:78:aa:bb:cc:dd:ee:ff
          }
       }
    }
```

Operation Mode

show log dhcpv6 server

Show DHCPv6 server daemon log file

show log dhcpv6 client

Show logs from all DHCPv6 client processes.

show log dhcpv6 client interface <interface>

Show logs from specific *interface* DHCPv6 client process.

restart dhcpv6 server

To restart the DHCPv6 server

show dhcpv6 server status

To show the current status of the DHCPv6 server.

show dhcpv6 server leases

Shows status of all assigned leases:

```
vyos@vyos:~$ show dhcpv6 server leases
IPv6 address   State    Last communication    Lease expiration     Remaining    Type    ␣
↪      Pool   IAID_DUID
-------------  -------  --------------------  -------------------  -----------  ---------
↪----  -----  ------------------------------------------
2001:db8::101  active   2019/12/05 19:40:10   2019/12/06 07:40:10  11:45:21     non-
↪temporary  NET1   98:76:54:32:00:01:00:01:12:34:56:78:aa:bb:cc:dd:ee:ff
```

(continues on next page)

(continued from previous page)

```
2001:db8::102  active   2019/12/05 14:01:23   2019/12/06 02:01:23  6:06:34      non-
↪temporary  NET1   87:65:43:21:00:01:00:01:11:22:33:44:fa:fb:fc:fd:fe:ff
```

Hint: Static mappings aren't shown. To show all states, use `show dhcp server leases state all`.

show dhcpv6 server leases pool <pool>

Show only leases in the specified pool.

show dhcpv6 server leases sort <key>

Sort the output by the specified key. Possible keys: expires, iaid_duid, ip, last_comm, pool, remaining, state, type (default = ip)

show dhcpv6 server leases state <state>

Show only leases with the specified state. Possible states: abandoned, active, all, backup, expired, free, released, reset (default = active)

8.10.6 DNS Forwarding

Configuration

VyOS provides DNS infrastructure for small networks. It is designed to be lightweight and have a small footprint, suitable for resource constrained routers and firewalls. For this we utilize PowerDNS recursor.

The VyOS DNS forwarder does not require an upstream DNS server. It can serve as a full recursive DNS server - but it can also forward queries to configurable upstream DNS servers. By not configuring any upstream DNS servers you also avoid being tracked by the provider of your upstream DNS server.

set service dns forwarding system

Forward incoming DNS queries to the DNS servers configured under the `system name-server` nodes.

set service dns forwarding dhcp <interface>

Interfaces whose DHCP client nameservers to forward requests to.

set service dns forwarding name-server <address>

Send all DNS queries to the IPv4/IPv6 DNS server specified under <*address*>. You can configure multiple nameservers here.

set service dns forwarding domain <domain-name> server <address>

Forward received queries for a particular domain (specified via *domain-name*) to a given nameserver. Multiple nameservers can be specified. You can use this feature for a DNS split-horizon configuration.

Note: This also works for reverse-lookup zones (`18.172.in-addr.arpa`).

set service dns forwarding domain <domain-name> addnta

Add NTA (negative trust anchor) for this domain. This must be set if the domain does not support DNSSEC.

set service dns forwarding domain <domain-name> recursion-desired

Set the "recursion desired" bit in requests to the upstream nameserver.

set service dns forwarding allow-from <network>

Given the fact that open DNS recursors could be used on DDoS amplification attacks, you must configure the networks which are allowed to use this recursor. A network of `0.0.0.0/0` or `::/0` would allow all IPv4 and IPv6 networks to query this server. This is generally a bad idea.

set service dns forwarding dnssec <off | process-no-validate | process | log-fail | validate>

The PowerDNS recursor has 5 different levels of DNSSEC processing, which can be set with the dnssec setting. In order from least to most processing, these are:

- **off** In this mode, no DNSSEC processing takes place. The recursor will not set the DNSSEC OK (DO) bit in the outgoing queries and will ignore the DO and AD bits in queries.
- **process-no-validate** In this mode the recursor acts as a "security aware, non-validating" nameserver, meaning it will set the DO-bit on outgoing queries and will provide DNSSEC related RRsets (NSEC, RRSIG) to clients that ask for them (by means of a DO-bit in the query), except for zones provided through the auth-zones setting. It will not do any validation in this mode, not even when requested by the client.
- **process** When dnssec is set to process the behavior is similar to process-no-validate. However, the recursor will try to validate the data if at least one of the DO or AD bits is set in the query; in that case, it will set the AD-bit in the response when the data is validated successfully, or send SERVFAIL when the validation comes up bogus.
- **log-fail** In this mode, the recursor will attempt to validate all data it retrieves from authoritative servers, regardless of the client's DNSSEC desires, and will log the validation result. This mode can be used to determine the extra load and amount of possibly bogus answers before turning on full-blown validation. Responses to client queries are the same as with process.
- **validate** The highest mode of DNSSEC processing. In this mode, all queries will be validated and will be answered with a SERVFAIL in case of bogus data, regardless of the client's request.

Note: The popular Unix/Linux `dig` tool sets the AD-bit in the query. This might lead to unexpected query results when testing. Set `+noad` on the `dig` command line when this is the case.

Note: The CD-bit is honored correctly for process and validate. For log-fail, failures will be logged too.

---

set service dns forwarding ignore-hosts-file

Do not use the local `/etc/hosts` file in name resolution. VyOS DHCP server will use this file to add resolvers to assigned addresses.

set service dns forwarding cache-size <0-2147483647>

Maximum number of DNS cache entries. 1 million per CPU core will generally suffice for most installations.

This defaults to 10000.

set service dns forwarding negative-ttl <0-7200>

A query for which there is authoritatively no answer is cached to quickly deny a record's existence later on, without putting a heavy load on the remote server. In practice, caches can become saturated with hundreds of thousands of hosts which are tried only once.

This setting, which defaults to 3600 seconds, puts a maximum on the amount of time negative entries are cached.

set service dns forwarding listen-address <address>

The local IPv4 or IPv6 addresses to bind the DNS forwarder to. The forwarder will listen on this address for incoming connections.

set service dns forwarding source-address <address>

The local IPv4 or IPv6 addresses to use as a source address for sending queries. The forwarder will send forwarded outbound DNS requests from this address.

set service dns forwarding no-serve-rfc1918

This makes the server authoritatively not aware of: 10.in-addr.arpa, 168.192.in-addr.arpa, 16-31.172.in-addr.arpa, which enabling upstream DNS server(s) to be used for reverse lookups of these zones.

Example

A VyOS router with two interfaces - eth0 (WAN) and eth1 (LAN) - is required to implement a split-horizon DNS configuration for example.com.

In this scenario:

- All DNS requests for example.com must be forwarded to a DNS server at 192.0.2.254 and 2001:db8:cafe::1
- All other DNS requests will be forwarded to a different set of DNS servers at 192.0.2.1, 192.0.2.2, 2001:db8::1:ffff and 2001:db8::2:ffff
- The VyOS DNS forwarder will only listen for requests on the eth1 (LAN) interface addresses - 192.168.1.254 for IPv4 and 2001:db8::ffff for IPv6
- The VyOS DNS forwarder will only accept lookup requests from the LAN subnets - 192.168.1.0/24 and 2001:db8::/64
- The VyOS DNS forwarder will pass reverse lookups for 10.in-addr.arpa, 168.192.in-addr.arpa, 16-31.172.in-addr.arpa zones to upstream server.

```
set service dns forwarding domain example.com server 192.0.2.254
set service dns forwarding domain example.com server 2001:db8:cafe::1
set service dns forwarding name-server 192.0.2.1
set service dns forwarding name-server 192.0.2.2
set service dns forwarding name-server 2001:db8::1:ffff
set service dns forwarding name-server 2001:db8::2:ffff
set service dns forwarding listen-address 192.168.1.254
set service dns forwarding listen-address 2001:db8::ffff
set service dns forwarding allow-from 192.168.1.0/24
set service dns forwarding allow-from 2001:db8::/64
set service dns forwarding no-serve-rfc1918
```

Operation

reset dns forwarding <all | domain>

Resets the local DNS forwarding cache database. You can reset the cache for all entries or only for entries to a specific domain.

restart dns forwarding

Restarts the DNS recursor process. This also invalidates the local DNS forwarding cache.

8.10.7 Dynamic DNS

VyOS is able to update a remote DNS record when an interface gets a new IP address. In order to do so, VyOS includes ddclient, a Perl script written for this only one purpose.

ddclient uses two methods to update a DNS record. The first one will send updates directly to the DNS daemon, in compliance with **RFC 2136**. The second one involves a third party service, like DynDNS.com or any other similar website. This method uses HTTP requests to transmit the new IP address. You can configure both in VyOS.

Configuration

RFC 2136 Based

set service dns dynamic interface <interface> rfc2136 <service-name>

Create new **RFC 2136** DNS update configuration which will update the IP address assigned to <*interface*> on the service you configured under <*service-name*>.

set service dns dynamic interface <interface> rfc2136 <service-name> key <keyfile>

File identified by <*keyfile*> containing the secret RNDC key shared with remote DNS server. This is a required option.

set service dns dynamic interface <interface> rfc2136 <service-name> server <server>

Configure the DNS <*server*> IP/FQDN used when updating this dynamic assignment. This is a required option.

set service dns dynamic interface <interface> rfc2136 <service-name> zone <zone>

Configure DNS <*zone*> to be updated. This is a required option.

set service dns dynamic interface <interface> rfc2136 <service-name> record <record>

Configure DNS <*record*> which should be updated. This can be set multiple times. This is a required option.

set service dns dynamic interface <interface> rfc2136 <service-name> ttl <ttl>

Configure optional TTL value on the given resource record. This defaults to 600 seconds.

Example

- Register DNS record `example.vyos.io` on DNS server `ns1.vyos.io`
- Use auth key file at `/config/auth/my.key`
- Set TTL to 300 seconds

```
vyos@vyos# show service dns dynamic
 interface eth0.7 {
     rfc2136 VyOS-DNS {
         key /config/auth/my.key
         record example.vyos.io
         server ns1.vyos.io
         ttl 300
         zone vyos.io
     }
 }
```

This will render the following ddclient configuration entry:

```
#
# ddclient configuration for interface "eth0.7":
#
use=if, if=eth0.7

# RFC2136 dynamic DNS configuration for example.vyos.io.vyos.io
server=ns1.vyos.io
protocol=nsupdate
password=/config/auth/my.key
ttl=300
zone=vyos.io
example.vyos.io
```

Note: You can also keep different DNS zone updated. Just create a new config node: `set service dns dynamic interface <interface> rfc2136 <other-service-name>`

HTTP based services

VyOS is also able to use any service relying on protocols supported by ddclient.

To use such a service, one must define a login, password, one or multiple hostnames, protocol and server.

set service dns dynamic interface <interface> service <service> host-name <hostname>

Setup the dynamic DNS hostname <*hostname*> associated with the DynDNS provider identified by <*service*> when the IP address on interface <*interface*> changes.

set service dns dynamic interface <interface> service <service> login <username>

Configure <*username*> used when authenticating the update request for DynDNS service identified by <*service*>. For Namecheap, set the <domain> you wish to update.

set service dns dynamic interface <interface> service <service> password <password>

Configure <*password*> used when authenticating the update request for DynDNS service identified by <*service*>.

set service dns dynamic interface <interface> service <service> protocol <protocol>

When a `custom` DynDNS provider is used the protocol used for communicating to the provider must be specified under <*protocol*>. See the embedded completion helper for available protocols.

set service dns dynamic interface <interface> service <service> server <server>

When a `custom` DynDNS provider is used the <*server*> where update requests are being sent to must be specified.

set service dns dynamic interface <interface> service <service> zone <zone>

Set the DNS zone to update. This is only available with CloudFlare.

Example:

Use DynDNS as your preferred provider:

```
set service dns dynamic interface eth0 service dyndns
set service dns dynamic interface eth0 service dyndns login my-login
set service dns dynamic interface eth0 service dyndns password my-password
set service dns dynamic interface eth0 service dyndns host-name my-dyndns-hostname
```

Note: Multiple services can be used per interface. Just specify as many services per interface as you like!

Running Behind NAT

By default, ddclient will update a dynamic dns record using the IP address directly attached to the interface. If your VyOS instance is behind NAT, your record will be updated to point to your internal IP.

ddclient has another way to determine the WAN IP address. This is controlled by:

set service dns dynamic interface <interface> use-web url <url>

Use configured <*url*> to determine your IP address. ddclient will load <*url*> and tries to extract your IP address from the response.

set service dns dynamic interface <interface> use-web skip <pattern>

ddclient will skip any address located before the string set in <*pattern*>.

8.10.8 Event Handler

Event Handler Technology Overview

Event handler allows you to execute scripts when a string that matches a regex or a regex with a service name appears in journald logs. You can pass variables, arguments, and a full matching string to the script.

How to configure Event Handler

1. *Create an event handler*
2. *Add regex to the script*
3. *Add a full path to the script*
4. *Add optional parameters*

Event Handler Configuration Steps

1. Create an event handler

```
set service event-handler event <event-handler name>
```

This is an optional command because the event handler will be automatically created after any of the next commands.

2. Add regex to the script

```
set service event-handler event <event-handler name> filter pattern <regex>
```

This is a mandatory command. Sets regular expression to match against log string message.

Note: The regular expression matches if and only if the entire string matches the pattern.

3. Add a full path to the script

```
set service event-handler event <event-handler name> script path <path to
script>
```

This is a mandatory command. Sets the full path to the script. The script file must be executable.

4. Add optional parameters

```
set service event-handler event <event-handler name> filter syslog-identifier
<sylogid name>
```

This is an optional command. Filters log messages by syslog-identifier.

```
set service event-handler event <event-handler name> script environment <env
name> value <env value>
```

This is an optional command. Adds environment and its value to the script. Use separate commands for each environment.

One implicit environment exists.

- `message`: Full message that has triggered the script.

```
set service event-handler event <event-handler name> script arguments
<arguments>
```

This is an optional command. Adds arguments to the script. Arguments must be separated by spaces.

Note: We don't recomend to use arguments. Using environments is more prefferebe.

Example

Event handler that monitors the state of interface eth0.

```
set service event-handler event INTERFACE_STATE_DOWN filter pattern '.*eth0.*,
↪RUNNING,.*->.*'
set service event-handler event INTERFACE_STATE_DOWN filter syslog-identifier
↪'netplugd'
set service event-handler event INTERFACE_STATE_DOWN script environment␣
↪interface_action value 'down'
set service event-handler event INTERFACE_STATE_DOWN script environment␣
↪interface_name value 'eth2'
set service event-handler event INTERFACE_STATE_DOWN script path '/config/
↪scripts/eventhandler.py'
```

Event handler script

```
#!/usr/bin/env python3
#
# VyOS event-handler script example
from os import environ
import subprocess
from sys import exit

# Perform actions according to requirements
def process_event() -> None:
    # Get variables
    message_text = environ.get('message')
    interface_name = environ.get('interface_name')
    interface_action = environ.get('interface_action')
    # Print the message that triggered this script
    print(f'Logged message: {message_text}')
    # Prepare a command to run
    command = f'sudo ip link set {interface_name} {interface_action}'.split()
    # Execute a command
    subprocess.run(command)

if __name__ == '__main__':
    try:
        # Run script actions and exit
        process_event()
        exit(0)
    except Exception as err:
        # Exit properly in case if something in the script goes wrong
        print(f'Error running script: {err}')
        exit(1)
```

8.10.9 HTTP-API

VyOS provide an HTTP API. You can use it to execute op-mode commands, update VyOS, set or delete config.

Please take a look at the *VyOS API* page for an detailed how-to.

Configuration

set service https api keys id <name> key <apikey>

Set a named api key. Every key has the same, full permissions on the system.

set service https api debug

To enable debug messages. Available via `show log` or `monitor log`

set service https api port

Set the listen port of the local API, this has no effect on the webserver. The default is port 8080

set service https api socket

Use local socket for API

set service https api strict

Enforce strict path checking

set service https virtual-host <vhost> listen-address <ipv4 or ipv6 address>

Address to listen for HTTPS requests

set service https virtual-host <vhost> listen-port <1-65535>

Port to listen for HTTPS requests; default 443

set service https virtual-host <vhost> server-name <text>

Server names for virtual hosts it can be exact, wildcard or regex.

set service https api-restrict virtual-host <vhost>

By default, nginx exposes the local API on all virtual servers. Use this to restrict nginx to one or more virtual hosts.

set service https certificates certbot domain-name <text>

Domain name(s) for which to obtain certificate

set service https certificates certbot email

Email address to associate with certificate

set service https certificates system-generated-certificate

Use an automatically generated self-signed certificate

set service https certificates system-generated-certificate lifetime <days>

Lifetime in days; default is 365

Example Configuration

Set an API-KEY is the minimal configuration to get a working API Endpoint.

```
set service https api keys id MY-HTTPS-API-ID key MY-HTTPS-API-PLAINTEXT-KEY
```

To use this full configuration we asume a public accessible hostname.

```
set service https api keys id MY-HTTPS-API-ID key MY-HTTPS-API-PLAINTEXT-KEY
set service https certificates certbot domain-name rtr01.example.com
set service https certificates certbot email mail@example.com
set service https virtual-host rtr01 listen-address 198.51.100.2
set service https virtual-host rtr01 listen-port 11443
set service https virtual-host rtr01 server-name rtr01.example.com
set service https api-restrict virtual-host rtr01
```

8.10.10 IPoE Server

VyOS utilizes accel-ppp to provide IPoE (Internet Protocol over Ethernet) server functionality. It can be used with local authentication (mac-address) or a connected RADIUS server.

IPoE is a method of delivering an IP payload over an Ethernet-based access network or an access network using bridged Ethernet over Asynchronous Transfer Mode (ATM) without using PPPoE. It directly encapsulates the IP datagrams in Ethernet frames, using the standard **RFC 894** encapsulation.

The use of IPoE addresses the disadvantage that PPP is unsuited for multicast delivery to multiple users. Typically, IPoE uses Dynamic Host Configuration Protocol and Extensible Authentication Protocol to provide the same functionality as PPPoE, but in a less robust manner.

Note: Please be aware, due to an upstream bug, config changes/commits will restart the ppp daemon and will reset existing IPoE sessions, in order to become effective.

Configuration

IPoE can be configure on different interfaces, it will depend on each specific situation which interface will provide IPoE to clients. The clients mac address and the incoming interface is being used as control parameter, to authenticate a client.

The example configuration below will assign an IP to the client on the incoming interface eth2 with the client mac address 08:00:27:2f:d8:06. Other DHCP discovery requests will be ignored, unless the client mac has been enabled in the configuration.

```
set service ipoe-server authentication interface eth2 mac-address 08:00:27:2f:d8:06
set service ipoe-server authentication mode 'local'
set service ipoe-server name-server '10.10.1.1'
set service ipoe-server name-server '10.10.1.2'
set service ipoe-server interface eth2 client-subnet '192.168.0.0/24'
```

The first address of the parameter `client-subnet`, will be used as the default gateway. Connected sessions can be checked via the `show ipoe-server sessions` command.

```
vyos@vyos:~$ show ipoe-server sessions

ifname | called-sid |    calling-sid    |     ip      | ip6 | ip6-dp | rate-limit |␣
↪state  |  uptime  |        sid
-------+------------+-------------------+-------------+-----+--------+------------+------
↪--+----------+------------------
ipoe0  | eth2       | 08:00:27:2f:d8:06 | 192.168.0.2 |     |        |            |␣
↪active | 00:45:05 | dccc870fd3134612
```

IPv6 SLAAC and IA-PD

To configure IPv6 assignments for clients, two options need to be configured. A global prefix which is terminated on the clients cpe and a delegated prefix, the client can use for devices routed via the clients cpe.

IPv6 DNS addresses are optional.

```
set service ipoe-server authentication interface eth3 mac-address 08:00:27:2F:D8:06
set service ipoe-server authentication mode 'local'
set service ipoe-server client-ipv6-pool delegate '2001:db8:1::/48' delegation-prefix '56
↪'
set service ipoe-server client-ipv6-pool prefix '2001:db8::/48' mask '64'
set service ipoe-server name-server '2001:db8::'
set service ipoe-server name-server '2001:db8:aaa::'
set service ipoe-server name-server '2001:db8:bbb::'
set service ipoe-server interface eth3 client-subnet '192.168.1.0/24'
```

```
vyos@ipoe-server# run sh ipoe-server sessions
ifname | called-sid |    calling-sid    |     ip      |              ip6              ␣
↪| ip6-dp          | rate-limit | state  |  uptime  |        sid
-------+------------+-------------------+-------------+-------------------------------
↪+-----------------+------------+--------+----------+------------------
ipoe0  | eth3       | 08:00:27:2f:d8:06 | 192.168.1.2 | 2001:db8::a00:27ff:fe2f:d806/64␣
↪| 2001:db8:1::/56 |            | active | 01:02:59 | 4626faf71b12cc25
```

The clients CPE (Customer Premises Equipment) can now communicate via IPv4 or IPv6. All devices behind `2001:db8::a00:27ff:fe2f:d806/64` can use addresses from `2001:db8:1::/56` and can globally communicate without the need of any NAT rules.

Automatic VLAN creation

To create VLANs per user during runtime, the following settings are required on a per interface basis. VLAN ID and VLAN range can be present in the configuration at the same time.

```
set service ipoe-server interface eth2 network vlan
set service ipoe-server interface eth2 vlan-id 100
set service ipoe-server interface eth2 vlan-id 200
set service ipoe-server interface eth2 vlan-range 1000-2000
set service ipoe-server interface eth2 vlan-range 2500-2700
```

RADIUS Setup

To use a RADIUS server for authentication and bandwidth-shaping, the following example configuration can be used.

```
set service ipoe-server authentication mode 'radius'
set service ipoe-server authentication radius server 10.100.100.1 key 'password'
```

Bandwidth Shaping

Bandwidth rate limits can be set for local users within the configuration or via RADIUS based attributes.

Bandwidth Shaping for local users

The rate-limit is set in kbit/sec.

```
set service ipoe-server authentication interface eth2 mac-address 08:00:27:2f:d8:06 rate-
↪limit download '500'
set service ipoe-server authentication interface eth2 mac-address 08:00:27:2f:d8:06 rate-
↪limit upload '500'
set service ipoe-server authentication mode 'local'
set service ipoe-server name-server '10.10.1.1'
set service ipoe-server name-server '10.10.1.2'
set service ipoe-server interface eth2 client-subnet '192.168.0.0/24'
```

```
vyos@vyos# run show ipoe-server sessions

ifname | called-sid |    calling-sid    |     ip      | ip6 | ip6-dp | rate-limit |␣
↪state  |  uptime  |        sid
-------+------------+-------------------+-------------+-----+--------+------------+------
↪--+----------+------------------
ipoe0  | eth2       | 08:00:27:2f:d8:06 | 192.168.0.2 |     |        | 500/500    |␣
↪active | 00:00:05 | dccc870fd31349fb
```

8.10.11 LLDP

LLDP (Link Layer Discovery Protocol) is a vendor-neutral link layer protocol in the Internet Protocol Suite used by network devices for advertising their identity, capabilities, and neighbors on an IEEE 802 local area network, principally wired Ethernet. The protocol is formally referred to by the IEEE as Station and Media Access Control Connectivity Discovery specified in IEEE 802.1AB and IEEE 802.3-2012 section 6 clause 79.

LLDP performs functions similar to several proprietary protocols, such as CDP (Cisco Discovery Protocol), FDP (Foundry Discovery Protocol), NDP (Nortel Discovery Protocol) and LLTD (Link Layer Topology Discovery).

Information gathered with LLDP is stored in the device as a MIB (Management Information Database) and can be queried with SNMP (Simple Network Management Protocol) as specified in **RFC 2922**. The topology of an LLDP-enabled network can be discovered by crawling the hosts and querying this database. Information that may be retrieved include:

- System Name and Description
- Port name and description
- VLAN name

- IP management address
- System capabilities (switching, routing, etc.)
- MAC/PHY information
- MDI power
- Link aggregation

Configuration

set service lldp

Enable LLDP service

set service lldp management-address <address>

Define IPv4/IPv6 management address transmitted via LLDP. Multiple addresses can be defined. Only addresses connected to the system will be transmitted.

set service lldp interface <interface>

Enable transmission of LLDP information on given <*interface*>. You can also say `all` here so LLDP is turned on on every interface.

set service lldp interface <interface> disable

Disable transmit of LLDP frames on given <*interface*>. Useful to exclude certain interfaces from LLDP when `all` have been enabled.

set service lldp snmp enable

Enable SNMP queries of the LLDP database

set service lldp legacy-protocols <cdp|edp|fdp|sonmp>

Enable given legacy protocol on this LLDP instance. Legacy protocols include:

- `cdp` - Listen for CDP for Cisco routers/switches
- `edp` - Listen for EDP for Extreme routers/switches
- `fdp` - Listen for FDP for Foundry routers/switches
- `sonmp` - Listen for SONMP for Nortel routers/switches

Operation

show lldp neighbors

Displays information about all neighbors discovered via LLDP.

```
vyos@vyos:~$ show lldp neighbors
Capability Codes: R - Router, B - Bridge, W - Wlan r - Repeater, S - Station
                  D - Docsis, T - Telephone, O - Other

Device ID                Local     Proto  Cap   Platform            Port ID
---------                -----     -----  ---   --------            -------
BR2.vyos.net             eth0      LLDP   R     VyOS 1.2.4          eth1
BR3.vyos.net             eth0      LLDP   RB    VyOS 1.2.4          eth2
```

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```
SW1.vyos.net              eth0      LLDP   B     Cisco IOS Software  ␣
↪GigabitEthernet0/6
```

show lldp neighbors detail

Get detailed information about LLDP neighbors.

```
vyos@vyos:~$ show lldp neighbors detail
------------------------------------------------------------------------------
LLDP neighbors:
------------------------------------------------------------------------------
Interface:    eth0, via: LLDP, RID: 28, Time: 0 day, 00:24:33
  Chassis:
    ChassisID:    mac 00:53:00:01:02:c9
    SysName:      BR2.vyos.net
    SysDescr:     VyOS 1.3-rolling-201912230217
    MgmtIP:       192.0.2.1
    MgmtIP:       2001:db8::ffff
    Capability:   Bridge, on
    Capability:   Router, on
    Capability:   Wlan, off
    Capability:   Station, off
  Port:
    PortID:       mac 00:53:00:01:02:c9
    PortDescr:    eth0
    TTL:          120
    PMD autoneg:  supported: no, enabled: no
      MAU oper type: 10GigBaseCX4 - X copper over 8 pair 100-Ohm balanced cable
  VLAN:         201 eth0.201
  VLAN:         205 eth0.205
  LLDP-MED:
    Device Type:  Network Connectivity Device
    Capability:   Capabilities, yes
    Capability:   Policy, yes
    Capability:   Location, yes
    Capability:   MDI/PSE, yes
    Capability:   MDI/PD, yes
    Capability:   Inventory, yes
    Inventory:
      Hardware Revision: None
      Software Revision: 4.19.89-amd64-vyos
      Firmware Revision: 6.00
      Serial Number: VMware-42 1d 83 b9 fe c1 bd b2-7
      Manufacturer: VMware, Inc.
      Model:        VMware Virtual Platform
      Asset ID:     No Asset Tag
------------------------------------------------------------------------------
```

show lldp neighbors interface <interface>

Show LLDP neighbors connected via interface <*interface*>.

show log lldp

Used for troubleshooting.

8.10.12 mDNS Repeater

Starting with VyOS 1.2 a мDNS (Multicast DNS) repeater functionality is provided. Additional information can be obtained from https://en.wikipedia.org/wiki/Multicast_DNS.

Multicast DNS uses the 224.0.0.251 address, which is "administratively scoped" and does not leave the subnet. It retransmits mDNS packets from one interface to other interfaces. This enables support for e.g. Apple Airplay devices across multiple VLANs.

Since the mDNS protocol sends the AA records in the packet itself, the repeater does not need to forge the source address. Instead, the source address is of the interface that repeats the packet.

Configuration

set service mdns repeater interface <interface>

To enable mDNS repeater you need to configure at least two interfaces. To re-broadcast all incoming mDNS packets from any interface configured here to any other interface configured under this section.

set service mdns repeater disable

mDNS repeater can be temporarily disabled without deleting the service using

---

Note: You can not run this in a VRRP setup, if multiple mDNS repeaters are launched in a subnet you will experience the mDNS packet storm death!

Example

To listen on both *eth0* and *eth1* mDNS packets and also repeat packets received on *eth0* to *eth1* (and vice-versa) use the following commands:

```
set service mdns repeater interface 'eth0'
set service mdns repeater interface 'eth1'
```

8.10.13 PPPoE Server

VyOS utilizes accel-ppp to provide PPPoE server functionality. It can be used with local authentication or a connected RADIUS server.

Note: Please be aware, due to an upstream bug, config changes/commits will restart the ppp daemon and will reset existing PPPoE connections from connected users, in order to become effective.

Configuration

First steps

set service pppoe-server access-concentrator <name>

Use this command to set a name for this PPPoE-server access concentrator.

set service pppoe-server authentication mode <local | radius>

Use this command to define whether your PPPoE clients will locally authenticate in your VyOS system or in RADIUS server.

set service pppoe-server authentication local-users username <name> password <password>

Use this command to configure the username and the password of a locally configured user.

set service pppoe-server interface <interface>

Use this command to define the interface the PPPoE server will use to listen for PPPoE clients.

set service pppoe-server gateway-address <address>

Use this command to configure the local gateway IP address.

set service pppoe-server name-server <address>

Use this command to set the IPv4 or IPv6 address of every Doman Name Server you want to configure. They will be propagated to PPPoE clients.

Client Address Pools

To automatically assign the client an IP address as tunnel endpoint, a client IP pool is needed. The source can be either RADIUS or a local subnet or IP range definition.

Once the local tunnel endpoint `set service pppoe-server gateway-address '10.1.1.2'` has been defined, the client IP pool can be either defined as a range or as subnet using CIDR notation. If the CIDR notation is used, multiple subnets can be setup which are used sequentially.

Client IP address via IP range definition

set service pppoe-server client-ip-pool start <address>

Use this command to define the first IP address of a pool of addresses to be given to PPPoE clients. It must be within a /24 subnet.

set service pppoe-server client-ip-pool stop <address>

Use this command to define the last IP address of a pool of addresses to be given to PPPoE clients. It must be within a /24 subnet.

```
set service pppoe-server client-ip-pool start '10.1.1.100'
set service pppoe-server client-ip-pool stop '10.1.1.111'
```

Client IP subnets via CIDR notation

set service pppoe-server client-ip-pool subnet <address>

Use this command for every pool of client IP addresses you want to define. The addresses of this pool will be given to PPPoE clients. You must use CIDR notation and it must be within a /24 subnet.

```
set service pppoe-server client-ip-pool subnet '10.1.1.0/24'
set service pppoe-server client-ip-pool subnet '10.1.2.0/24'
set service pppoe-server client-ip-pool subnet '10.1.3.0/24'
```

RADIUS based IP pools (Framed-IP-Address)

To use a radius server, you need to switch to authentication mode RADIUS and then configure it.

set service pppoe-server authentication radius server <address> key <secret>

Use this command to configure the IP address and the shared secret key of your RADIUS server. You can have multiple RADIUS servers configured if you wish to achieve redundancy.

```
set service pppoe-server access-concentrator 'ACN'
set service pppoe-server authentication mode 'radius'
set service pppoe-server authentication radius server 10.1.100.1 key 'secret'
set service pppoe-server interface 'eth1'
set service pppoe-server gateway-address '10.1.1.2'
```

RADIUS provides the IP addresses in the example above via Framed-IP-Address.

RADIUS sessions management DM/CoA

set service pppoe-server authentication radius dynamic-author <key | port | server>

Use this command to configure Dynamic Authorization Extensions to RADIUS so that you can remotely disconnect sessions and change some authentication parameters.

```
set service pppoe-server authentication radius dynamic-author key 'secret123'
set service pppoe-server authentication radius dynamic-author port '3799'
set service pppoe-server authentication radius dynamic-author server '10.1.1.2'
```

Example, from radius-server send command for disconnect client with username test

```
root@radius-server:~# echo "User-Name=test" | radclient -x 10.1.1.2:3799
disconnect secret123
```

You can also use another attributes for identify client for disconnect, like Framed-IP-Address, Acct-Session-Id, etc. Result commands appears in log.

```
show log | match Disconnect*
```

Example for changing rate-limit via RADIUS CoA.

```
echo "User-Name=test,Filter-Id=5000/4000" | radclient 10.1.1.2:3799 coa
secret123
```

Filter-Id=5000/4000 (means 5000Kbit down-stream rate and 4000Kbit up-stream rate) If attribute Filter-Id redefined, replace it in RADIUS CoA request.

Automatic VLAN Creation

set service pppoe-server interface <interface> <vlan-id | vlan range> <text>

VLAN's can be created by Accel-ppp on the fly via the use of a Kernel module named *vlan_mon*, which is monitoring incoming vlans and creates the necessary VLAN if required and allowed. VyOS supports the use of either VLAN ID's or entire ranges, both values can be defined at the same time for an interface.

When configured, PPPoE will create the necessary VLANs when required. Once the user session has been cancelled and the VLAN is not needed anymore, VyOS will remove it again.

```
set service pppoe-server interface eth3 vlan-id 100
set service pppoe-server interface eth3 vlan-id 200
set service pppoe-server interface eth3 vlan-range 500-1000
set service pppoe-server interface eth3 vlan-range 2000-3000
```

Bandwidth Shaping

Bandwidth rate limits can be set for local users or RADIUS based attributes.

For Local Users

set service pppoe-server authentication local-users username <name> rate-limit <download | upload>

Use this command to configure a data-rate limit to PPPOoE clients for traffic download or upload. The rate-limit is set in kbit/sec.

```
set service pppoe-server access-concentrator 'ACN'
set service pppoe-server authentication local-users username foo password 'bar'
set service pppoe-server authentication local-users username foo rate-limit download
↪'20480'
set service pppoe-server authentication local-users username foo rate-limit upload '10240
↪'
set service pppoe-server authentication mode 'local'
set service pppoe-server client-ip-pool start '10.1.1.100'
set service pppoe-server client-ip-pool stop '10.1.1.111'
set service pppoe-server name-server '10.100.100.1'
set service pppoe-server name-server '10.100.200.1'
set service pppoe-server interface 'eth1'
set service pppoe-server gateway-address '10.1.1.2'
```

Once the user is connected, the user session is using the set limits and can be displayed via 'show pppoe-server sessions'.

```
show pppoe-server sessions
ifname | username |     ip     |    calling-sid    | rate-limit  | state  |  uptime  |␣
↪rx-bytes | tx-bytes
-------+----------+------------+-------------------+-------------+--------+----------+---
↪-------+----------
ppp0   | foo      | 10.1.1.100 | 00:53:00:ba:db:15 | 20480/10240 | active | 00:00:11 |␣
↪214 B    | 76 B
```

For RADIUS users

The current attribute 'Filter-Id' is being used as default and can be setup within RADIUS:

Filter-Id=2000/3000 (means 2000Kbit down-stream rate and 3000Kbit up-stream rate)

The command below enables it, assuming the RADIUS connection has been setup and is working.

set service pppoe-server authentication radius rate-limit enable

Use this command to enable bandwidth shaping via RADIUS.

Other attributes can be used, but they have to be in one of the dictionaries in */usr/share/accel-ppp/radius*.

Load Balancing

set service pppoe-server pado-delay <number-of-ms> sessions <number-of-sessions>

Use this command to enable the delay of PADO (PPPoE Active Discovery Offer) packets, which can be used as a session balancing mechanism with other PPPoE servers.

```
set service pppoe-server pado-delay 50 sessions '500'
set service pppoe-server pado-delay 100 sessions '1000'
set service pppoe-server pado-delay 300 sessions '3000'
```

In the example above, the first 499 sessions connect without delay. PADO packets will be delayed 50 ms for connection from 500 to 999, this trick allows other PPPoE servers send PADO faster and clients will connect to other servers. Last command says that this PPPoE server can serve only 3000 clients.

IPv6

IPv6 client's prefix assignment

set service pppoe-server client-ipv6-pool prefix <address> mask <number-of-bits>

Use this comand to set the IPv6 address pool from which a PPPoE client will get an IPv6 prefix of your defined length (mask) to terminate the PPPoE endpoint at their side. The mask length can be set from 48 to 128 bit long, the default value is 64.

IPv6 Prefix Delegation

set service pppoe-server client-ipv6-pool delegate <address> delegation-prefix <number-of-bits>

Use this command to configure DHCPv6 Prefix Delegation (RFC3633). You will have to set your IPv6 pool and the length of the delegation prefix. From the defined IPv6 pool you will be handing out networks of the defined length (delegation-prefix). The length of the delegation prefix can be set from 32 to 64 bit long.

Maintenance mode

set pppoe-server maintenance-mode <enable | disable>

For network maintenance, it's a good idea to direct users to a backup server so that the primary server can be safely taken out of service. It's possible to switch your PPPoE server to maintenance mode where it maintains already established connections, but refuses new connection attempts.

Checking connections

show pppoe-server sessions

Use this command to locally check the active sessions in the PPPoE server.

```
show pppoe-server sessions
ifname | username |     ip     |    calling-sid    | rate-limit  | state  |  uptime  |␣
↪rx-bytes | tx-bytes
-------+----------+------------+-------------------+-------------+--------+----------+---
↪-------+----------
ppp0   | foo      | 10.1.1.100 | 00:53:00:ba:db:15 | 20480/10240 | active | 00:00:11 |␣
↪214 B    | 76 B
```

Per default the user session is being replaced if a second authentication request succeeds. Such session requests can be either denied or allowed entirely, which would allow multiple sessions for a user in the latter case. If it is denied, the second session is being rejected even if the authentication succeeds, the user has to terminate its first session and can then authentication again.

```
vyos@# set service pppoe-server session-control
  Possible completions:
  disable      Disables session control
  deny         Deny second session authorization
```

Examples

IPv4

The example below uses ACN as access-concentrator name, assigns an address from the pool 10.1.1.100-111, terminates at the local endpoint 10.1.1.1 and serves requests only on eth1.

```
set service pppoe-server access-concentrator 'ACN'
set service pppoe-server authentication local-users username foo password 'bar'
set service pppoe-server authentication mode 'local'
set service pppoe-server client-ip-pool start '10.1.1.100'
set service pppoe-server client-ip-pool stop '10.1.1.111'
set service pppoe-server interface eth1
set service pppoe-server gateway-address '10.1.1.2'
set service pppoe-server name-server '10.100.100.1'
set service pppoe-server name-server '10.100.200.1'
```

Dual-Stack IPv4/IPv6 provisioning with Prefix Delegation

The example below covers a dual-stack configuration via pppoe-server.

```
set service pppoe-server authentication local-users username test password 'test'
set service pppoe-server authentication mode 'local'
set service pppoe-server client-ip-pool start '192.168.0.1'
set service pppoe-server client-ip-pool stop '192.168.0.10'
set service pppoe-server client-ipv6-pool delegate '2001:db8:8003::/48' delegation-
↪prefix '56'
set service pppoe-server client-ipv6-pool prefix '2001:db8:8002::/48' mask '64'
set service pppoe-server ppp-options ipv6 allow
set service pppoe-server name-server '10.1.1.1'
set service pppoe-server name-server '2001:db8:4860::8888'
set service pppoe-server interface 'eth2'
set service pppoe-server gateway-address '10.100.100.1'
```

The client, once successfully authenticated, will receive an IPv4 and an IPv6 /64 address to terminate the pppoe endpoint on the client side and a /56 subnet for the clients internal use.

```
vyos@pppoe-server:~$ sh pppoe-server sessions
 ifname | username |     ip      |            ip6           |       ip6-dp        |  ␣
↪calling-sid    | rate-limit | state  |  uptime  | rx-bytes | tx-bytes
--------+----------+-------------+--------------------------+---------------------+------
↪-------------+------------+--------+----------+----------+----------
 ppp0   | test     | 192.168.0.1 | 2001:db8:8002:0:200::/64 | 2001:db8:8003::1/56 |␣
↪00:53:00:12:42:eb |            | active | 00:00:49 | 875 B    | 2.1 KiB
```

8.10.14 Router Advertisements

RAs (Router advertisements) are described in **RFC 4861#section-4.6.2**. They are part of what is known as SLAAC.

Supported interface types:

- bonding
- bridge
- ethernet
- l2tpv3
- openvpn
- pseudo-ethernet
- tunnel
- vxlan
- wireguard
- wireless
- wwan

Enabling Advertisments

```
set service router-advert interface <interface> ....
```

Field	VyOS Option	Description
Cur Hop Limit	hop-limit	Hop count field of the outgoing RA packets
"Managed address configuration" flag	managed-flag	Tell hosts to use the administered stateful protocol (i.e. DHCP) for autoconfiguration
"Other configuration" flag	other-config-flag	Tell hosts to use the administered (stateful) protocol (i.e. DHCP) for autoconfiguration of other (non-address) information
MTU	link-mtu	Link MTU value placed in RAs, exluded in RAs if unset
Router Lifetime	default-lifetime	Lifetime associated with the default router in units of seconds
Reachable Time	reachable-time	Time, in milliseconds, that a node assumes a neighbor is reachable after having received a reachability confirmation
Retransmit Timer	retrans-timer	Time in milliseconds between retransmitted Neighbor Solicitation messages
Default Router Preference	default-preference	Preference associated with the default router
Interval	interval	Min and max intervals between unsolicited multicast RAs
DNSSL	dnssl	DNS search list to advertise
Name Server	name-server	Advertise DNS server per https://tools.ietf.org/html/rfc6106

Advertising a Prefix

```
set service router-advert interface <interface> prefix 2001:DB8::/32
```

VyOS Field	Description
no-autonomous-flag	Prefix can not be used for stateless address auto-configuration
no-on-link-flag	Prefix can not be used for on-link determination
preferred-lifetime	Time in seconds that the prefix will remain preferred (default 4 hours)
valid-lifetime	Time in seconds that the prefix will remain valid (default: 30 days)

Disabling Advertisements

To disable advertisements without deleting the configuration:

```
set service router-advert interface <interface> no-send-advert
```

Example Configuration

```
interface eth0.2 {
   default-preference high
   hop-limit 64
   interval {
       max 600
   }
   name-server 2001:db8::1
   name-server 2001:db8::2
   other-config-flag
   prefix 2001:db8:beef:2::/64 {
       valid-lifetime 2592000
   }
   reachable-time 0
   retrans-timer 0
}
```

8.10.15 Salt-Minion

SaltStack is Python-based, open-source software for event-driven IT automation, remote task execution, and configuration management. Supporting the "infrastructure as code" approach to data center system and network deployment and management, configuration automation, SecOps orchestration, vulnerability remediation, and hybrid cloud control.

Requirements

To use the Salt-Minion, a running Salt-Master is required. You can find more in the Salt Poject Documentaion

Configuration

set service salt-minion hash <type>

The hash type used when discovering file on master server (default: sha256)

set service salt-minion id <id>

Explicitly declare ID for this minion to use (default: hostname)

set service salt-minion interval <1-1440>

Interval in minutes between updates (default: 60)

set service salt-minion master <hostname | IP>

The hostname or IP address of the master

set service salt-minion master-key <key>

URL with signature of master for auth reply verification

Please take a look in the Automation section to find some usefull Examples.

8.10.16 SNMP

SNMP is an Internet Standard protocol for collecting and organizing information about managed devices on IP networks and for modifying that information to change device behavior. Devices that typically support SNMP include cable modems, routers, switches, servers, workstations, printers, and more.

SNMP is widely used in network management for network monitoring. SNMP exposes management data in the form of variables on the managed systems organized in a management information base (MIB) which describe the system status and configuration. These variables can then be remotely queried (and, in some circumstances, manipulated) by managing applications.

Three significant versions of SNMP have been developed and deployed. SNMPv1 is the original version of the protocol. More recent versions, SNMPv2c and SNMPv3, feature improvements in performance, flexibility and security.

SNMP is a component of the Internet Protocol Suite as defined by the Internet Engineering Task Force (IETF). It consists of a set of standards for network management, including an application layer protocol, a database schema, and a set of data objects.

Overview and basic concepts

In typical uses of SNMP, one or more administrative computers called managers have the task of monitoring or managing a group of hosts or devices on a computer network. Each managed system executes a software component called an agent which reports information via SNMP to the manager.

An SNMP-managed network consists of three key components:

- Managed devices
- Agent - software which runs on managed devices
- Network management station (NMS) - software which runs on the manager

A managed device is a network node that implements an SNMP interface that allows unidirectional (read-only) or bidirectional (read and write) access to node-specific information. Managed devices exchange node-specific information with the NMSs. Sometimes called network elements, the managed devices can be any type of device, including, but not limited to, routers, access servers, switches, cable modems, bridges, hubs, IP telephones, IP video cameras, computer hosts, and printers.

An agent is a network-management software module that resides on a managed device. An agent has local knowledge of management information and translates that information to or from an SNMP-specific form.

A network management station executes applications that monitor and control managed devices. NMSs provide the bulk of the processing and memory resources required for network management. One or more NMSs may exist on any managed network.

Note: VyOS SNMP supports both IPv4 and IPv6.

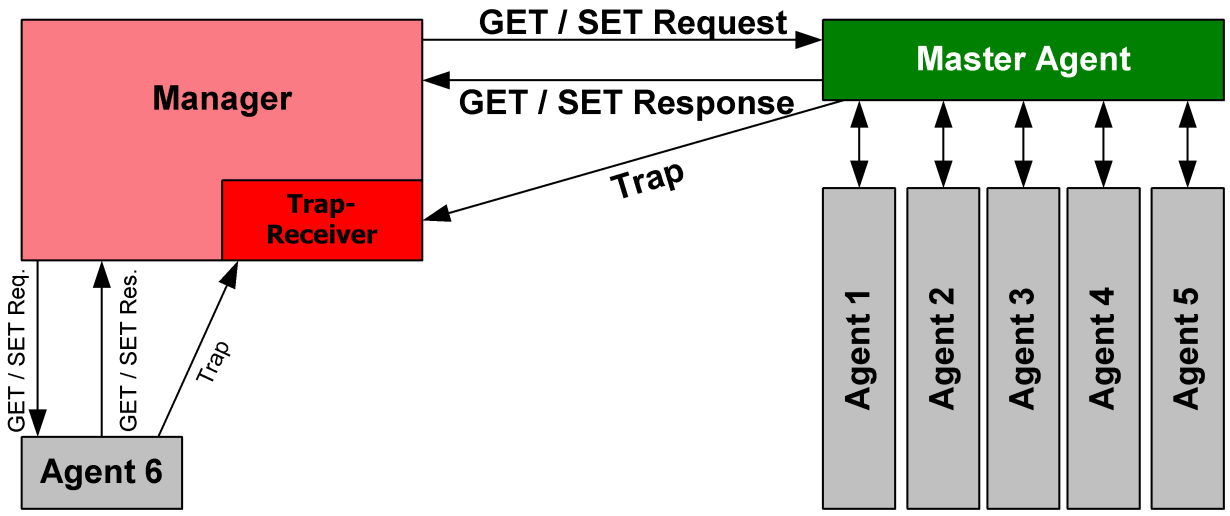

Fig. 5: Image thankfully borrowed from https://en.wikipedia.org/wiki/File:SNMP_communication_principles_diagram.PNG which is under the GNU Free Documentation License

SNMP Protocol Versions

VyOS itself supports SNMPv2 (version 2) and SNMPv3 (version 3) where the later is recommended because of improved security (optional authentication and encryption).

SNMPv2

SNMPv2 is the original and most commonly used version. For authorizing clients, SNMP uses the concept of communities. Communities may have authorization set to read only (this is most common) or to read and write (this option is not actively used in VyOS).

SNMP can work synchronously or asynchronously. In synchronous communication, the monitoring system queries the router periodically. In asynchronous, the router sends notification to the "trap" (the monitoring host).

SNMPv2 does not support any authentication mechanisms, other than client source address, so you should specify addresses of clients allowed to monitor the router. Note that SNMPv2 also supports no encryption and always sends data in plain text.

Example

```
# Define a community
set service snmp community routers authorization ro

# Allow monitoring access from the entire network
set service snmp community routers network 192.0.2.0/24
set service snmp community routers network 2001::db8:ffff:eeee::/64

# Allow monitoring access from specific addresses
set service snmp community routers client 203.0.113.10
```

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```
set service snmp community routers client 203.0.113.20

# Define optional router information
set service snmp location "UK, London"
set service snmp contact "admin@example.com"

# Trap target if you want asynchronous communication
set service snmp trap-target 203.0.113.10

# Listen only on specific IP addresses (port defaults to 161)
set service snmp listen-address 172.16.254.36 port 161
set service snmp listen-address 2001:db8::f00::1
```

SNMPv3

SNMPv3 (version 3 of the SNMP protocol) introduced a whole slew of new security related features that have been missing from the previous versions. Security was one of the biggest weakness of SNMP until v3. Authentication in SNMP Versions 1 and 2 amounts to nothing more than a password (community string) sent in clear text between a manager and agent. Each SNMPv3 message contains security parameters which are encoded as an octet string. The meaning of these security parameters depends on the security model being used.

The security approach in SNMPv3 targets:

- Confidentiality – Encryption of packets to prevent snooping by an unauthorized source.
- Integrity – Message integrity to ensure that a packet has not been tampered while in transit including an optional packet replay protection mechanism.
- Authentication – to verify that the message is from a valid source.

Example

- Let SNMP daemon listen only on IP address 192.0.2.1
- Configure new SNMP user named “vyos” with password “vyos12345678”
- New user will use SHA/AES for authentication and privacy

```
set service snmp listen-address 192.0.2.1
set service snmp location 'VyOS Datacenter'
set service snmp v3 engineid '000000000000000000000002'
set service snmp v3 group default mode 'ro'
set service snmp v3 group default view 'default'
set service snmp v3 user vyos auth plaintext-password 'vyos12345678'
set service snmp v3 user vyos auth type 'sha'
set service snmp v3 user vyos group 'default'
set service snmp v3 user vyos privacy plaintext-password 'vyos12345678'
set service snmp v3 user vyos privacy type 'aes'
set service snmp v3 view default oid 1
```

After commit the plaintext passwords will be hashed and stored in your configuration. The resulting CLI config will look like:

```
vyos@vyos# show service snmp
 listen-address 192.0.2.1 {
 }
 location "VyOS Datacenter"
 v3 {
     engineid 000000000000000000000002
     group default {
         mode ro
         view default
     }
     user vyos {
         auth {
             encrypted-password 4e52fe55fd011c9c51ae2c65f4b78ca93dcafdfe
             type sha
         }
         group default
         privacy {
             encrypted-password 4e52fe55fd011c9c51ae2c65f4b78ca93dcafdfe
             type aes
         }
     }
     view default {
         oid 1 {
         }
     }
 }
```

You can test the SNMPv3 functionality from any linux based system, just run the following command: `snmpwalk -v 3 -u vyos -a SHA -A vyos12345678 -x AES -X vyos12345678 -l authPriv 192.0.2.1 .1`

VyOS MIBs

All SNMP MIBs are located in each image of VyOS here: `/usr/share/snmp/mibs/`

You are be able to download the files using SCP, once the SSH service has been activated like so

```
scp -r vyos@your_router:/usr/share/snmp/mibs /your_folder/mibs
```

SNMP Extensions

To extend SNMP agent functionality, custom scripts can be executed every time the agent is being called. This can be achieved by using `arbitrary extensioncommands`. The first step is to create a functional script of course, then upload it to your VyOS instance via the command `scp your_script.sh vyos@your_router:/config/user-data`. Once the script is uploaded, it needs to be configured via the command below.

```
set service snmp script-extensions extension-name my-extension script your_script.sh
commit
```

The OID `.1.3.6.1.4.1.8072.1.3.2.3.1.1.4.116.101.115.116`, once called, will contain the output of the extension.

```
root@vyos:/home/vyos# snmpwalk -v2c  -c public 127.0.0.1 nsExtendOutput1
NET-SNMP-EXTEND-MIB::nsExtendOutput1Line."my-extension" = STRING: hello
NET-SNMP-EXTEND-MIB::nsExtendOutputFull."my-extension" = STRING: hello
NET-SNMP-EXTEND-MIB::nsExtendOutNumLines."my-extension" = INTEGER: 1
NET-SNMP-EXTEND-MIB::nsExtendResult."my-extension" = INTEGER: 0
```

SolarWinds

If you happen to use SolarWinds Orion as NMS you can also use the Device Templates Management. A template for VyOS can be easily imported.

Create a file named `VyOS-1.3.6.1.4.1.44641.ConfigMgmt-Commands` using the following content:

```
<Configuration-Management Device="VyOS" SystemOID="1.3.6.1.4.1.44641">
    <Commands>
        <Command Name="Reset" Value="set terminal width 0${CRLF}set terminal length 0"/>
        <Command Name="Reboot" Value="reboot${CRLF}Yes"/>
        <Command Name="EnterConfigMode" Value="configure"/>
        <Command Name="ExitConfigMode" Value="commit${CRLF}exit"/>
        <Command Name="DownloadConfig" Value="show configuration commands"/>
        <Command Name="SaveConfig" Value="commit${CRLF}save"/>
        <Command Name="Version" Value="show version"/>
        <Command Name="MenuBased" Value="False"/>
        <Command Name="VirtualPrompt" Value=":~"/>
    </Commands>
</Configuration-Management>
```

8.10.17 SSH

SSH (Secure Shell) is a cryptographic network protocol for operating network services securely over an unsecured network. The standard TCP port for SSH is 22. The best known example application is for remote login to computer systems by users.

SSH provides a secure channel over an unsecured network in a client-server architecture, connecting an SSH client application with an SSH server. Common applications include remote command-line login and remote command execution, but any network service can be secured with SSH. The protocol specification distinguishes between two major versions, referred to as SSH-1 and SSH-2.

The most visible application of the protocol is for access to shell accounts on Unix-like operating systems, but it sees some limited use on Windows as well. In 2015, Microsoft announced that they would include native support for SSH in a future release.

SSH was designed as a replacement for Telnet and for unsecured remote shell protocols such as the Berkeley rlogin, rsh, and rexec protocols. Those protocols send information, notably passwords, in plaintext, rendering them susceptible to interception and disclosure using packet analysis. The encryption used by SSH is intended to provide confidentiality and integrity of data over an unsecured network, such as the Internet.

Note: VyOS 1.1 supported login as user `root`. This has been removed due to tighter security in VyOS 1.2.

See also:

SSH *Key Based Authentication*

Configuration

set service ssh port <port>

Enabling SSH only requires you to specify the port <port> you want SSH to listen on. By default, SSH runs on port 22.

set service ssh listen-address <address>

Specify IPv4/IPv6 listen address of SSH server. Multiple addresses can be defined.

set service ssh ciphers <cipher>

Define allowed ciphers used for the SSH connection. A number of allowed ciphers can be specified, use multiple occurrences to allow multiple ciphers.

List of supported ciphers: 3des-cbc, aes128-cbc, aes192-cbc, aes256-cbc, aes128-ctr, aes192-ctr, aes256-ctr, arcfour128, arcfour256, arcfour, blowfish-cbc, cast128-cbc

set service ssh disable-password-authentication

Disable password based authentication. Login via SSH keys only. This hardens security!

set service ssh disable-host-validation

Disable the host validation through reverse DNS lookups - can speedup login time when reverse lookup is not possible.

set service ssh macs <mac>

Specifies the available MAC algorithms. The MAC algorithm is used in protocol version 2 for data integrity protection. Multiple algorithms can be provided.

List of supported MACs: hmac-md5, hmac-md5-96, hmac-ripemd160, hmac-sha1, hmac-sha1-96, hmac-sha2-256, hmac-sha2-512, umac-64@openssh.com, umac-128@openssh.com, hmac-md5-etm@openssh.com, hmac-md5-96-etm@openssh.com, hmac-ripemd160-etm@openssh.com, hmac-sha1-etm@openssh.com, hmac-sha1-96-etm@openssh.com, hmac-sha2-256-etm@openssh.com, hmac-sha2-512-etm@openssh.com, umac-64-etm@openssh.com, umac-128-etm@openssh.com

set service ssh access-control <allow | deny> <group | user> <name>

Add access-control directive to allow or deny users and groups. Directives are processed in the following order of precedence: deny-users, allow-users, deny-groups and allow-groups.

set service ssh client-keepalive-interval <interval>

Specify timeout interval for keepalive message in seconds.

set service ssh key-exchange <kex>

Specify allowed KEX (Key Exchange) algorithms.

List of supported algorithms: diffie-hellman-group1-sha1, diffie-hellman-group14-sha1, diffie-hellman-group14-sha256, diffie-hellman-group16-sha512, diffie-hellman-group18-sha512, diffie-hellman-group-exchange-sha1, diffie-hellman-group-exchange-sha256, ecdh-sha2-nistp256, ecdh-sha2-nistp384, ecdh-sha2-nistp521, curve25519-sha256 and curve25519-sha256@libssh.org.

set service ssh loglevel <quiet | fatal | error | info | verbose>

Set the sshd log level. The default is info.

set service ssh vrf <name>

Specify name of the VRF (Virtual Routing and Forwarding) instance.

Operation

restart ssh

Restart the SSH daemon process, the current session is not affected, only the background daemon is restarted.

generate ssh server-key

Re-generated the public/private keyportion which SSH uses to secure connections.

Note: Already learned known_hosts files of clients need an update as the public key will change.

---

generate ssh client-key /path/to/private_key

Re-generated a known pub/private keyfile which can be used to connect to other services (e.g. RPKI cache).

Example:

```
vyos@vyos:~$ generate ssh client-key /config/auth/id_rsa_rpki
Generating public/private rsa key pair.
Your identification has been saved in /config/auth/id_rsa_rpki.
Your public key has been saved in /config/auth/id_rsa_rpki.pub.
The key fingerprint is:
SHA256:XGv2PpdOzVCzpmEzJZga8hTRq7B/ZYL3fXaioLFLS5Q vyos@vyos
The key's randomart image is:
+---[RSA 2048]----+
|         oo      |
|          ..o    |
|       . o.o.. o.|
|       o+ooo  o.o|
|        Eo*  =.o |
|       o = +.o*+ |
|        = o *.o.o|
|       o * +.o+.+|
|        =.. o=.oo|
+----[SHA256]-----+
```

Two new files `/config/auth/id_rsa_rpki` and `/config/auth/id_rsa_rpki.pub` will be created.

generate public-key-command user <username> path <location>

Generate the configuration mode commands to add a public key for *Key Based Authentication*. <location> can be a local path or a URL pointing at a remote file.

Supported remote protocols are FTP, FTPS, HTTP, HTTPS, SCP/SFTP and TFTP.

Example:

```
alyssa@vyos:~$ generate public-key-command user alyssa path sftp://example.net/home/
↪alyssa/.ssh/id_rsa.pub
# To add this key as an embedded key, run the following commands:
configure
set system login user alyssa authentication public-keys alyssa@example.net key AAA..
↪.
set system login user alyssa authentication public-keys alyssa@example.net type ssh-
↪rsa
commit
```

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```
save
exit

ben@vyos:~$ generate public-key-command user ben path ~/.ssh/id_rsa.pub
# To add this key as an embedded key, run the following commands:
configure
set system login user ben authentication public-keys ben@vyos key AAA...
set system login user ben authentication public-keys ben@vyos type ssh-dss
commit
save
exit
```

8.10.18 TFTP Server

TFTP (Trivial File Transfer Protocol) is a simple, lockstep file transfer protocol which allows a client to get a file from or put a file onto a remote host. One of its primary uses is in the early stages of nodes booting from a local area network. TFTP has been used for this application because it is very simple to implement.

Configuration

set service tftp-server directory <directory>

Enable TFTP service by specifying the <*directory*> which will be used to serve files.

Hint: Choose your `directory` location carefully or you will lose the content on image upgrades. We preserve the contents of `/config`, so we recommend using a directory there, for example `/config/tftpboot`.

---

set service tftp-server listen-address <address>

Configure the IPv4 or IPv6 listen address of the TFTP server. Multiple IPv4 and IPv6 addresses can be given. There will be one TFTP server instances listening on each IP address.

set service tftp-server listen-address <address> vrf <name>

Additional option to run TFTP server in the VRF context

Note: Configuring a listen-address is essential for the service to work.

---

set service tftp-server allow-upload

Optional, if you want to enable uploads, else TFTP server will act as a read-only server.

Example

Provide TFTP server listening on both IPv4 and IPv6 addresses `192.0.2.1` and `2001:db8::1` serving the content from `/config/tftpboot`. Uploading via TFTP to this server is disabled.

The resulting configuration will look like:

```
vyos@vyos# show service
 tftp-server {
    directory /config/tftpboot
    listen-address 2001:db8::1
    listen-address 192.0.2.1
 }
```

Verification

Client:

```
vyos@RTR2:~$ tftp -p -l /config/config.boot -r backup 192.0.2.1
backup1             100% |*******************************|   723  0:00:00 ETA
```

Server:

```
vyos@RTR1# ls -ltr /config/tftpboot/
total 1
-rw-rw-rw- 1 tftp tftp  1995 May 19 16:02 backup
```

8.10.19 Webproxy

The proxy service in VyOS is based on Squid and some related modules.

Squid is a caching and forwarding HTTP web proxy. It has a wide variety of uses, including speeding up a web server by caching repeated requests, caching web, DNS and other computer network lookups for a group of people sharing network resources, and aiding security by filtering traffic. Although primarily used for HTTP and FTP, Squid includes limited support for several other protocols including Internet Gopher, SSL,[6] TLS and HTTPS. Squid does not support the SOCKS protocol.

URL Filtering is provided by SquidGuard.

Configuration

set service webproxy append-domain <domain>

Use this command to specify a domain name to be appended to domain-names within URLs that do not include a dot `.` the domain is appended.

Example: to be appended is set to `vyos.net` and the URL received is `www/foo.html`, the system will use the generated, final URL of `www.vyos.net/foo.html`.

```
set service webproxy append-domain vyos.net
```

set service webproxy cache-size <size>

The size of the on-disk Proxy cache is user configurable. The Proxies default cache-size is configured to 100 MB.

Unit of this command is MB.

```
set service webproxy cache-size 1024
```

set service webproxy default-port <port>

Specify the port used on which the proxy service is listening for requests. This port is the default port used for the specified listen-address.

Default port is 3128.

```
set service webproxy default-port 8080
```

set service webproxy domain-block <domain>

Used to block specific domains by the Proxy. Specifying "vyos.net" will block all access to vyos.net, and specifying ".xxx" will block all access to URLs having an URL ending on .xxx.

```
set service webproxy domain-block vyos.net
```

set service webproxy domain-noncache <domain>

Allow access to sites in a domain without retrieving them from the Proxy cache. Specifying "vyos.net" will allow access to vyos.net but the pages accessed will not be cached. It useful for working around problems with "If-Modified-Since" checking at certain sites.

```
set service webproxy domain-noncache vyos.net
```

set service webproxy listen-address <address>

Specifies proxy service listening address. The listen address is the IP address on which the web proxy service listens for client requests.

For security, the listen address should only be used on internal/trusted networks!

```
set service webproxy listen-address 192.0.2.1
```

set service webproxy listen-address <address> disable-transparent

Disables web proxy transparent mode at a listening address.

In transparent proxy mode, all traffic arriving on port 80 and destined for the Internet is automatically forwarded through the proxy. This allows immediate proxy forwarding without configuring client browsers.

Non-transparent proxying requires that the client browsers be configured with the proxy settings before requests are redirected. The advantage of this is that the client web browser can detect that a proxy is in use and can behave accordingly. In addition, web-transmitted malware can sometimes be blocked by a non-transparent web proxy, since they are not aware of the proxy settings.

```
set service webproxy listen-address 192.0.2.1 disable-transparent
```

set service webproxy listen-address <address> port <port>

Sets the listening port for a listening address. This overrides the default port of 3128 on the specific listen address.

```
set service webproxy listen-address 192.0.2.1 port 8080
```

set service webproxy reply-block-mime <mime>

Used to block a specific mime-type.

```
# block all PDFs
set service webproxy reply-block-mime application/pdf
```

set service webproxy reply-body-max-size <size>

Specifies the maximum size of a reply body in KB, used to limit the reply size.

All reply sizes are accepted by default.

```
set service webproxy reply-body-max-size 2048
```

Authentication

The embedded Squid proxy can use LDAP to authenticate users against a company wide directory. The following configuration is an example of how to use Active Directory as authentication backend. Queries are done via LDAP.

set service webproxy authentication children <number>

Maximum number of authenticator processes to spawn. If you start too few Squid will have to wait for them to process a backlog of credential verifications, slowing it down. When password verifications are done via a (slow) network you are likely to need lots of authenticator processes.

This defaults to 5.

```
set service webproxy authentication children 10
```

set service webproxy authentication credentials-ttl <time>

Specifies how long squid assumes an externally validated username:password pair is valid for - in other words how often the helper program is called for that user. Set this low to force revalidation with short lived passwords.

Time is in minutes and defaults to 60.

```
set service webproxy authentication credentials-ttl 120
```

set service webproxy authentication method <ldap>

Proxy authentication method, currently only LDAP is supported.

```
set service webproxy authentication method ldap
```

set service webproxy authentication realm

Specifies the protection scope (aka realm name) which is to be reported to the client for the authentication scheme. It is commonly part of the text the user will see when prompted for their username and password.

```
set service webproxy authentication realm "VyOS proxy auth"
```

LDAP

set service webproxy authentication ldap base-dn <base-dn>

Specifies the base DN under which the users are located.

```
set service webproxy authentication ldap base-dn DC=vyos,DC=net
```

set service webproxy authentication ldap bind-dn <bind-dn>

The DN and password to bind as while performing searches.

```
set service webproxy authentication ldap bind-dn CN=proxyuser,CN=Users,DC=vyos,
↪DC=net
```

set service webproxy authentication ldap filter-expression <expr>

LDAP search filter to locate the user DN. Required if the users are in a hierarchy below the base DN, or if the login name is not what builds the user specific part of the users DN.

The search filter can contain up to 15 occurrences of %s which will be replaced by the username, as in "uid=%s" for **RFC 2037** directories. For a detailed description of LDAP search filter syntax see **RFC 2254**.

```
set service webproxy authentication ldap filter-expression (cn=%s)
```

set service webproxy authentication ldap password <password>

The DN and password to bind as while performing searches. As the password needs to be printed in plain text in your Squid configuration it is strongly recommended to use a account with minimal associated privileges. This to limit the damage in case someone could get hold of a copy of your Squid configuration file.

```
set service webproxy authentication ldap password vyos
```

set service webproxy authentication ldap persistent-connection

Use a persistent LDAP connection. Normally the LDAP connection is only open while validating a username to preserve resources at the LDAP server. This option causes the LDAP connection to be kept open, allowing it to be reused for further user validations.

Recommended for larger installations.

```
set service webproxy authentication ldap persistent-connection
```

set service webproxy authentication ldap port <port>

Specify an alternate TCP port where the ldap server is listening if other than the default LDAP port 389.

```
set service webproxy authentication ldap port 389
```

set service webproxy authentication ldap server <server>

Specify the LDAP server to connect to.

```
set service webproxy authentication ldap server ldap.vyos.net
```

set service webproxy authentication ldap use-ssl

Use TLS encryption.

```
set service webproxy authentication ldap use-ssl
```

set service webproxy authentication ldap username-attribute <attr>

Specifies the name of the DN attribute that contains the username/login. Combined with the base DN to construct the users DN when no search filter is specified (*filter-expression*).

Defaults to 'uid'

Note: This can only be done if all your users are located directly under the same position in the LDAP tree and the login name is used for naming each user object. If your LDAP tree does not match these criterias or if you want to filter who are valid users then you need to use a search filter to search for your users DN (*filter-expression*).

```
set service webproxy authentication ldap username-attribute uid
```

set service webproxy authentication ldap version <2 | 3>

LDAP protocol version. Defaults to 3 if not specified.

```
set service webproxy authentication ldap version 2
```

URL filtering

set service webproxy url-filtering disable

Disables web filtering without discarding configuration.

```
set service webproxy url-filtering disable
```

Operation

Filtering

Update

If you want to use existing blacklists you have to create/download a database first. Otherwise you will not be able to commit the config changes.

update webproxy blacklists

Download/Update complete blacklist

```
vyos@vyos:~$ update webproxy blacklists
Warning: No url-filtering blacklist installed
Would you like to download a default blacklist? [confirm][y]
Connecting to ftp.univ-tlse1.fr (193.49.48.249:21)
blacklists.gz        100%␣
↪|*******************************************************************************************************************
↪17.0M  0:00:00 ETA
Uncompressing blacklist...
Checking permissions...
```

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```
Skip link for   [ads] -> [publicite]
Building DB for [adult/domains] - 2467177 entries
Building DB for [adult/urls] - 67798 entries
Skip link for   [aggressive] -> [agressif]
Building DB for [agressif/domains] - 348 entries
Building DB for [agressif/urls] - 36 entries
Building DB for [arjel/domains] - 69 entries
...

Building DB for [webmail/domains] - 374 entries
Building DB for [webmail/urls] - 9 entries

The webproxy daemon must be restarted
Would you like to restart it now? [confirm][y]

[ ok ] Restarting squid (via systemctl): squid.service.
vyos@vyos:~$
```

update webproxy blacklists category <category>

Download/Update partial blacklist.

Use tab completion to get a list of categories.

- To auto update the blacklist files

  ```
  set service webproxy url-filtering squidguard auto-update update-hour 23
  ```

- To configure blocking add the following to the configuration

  ```
  set service webproxy url-filtering squidguard block-category ads
  ```

  ```
  set service webproxy url-filtering squidguard block-category malware
  ```

Bypassing the webproxy

Some services don't work correctly when being handled via a web proxy. So sometimes it is useful to bypass a transparent proxy:

- To bypass the proxy for every request that is directed to a specific destination:

  ```
  set service webproxy whitelist destination-address 198.51.100.33
  ```

  ```
  set service webproxy whitelist destination-address 192.0.2.0/24
  ```

- To bypass the proxy for every request that is coming from a specific source:

  ```
  set service webproxy whitelist source-address 192.168.1.2
  ```

  ```
  set service webproxy whitelist source-address 192.168.2.0/24
  ```

  (This can be useful when a called service has many and/or often changing destination addresses - e.g. Netflix.)

Examples

```
vyos@vyos# show service webproxy
 authentication {
     children 5
     credentials-ttl 60
     ldap {
         base-dn DC=example,DC=local
         bind-dn CN=proxyuser,CN=Users,DC=example,DC=local
         filter-expression (cn=%s)
         password Qwert1234
         server ldap.example.local
         username-attribute cn
     }
     method ldap
     realm "VyOS Webproxy"
 }
 cache-size 100
 default-port 3128
 listen-address 192.168.188.103 {
     disable-transparent
 }
```

8.11 System

8.11.1 Acceleration

In this command tree, all hardware acceleration options will be handled. At the moment only Intel® QAT is supported

Intel® QAT

show system acceleration qat

use this command to check if there is an Intel® QAT supported Processor in your system.

```
vyos@vyos:~$ show system acceleration qat
01:00.0 Co-processor [0b40]: Intel Corporation Atom Processor C3000 Series␣
↪QuickAssist Technology [8086:19e2] (rev 11)
```

if there is non device the command will show `No QAT device found`

set system acceleration qat

if there is a supported device, enable Intel® QAT

show system acceleration qat status

Check if the Intel® QAT device is up and ready to do the job.

```
vyos@vyos:~$ show system acceleration qat status
Checking status of all devices.
There is 1 QAT acceleration device(s) in the system:
```

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```
qat_dev0 - type: c3xxx,  inst_id: 0,  node_id: 0,  bsf: 0000:01:00.0,  #accel: 3
↪#engines: 6 state: up
```

Operation Mode

show system acceleration qat device <device> config

Show the full config uploaded to the QAT device.

show system acceleration qat device <device> flows

Get an overview over the encryption counters.

show system acceleration qat interrupts

Show binded qat device interrupts to certain core.

Example

Let's build a simple VPN between 2 Intel® QAT ready devices.

Side A:

```
set interfaces vti vti1 address '192.168.1.2/24'
set vpn ipsec esp-group MyESPGroup proposal 1 encryption 'aes256'
set vpn ipsec esp-group MyESPGroup proposal 1 hash 'sha256'
set vpn ipsec ike-group MyIKEGroup proposal 1 dh-group '14'
set vpn ipsec ike-group MyIKEGroup proposal 1 encryption 'aes256'
set vpn ipsec ike-group MyIKEGroup proposal 1 hash 'sha256'
set vpn ipsec ipsec-interfaces interface 'eth0'
set vpn ipsec site-to-site peer 10.10.10.1 authentication mode 'pre-shared-secret'
set vpn ipsec site-to-site peer 10.10.10.1 authentication pre-shared-secret 'Qwerty123'
set vpn ipsec site-to-site peer 10.10.10.1 connection-type 'initiate'
set vpn ipsec site-to-site peer 10.10.10.1 default-esp-group 'MyESPGroup'
set vpn ipsec site-to-site peer 10.10.10.1 ike-group 'MyIKEGroup'
set vpn ipsec site-to-site peer 10.10.10.1 local-address '10.10.10.2'
set vpn ipsec site-to-site peer 10.10.10.1 vti bind 'vti1'
```

Side B:

```
set interfaces vti vti1 address '192.168.1.1/24'
set vpn ipsec esp-group MyESPGroup proposal 1 encryption 'aes256'
set vpn ipsec esp-group MyESPGroup proposal 1 hash 'sha256'
set vpn ipsec ike-group MyIKEGroup proposal 1 dh-group '14'
set vpn ipsec ike-group MyIKEGroup proposal 1 encryption 'aes256'
set vpn ipsec ike-group MyIKEGroup proposal 1 hash 'sha256'
set vpn ipsec ipsec-interfaces interface 'eth0'
set vpn ipsec site-to-site peer 10.10.10.2 authentication mode 'pre-shared-secret'
set vpn ipsec site-to-site peer 10.10.10.2 authentication pre-shared-secret 'Qwerty123'
set vpn ipsec site-to-site peer 10.10.10.2 connection-type 'initiate'
set vpn ipsec site-to-site peer 10.10.10.2 default-esp-group 'MyESPGroup'
set vpn ipsec site-to-site peer 10.10.10.2 ike-group 'MyIKEGroup'
```

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```
set vpn ipsec site-to-site peer 10.10.10.2 local-address '10.10.10.1'
set vpn ipsec site-to-site peer 10.10.10.2 vti bind 'vti1'
```

a bandwidth test over the VPN got these results:

```
Connecting to host 192.168.1.2, port 5201
[  9] local 192.168.1.1 port 51344 connected to 192.168.1.2 port 5201
[ ID] Interval           Transfer     Bitrate         Retr  Cwnd
[  9]   0.00-1.01   sec  32.3 MBytes   268 Mbits/sec    0    196 KBytes
[  9]   1.01-2.03   sec  32.5 MBytes   268 Mbits/sec    0    208 KBytes
[  9]   2.03-3.03   sec  32.5 MBytes   271 Mbits/sec    0    208 KBytes
[  9]   3.03-4.04   sec  32.5 MBytes   272 Mbits/sec    0    208 KBytes
[  9]   4.04-5.00   sec  31.2 MBytes   272 Mbits/sec    0    208 KBytes
[  9]   5.00-6.01   sec  32.5 MBytes   272 Mbits/sec    0    234 KBytes
[  9]   6.01-7.04   sec  32.5 MBytes   265 Mbits/sec    0    234 KBytes
[  9]   7.04-8.04   sec  32.5 MBytes   272 Mbits/sec    0    234 KBytes
[  9]   8.04-9.04   sec  32.5 MBytes   273 Mbits/sec    0    336 KBytes
[  9]   9.04-10.00  sec  31.2 MBytes   272 Mbits/sec    0    336 KBytes
- - - - - - - - - - - - - - - - - - - - - - - - -
[ ID] Interval           Transfer     Bitrate         Retr
[  9]   0.00-10.00  sec   322 MBytes   270 Mbits/sec    0           sender
[  9]   0.00-10.00  sec   322 MBytes   270 Mbits/sec                receiver
```

with `set system acceleration qat` on both systems the bandwidth increases.

```
Connecting to host 192.168.1.2, port 5201
[  9] local 192.168.1.1 port 51340 connected to 192.168.1.2 port 5201
[ ID] Interval           Transfer     Bitrate         Retr  Cwnd
[  9]   0.00-1.00   sec  97.3 MBytes   817 Mbits/sec    0   1000 KBytes
[  9]   1.00-2.00   sec  92.5 MBytes   776 Mbits/sec    0   1.07 MBytes
[  9]   2.00-3.00   sec  92.5 MBytes   776 Mbits/sec    0    820 KBytes
[  9]   3.00-4.00   sec  92.5 MBytes   776 Mbits/sec    0    899 KBytes
[  9]   4.00-5.00   sec  91.2 MBytes   765 Mbits/sec    0    972 KBytes
[  9]   5.00-6.00   sec  92.5 MBytes   776 Mbits/sec    0   1.02 MBytes
[  9]   6.00-7.00   sec  92.5 MBytes   776 Mbits/sec    0   1.08 MBytes
[  9]   7.00-8.00   sec  92.5 MBytes   776 Mbits/sec    0   1.14 MBytes
[  9]   8.00-9.00   sec  91.2 MBytes   765 Mbits/sec    0    915 KBytes
[  9]   9.00-10.00  sec  92.5 MBytes   776 Mbits/sec    0   1000 KBytes
- - - - - - - - - - - - - - - - - - - - - - - - -
[ ID] Interval           Transfer     Bitrate         Retr
[  9]   0.00-10.00  sec   927 MBytes   778 Mbits/sec    0             sender
[  9]   0.00-10.01  sec   925 MBytes   775 Mbits/sec                  receiver
```

8.11.2 Conntrack

VyOS can be configured to track connections using the connection tracking subsystem. Connection tracking becomes operational once either stateful firewall or NAT is configured.

Configure

set system conntrack table-size <1-50000000> default: 262144

The connection tracking table contains one entry for each connection being tracked by the system.

set system conntrack expect-table-size <1-50000000> default: 2048

The connection tracking expect table contains one entry for each expected connection related to an existing connection. These are generally used by "connection tracking helper" modules such as FTP. The default size of the expect table is 2048 entries.

set system conntrack hash-size <1-50000000> default: 32768

Set the size of the hash table. The connection tracking hash table makes searching the connection tracking table faster. The hash table uses "buckets" to record entries in the connection tracking table.

set system conntrack modules ftp

set system conntrack modules h323

set system conntrack modules nfs

set system conntrack modules pptp

set system conntrack modules sip

set system conntrack modules sqlnet

set system conntrack modules tftp

Configure the connection tracking protocol helper modules. All modules are enable by default.

Use *delete system conntrack modules* to deactive all modules.
Or, for example ftp, *delete system conntrack modules ftp*.

Define Conection Timeouts

VyOS supports setting timeouts for connections according to the connection type. You can set timeout values for generic connections, for ICMP connections, UDP connections, or for TCP connections in a number of different states.

set system conntrack timeout icmp <1-21474836> default: 30

set system conntrack timeout other <1-21474836> default: 600

set system conntrack timeout tcp close <1-21474836> default: 10

set system conntrack timeout tcp close-wait <1-21474836> default: 60

set system conntrack timeout tcp established <1-21474836> default: 432000

set system conntrack timeout tcp fin-wait <1-21474836> default: 120

set system conntrack timeout tcp last-ack <1-21474836> default: 30

set system conntrack timeout tcp syn-recv <1-21474836> default: 60

set system conntrack timeout tcp syn-sent <1-21474836> default: 120

set system conntrack timeout tcp time-wait <1-21474836> default: 120

set system conntrack timeout udp other <1-21474836> default: 30

set system conntrack timeout udp stream <1-21474836> default: 180

Set the timeout in secounds for a protocol or state.

You can also define custom timeout values to apply to a specific subset of connections, based on a packet and flow selector. To do this, you need to create a rule defining the packet and flow selector.

set system conntrack timeout custom rule <1-9999> description <test>

Set a rule description.

set system conntrack timeout custom rule <1-9999> destination address <ip-address>

set system conntrack timeout custom rule <1-9999> source address <ip-address>

set a destination and/or source address. Accepted input:

```
<x.x.x.x>    IP address to match
<x.x.x.x/x>  Subnet to match
<x.x.x.x>-<x.x.x.x>
                IP range to match
!<x.x.x.x>   Match everything except the specified address
!<x.x.x.x/x> Match everything except the specified subnet
!<x.x.x.x>-<x.x.x.x>
                Match everything except the specified range
```

set system conntrack timeout custom rule <1-9999> destination port <value>

set system conntrack timeout custom rule <1-9999> source port <value>

Set a destination and/or source port. Accepted input:

```
<port name>    Named port (any name in /etc/services, e.g., http)
<1-65535>      Numbered port
<start>-<end>  Numbered port range (e.g., 1001-1005)
```

Multiple destination ports can be specified as a comma-separated list. The whole list can also be "negated" using '!'. For example: *!22,telnet,http,123,1001-1005* `

set system conntrack timeout custom rule <1-9999> protocol icmp <1-21474836>

set system conntrack timeout custom rule <1-9999> protocol other <1-21474836>

set system conntrack timeout custom rule <1-9999> protocol tcp close <1-21474836>

set system conntrack timeout custom rule <1-9999> protocol tcp close-wait <1-21474836>

set system conntrack timeout custom rule <1-9999> protocol tcp established <1-21474836>

set system conntrack timeout custom rule <1-9999> protocol tcp fin-wait <1-21474836>

set system conntrack timeout custom rule <1-9999> protocol tcp last-ack <1-21474836>

set system conntrack timeout custom rule <1-9999> protocol tcp syn-recv <1-21474836>

set system conntrack timeout custom rule <1-9999> protocol tcp syn-sent <1-21474836>

set system conntrack timeout custom rule <1-9999> protocol tcp time-wait <1-21474836>

set system conntrack timeout custom rule <1-9999> protocol udp other <1-21474836>

set system conntrack timeout custom rule <1-9999> protocol udp stream <1-21474836>

Set the timeout in secounds for a protocol or state in a custom rule.

set system conntrack tcp half-open-connections <1-21474836> default: 512

Set the maximum number of TCP half-open connections.

set system conntrack tcp loose <enable | disable> default: enable

Policy to track previously established connections.

set system conntrack tcp max-retrans <1-2147483647> default: 3

Set the number of TCP maximum retransmit attempts.

set system conntrack ignore rule <1-9999> description <text>

set system conntrack ignore rule <1-9999> destination address <ip-address>

set system conntrack ignore rule <1-9999> destination port <port>

set system conntrack ignore rule <1-9999> inbound-interface <interface>

set system conntrack ignore rule <1-9999> protocol <protocol>

set system conntrack ignore rule <1-9999> source address <ip-address>

set system conntrack ignore rule <1-9999> source port <port>

Customized ignore rules, based on a packet and flow selector.

set system conntrack log icmp destroy

set system conntrack log icmp new

set system conntrack log icmp update

set system conntrack log other destroy

set system conntrack log other new

set system conntrack log other update

set system conntrack log tcp destroy

set system conntrack log tcp new

set system conntrack log tcp update close-wait

set system conntrack log tcp update established

set system conntrack log tcp update fin-wait

set system conntrack log tcp update last-ack

set system conntrack log tcp update syn-received

set system conntrack log tcp update time-wait

set system conntrack log udp destroy

set system conntrack log udp new

set system conntrack log udp update

Log the connection tracking events per protocol.

8.11.3 Serial Console

For the average user a serial console has no advantage over a console offered by a directly attached keyboard and screen. Serial consoles are much slower, taking up to a second to fill a 80 column by 24 line screen. Serial consoles generally only support non-proportional ASCII text, with limited support for languages other than English.

There are some scenarios where serial consoles are useful. System administration of remote computers is usually done using *SSH*, but there are times when access to the console is the only way to diagnose and correct software failures. Major upgrades to the installed distribution may also require console access.

set system console device <device>

Defines the specified device as a system console. Available console devices can be (see completion helper):

- `ttySN` - Serial device name
- `ttyUSBX` - USB Serial device name
- `hvc0` - Xen console

set system console device <device> speed <speed>

The speed (baudrate) of the console device. Supported values are:

- `1200` - 1200 bps
- `2400` - 2400 bps
- `4800` - 4800 bps
- `9600` - 9600 bps
- `19200` - 19,200 bps
- `38400` - 38,400 bps (default for Xen console)
- `57600` - 57,600 bps
- `115200` - 115,200 bps (default for serial console)

Note: If you use USB to serial converters for connecting to your VyOS appliance please note that most of them use software emulation without flow control. This means you should start with a common baud rate (most likely 9600 baud) as otherwise you probably can not connect to the device using high speed baud rates as your serial converter simply can not process this data rate.

8.11.4 Flow Accounting

VyOS supports flow-accounting for both IPv4 and IPv6 traffic. The system acts as a flow exporter, and you are free to use it with any compatible collector.

Flows can be exported via two different protocols: NetFlow (versions 5, 9 and 10/IPFIX) and sFlow. Additionally, you may save flows to an in-memory table internally in a router.

Warning: You need to disable the in-memory table in production environments! Using IMT (In-Memory Table) may lead to heavy CPU overloading and unstable flow-accounting behavior.

NetFlow / IPFIX

NetFlow is a feature that was introduced on Cisco routers around 1996 that provides the ability to collect IP network traffic as it enters or exits an interface. By analyzing the data provided by NetFlow, a network administrator can determine things such as the source and destination of traffic, class of service, and the causes of congestion. A typical flow monitoring setup (using NetFlow) consists of three main components:

- **exporter**: aggregates packets into flows and exports flow records towards one or more flow collectors
- **collector**: responsible for reception, storage and pre-processing of flow data received from a flow exporter
- **application**: analyzes received flow data in the context of intrusion detection or traffic profiling, for example

For connectionless protocols as like ICMP and UDP, a flow is considered complete once no more packets for this flow appear after configurable timeout.

NetFlow is usually enabled on a per-interface basis to limit load on the router components involved in NetFlow, or to limit the amount of NetFlow records exported.

Configuration

In order for flow accounting information to be collected and displayed for an interface, the interface must be configured for flow accounting.

set system flow-accounting interface <interface>

Configure and enable collection of flow information for the interface identified by <*interface*>.

You can configure multiple interfaces which whould participate in flow accounting.

Note: Will be recorded only packets/flows on **incoming** direction in configured interfaces by default.

By default, recorded flows will be saved internally and can be listed with the CLI command. You may disable using the local in-memory table with the command:

set system flow-accounting disable-imt

If you need to sample also egress traffic, you may want to configure egress flow-accounting:

set system flow-accounting enable-egress

Internally, in flow-accounting processes exist a buffer for data exchanging between core process and plugins (each export target is a separated plugin). If you have high traffic levels or noted some problems with missed records or stopping exporting, you may try to increase a default buffer size (10 MiB) with the next command:

set system flow-accounting buffer-size <buffer size>

In case, if you need to catch some logs from flow-accounting daemon, you may configure logging facility:

set system flow-accounting syslog-facility <facility>

TBD

Flow Export

In addition to displaying flow accounting information locally, one can also exported them to a collection server.

NetFlow

set system flow-accounting netflow version <version>

There are multiple versions available for the NetFlow data. The <*version*> used in the exported flow data can be configured here. The following versions are supported:

- **5** - Most common version, but restricted to IPv4 flows only
- **9** - NetFlow version 9 (default)
- **10** - IPFIX (IP Flow Information Export) as per **RFC 3917**

set system flow-accounting netflow server <address>

Configure address of NetFlow collector. NetFlow server at <*address*> can be both listening on an IPv4 or IPv6 address.

set system flow-accounting netflow source-ip <address>

IPv4 or IPv6 source address of NetFlow packets

set system flow-accounting netflow engine-id <id>

NetFlow engine-id which will appear in NetFlow data. The range is 0 to 255.

set system flow-accounting netflow sampling-rate <rate>

Use this command to configure the sampling rate for flow accounting. The system samples one in every <*rate*> packets, where <*rate*> is the value configured for the sampling-rate option. The advantage of sampling every n packets, where n > 1, allows you to decrease the amount of processing resources required for flow accounting. The disadvantage of not sampling every packet is that the statistics produced are estimates of actual data flows.

Per default every packet is sampled (that is, the sampling rate is 1).

set system flow-accounting netflow timeout expiry-interval <interval>

Specifies the interval at which Netflow data will be sent to a collector. As per default, Netflow data will be sent every 60 seconds.

You may also additionally configure timeouts for different types of connections.

set system flow-accounting netflow max-flows <n>

If you want to change the maximum number of flows, which are tracking simultaneously, you may do this with this command (default 8192).

sFlow

set system flow-accounting sflow server <address>

Configure address of sFlow collector. sFlow server at <*address*> can be an IPv4 or IPv6 address. But you cannot export to both IPv4 and IPv6 collectors at the same time!

set system flow-accounting sflow sampling-rate <rate>

Enable sampling of packets, which will be transmitted to sFlow collectors.

set system flow-accounting sflow agent-address <address>

Configure a sFlow agent address. It can be IPv4 or IPv6 address, but you must set the same protocol, which is used for sFlow collector addresses. By default, using router-id from BGP or OSPF protocol, or the primary IP address from the first interface.

Example:

NetFlow v5 example:

```
set system flow-accounting netflow engine-id 100
set system flow-accounting netflow version 5
set system flow-accounting netflow server 192.168.2.10 port 2055
```

Operation

Once flow accounting is configured on an interfaces it provides the ability to display captured network traffic information for all configured interfaces.

show flow-accounting interface <interface>

Show flow accounting information for given <*interface*>.

```
vyos@vyos:~$ show flow-accounting interface eth0
IN_IFACE    SRC_MAC            DST_MAC            SRC_IP                     DST_IP␣
↪            SRC_PORT    DST_PORT  PROTOCOL      TOS    PACKETS    FLOWS    BYTES
----------  -----------------  -----------------  -------------------------  --------
↪-------  ----------  ----------  ----------  -----  ---------  -------  -------
eth0        00:53:01:a8:28:ac  ff:ff:ff:ff:ff:ff  192.0.2.2                  255.255.
↪255.255        5678        5678  udp             0          1        1      178
eth0        00:53:01:b2:2f:34  33:33:ff:00:00:00  fe80::253:01ff:feb2:2f34 ␣
↪ff02::1:ff00:0            0           0  ipv6-icmp       0          2        1   ␣
↪  144
eth0        00:53:01:1a:b4:53  33:33:ff:00:00:00  fe80::253:01ff:fe1a:b453 ␣
↪ff02::1:ff00:0            0           0  ipv6-icmp       0          1        1   ␣
↪   72
eth0        00:53:01:b2:22:48  00:53:02:58:a2:92  192.0.2.100                192.0.2.
↪14           40152          22  tcp             16         39        1     2064
eth0        00:53:01:c8:33:af  ff:ff:ff:ff:ff:ff  192.0.2.3                  255.255.
↪255.255        5678        5678  udp             0          1        1      154
eth0        00:53:01:b2:22:48  00:53:02:58:a2:92  192.0.2.100                192.0.2.
↪14           40006          22  tcp             16        146        1     9444
eth0        00:53:01:b2:22:48  00:53:02:58:a2:92  192.0.2.100                192.0.2.
↪14               0           0  icmp          192         27        1     4455
```

show flow-accounting interface <interface> host <address>

Show flow accounting information for given <*interface*> for a specific host only.

```
vyos@vyos:~$ show flow-accounting interface eth0 host 192.0.2.14
IN_IFACE    SRC_MAC            DST_MAC            SRC_IP       DST_IP        SRC_
↪PORT    DST_PORT  PROTOCOL      TOS    PACKETS    FLOWS    BYTES
----------  -----------------  -----------------  -----------  ----------  ---------
↪-  ----------  ----------  -----  ---------  -------  -------
eth0        00:53:01:b2:22:48  00:53:02:58:a2:92  192.0.2.100  192.0.2.14      ␣
```

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```
↪40006          22  tcp            16        197        2    12940
eth0        00:53:01:b2:22:48  00:53:02:58:a2:92  192.0.2.100  192.0.2.14      ␣
↪40152          22  tcp            16         94        1     4924
eth0        00:53:01:b2:22:48  00:53:02:58:a2:92  192.0.2.100  192.0.2.14      ␣
↪0            0  icmp          192         36        1     5877
```

8.11.5 Host Information

This section describes the system's host information and how to configure them, it covers the following topics:

- Host name
- Domain
- IP address
- Aliases

Hostname

A hostname is the label (name) assigned to a network device (a host) on a network and is used to distinguish one device from another on specific networks or over the internet. On the other hand this will be the name which appears on the command line prompt.

set system host-name <hostname>

The hostname can be up to 63 characters. A hostname must start and end with a letter or digit, and have as interior characters only letters, digits, or a hyphen.

The default hostname used is *vyos*.

Domain Name

A domain name is the label (name) assigned to a computer network and is thus unique. VyOS appends the domain name as a suffix to any unqualified name. For example, if you set the domain name *example.com*, and you would ping the unqualified name of *crux*, then VyOS qualifies the name to *crux.example.com*.

set system domain-name <domain>

Configure system domain name. A domain name must start and end with a letter or digit, and have as interior characters only letters, digits, or a hyphen.

Static Hostname Mapping

How an IP address is assigned to an interface in *Ethernet*. This section shows how to statically map an IP address to a hostname for local (meaning on this VyOS instance) name resolution. This is the VyOS equivalent to */etc/hosts* file entries.

Note: Do *not* manually edit */etc/hosts*. This file will automatically be regenerated on boot based on the settings in this section, which means you'll lose all your manual edits. Instead, configure static host mappings as follows.

---

set system static-host-mapping host-name <hostname> inet <address>

Create a static hostname mapping which will always resolve the name <*hostname*> to IP address <*address*>.

set system static-host-mapping host-name <hostname> alias <alias>

Create named <*alias*> for the configured static mapping for <*hostname*>. Thus the address configured as `set system static-host-mapping host-name <hostname> inet <address>` can be reached via multiple names.

Multiple aliases can pe specified per host-name.

8.11.6 IP

System configuration commands

set system ip disable-forwarding

Use this command to disable IPv4 forwarding on all interfaces.

set system ip arp table-size <number>

Use this command to define the maximum number of entries to keep in the ARP cache (1024, 2048, 4096, 8192, 16384, 32768).

set system ip multipath layer4-hashing

Use this command to use Layer 4 information for IPv4 ECMP hashing.

Operational commands

show commands

See below the different parameters available for the IPv4 **show** command:

```
vyos@vyos:~$ show ip
Possible completions:
  access-list   Show all IP access-lists
  as-path-access-list
                Show all as-path-access-lists
  bgp           Show Border Gateway Protocol (BGP) information
  community-list
                Show IP community-lists
  extcommunity-list
                Show extended IP community-lists
  forwarding    Show IP forwarding status
  groups        Show IP multicast group membership
  igmp          Show IGMP (Internet Group Management Protocol) information
  large-community-list
                Show IP large-community-lists
  multicast     Show IP multicast
  ospf          Show IPv4 Open Shortest Path First (OSPF) routing information
  pim           Show PIM (Protocol Independent Multicast) information
  ports         Show IP ports in use by various system services
  prefix-list   Show all IP prefix-lists
  protocol      Show IP route-maps per protocol
  rip           Show Routing Information Protocol (RIP) information
  route         Show IP routes
```

reset commands

And the different IPv4 **reset** commands available:

```
vyos@vyos:~$ reset ip
Possible completions:
  arp           Reset Address Resolution Protocol (ARP) cache
  bgp           Clear Border Gateway Protocol (BGP) statistics or status
  igmp          IGMP clear commands
  multicast     IP multicast routing table
  route         Reset IP route
```

8.11.7 IPv6

System configuration commands

set system ipv6 disable

Use this command to disable assignment of IPv6 addresses on all interfaces.

Note: This command is deprecated in VyOS 1.3 (equuleus) and removed in VyOS 1.4 (sagitta). IPv6 address family can no longer be disabled.

---

set system ipv6 disable-forwarding

Use this command to disable IPv6 forwarding on all interfaces.

set system ipv6 neighbor table-size <number>

Use this command to define the maximum number of entries to keep in the Neighbor cache (1024, 2048, 4096, 8192, 16384, 32768).

set system ipv6 strict-dad

Use this command to disable IPv6 operation on interface when Duplicate Address Detection fails on Link-Local address.

set system ipv6 multipath layer4-hashing

Use this command to user Layer 4 information for ECMP hashing.

Operational commands

Show commands

show ipv6 neighbors

Use this command to show IPv6 Neighbor Discovery Protocol information.

show ipv6 groups

Use this command to show IPv6 multicast group membership.

show ipv6 forwarding

Use this command to show IPv6 forwarding status.

show ipv6 route

Use this command to show IPv6 routes.

Check the many parameters available for the *show ipv6 route* command:

```
vyos@vyos:~$ show ipv6 route
Possible completions:
  <Enter>       Execute the current command
  <X:X::X:X>    Show IPv6 routes of given address or prefix
  <X:X::X:X/M>
  bgp           Show IPv6 BGP routes
  cache         Show kernel IPv6 route cache
  connected     Show IPv6 connected routes
  forward       Show kernel IPv6 route table
  isis          Show IPv6 ISIS routes
  kernel        Show IPv6 kernel routes
  ospfv3        Show IPv6 OSPF6 routes
  ripng         Show IPv6 RIPNG routes
  static        Show IPv6 static routes
  summary       Show IPv6 routes summary
  table         Show IP routes in policy table
  vrf           Show IPv6 routes in VRF
```

show ipv6 prefix-list

Use this command to show all IPv6 prefix lists

There are different parameters for getting prefix-list information:

```
vyos@vyos:~$ show ipv6 prefix-list
Possible completions:
  <Enter>       Execute the current command
  <WORD>        Show specified IPv6 prefix-list
  detail        Show detail of IPv6 prefix-lists
  summary       Show summary of IPv6 prefix-lists
```

show ipv6 access-list

Use this command to show all IPv6 access lists

You can also specify which IPv6 access-list should be shown:

```
vyos@vyos:~$ show ipv6 access-list
Possible completions:
  <Enter>       Execute the current command
  <text>        Show specified IPv6 access-list
```

show ipv6 bgp

Use this command to show IPv6 Border Gateway Protocol information.

In addition, you can specify many other parameters to get BGP information:

```
vyos@vyos:~$ show ipv6 bgp
Possible completions:
  <Enter>       Execute the current command
  <X:X::X:X>    Show BGP information for given address or prefix
```

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```
  <X:X::X:X/M>
  community     Show routes matching the communities
  community-list
                Show routes matching the community-list
  filter-list   Show routes conforming to the filter-list
  large-community
                Show routes matching the large-community-list
  large-community-list
  neighbors     Show detailed information on TCP and BGP neighbor connections
  prefix-list   Show routes matching the prefix-list
  regexp        Show routes matching the AS path regular expression
  route-map     Show BGP routes matching the specified route map
  summary       Show summary of BGP neighbor status
```

show ipv6 ospfv3

Use this command to get information about OSPFv3.

You can get more specific OSPFv3 information by using the parameters shown below:

```
vyos@vyos:~$ show ipv6 ospfv3
Possible completions:
  <Enter>       Execute the current command
  area          Show OSPFv3 spf-tree information
  border-routers
                Show OSPFv3 border-router (ABR and ASBR) information
  database      Show OSPFv3 Link state database information
  interface     Show OSPFv3 interface information
  linkstate     Show OSPFv3 linkstate routing information
  neighbor      Show OSPFv3 neighbor information
  redistribute  Show OSPFv3 redistribute External information
  route         Show OSPFv3 routing table information
```

show ipv6 ripng

Use this command to get information about the RIPNG protocol

show ipv6 ripng status

Use this command to show the status of the RIPNG protocol

Reset commands

reset ipv6 bgp <address>

Use this command to clear Border Gateway Protocol statistics or status.

reset ipv6 neighbors <address | interface>

Use this command to reset IPv6 Neighbor Discovery Protocol cache for an address or interface.

reset ipv6 route cache

Use this command to flush the kernel IPv6 route cache. An address can be added to flush it only for that route.

8.11.8 System Display (LCD)

The system LCD LCD (Liquid-crystal display) option is for users running VyOS on hardware that features an LCD display. This is typically a small display built in an 19 inch rack-mountable appliance. Those displays are used to show runtime data.

To configure your LCD display you must first identify the used hardware, and connectivity of the display to your system. This can be any serial port (*ttySxx*) or serial via USB or even old parallel port interfaces.

Configuration

set system lcd device <device>

This is the name of the physical interface used to connect to your LCD display. Tab completion is supported and it will list you all available serial interface.

For serial via USB port information please refor to: *USB*.

set system lcd model <model>

This is the LCD model used in your system.

At the time of this writing the following displays are supported:

- Crystalfontz CFA-533
- Crystalfontz CFA-631
- Crystalfontz CFA-633
- Crystalfontz CFA-635

Note: We can't support all displays from the beginning. If your display type is missing, please create a feature request via Phabricator.

8.11.9 User Management

The default VyOS user account (*vyos*), as well as newly created user accounts, have all capabilities to configure the system. All accounts have sudo capabilities and therefore can operate as root on the system.

Both local administered and remote administered RADIUS (Remote Authentication Dial-In User Service) accounts are supported.

Local

set system login user <name> full-name "<string>"

Create new system user with username <*name*> and real-name specified by <*string*>.

set system login user <name> authentication plaintext-password <password>

Specify the plaintext password user by user <*name*> on this system. The plaintext password will be automatically transferred into a secure hashed password and not saved anywhere in plaintext.

set system login user <name> authentication encrypted-password <password>

Setup encrypted password for given username. This is useful for transferring a hashed password from system to system.

Key Based Authentication

It is highly recommended to use SSH key authentication. By default there is only one user (`vyos`), and you can assign any number of keys to that user. You can generate a ssh key with the `ssh-keygen` command on your local machine, which will (by default) save it as `~/.ssh/id_rsa.pub`.

Every SSH key comes in three parts:

```
ssh-rsa AAAAB3NzaC1yc2EAAAABAA...VBD5lKwEWB username@host.example.com
```

Only the type (`ssh-rsa`) and the key (`AAAB3N...`) are used. Note that the key will usually be several hundred characters long, and you will need to copy and paste it. Some terminal emulators may accidentally split this over several lines. Be attentive when you paste it that it only pastes as a single line. The third part is simply an identifier, and is for your own reference.

set system login user <username> authentication public-keys <identifier> key <key>

Assign the SSH public key portion <*key*> identified by per-key <*identifier*> to the local user <*username*>.

set system login user <username> authentication public-keys <identifier> type <type>

Every SSH public key portion referenced by <*identifier*> requires the configuration of the <*type*> of public-key used. This type can be any of:

- `ecdsa-sha2-nistp256`
- `ecdsa-sha2-nistp384`
- `ecdsa-sha2-nistp521`
- `ssh-dss`
- `ssh-ed25519`
- `ssh-rsa`

Note: You can assign multiple keys to the same user by using a unique identifier per SSH key.

---

set system login user <username> authentication public-keys <identifier> options <options>

Set the options for this public key. See the ssh `authorized_keys` man page for details of what you can specify here. To place a " character in the options field, use `"`, for example `from="10.0.0.0/24"` to restrict where the user may connect from when using this key.

loadkey <username> <location>

Deprecation notice: `loadkey` has been deprecated in favour of `generate public-key-commands` and will be removed in a future version. See *SSH*.

SSH keys can not only be specified on the command-line but also loaded for a given user with <*username*> from a file pointed to by <*location*>. Keys can be either loaded from local filesystem or any given remote location using one of the following URIs (Uniform Resource Identifier):

- `<file>` - Load from file on local filesystem path
- `scp://<user>@<host>:/<file>` - Load via SCP from remote machine
- `sftp://<user>@<host>/<file>` - Load via SFTP from remote machine
- `ftp://<user>@<host>/<file>` - Load via FTP from remote machine
- `http://<host>/<file>` - Load via HTTP from remote machine

- `tftp://<host>/<file>` - Load via TFTP from remote machine

Example

In the following example, both *User1* and *User2* will be able to SSH into VyOS as user `vyos` using their very own keys. *User1* is restricted to only be able to connect from a single IP address.

```
set system login user vyos authentication public-keys 'User1' key "AAAAB3Nz...KwEW"
set system login user vyos authentication public-keys 'User1' type ssh-rsa
set system login user vyos authentication public-keys 'User1' options "from=&quot;192.
↪168.0.100&quot;"
set system login user vyos authentication public-keys 'User2' key "AAAAQ39x...fbV3"
set system login user vyos authentication public-keys 'User2' type ssh-rsa
```

RADIUS

In large deployments it is not reasonable to configure each user individually on every system. VyOS supports using RADIUS servers as backend for user authentication.

Configuration

set system login radius server <address> key <secret>

Specify the <*address*> of the RADIUS server user with the pre-shared-secret given in <*secret*>. Multiple servers can be specified.

set system login radius server <address> port <port>

Configure the discrete port under which the RADIUS server can be reached. This defaults to 1812.

set system login radius server <address> timeout <timeout>

Setup the <*timeout*> in seconds when querying the RADIUS server.

set system login radius server <address> disable

Temporary disable this RADIUS server. It won't be queried.

set system login radius source-address <address>

RADIUS servers could be hardened by only allowing certain IP addresses to connect. As of this the source address of each RADIUS query can be configured. If this is not set, incoming connections to the RADIUS server will use the nearest interface address pointing towards the server - making it error prone on e.g. OSPF networks when a link fails and a backup route is taken.

Hint: If you want to have admin users to authenticate via RADIUS it is essential to sent the `Cisco-AV-Pair shell:priv-lvl=15` attribute. Without the attribute you will only get regular, non privilegued, system users.

Login Banner

You are able to set post-login or pre-login banner messages to display certain information for this system.

set system login banner pre-login <message>

Configure <*message*> which is shown during SSH connect and before a user is logged in.

set system login banner post-login <message>

Configure <*message*> which is shown after user has logged in to the system.

Note: To create a new line in your login message you need to escape the new line character by using \\n.

8.11.10 System DNS

This section describes configuring DNS on the system, namely:

- DNS name servers
- Domain search order

DNS name servers

set system name-server <address>

Use this command to specify a DNS server for the system to be used for DNS lookups. More than one DNS server can be added, configuring one at a time. Both IPv4 and IPv6 addresses are supported.

Example

In this example, some *OpenNIC* servers are used, two IPv4 addresses and two IPv6 addresses:

```
set system name-server 176.9.37.132
set system name-server 195.10.195.195
set system name-server 2a01:4f8:161:3441::1
set system name-server 2a00:f826:8:2::195
```

Domain search order

In order for the system to use and complete unqualified host names, a list can be defined which will be used for domain searches.

set system domain-search domain <domain>

Use this command to define domains, one at a time, so that the system uses them to complete unqualified host names. Maximum: 6 entries.

Note: Domain names can include letters, numbers, hyphens and periods with a maximum length of 253 characters.

Example

The system is configured to attempt domain completion in the following order: vyos.io (first), vyos.net (second) and vyos.network (last):

```
set system domain-search domain vyos.io
set system domain-search domain vyos.net
set system domain-search domain vyos.network
```

8.11.11 NTP

NTP (Network Time Protocol) is a networking protocol for clock synchronization between computer systems over packet-switched, variable-latency data networks. In operation since before 1985, NTP is one of the oldest Internet protocols in current use.

NTP is intended to synchronize all participating computers to within a few milliseconds of UTC (Coordinated Universal Time). It uses the intersection algorithm, a modified version of Marzullo's algorithm, to select accurate time servers and is designed to mitigate the effects of variable network latency. NTP can usually maintain time to within tens of milliseconds over the public Internet, and can achieve better than one millisecond accuracy in local area networks under ideal conditions. Asymmetric routes and network congestion can cause errors of 100 ms or more.

The protocol is usually described in terms of a client-server model, but can as easily be used in peer-to-peer relationships where both peers consider the other to be a potential time source. Implementations send and receive timestamps using UDP (User Datagram Protocol) on port number 123.

NTP supplies a warning of any impending leap second adjustment, but no information about local time zones or daylight saving time is transmitted.

The current protocol is version 4 (NTPv4), which is a proposed standard as documented in **RFC 5905**. It is backward compatible with version 3, specified in **RFC 1305**.

Configuration

set system ntp server <address>

Configure one or more servers for synchronisation. Server name can be either an IP address or FQDN (Fully Qualified Domain Name).

There are 3 default NTP server set. You are able to change them.

- `0.pool.ntp.org`
- `1.pool.ntp.org`
- `2.pool.ntp.org`

set system ntp server <address> <noselect | pool | preempt | prefer>

Configure one or more attributes to the given NTP server.

- `noselect` marks the server as unused, except for display purposes. The server is discarded by the selection algorithm.
- `pool` mobilizes persistent client mode association with a number of remote servers.
- `preempt` a preemptable association is expendable.
- `prefer` marks the server as preferred. All other things being equal, this host will be chosen for synchronization among a set of correctly operating hosts.

set system ntp listen-address <address>

NTP process will only listen on the specified IP address. You must specify the <*address*> and optionally the permitted clients. Multiple listen addresses can be configured.

set system ntp interface <interface>

NTP process will listen on the specified interface. Multiple listen interfaces can be configured.

set system ntp allow-clients address <address>

List of networks or client addresses permitted to contact this NTP server.

Multiple networks can be configured.

set system ntp vrf <name>

Specify name of the VRF instance.

8.11.12 Option

This chapter describe the possibilities of advanced system behavior.

General

set system option ctrl-alt-delete <ignore | reboot | poweroff>

Action which will be run once the ctrl-alt-del keystroke is received.

set system option reboot-on-panic

Automatically reboot system on kernel panic after 60 seconds.

set system option startup-beep

Play an audible beep to the system speaker when system is ready.

set system option root-partition-auto-resize

Enables the root partition auto-extension and resizes to the maximum available space on system boot.

HTTP client

set system option http-client source-address <address>

Several commands utilize curl to initiate transfers. Configure the local source IPv4/IPv6 address used for all CURL operations.

set system option http-client source-interface <interface>

Several commands utilize curl to initiate transfers. Configure the local source interface used for all CURL operations.

Note: *source-address* and *source-interface* can not be used at the same time.

Keyboard Layout

When starting a VyOS live system (the installation CD) the configured keyboard layout defaults to US. As this might not suite everyones use case you can adjust the used keyboard layout on the system console.

set system option keyboard-layout <us | fr | de | fi | no | dk>

Change system keyboard layout to given language.

Defaults to us.

Note: Changing the keymap only has an effect on the system console, using SSH oder Serial remote access to the device is not affected as the keyboard layout here corresponds to your access system.

Performance

As more and more routers run on Hypervisors, expecially with a NOS (Network Operating System) as VyOS, it makes fewer and fewer sense to use static resource bindings like `smp-affinity` as present in VyOS 1.2 and earlier to pin certain interrupt handlers to specific CPUs.

We now utilize *tuned* for dynamic resource balancing based on profiles.

See also:

https://access.redhat.com/sites/default/files/attachments/201501-perf-brief-low-latency-tuning-rhel7-v2.1.pdf

set system option performance < throughput | latency >

Configure one of the predefined system performance profiles.

- `throughput`: A server profile focused on improving network throughput. This profile favors performance over power savings by setting `intel_pstate` and `max_perf_pct=100` and increasing kernel network buffer sizes.

  It enables transparent huge pages, and uses cpupower to set the performance cpufreq governor. It also sets `kernel.sched_min_granularity_ns` to 10 us, `kernel.sched_wakeup_granularity_ns` to 15 uss, and `vm.dirty_ratio` to 40%.

- `latency`: A server profile focused on lowering network latency. This profile favors performance over power savings by setting `intel_pstate` and `min_perf_pct=100`.

  It disables transparent huge pages, and automatic NUMA balancing. It also uses cpupower to set the performance cpufreq governor, and requests a cpu_dma_latency value of 1. It also sets busy_read and busy_poll times to 50 us, and tcp_fastopen to 3.

8.11.13 System Proxy

Some IT environments require the use of a proxy to connect to the Internet. Without this configuration VyOS updates could not be installed directly by using the `add system image` command (*Update VyOS*).

set system proxy url <url>

Set proxy for all connections initiated by VyOS, including HTTP, HTTPS, and FTP (anonymous ftp).

set system proxy port <port>

Configure proxy port if it does not listen to the default port 80.

set system proxy username <username>

Some proxys require/support the "basic" HTTP authentication scheme as per **RFC 7617**, thus a username can be configured.

set system proxy password <password>

Some proxys require/support the "basic" HTTP authentication scheme as per **RFC 7617**, thus a password can be configured.

8.11.14 Syslog

Per default VyOSs has minimal syslog logging enabled which is stored and rotated locally. Errors will be always logged to a local file, which includes *local7* error messages, emergency messages will be sent to the console, too.

To configure syslog, you need to switch into configuration mode.

Logging

Syslog supports logging to multiple targets, those targets could be a plain file on your VyOS installation itself, a serial console or a remote syslog server which is reached via IP (Internet Protocol) UDP/TCP.

Console

set system syslog console facility <keyword> level <keyword>

Log syslog messages to `/dev/console`, for an explanation on *Facilities* keywords and *Severity Level* keywords see tables below.

Custom File

set system syslog file <filename> facility <keyword> level <keyword>

Log syslog messages to file specified via <*filename*>, for an explanation on *Facilities* keywords and *Severity Level* keywords see tables below.

set system syslog file <filename> archive size <size>

Syslog will write <*size*> kilobytes into the file specified by <*filename*>. After this limit has been reached, the custom file is "rotated" by logrotate and a new custom file is created.

set system syslog file <filename> archive file <number>

Syslog uses logrotate to rotate logiles after a number of gives bytes. We keep as many as <*number*> rotated file before they are deleted on the system.

Remote Host

Logging to a remote host leaves the local logging configuration intact, it can be configured in parallel to a custom file or console logging. You can log to multiple hosts at the same time, using either TCP or UDP. The default is sending the messages via port 514/UDP.

set system syslog host <address> facility <keyword> level <keyword>

Log syslog messages to remote host specified by <*address*>. The address can be specified by either FQDN or IP address. For an explanation on *Facilities* keywords and *Severity Level* keywords see tables below.

set system syslog host <address> facility <keyword> protocol <udp|tcp>

Configure protocol used for communication to remote syslog host. This can be either UDP or TCP.

set system syslog vrf <name>

Specify name of the VRF instance.

Local User Account

set system syslog user <username> facility <keyword> level <keyword>

If logging to a local user account is configured, all defined log messages are display on the console if the local user is logged in, if the user is not logged in, no messages are being displayed. For an explanation on *Facilities* keywords and *Severity Level* keywords see tables below.

Facilities

List of facilities used by syslog. Most facilities names are self explanatory. Facilities local0 - local7 common usage is f.e. as network logs facilities for nodes and network equipment. Generally it depends on the situation how to classify logs and put them to facilities. See facilities more as a tool rather than a directive to follow.

Facilities can be adjusted to meet the needs of the user:

Facility Code	Keyword	Description
	all	All facilities
0	kern	Kernel messages
1	user	User-level messages
2	mail	Mail system
3	daemon	System daemons
4	auth	Security/authentication messages
5	syslog	Messages generated internally by syslogd
6	lpr	Line printer subsystem
7	news	Network news subsystem
8	uucp	UUCP subsystem
9	cron	Clock daemon
10	security	Security/authentication messages
11	ftp	FTP daemon
12	ntp	NTP subsystem
13	logaudit	Log audit
14	logalert	Log alert
15	clock	clock daemon (note 2)
16	local0	local use 0 (local0)
17	local1	local use 1 (local1)
18	local2	local use 2 (local2)
19	local3	local use 3 (local3)
20	local4	local use 4 (local4)
21	local5	local use 5 (local5)
22	local6	use 6 (local6)
23	local7	local use 7 (local7)

Severity Level

Value	Severity	Keyword	Description
		all	Log everything
0	Emergency	emerg	System is unusable - a panic condition
1	Alert	alert	Action must be taken immediately - A condition that should be corrected immediately, such as a corrupted system database.
2	Critical	crit	Critical conditions - e.g. hard drive errors.
3	Error	err	Error conditions
4	Warning	warning	Warning conditions
5	Notice	notice	Normal but significant conditions - conditions that are not error conditions, but that may require special handling.
6	Informational	info	Informational messages
7	Debug	debug	Debug-level messages - Messages that contain information normally of use only when debugging a program.

Display Logs

show log [all | authorization | cluster | conntrack-sync | ...]

Display log files of given category on the console. Use tab completion to get a list of available categories. Thos categories could be: all, authorization, cluster, conntrack-sync, dhcp, directory, dns, file, firewall, https, image lldp, nat, openvpn, snmp, tail, vpn, vrrp

If no option is specified, this defaults to *all*.

show log image <name> [all | authorization | directory | file <file name> | tail <lines>]

Log messages from a specified image can be displayed on the console. Details of allowed parameters:

all	Display contents of all master log files of the specified image
authorization	Display all authorization attempts of the specified image
directory	Display list of all user-defined log files of the specified image
file <file name>	Display contents of a specified user-defined log file of the specified image
tail	Display last lines of the system log of the specified image
<lines>	Number of lines to be displayed, default 10

When no options/parameters are used, the contents of the main syslog file are displayed.

Hint: Use `show log | strip-private` if you want to hide private data when sharing your logs.

Delete Logs

delete log file <text>

Deletes the specified user-defined file <text> in the /var/log/user directory

Note that deleting the log file does not stop the system from logging events. If you use this command while the system is logging events, old log events will be deleted, but events after the delete operation will be recorded in the new file. To delete the file altogether, first delete logging to the file using system syslog *Custom File* command, and then delete the file.

8.11.15 Task Scheduler

The task scheduler allows you to execute tasks on a given schedule. It makes use of UNIX cron.

Note: All scripts excecuted this way are executed as root user - this may be dangerous. Together with *Command Scripting* this can be used for automating (re-)configuration.

---

set system task-scheduler task <task> interval <interval>

Specify the time interval when <*task*> should be executed. The interval is specified as number with one of the following suffixes:

- `none` - Execution interval in minutes
- `m` - Execution interval in minutes
- `h` - Execution interval in hours
- `d` - Execution interval in days

Note: If suffix is omitted, minutes are implied.

---

set system task-scheduler task <task> crontab-spec <spec>

Set execution time in common cron time format. A cron <*spec*> of `30 */6 * * *` would execute the <*task*> at minute 30 past every 6th hour.

set system task-scheduler task <task> executable path <path>

Specify absolute <*path*> to script which will be run when <*task*> is executed.

set system task-scheduler task <task> executable arguments <args>

Arguments which will be passed to the executable.

8.11.16 Time Zone

Time Zone setting is very important as e.g all your logfile entries will be based on the configured zone. Without proper time zone configuration it will be very difficult to compare logfiles from different systems.

set system time-zone <timezone>

Specify the systems <*timezone*> as the Region/Location that best defines your location. For example, specifying US/Pacific sets the time zone to US Pacific time.

Command completion can be used to list available time zones. The adjustment for daylight time will take place automatically based on the time of year.

8.11.17 Default Gateway/Route

In the past (VyOS 1.1) used a gateway-address configured under the system tree (`set system gateway-address <address>`), this is no longer supported and existing configurations are migrated to the new CLI command.

Configuration

set protocols static route 0.0.0.0/0 next-hop <address>

Specify static route into the routing table sending all non local traffic to the nexthop address *<address>*.

delete protocols static route 0.0.0.0/0

Delete default route from the system.

Operation

show ip route 0.0.0.0

Show routing table entry for the default route.

```
vyos@vyos:~$ show ip route 0.0.0.0
Routing entry for 0.0.0.0/0
  Known via "static", distance 10, metric 0, best
  Last update 09:46:30 ago
  * 172.18.201.254, via eth0.201
```

See also:

Configuration of *Static*

8.12 Traffic Policy

8.12.1 QoS

The generic name of Quality of Service or Traffic Control involves things like shaping traffic, scheduling or dropping packets, which are the kind of things you may want to play with when you have, for instance, a bandwidth bottleneck in a link and you want to somehow prioritize some type of traffic over another.

tc is a powerful tool for Traffic Control found at the Linux kernel. However, its configuration is often considered a cumbersome task. Fortunately, VyOS eases the job through its CLI, while using `tc` as backend.

How to make it work

In order to have VyOS Traffic Control working you need to follow 2 steps:

1. **Create a traffic policy**.
2. **Apply the traffic policy to an interface ingress or egress**.

But before learning to configure your policy, we will warn you about the different units you can use and also show you what *classes* are and how they work, as some policies may require you to configure them.

Units

When configuring your traffic policy, you will have to set data rate values, watch out the units you are managing, it is easy to get confused with the different prefixes and suffixes you can use. VyOS will always show you the different units you can use.

Prefixes

They can be **decimal** prefixes.

```
kbit  (10^3)    kilobit per second
mbit  (10^6)    megabit per second
gbit  (10^9)    gigabit per second
tbit  (10^12)   terabit per second

kbps  (8*10^3)  kilobyte per second
mbps  (8*10^6)  megabyte per second
gbps  (8*10^9)  gigabyte per second
tbps  (8*10^12) terabyte per second
```

Or **binary** prefixes.

```
kibit (2^10 = 1024)    kibibit per second
mibit (2^20 = 1024^2)  mebibit per second
gibit (2^30 = 1024^3)  gibibit per second
tbit  (2^40 = 1024^4)  tebibit per second

kibps (1024*8)         kibibyte (KiB) per second
mibps (1024^2*8)       mebibyte (MiB) per second
gibps (1024^3*8)       gibibyte (GiB) per second
tibps (1024^4*8)       tebibyte (TiB) per second
```

Suffixes

A *bit* is written as **bit**,

```
kbit (kilobits per second)
mbit (megabits per second)
gbit (gigabits per second)
tbit (terabits per second)
```

while a *byte* is written as a single **b**.

```
kbps (kilobytes per second)
mbps (megabytes per second)
gbps (gigabytes per second)
```

Classes

In the *Creating a traffic policy* section you will see that some of the policies use *classes*. Those policies let you distribute traffic into different classes according to different parameters you can choose. So, a class is just a specific type of traffic you select.

The ultimate goal of classifying traffic is to give each class a different treatment.

Matching traffic

In order to define which traffic goes into which class, you define filters (that is, the matching criteria). Packets go through these matching rules (as in the rules of a firewall) and, if a packet matches the filter, it is assigned to that class.

In VyOS, a class is identified by a number you can choose when configuring it.

Note: The meaning of the Class ID is not the same for every type of policy. Normally policies just need a meaningless number to identify a class (Class ID), but that does not apply to every policy. The the number of a class in a Priority Queue it does not only identify it, it also defines its priority.

```
set traffic-policy <policy> <policy-name> class <class-ID> match <class-matching-rule-
↪name>
```

In the command above, we set the type of policy we are going to work with and the name we choose for it; a class (so that we can differentiate some traffic) and an identifiable number for that class; then we configure a matching rule (or filter) and a name for it.

A class can have multiple match filters:

```
set traffic-policy shaper MY-SHAPER class 30 match HTTP
set traffic-policy shaper MY-SHAPER class 30 match HTTPs
```

A match filter can contain multiple criteria and will match traffic if all those criteria are true.

For example:

```
set traffic-policy shaper MY-SHAPER class 30 match HTTP ip protocol tcp
set traffic-policy shaper MY-SHAPER class 30 match HTTP ip source port 80
```

This will match TCP traffic with source port 80.

There are many parameters you will be able to use in order to match the traffic you want for a class:

- **Ethernet (protocol, destination address or source address)**
- **Interface name**
- **IPv4 (DSCP value, maximum packet length, protocol, source address, destination address, source port, destination port or TCP flags)**
- **IPv6 (DSCP value, maximum payload length, protocol, source address, destination address, source port, destination port or TCP flags)**
- **Firewall mark**
- **VLAN ID**

When configuring your filter, you can use the `Tab` key to see the many different parameters you can configure.

```
vyos@vyos# set traffic-policy shaper MY-SHAPER class 30 match MY-FIRST-FILTER
Possible completions:
   description  Description for this match
 > ether        Ethernet header match
   interface    Interface name for this match
 > ip           Match IP protocol header
 > ipv6         Match IPV6 header
   mark         Match on mark applied by firewall
   vif          Virtual Local Area Network (VLAN) ID for this match
```

As shown in the example above, one of the possibilities to match packets is based on marks done by the firewall, that can give you a great deal of flexibility.

You can also write a description for a filter:

```
set traffic-policy shaper MY-SHAPER class 30 match MY-FIRST-FILTER description "My␣
↪filter description"
```

Note: An IPv4 TCP filter will only match packets with an IPv4 header length of 20 bytes (which is the majority of IPv4 packets anyway).

Note: IPv6 TCP filters will only match IPv6 packets with no header extension, see https://en.wikipedia.org/wiki/IPv6_packet#Extension_headers

Default

Often you will also have to configure your *default* traffic in the same way you do with a class. *Default* can be considered a class as it behaves like that. It contains any traffic that did not match any of the defined classes, so it is like an open class, a class without matching filters.

Class treatment

Once a class has a filter configured, you will also have to define what you want to do with the traffic of that class, what specific Traffic-Control treatment you want to give it. You will have different possibilities depending on the Traffic Policy you are configuring.

```
vyos@vyos# set traffic-policy shaper MY-SHAPER class 30
Possible completions:
   bandwidth    Bandwidth used for this class
   burst        Burst size for this class (default: 15kb)
   ceiling      Bandwidth limit for this class
   codel-quantum
                fq-codel - Number of bytes used as 'deficit' (default 1514)
   description  Description for this traffic class
   flows        fq-codel - Number of flows (default 1024)
   interval     fq-codel - Interval (milliseconds) used to measure the delay (default␣
↪100)
+> match        Class matching rule name
```

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```
  priority     Priority for usage of excess bandwidth
  queue-limit  Maximum queue size (packets)
  queue-type   Queue type for this class
  set-dscp     Change the Differentiated Services (DiffServ) field in the IP header
  target       fq-codel - Acceptable minimum queue delay (milliseconds)
```

For instance, with `set traffic-policy shaper MY-SHAPER class 30 set-dscp EF` you would be modifying the DSCP field value of packets in that class to Expedite Forwarding.

DSCP values as per **RFC 2474** and **RFC 4595**:

Binary value	Configured value	Drop rate	Description
101110	46	•	Expedited forwarding (EF)
000000	0	•	Best effort traffic, default
001010	10	Low	Assured Forwarding(AF) 11
001100	12	Medium	Assured Forwarding(AF) 12
001110	14	High	Assured Forwarding(AF) 13
010010	18	Low	Assured Forwarding(AF) 21
010100	20	Medium	Assured Forwarding(AF) 22
010110	22	High	Assured Forwarding(AF) 23
011010	26	Low	Assured Forwarding(AF) 31
011100	28	Medium	Assured Forwarding(AF) 32
011110	30	High	Assured Forwarding(AF) 33
100010	34	Low	Assured Forwarding(AF) 41
100100	36	Medium	Assured Forwarding(AF) 42
100110	38	High	Assured Forwarding(AF) 43

Embedding one policy into another one

Often we need to embed one policy into another one. It is possible to do so on classful policies, by attaching a new policy into a class. For instance, you might want to apply different policies to the different classes of a Round-Robin policy you have configured.

A common example is the case of some policies which, in order to be effective, they need to be applied to an interface that is directly connected where the bottleneck is. If your router is not directly connected to the bottleneck, but some hop before it, you can emulate the bottleneck by embedding your non-shaping policy into a classful shaping one so that it takes effect.

You can configure a policy into a class through the `queue-type` setting.

```
set traffic-policy shaper FQ-SHAPER bandwidth 4gbit
set traffic-policy shaper FQ-SHAPER default bandwidth 100%
set traffic-policy shaper FQ-SHAPER default queue-type fq-codel
```

As shown in the last command of the example above, the *queue-type* setting allows these combinations. You will be able to use it in many policies.

Note: Some policies already include other embedded policies inside. That is the case of *Shaper*: each of its classes use fq-codel unless you change it.

Creating a traffic policy

VyOS lets you control traffic in many different ways, here we will cover every possibility. You can configure as many policies as you want, but you will only be able to apply one policy per interface and direction (inbound or outbound).

Some policies can be combined, you will be able to *embed* a different policy that will be applied to a class of the main policy.

Hint: **If you are looking for a policy for your outbound traffic** but you don't know which one you need and you don't want to go through every possible policy shown here, **our bet is that highly likely you are looking for a** *Shaper* **policy and you want to** *set its queues* **as FQ-CoDel**.

Drop Tail

Queueing discipline: PFIFO (Packet First In First Out).
Applies to: Outbound traffic.

This the simplest queue possible you can apply to your traffic. Traffic must go through a finite queue before it is actually sent. You must define how many packets that queue can contain.

When a packet is to be sent, it will have to go through that queue, so the packet will be placed at the tail of it. When the packet completely goes through it, it will be dequeued emptying its place in the queue and being eventually handed to the NIC to be actually sent out.

Despite the Drop-Tail policy does not slow down packets, if many packets are to be sent, they could get dropped when trying to get enqueued at the tail. This can happen if the queue has still not been able to release enough packets from its head.

This is the policy that requieres the lowest resources for the same amount of traffic. But **very likely you do not need it as you cannot get much from it. Sometimes it is used just to enable logging.**

`set traffic-policy drop-tail <policy-name> queue-limit <number-of-packets>`

Use this command to configure a drop-tail policy (PFIFO). Choose a unique name for this policy and the size of the queue by setting the number of packets it can contain (maximum 4294967295).

Fair Queue

Queueing discipline: SFQ (Stochastic Fairness Queuing).
Applies to: Outbound traffic.

Fair Queue is a work-conserving scheduler which schedules the transmission of packets based on flows, that is, it balances traffic distributing it through different sub-queues in order to ensure fairness so that each flow is able to send data in turn, preventing any single one from drowning out the rest.

`set traffic-policy fair-queue <policy-name>`

Use this command to create a Fair-Queue policy and give it a name. It is based on the Stochastic Fairness Queueing and can be applied to outbound traffic.

In order to separate traffic, Fair Queue uses a classifier based on source address, destination address and source port. The algorithm enqueues packets to hash buckets based on those tree parameters. Each of these buckets should represent a unique flow. Because multiple flows may get hashed to the same bucket, the hashing algorithm is perturbed at configurable intervals so that the unfairness lasts only for a short while. Perturbation may however cause some inadvertent packet reordering to occur. An advisable value could be 10 seconds.

One of the uses of Fair Queue might be the mitigation of Denial of Service attacks.

`set traffic-policy fair-queue <policy-name> hash-interval <seconds>`\`

Use this command to define a Fair-Queue policy, based on the Stochastic Fairness Queueing, and set the number of seconds at which a new queue algorithm perturbation will occur (maximum 4294967295).

When dequeuing, each hash-bucket with data is queried in a round robin fashion. You can configure the length of the queue.

`set traffic-policy fair-queue <policy-name> queue-limit <limit>`

Use this command to define a Fair-Queue policy, based on the Stochastic Fairness Queueing, and set the number of maximum packets allowed to wait in the queue. Any other packet will be dropped.

Note: Fair Queue is a non-shaping (work-conserving) policy, so it will only be useful if your outgoing interface is really full. If it is not, VyOS will not own the queue and Fair Queue will have no effect. If there is bandwidth available on the physical link, you can *embed* Fair-Queue into a classful shaping policy to make sure it owns the queue.

FQ-CoDel

Queueing discipline Fair/Flow Queue CoDel.
Applies to: Outbound Traffic.

The FQ-CoDel policy distributes the traffic into 1024 FIFO queues and tries to provide good service between all of them. It also tries to keep the length of all the queues short.

FQ-CoDel fights bufferbloat and reduces latency without the need of complex configurations. It has become the new default Queueing Discipline for the interfaces of some GNU/Linux distributions.

It uses a stochastic model to classify incoming packets into different flows and is used to provide a fair share of the bandwidth to all the flows using the queue. Each flow is managed by the CoDel queuing discipline. Reordering within a flow is avoided since Codel internally uses a FIFO queue.

FQ-CoDel is based on a modified Deficit Round Robin (*DRR*) queue scheduler with the CoDel Active Queue Management (AQM) algorithm operating on each queue.

Note: FQ-Codel is a non-shaping (work-conserving) policy, so it will only be useful if your outgoing interface is really full. If it is not, VyOS will not own the queue and FQ-Codel will have no effect. If there is bandwidth available on the physical link, you can *embed* FQ-Codel into a classful shaping policy to make sure it owns the queue. If you are not sure if you need to embed your FQ-CoDel policy into a Shaper, do it.

FQ-CoDel is tuned to run ok with its default parameters at 10Gbit speeds. It might work ok too at other speeds without configuring anything, but here we will explain some cases when you might want to tune its parameters.

When running it at 1Gbit and lower, you may want to reduce the *queue-limit* to 1000 packets or less. In rates like 10Mbit, you may want to set it to 600 packets.

If you are using FQ-CoDel embedded into *Shaper* and you have large rates (100Mbit and above), you may consider increasing *quantum* to 8000 or higher so that the scheduler saves CPU.

On low rates (below 40Mbit) you may want to tune *quantum* down to something like 300 bytes.

At very low rates (below 3Mbit), besides tuning *quantum* (300 keeps being ok) you may also want to increase *target* to something like 15ms and increase *interval* to something around 150 ms.

set traffic-policy fq-codel <policy name> codel-quantum <bytes>

Use this command to configure an fq-codel policy, set its name and the maximum number of bytes (default: 1514) to be dequeued from a queue at once.

set traffic-policy fq-codel <policy name> flows <number-of-flows>

Use this command to configure an fq-codel policy, set its name and the number of sub-queues (default: 1024) into which packets are classified.

set traffic-policy fq-codel <policy name> interval <miliseconds>

Use this command to configure an fq-codel policy, set its name and the time period used by the control loop of CoDel to detect when a persistent queue is developing, ensuring that the measured minimum delay does not become too stale (default: 100ms).

set traffic-policy fq-codel <policy-name> queue-limit <number-of-packets>`

Use this command to configure an fq-codel policy, set its name, and define a hard limit on the real queue size. When this limit is reached, new packets are dropped (default: 10240 packets).

set traffic-policy fq-codel <policy-name> target <miliseconds>`

Use this command to configure an fq-codel policy, set its name, and define the acceptable minimum standing/persistent queue delay. This minimum delay is identified by tracking the local minimum queue delay that packets experience (default: 5ms).

Example

A simple example of an FQ-CoDel policy working inside a Shaper one.

```
set traffic-policy shaper FQ-CODEL-SHAPER bandwidth 2gbit
set traffic-policy shaper FQ-CODEL-SHAPER default bandwidth 100%
set traffic-policy shaper FQ-CODEL-SHAPER default queue-type fq-codel
```

Limiter

Queueing discipline: Ingress policer.
Applies to: Inbound traffic.

Limiter is one of those policies that uses *classes* (Ingress qdisc is actually a classless policy but filters do work in it).

The limiter performs basic ingress policing of traffic flows. Multiple classes of traffic can be defined and traffic limits can be applied to each class. Although the policer uses a token bucket mechanism internally, it does not have the capability to delay a packet as a shaping mechanism does. Traffic exceeding the defined bandwidth limits is directly dropped. A maximum allowed burst can be configured too.

You can configure classes (up to 4090) with different settings and a default policy which will be applied to any traffic not matching any of the configured classes.

Note: In the case you want to apply some kind of **shaping** to your **inbound** traffic, check the *ingress-shaping* section.

---

set traffic-policy limiter <policy-name> class <class ID> match <match-name> description <description>

Use this command to configure an Ingress Policer, defining its name, a class identifier (1-4090), a class matching rule name and its description.

Once the matching rules are set for a class, you can start configuring how you want matching traffic to behave.

set traffic-policy limiter <policy-name> class <class-ID> bandwidth <rate>

Use this command to configure an Ingress Policer, defining its name, a class identifier (1-4090) and the maximum allowed bandwidth for this class.

set traffic-policy limiter <policy-name> class <class-ID> burst <burst-size>

Use this command to configure an Ingress Policer, defining its name, a class identifier (1-4090) and the burst size in bytes for this class (default: 15).

set traffic-policy limiter <policy-name> default bandwidth <rate>

Use this command to configure an Ingress Policer, defining its name and the maximum allowed bandwidth for its default policy.

set traffic-policy limiter <policy-name> default burst <burst-size>

Use this command to configure an Ingress Policer, defining its name and the burst size in bytes (default: 15) for its default policy.

set traffic-policy limiter <policy-name> class <class ID> priority <value>

Use this command to configure an Ingress Policer, defining its name, a class identifier (1-4090), and the priority (0-20, default 20) in which the rule is evaluated (the lower the number, the higher the priority).

Network Emulator

Queueing discipline: netem (Network Emulator) + TBF (Token Bucket Filter).
Applies to: Outbound traffic.

VyOS Network Emulator policy emulates the conditions you can suffer in a real network. You will be able to configure things like rate, burst, delay, packet loss, packet corruption or packet reordering.

This could be helpful if you want to test how an application behaves under certain network conditions.

set traffic-policy network-emulator <policy-name> bandwidth <rate>

Use this command to configure the maximum rate at which traffic will be shaped in a Network Emulator policy. Define the name of the policy and the rate.

set traffic-policy network-emulator <policy-name> burst <burst-size>

Use this command to configure the burst size of the traffic in a Network Emulator policy. Define the name of the Network Emulator policy and its traffic burst size (it will be configured through the Token Bucket Filter qdisc). Default:15kb. It will only take effect if you have configured its bandwidth too.

set traffic-policy network-emulator <policy-name> network-delay <delay>

Use this command to configure a Network Emulator policy defining its name and the fixed amount of time you want to add to all packet going out of the interface. The latency will be added through the Token Bucket Filter qdisc. It will only take effect if you have configured its bandwidth too. You can use secs, ms and us. Default: 50ms.

set traffic-policy network-emulator <policy-name> packet-corruption <percent>

Use this command to emulate noise in a Network Emulator policy. Set the policy name and the percentage of corrupted packets you want. A random error will be introduced in a random position for the chosen percent of packets.

set traffic-policy network-emulator <policy-name> packet-loss <percent>

Use this command to emulate packet-loss conditions in a Network Emulator policy. Set the policy name and the percentage of loss packets your traffic will suffer.

set traffic-policy network-emulator <policy-name> packet-reordering <percent>

Use this command to emulate packet-reordering conditions in a Network Emulator policy. Set the policy name and the percentage of reordered packets your traffic will suffer.

set traffic-policy network-emulator <policy-name> queue-limit <limit>

Use this command to define the length of the queue of your Network Emulator policy. Set the policy name and the maximum number of packets (1-4294967295) the queue may hold queued at a time.

Priority Queue

Queueing discipline: PRIO.
Applies to: Outbound traffic.

The Priority Queue is a classful scheduling policy. It does not delay packets (Priority Queue is not a shaping policy), it simply dequeues packets according to their priority.

Note: Priority Queue, as other non-shaping policies, is only useful if your outgoing interface is really full. If it is not, VyOS will not own the queue and Priority Queue will have no effect. If there is bandwidth available on the physical link, you can *embed* Priority Queue into a classful shaping policy to make sure it owns the queue. In that case packets can be prioritized based on DSCP.

Up to seven queues -defined as *classes* with different priorities- can be configured. Packets are placed into queues based on associated match criteria. Packets are transmitted from the queues in priority order. If classes with a higher priority are being filled with packets continuously, packets from lower priority classes will only be transmitted after traffic volume from higher priority classes decreases.

Note: In Priority Queue we do not define clases with a meaningless class ID number but with a class priority number (1-7). The lower the number, the higher the priority.

As with other policies, you can define different type of matching rules for your classes:

```
vyos@vyos# set traffic-policy priority-queue MY-PRIO class 3 match MY-MATCH-RULE
Possible completions:
   description  Description for this match
 > ether        Ethernet header match
   interface    Interface name for this match
 > ip           Match IP protocol header
 > ipv6         Match IPV6 header
   mark         Match on mark applied by firewall
   vif          Virtual Local Area Network (VLAN) ID for this match
```

As with other policies, you can *embed* other policies into the classes (and default) of your Priority Queue policy through the `queue-type` setting:

```
vyos@vyos# set traffic-policy priority-queue MY-PRIO class 3 queue-type
Possible completions:
   fq-codel     Fair Queue Codel
   fair-queue   Stochastic Fair Queue (SFQ)
   drop-tail    First-In-First-Out (FIFO)
   priority     Priority queueing based on DSCP
   random-detect
                Random Early Detection (RED)
```

set traffic-policy priority-queue <policy-name> class <class-ID> queue-limit <limit>`

Use this command to configure a Priority Queue policy, set its name, set a class with a priority from 1 to 7 and define a hard limit on the real queue size. When this limit is reached, new packets are dropped.

Random-Detect

Queueing discipline: Generalized Random Early Drop.
Applies to: Outbound traffic.

A simple Random Early Detection (RED) policy would start randomly dropping packets from a queue before it reaches its queue limit thus avoiding congestion. That is good for TCP connections as the gradual dropping of packets acts as a signal for the sender to decrease its transmission rate.

In contrast to simple RED, VyOS' Random-Detect uses a Generalized Random Early Detect policy that provides different virtual queues based on the IP Precedence value so that some virtual queues can drop more packets than others.

This is achieved by using the first three bits of the ToS (Type of Service) field to categorize data streams and, in accordance with the defined precedence parameters, a decision is made.

IP precedence as defined in **RFC 791**:

Precedence	Priority
7	Network Control
6	Internetwork Control
5	CRITIC/ECP
4	Flash Override
3	Flash
2	Immediate
1	Priority
0	Routine

Random-Detect could be useful for heavy traffic. One use of this algorithm might be to prevent a backbone overload. But only for TCP (because dropped packets could be retransmitted), not for UDP.

set traffic-policy random-detect <policy-name> bandwidth <bandwidth>

Use this command to configure a Random-Detect policy, set its name and set the available bandwidth for this policy. It is used for calculating the average queue size after some idle time. It should be set to the bandwidth of your interface. Random Detect is not a shaping policy, this command will not shape.

set traffic-policy random-detect <policy-name> precedence <IP-precedence-value> average-packet <bytes>

Use this command to configure a Random-Detect policy and set its name, then state the IP Precedence for the virtual queue you are configuring and what the size of its average-packet should be (in bytes, default: 1024).

Note: When configuring a Random-Detect policy: **the higher the precedence number, the higher the priority**.

set traffic-policy random-detect <policy-name> precedence <IP-precedence-value> mark-probability <value>

Use this command to configure a Random-Detect policy and set its name, then state the IP Precedence for the virtual queue you are configuring and what its mark (drop) probability will be. Set the probability by giving the N value of the fraction 1/N (default: 10).

set traffic-policy random-detect <policy-name> precedence <IP-precedence-value> maximum-threshold <packets>

Use this command to configure a Random-Detect policy and set its name, then state the IP Precedence for the virtual queue you are configuring and what its maximum threshold for random detection will be (from 0 to 4096 packets, default: 18). At this size, the marking (drop) probability is maximal.

set traffic-policy random-detect <policy-name> precedence <IP-precedence-value> minimum-threshold <packets>

Use this command to configure a Random-Detect policy and set its name, then state the IP Precedence for the virtual queue you are configuring and what its minimum threshold for random detection will be (from 0 to 4096 packets). If this value is exceeded, packets start being eligible for being dropped.

The default values for the minimum-threshold depend on IP precedence:

Precedence	default min-threshold
7	16
6	15
5	14
4	13
3	12
2	11
1	10
0	9

set traffic-policy random-detect <policy-name> precedence <IP-precedence-value> queue-limit <packets>

Use this command to configure a Random-Detect policy and set its name, then name the IP Precedence for the virtual queue you are configuring and what the maximum size of its queue will be (from 1 to 1-4294967295 packets). Packets are dropped when the current queue length reaches this value.

If the average queue size is lower than the **min-threshold**, an arriving packet will be placed in the queue.

In the case the average queue size is between **min-threshold** and **max-threshold**, then an arriving packet would be either dropped or placed in the queue, it will depend on the defined **mark-probability**.

If the current queue size is larger than **queue-limit**, then packets will be dropped. The average queue size depends on its former average size and its current one.

If **max-threshold** is set but **min-threshold is not, then **min-threshold** is scaled to 50% of **max-threshold**.

In principle, values must be `min-threshold` < `max-threshold` < `queue-limit`.

Rate Control

Queueing discipline: Tocken Bucket Filter.
Applies to: Outbound traffic.

Rate-Control is a classless policy that limits the packet flow to a set rate. It is a pure shaper, it does not schedule traffic. Traffic is filtered based on the expenditure of tokens. Tokens roughly correspond to bytes.

Short bursts can be allowed to exceed the limit. On creation, the Rate-Control traffic is stocked with tokens which correspond to the amount of traffic that can be burst in one go. Tokens arrive at a steady rate, until the bucket is full.

set traffic-policy rate-control <policy-name> bandwidth <rate>

Use this command to configure a Rate-Control policy, set its name and the rate limit you want to have.

set traffic-policy rate-control <policy-name> burst <burst-size>

Use this command to configure a Rate-Control policy, set its name and the size of the bucket in bytes which will be available for burst.

As a reference: for 10mbit/s on Intel, you might need at least 10kbyte buffer if you want to reach your configured rate.

A very small buffer will soon start dropping packets.

set traffic-policy rate-control <policy-name> latency

Use this command to configure a Rate-Control policy, set its name and the maximum amount of time a packet can be queued (default: 50 ms).

Rate-Control is a CPU-friendly policy. You might consider using it when you just simply want to slow traffic down.

Round Robin

Queueing discipline: Deficit Round Robin.
Applies to: Outbound traffic.

The round-robin policy is a classful scheduler that divides traffic in different *classes* you can configure (up to 4096). You can *embed* a new policy into each of those classes (default included).

Each class is assigned a deficit counter (the number of bytes that a flow is allowed to transmit when it is its turn) initialized to quantum. Quantum is a parameter you configure which acts like a credit of fix bytes the counter receives on each round. Then the Round-Robin policy starts moving its Round Robin pointer through the queues. If the deficit counter is greater than the packet's size at the head of the queue, this packet will be sent and the value of the counter will be decremented by the packet size. Then, the size of the next packet will be compared to the counter value again, repeating the process. Once the queue is empty or the value of the counter is insufficient, the Round-Robin pointer will move to the next queue. If the queue is empty, the value of the deficit counter is reset to 0.

At every round, the deficit counter adds the quantum so that even large packets will have their opportunity to be dequeued.

set traffic-policy round-robin <policy name> class <class-ID> quantum <packets>

Use this command to configure a Round-Robin policy, set its name, set a class ID, and the quantum for that class. The deficit counter will add that value each round.

set traffic-policy round-robin <policy name> class <class ID> queue-limit <packets>

Use this command to configure a Round-Robin policy, set its name, set a class ID, and the queue size in packets.

As with other policies, Round-Robin can *embed* another policy into a class through the `queue-type` setting.

```
vyos@vyos# set traffic-policy round-robin DRR class 10 queue-type
Possible completions:
   fq-codel     Fair Queue Codel
   fair-queue   Stochastic Fair Queue (SFQ)
   drop-tail    First-In-First-Out (FIFO)
   priority     Priority queueing based on DSCP
```

Shaper

Queueing discipline: Hierarchical Token Bucket.
Applies to: Outbound traffic.

The Shaper policy does not guarantee a low delay, but it does guarantee bandwidth to different traffic classes and also lets you decide how to allocate more traffic once the guarantees are met.

Each class can have a guaranteed part of the total bandwidth defined for the whole policy, so all those shares together should not be higher than the policy's whole bandwidth.

If guaranteed traffic for a class is met and there is room for more traffic, the ceiling parameter can be used to set how much more bandwidth could be used. If guaranteed traffic is met and there are several classes willing to use their ceilings, the priority parameter will establish the order in which that additional traffic will be allocated. Priority can be any number from 0 to 7. The lower the number, the higher the priority.

set traffic-policy shaper <policy-name> bandwidth <rate>

Use this command to configure a Shaper policy, set its name and the maximum bandwidth for all combined traffic.

set traffic-policy shaper <policy-name> class <class-ID> bandwidth <rate>

Use this command to configure a Shaper policy, set its name, define a class and set the guaranteed traffic you want to allocate to that class.

set traffic-policy shaper <policy-name> class <class-ID> burst <bytes>

Use this command to configure a Shaper policy, set its name, define a class and set the size of the tocken bucket in bytes, which will be available to be sent at ceiling speed (default: 15Kb).

set traffic-policy shaper <policy-name> class <class-ID> ceiling <bandwidth>

Use this command to configure a Shaper policy, set its name, define a class and set the maximum speed possible for this class. The default ceiling value is the bandwidth value.

set traffic-policy shaper <policy-name> class <class-ID> priority <0-7>

Use this command to configure a Shaper policy, set its name, define a class and set the priority for usage of available bandwidth once guarantees have been met. The lower the priority number, the higher the priority. The default priority value is 0, the highest priority.

As with other policies, Shaper can *embed* other policies into its classes through the `queue-type` setting and then configure their parameters.

```
vyos@vyos# set traffic-policy shaper HTB class 10 queue-type
Possible completions:
   fq-codel     Fair Queue Codel
   fair-queue   Stochastic Fair Queue (SFQ)
   drop-tail    First-In-First-Out (FIFO)
   priority     Priority queueing based on DSCP
   random-detect
                Random Early Detection (RED)
```

```
vyos@vyos# set traffic-policy shaper HTB class 10
Possible completions:
   bandwidth    Bandwidth used for this class
   burst        Burst size for this class (default: 15kb)
```

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```
   ceiling      Bandwidth limit for this class
   codel-quantum
                fq-codel - Number of bytes used as 'deficit' (default 1514)
   description  Description for this traffic class
   flows        fq-codel - Number of flows (default 1024)
   interval     fq-codel - Interval (milliseconds) used to measure the delay (default␣
↪100)
+> match        Class matching rule name
   priority     Priority for usage of excess bandwidth
   queue-limit  Maximum queue size (packets)
   queue-type   Queue type for this class
   set-dscp     Change the Differentiated Services (DiffServ) field in the IP header
   target       fq-codel - Acceptable minimum queue delay (milliseconds)
```

Note: If you configure a class for **VoIP traffic**, don't give it any *ceiling*, otherwise new VoIP calls could start when the link is available and get suddenly dropped when other classes start using their assigned *bandwidth* share.

Example

A simple example of Shaper using priorities.

```
set traffic-policy shaper MY-HTB bandwidth '50mbit'
set traffic-policy shaper MY-HTB class 10 bandwidth '20%'
set traffic-policy shaper MY-HTB class 10 match DSCP ip dscp 'EF'
set traffic-policy shaper MY-HTB class 10 queue-type 'fq-codel'
set traffic-policy shaper MY-HTB class 20 bandwidth '10%'
set traffic-policy shaper MY-HTB class 20 ceiling '50%'
set traffic-policy shaper MY-HTB class 20 match PORT666 ip destination port '666'
set traffic-policy shaper MY-HTB class 20 priority '3'
set traffic-policy shaper MY-HTB class 20 queue-type 'fair-queue'
set traffic-policy shaper MY-HTB class 30 bandwidth '10%'
set traffic-policy shaper MY-HTB class 30 ceiling '50%'
set traffic-policy shaper MY-HTB class 30 match ADDRESS30 ip source address '192.168.30.
↪0/24'
set traffic-policy shaper MY-HTB class 30 priority '5'
set traffic-policy shaper MY-HTB class 30 queue-type 'fair-queue'
set traffic-policy shaper MY-HTB default bandwidth '10%'
set traffic-policy shaper MY-HTB default ceiling '100%'
set traffic-policy shaper MY-HTB default priority '7'
set traffic-policy shaper MY-HTB default queue-type 'fair-queue'
```

Applying a traffic policy

Once a traffic-policy is created, you can apply it to an interface:

```
set interfaces etherhet eth0 traffic-policy out WAN-OUT
```

You can only apply one policy per interface and direction, but you could reuse a policy on different interfaces and directions:

```
set interfaces ethernet eth0 traffic-policy in WAN-IN
set interfaces etherhet eth0 traffic-policy out WAN-OUT
set interfaces etherhet eth1 traffic-policy in LAN-IN
set interfaces etherhet eth1 traffic-policy out LAN-OUT
set interfaces ethernet eth2 traffic-policy in LAN-IN
set interfaces ethernet eth2 traffic-policy out LAN-OUT
set interfaces etherhet eth3 traffic-policy in TWO-WAY-POLICY
set interfaces etherhet eth3 traffic-policy out TWO-WAY-POLICY
set interfaces etherhet eth4 traffic-policy in TWO-WAY-POLICY
set interfaces etherhet eth4 traffic-policy out TWO-WAY-POLICY
```

Getting queueing information

show queueing <interface-type> <interface-name>

Use this command to see the queueing information for an interface. You will be able to see a packet counter (Sent, Dropped, Overlimit and Backlog) per policy and class configured.

The case of ingress shaping

Applies to: Inbound traffic.

For the ingress traffic of an interface, there is only one policy you can directly apply, a **Limiter** policy. You cannot apply a shaping policy directly to the ingress traffic of any interface because shaping only works for outbound traffic.

This workaround lets you apply a shaping policy to the ingress traffic by first redirecting it to an in-between virtual interface (Intermediate Functional Block). There, in that virtual interface, you will be able to apply any of the policies that work for outbound traffic, for instance, a shaping one.

That is how it is possible to do the so-called "ingress shaping".

```
set traffic-policy shaper MY-INGRESS-SHAPING bandwidth 1000kbit
set traffic-policy shaper MY-INGRESS-SHAPING default bandwidth 1000kbit
set traffic-policy shaper MY-INGRESS-SHAPING default queue-type fair-queue

set interfaces input ifb0 traffic-policy out MY-INGRESS-SHAPING
set interfaces ethernet eth0 redirect ifb0
```

Warning: Do not configure IFB as the first step. First create everything else of your traffic-policy, and then you can configure IFB. Otherwise you might get the `RTNETLINK answer: File exists` error, which can be solved with `sudo ip link delete ifb0`.

8.13 VPN

8.13.1 IPsec

GRE (Generic Routing Encapsulation), GRE/IPsec (or IPIP/IPsec, SIT/IPsec, or any other stateless tunnel protocol over IPsec) is the usual way to protect the traffic inside a tunnel.

An advantage of this scheme is that you get a real interface with its own address, which makes it easier to setup static routes or use dynamic routing protocols without having to modify IPsec policies. The other advantage is that it greatly simplifies router to router communication, which can be tricky with plain IPsec because the external outgoing address of the router usually doesn't match the IPsec policy of typical site-to-site setup and you need to add special configuration for it, or adjust the source address for outgoing traffic of your applications. GRE/IPsec has no such problem and is completely transparent for the applications.

GRE/IPIP/SIT and IPsec are widely accepted standards, which make this scheme easy to implement between VyOS and virtually any other router.

For simplicity we'll assume that the protocol is GRE, it's not hard to guess what needs to be changed to make it work with a different protocol. We assume that IPsec will use pre-shared secret authentication and will use AES128/SHA1 for the cipher and hash. Adjust this as necessary.

Note: VMware users should ensure that a VMXNET3 adapter is used. E1000 adapters have known issues with GRE processing.

IPsec policy matching GRE

The first and arguably cleaner option is to make your IPsec policy match GRE packets between external addresses of your routers. This is the best option if both routers have static external addresses.

Suppose the LEFT router has external address 192.0.2.10 on its eth0 interface, and the RIGHT router is 203.0.113.45

On the LEFT:

```
# GRE tunnel
set interfaces tunnel tun0 encapsulation gre
set interfaces tunnel tun0 source-address 192.0.2.10
set interfaces tunnel tun0 remote 203.0.113.45
set interfaces tunnel tun0 address 10.10.10.1/30

## IPsec
set vpn ipsec ipsec-interfaces interface eth0

# IKE group
set vpn ipsec ike-group MyIKEGroup proposal 1 dh-group '2'
set vpn ipsec ike-group MyIKEGroup proposal 1 encryption 'aes128'
set vpn ipsec ike-group MyIKEGroup proposal 1 hash 'sha1'

# ESP group
set vpn ipsec esp-group MyESPGroup proposal 1 encryption 'aes128'
set vpn ipsec esp-group MyESPGroup proposal 1 hash 'sha1'

# IPsec tunnel
set vpn ipsec site-to-site peer 203.0.113.45 authentication mode pre-shared-secret
```

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```
set vpn ipsec site-to-site peer 203.0.113.45 authentication pre-shared-secret MYSECRETKEY

set vpn ipsec site-to-site peer 203.0.113.45 ike-group MyIKEGroup
set vpn ipsec site-to-site peer 203.0.113.45 default-esp-group MyESPGroup

set vpn ipsec site-to-site peer 203.0.113.45 local-address 192.0.2.10

# This will match all GRE traffic to the peer
set vpn ipsec site-to-site peer 203.0.113.45 tunnel 1 protocol gre
```

On the RIGHT, setup by analogy and swap local and remote addresses.

Source tunnel from loopbacks

The scheme above doesn't work when one of the routers has a dynamic external address though. The classic workaround for this is to setup an address on a loopback interface and use it as a source address for the GRE tunnel, then setup an IPsec policy to match those loopback addresses.

We assume that the LEFT router has static 192.0.2.10 address on eth0, and the RIGHT router has a dynamic address on eth0.

Setting up the GRE tunnel

On the LEFT:

```
set interfaces loopback lo address 192.168.99.1/32

set interfaces tunnel tun0 encapsulation gre
set interfaces tunnel tun0 address 10.10.10.1/30
set interfaces tunnel tun0 source-address 192.168.99.1
set interfaces tunnel tun0 remote 192.168.99.2
```

On the RIGHT:

```
set interfaces loopback lo address 192.168.99.2/32

set interfaces tunnel tun0 encapsulation gre
set interfaces tunnel tun0 address 10.10.10.2/30
set interfaces tunnel tun0 source-address 192.168.99.2
set interfaces tunnel tun0 remote 192.168.99.1
```

Setting up IPSec

However, now you need to make IPsec work with dynamic address on one side. The tricky part is that pre-shared secret authentication doesn't work with dynamic address, so we'll have to use RSA keys.

First, on both routers run the operational command "generate vpn rsa-key bits 2048". You may choose different length than 2048 of course.

```
vyos@left# run generate vpn rsa-key bits 2048
Generating rsa-key to /config/ipsec.d/rsa-keys/localhost.key

Your new local RSA key has been generated
The public portion of the key is:
```

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```
0sAQO2335[long string here]
```

Then on the opposite router, add the RSA key to your config.

```
set vpn rsa-keys rsa-key-name LEFT rsa-key KEYGOESHERE
```

Now you are ready to setup IPsec. You'll need to use an ID instead of address for the peer on the dynamic side.

On the LEFT (static address):

```
set vpn rsa-keys rsa-key-name RIGHT rsa-key <PUBLIC KEY FROM THE RIGHT>

set vpn ipsec ipsec-interfaces interface eth0

set vpn ipsec esp-group MyESPGroup proposal 1 encryption aes128
set vpn ipsec esp-group MyESPGroup proposal 1 hash sha1

set vpn ipsec ike-group MyIKEGroup proposal 1 dh-group 2
set vpn ipsec ike-group MyIKEGroup proposal 1 encryption aes128
set vpn ipsec ike-group MyIKEGroup proposal 1 hash sha1

set vpn ipsec site-to-site peer @RIGHT authentication mode rsa
set vpn ipsec site-to-site peer @RIGHT authentication rsa-key-name RIGHT
set vpn ipsec site-to-site peer @RIGHT default-esp-group MyESPGroup
set vpn ipsec site-to-site peer @RIGHT ike-group MyIKEGroup
set vpn ipsec site-to-site peer @RIGHT local-address 192.0.2.10
set vpn ipsec site-to-site peer @RIGHT connection-type respond
set vpn ipsec site-to-site peer @RIGHT tunnel 1 local prefix 192.168.99.1/32  #␣
↪Additional loopback address on the local
set vpn ipsec site-to-site peer @RIGHT tunnel 1 remote prefix 192.168.99.2/32 #␣
↪Additional loopback address on the remote
```

On the RIGHT (dynamic address):

```
set vpn rsa-keys rsa-key-name LEFT rsa-key <PUBLIC KEY FROM THE LEFT>

set vpn ipsec ipsec-interfaces interface eth0

set vpn ipsec esp-group MyESPGroup proposal 1 encryption aes128
set vpn ipsec esp-group MyESPGroup proposal 1 hash sha1

set vpn ipsec ike-group MyIKEGroup proposal 1 dh-group 2
set vpn ipsec ike-group MyIKEGroup proposal 1 encryption aes128
set vpn ipsec ike-group MyIKEGroup proposal 1 hash sha1

set vpn ipsec site-to-site peer 192.0.2.10 authentication id @RIGHT
set vpn ipsec site-to-site peer 192.0.2.10 authentication mode rsa
set vpn ipsec site-to-site peer 192.0.2.10 authentication rsa-key-name LEFT
set vpn ipsec site-to-site peer 192.0.2.10 authentication remote-id LEFT
set vpn ipsec site-to-site peer 192.0.2.10 connection-type initiate
set vpn ipsec site-to-site peer 192.0.2.10 default-esp-group MyESPGroup
set vpn ipsec site-to-site peer 192.0.2.10 ike-group MyIKEGroup
```

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```
set vpn ipsec site-to-site peer 192.0.2.10 local-address any
set vpn ipsec site-to-site peer 192.0.2.10 tunnel 1 local prefix 192.168.99.2/32  #␣
↪Additional loopback address on the local
set vpn ipsec site-to-site peer 192.0.2.10 tunnel 1 remote prefix 192.168.99.1/32 #␣
↪Additional loopback address on the remote
```

8.13.2 L2TP

VyOS utilizes accel-ppp to provide L2TP server functionality. It can be used with local authentication or a connected RADIUS server.

L2TP over IPsec

Example for configuring a simple L2TP over IPsec VPN for remote access (works with native Windows and Mac VPN clients):

```
set vpn ipsec ipsec-interfaces interface eth0
set vpn ipsec nat-traversal enable
set vpn ipsec nat-networks allowed-network 0.0.0.0/0

set vpn l2tp remote-access outside-address 192.0.2.2
set vpn l2tp remote-access client-ip-pool start 192.168.255.2
set vpn l2tp remote-access client-ip-pool stop 192.168.255.254
set vpn l2tp remote-access ipsec-settings authentication mode pre-shared-secret
set vpn l2tp remote-access ipsec-settings authentication pre-shared-secret <secret>
set vpn l2tp remote-access authentication mode local
set vpn l2tp remote-access authentication local-users username test password 'test'
```

In the above example, an external IP of 192.0.2.2 is assumed.

If a local firewall policy is in place on your external interface you will need to allow the ports below:

- UDP port 500 (IKE)
- IP protocol number 50 (ESP)
- UDP port 1701 for IPsec

As well as the below to allow NAT-traversal (when NAT is detected by the VPN client, ESP is encapsulated in UDP for NAT-traversal):

- UDP port 4500 (NAT-T)

Example:

```
set firewall name OUTSIDE-LOCAL rule 40 action 'accept'
set firewall name OUTSIDE-LOCAL rule 40 protocol 'esp'
set firewall name OUTSIDE-LOCAL rule 41 action 'accept'
set firewall name OUTSIDE-LOCAL rule 41 destination port '500'
set firewall name OUTSIDE-LOCAL rule 41 protocol 'udp'
set firewall name OUTSIDE-LOCAL rule 42 action 'accept'
set firewall name OUTSIDE-LOCAL rule 42 destination port '4500'
set firewall name OUTSIDE-LOCAL rule 42 protocol 'udp'
set firewall name OUTSIDE-LOCAL rule 43 action 'accept'
```

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```
set firewall name OUTSIDE-LOCAL rule 43 destination port '1701'
set firewall name OUTSIDE-LOCAL rule 43 ipsec 'match-ipsec'
set firewall name OUTSIDE-LOCAL rule 43 protocol 'udp'
```

To allow VPN-clients access via your external address, a NAT rule is required:

```
set nat source rule 110 outbound-interface 'eth0'
set nat source rule 110 source address '192.168.255.0/24'
set nat source rule 110 translation address masquerade
```

VPN-clients will request configuration parameters, optionally you can DNS parameter to the client.

```
set vpn l2tp remote-access name-server '198.51.100.8'
set vpn l2tp remote-access name-server '198.51.100.4'
```

Established sessions can be viewed using the **show vpn remote-access** operational command, or **show l2tp-server sessions**

```
vyos@vyos:~$ show vpn remote-access
 ifname | username | calling-sid  |      ip       | rate-limit | type | comp | state  | ␣
↪uptime
--------+----------+--------------+---------------+------------+------+------+--------+--
↪--------
 ppp0   | vyos     | 192.168.0.36 | 192.168.255.1 |            | l2tp |      | active |␣
↪00:06:13
```

LNS (L2TP Network Server)

LNS are often used to connect to a LAC (L2TP Access Concentrator).

Below is an example to configure a LNS:

```
set vpn l2tp remote-access outside-address 192.0.2.2
set vpn l2tp remote-access client-ip-pool start 192.168.255.2
set vpn l2tp remote-access client-ip-pool stop 192.168.255.254
set vpn l2tp remote-access lns shared-secret 'secret'
set vpn l2tp remote-access ccp-disable
set vpn l2tp remote-access authentication mode local
set vpn l2tp remote-access authentication local-users username test password 'test'
```

The example above uses 192.0.2.2 as external IP address. A LAC normally requires an authentication password, which is set in the example configuration to `lns shared-secret 'secret'`. This setup requires the Compression Control Protocol (CCP) being disabled, the command `set vpn l2tp remote-access ccp-disable` accomplishes that.

Bandwidth Shaping

Bandwidth rate limits can be set for local users or via RADIUS based attributes.

Bandwidth Shaping for local users

The rate-limit is set in kbit/sec.

```
set vpn l2tp remote-access outside-address 192.0.2.2
set vpn l2tp remote-access client-ip-pool start 192.168.255.2
set vpn l2tp remote-access client-ip-pool stop 192.168.255.254
set vpn l2tp remote-access authentication mode local
set vpn l2tp remote-access authentication local-users username test password test
set vpn l2tp remote-access authentication local-users username test rate-limit download␣
↪20480
set vpn l2tp remote-access authentication local-users username test rate-limit upload␣
↪10240

vyos@vyos:~$ show vpn remote-access
ifname | username | calling-sid  |      ip       | rate-limit  | type | comp | state  | ␣
↪uptime
-------+----------+--------------+---------------+-------------+------+------+--------+--
↪---------
ppp0   | test     | 192.168.0.36 | 192.168.255.2 | 20480/10240 | l2tp |      | active |␣
↪00:06:30
```

RADIUS authentication

To enable RADIUS based authentication, the authentication mode needs to be changed within the configuration. Previous settings like the local users, still exists within the configuration, however they are not used if the mode has been changed from local to radius. Once changed back to local, it will use all local accounts again.

```
set vpn l2tp remote-access authentication mode <local|radius>
```

Since the RADIUS server would be a single point of failure, multiple RADIUS servers can be setup and will be used subsequentially.

```
set vpn l2tp remote-access authentication radius server 10.0.0.1 key 'foo'
set vpn l2tp remote-access authentication radius server 10.0.0.2 key 'foo'
```

Note: Some RADIUS severs use an access control list which allows or denies queries, make sure to add your VyOS router to the allowed client list.

RADIUS source address

If you are using OSPF as IGP, always the closest interface connected to the RADIUS server is used. With VyOS 1.2 you can bind all outgoing RADIUS requests to a single source IP e.g. the loopback interface.

```
set vpn l2tp remote-access authentication radius source-address 10.0.0.3
```

Above command will use *10.0.0.3* as source IPv4 address for all RADIUS queries on this NAS.

Note: The `source-address` must be configured on one of VyOS interface. Best practice would be a loopback or dummy interface.

RADIUS bandwidth shaping attribute

To enable bandwidth shaping via RADIUS, the option rate-limit needs to be enabled.

```
set vpn l2tp remote-access authentication radius rate-limit enable
```

The default RADIUS attribute for rate limiting is `Filter-Id`, but you may also redefine it.

```
set vpn l2tp remote-access authentication radius rate-limit attribute Download-Speed
```

Note: If you set a custom RADIUS attribute you must define it on both dictionaries at RADIUS server and client, which is the vyos router in our example.

The RADIUS dictionaries in VyOS are located at `/usr/share/accel-ppp/radius/`

RADIUS advanced features

Received RADIUS attributes have a higher priority than parameters defined within the CLI configuration, refer to the explanation below.

Allocation clients ip addresses by RADIUS

If the RADIUS server sends the attribute `Framed-IP-Address` then this IP address will be allocated to the client and the option ip-pool within the CLI config is being ignored.

Renaming clients interfaces by RADIUS

If the RADIUS server uses the attribute `NAS-Port-Id`, ppp tunnels will be renamed.

Note: The value of the attribute `NAS-Port-Id` must be less than 16 characters, otherwise the interface won't be renamed.

8.13.3 OpenConnect

OpenConnect-compatible server feature is available from this release. Openconnect VPN supports SSL connection and offers full network access. SSL VPN network extension connects the end-user system to the corporate network with access controls based only on network layer information, such as destination IP address and port number. So, it provides safe communication for all types of device traffic across public networks and private networks, also encrypts the traffic with SSL protocol.

The remote user will use the openconnect client to connect to the router and will receive an IP address from a VPN pool, allowing full access to the network.

Note: All certificates should be stored on VyOS under /config/auth. If certificates are not stored in the /config directory they will not be migrated during a software update.

Configuration

SSL Certificates

We need to generate the certificate which authenticates users who attempt to access the network resource through the SSL VPN tunnels. The following command will create a self signed certificates and will be stored in the file path */config/auth*.

```
openssl req -newkey rsa:4096 -new -nodes -x509 -days 3650 -keyout /config/auth/server.
↪key -out /config/auth/server.crt
openssl req -new -x509 -key /config/auth/server.key -out /config/auth/ca.crt
```

We can also create the certificates using Cerbort which is an easy-to-use client that fetches a certificate from Let's Encrypt an open certificate authority launched by the EFF, Mozilla, and others and deploys it to a web server.

```
sudo certbot certonly --standalone --preferred-challenges http -d <domain name>
```

Server Configuration

```
set vpn openconnect authentication local-users username <user> password <pass>
set vpn openconnect authentication mode <local|radius>
set vpn openconnect network-settings client-ip-settings subnet <subnet>
set vpn openconnect network-settings name-server <address>
set vpn openconnect network-settings name-server <address>
set vpn openconnect ssl ca-cert-file <file>
set vpn openconnect ssl cert-file <file>
set vpn openconnect ssl key-file <file>
```

Example

Use local user name "user4" with password "SecretPassword" Client IP addresses will be provided from pool 100.64.0.0/24 The Gateway IP Address must be in one of the router´s interfaces.

```
set vpn openconnect authentication local-users username user4 password 'SecretPassword'
set vpn openconnect authentication mode 'local'
set vpn openconnect network-settings client-ip-settings subnet '100.64.0.0/24'
set vpn openconnect network-settings name-server '10.1.1.1'
set vpn openconnect network-settings name-server '10.1.1.2'
set vpn openconnect ssl ca-cert-file '/config/auth/fullchain.pem'
set vpn openconnect ssl cert-file '/config/auth/cert.pem'
set vpn openconnect ssl key-file '/config/auth/privkey.pem'
```

Verification

```
vyos@RTR1:~$ show openconnect-server sessions

interface    username    ip            remote IP      RX        TX        state      ␣
↪uptime
-----------  ----------  ------------  -------------  --------  --------  ---------  ----
↪----
sslvpn0      user4       100.64.0.105  xx.xxx.49.253  127.3 KB  160.0 KB  connected ␣
↪12m:28s
```

Note: It is compatible with Cisco (R) AnyConnect (R) clients.

8.13.4 PPTP-Server

The Point-to-Point Tunneling Protocol (*PPTP*) has been implemented in VyOS only for backwards compatibility. PPTP has many well known security issues and you should use one of the many other new VPN implementations.

As per default and if not otherwise defined, mschap-v2 is being used for authentication and mppe 128-bit (stateless) for encryption. If no gateway-address is set within the configuration, the lowest IP out of the /24 client-ip-pool is being used. For instance, in the example below it would be 192.168.0.1.

server example

```
set vpn pptp remote-access authentication local-users username test password 'test'
set vpn pptp remote-access authentication mode 'local'
set vpn pptp remote-access client-ip-pool start '192.168.0.10'
set vpn pptp remote-access client-ip-pool stop '192.168.0.15'
set vpn pptp remote-access gateway-address '10.100.100.1'
set vpn pptp remote-access outside-address '10.1.1.120'
```

client example (debian 9)

Install the client software via apt and execute pptpsetup to generate the configuration.

```
apt-get install pptp-linux
pptpsetup --create TESTTUNNEL --server 10.1.1.120 --username test --password test --
↪encrypt
pon TESTTUNNEL
```

The command pon TESTUNNEL establishes the PPTP tunnel to the remote system.

All tunnel sessions can be checked via:

```
run sh pptp-server sessions
 ifname | username | calling-sid |      ip      | type | comp | state  |  uptime
--------+----------+-------------+--------------+------+------+--------+----------
 ppp0   | test     | 10.1.1.99   | 192.168.0.10 | pptp | mppe | active | 00:00:58
```

8.13.5 RSA-Keys

RSA can be used for services such as key exchanges and for encryption purposes. To make IPSec work with dynamic address on one/both sides, we will have to use RSA keys for authentication. They are very fast and easy to setup.

First, on both routers run the operational command "generate vpn rsa-key bits 2048". You may choose different length than 2048 of course.

```
vyos@left# run generate vpn rsa-key bits 2048
Generating rsa-key to /config/ipsec.d/rsa-keys/localhost.key

Your new local RSA key has been generated
The public portion of the key is:

0sAQO2335[long string here]
```

Please note down this public key, as you have to add this RSA key in the opposite router.

```
set vpn rsa-keys rsa-key-name LEFT rsa-key KEYGOESHERE
```

Now you are ready to setup IPsec. The key points:

1. Since both routers do not know their effective public addresses, we set the local-address of the peer to "any".
2. On the initiator, we set the peer address to its public address, but on the responder we only set the id.
3. On the initiator, we need to set the remote-id option so that it can identify IKE traffic from the responder correctly.
4. On the responder, we need to set the local id so that initiator can know who's talking to it for the point #3 to work.
5. Don't forget to enable NAT traversal on both sides, "set vpn ipsec nat-traversal enable".

LEFT SIDE:

```
set vpn rsa-keys rsa-key-name RIGHT rsa-key <PUBLIC KEY FROM THE RIGHT>

set vpn ipsec ipsec-interfaces interface eth0
set vpn ipsec nat-traversal 'enable'
```

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```
set vpn ipsec esp-group MyESPGroup proposal 1 encryption aes128
set vpn ipsec esp-group MyESPGroup proposal 1 hash sha1

set vpn ipsec ike-group MyIKEGroup proposal 1 dh-group 2
set vpn ipsec ike-group MyIKEGroup proposal 1 encryption aes128
set vpn ipsec ike-group MyIKEGroup proposal 1 hash sha1

set vpn ipsec site-to-site peer 192.0.2.60 authentication mode rsa
set vpn ipsec site-to-site peer 192.0.2.60 authentication id @LEFT
set vpn ipsec site-to-site peer 192.0.2.60 authentication rsa-key-name RIGHT
set vpn ipsec site-to-site peer 192.0.2.60 authentication remote-id RIGHT
set vpn ipsec site-to-site peer 192.0.2.60 default-esp-group MyESPGroup
set vpn ipsec site-to-site peer 192.0.2.60 ike-group MyIKEGroup
set vpn ipsec site-to-site peer 192.0.2.60 local-address any
set vpn ipsec site-to-site peer 192.0.2.60 connection-type initiate
set vpn ipsec site-to-site peer 192.0.2.60 tunnel 1 local prefix 192.168.99.1/32
set vpn ipsec site-to-site peer 192.0.2.60 tunnel 1 remote prefix 192.168.99.2/32
```

RIGHT SIDE:

```
set vpn rsa-keys rsa-key-name LEFT rsa-key <PUBLIC KEY FROM THE LEFT>

set vpn ipsec ipsec-interfaces interface eth0
set vpn ipsec nat-traversal 'enable'

set vpn ipsec esp-group MyESPGroup proposal 1 encryption aes128
set vpn ipsec esp-group MyESPGroup proposal 1 hash sha1

set vpn ipsec ike-group MyIKEGroup proposal 1 dh-group 2
set vpn ipsec ike-group MyIKEGroup proposal 1 encryption aes128
set vpn ipsec ike-group MyIKEGroup proposal 1 hash sha1

set vpn ipsec site-to-site peer @LEFT authentication id @RIGHT
set vpn ipsec site-to-site peer @LEFT authentication mode rsa
set vpn ipsec site-to-site peer @LEFT authentication rsa-key-name LEFT
set vpn ipsec site-to-site peer @LEFT connection-type respond
set vpn ipsec site-to-site peer @LEFT default-esp-group MyESPGroup
set vpn ipsec site-to-site peer @LEFT ike-group MyIKEGroup
set vpn ipsec site-to-site peer @LEFT local-address any
set vpn ipsec site-to-site peer @LEFT tunnel 1 local prefix 192.168.99.2/32
set vpn ipsec site-to-site peer @LEFT tunnel 1 remote prefix 192.168.99.1/32
```

8.13.6 SSTP

SSTP (Secure Socket Tunneling Protocol) is a form of VPN (Virtual Private Network) tunnel that provides a mechanism to transport PPP traffic through an SSL/TLS channel. SSL/TLS provides transport-level security with key negotiation, encryption and traffic integrity checking. The use of SSL/TLS over TCP port 443 allows SSTP to pass through virtually all firewalls and proxy servers except for authenticated web proxies.

SSTP is available for Linux, BSD, and Windows.

VyOS utilizes accel-ppp to provide SSTP server functionality. We support both local and RADIUS authentication.

As SSTP provides PPP via a SSL/TLS channel the use of either publically signed certificates as well as a private PKI is required.

Note: All certificates should be stored on VyOS under `/config/auth`. If certificates are not stored in the `/config` directory they will not be migrated during a software update.

Certificates

Self Signed CA

To generate the CA, the server private key and certificates the following commands can be used.

```
vyos@vyos:~$ mkdir -p /config/user-data/sstp
vyos@vyos:~$ openssl req -newkey rsa:4096 -new -nodes -x509 -days 3650 -keyout /config/
↪user-data/sstp/server.key -out /config/user-data/sstp/server.crt

Generating a 4096 bit RSA private key
.........................++
.............................................................++
writing new private key to 'server.key'
[...]
Country Name (2 letter code) [AU]:
State or Province Name (full name) [Some-State]:
Locality Name (eg, city) []:
Organization Name (eg, company) [Internet Widgits Pty Ltd]:
Organizational Unit Name (eg, section) []:
Common Name (e.g. server FQDN or YOUR name) []:
Email Address []:

vyos@vyos:~$ openssl req -new -x509 -key /config/user-data/sstp/server.key -out /config/
↪user-data/sstp/ca.crt
[...]
Country Name (2 letter code) [AU]:
State or Province Name (full name) [Some-State]:
Locality Name (eg, city) []:
Organization Name (eg, company) [Internet Widgits Pty Ltd]:
Organizational Unit Name (eg, section) []:
Common Name (e.g. server FQDN or YOUR name) []:
Email Address []:
```

Configuration

set vpn sstp authentication local-users username <user> password <pass>

Create <*user*> for local authentication on this system. The users password will be set to <*pass*>.

set vpn sstp authentication local-users username <user> disable

Disable <*user*> account.

set vpn sstp authentication local-users username <user> static-ip <address>

Assign static IP address to <*user*> account.

set vpn sstp authentication local-users username <user> rate-limit download <bandwidth>

Download bandwidth limit in kbit/s for <*user*>.

set vpn sstp authentication local-users username <user> rate-limit upload <bandwidth>

Upload bandwidth limit in kbit/s for <*user*>.

set vpn sstp authentication protocols <pap | chap | mschap | mschap-v2>

Require the peer to authenticate itself using one of the following protocols: pap, chap, mschap, mschap-v2.

set vpn sstp authentication mode <local | radius>

Set authentication backend. The configured authentication backend is used for all queries.

- **radius**: All authentication queries are handled by a configured RADIUS server.
- **local**: All authentication queries are handled locally.

set vpn sstp gateway-address <gateway>

Specifies single <*gateway*> IP address to be used as local address of PPP interfaces.

set vpn sstp client-ip-pool subnet <subnet>

Use <*subnet*> as the IP pool for all connecting clients.

set vpn sstp client-ipv6-pool prefix <address> mask <number-of-bits>

Use this comand to set the IPv6 address pool from which an SSTP client will get an IPv6 prefix of your defined length (mask) to terminate the SSTP endpoint at their side. The mask length can be set from 48 to 128 bit long, the default value is 64.

set vpn sstp client-ipv6-pool delegate <address> delegation-prefix <number-of-bits>

Use this command to configure DHCPv6 Prefix Delegation (RFC3633) on SSTP. You will have to set your IPv6 pool and the length of the delegation prefix. From the defined IPv6 pool you will be handing out networks of the defined length (delegation-prefix). The length of the delegation prefix can be set from 32 to 64 bit long.

set vpn sstp name-server <address>

Connected client should use <*address*> as their DNS server. This command accepts both IPv4 and IPv6 addresses. Up to two nameservers can be configured for IPv4, up to three for IPv6.

Maximum number of IPv4 nameservers

SSL Certificates

set vpn sstp ssl ca-cert-file <file>

Path to <*file*> pointing to the certificate authority certificate.

set vpn sstp ssl cert-file <file>

Path to <*file*> pointing to the servers certificate (public portion).

set vpn sstp ssl key-file <file>

Path to <*file*> pointing to the servers certificate (private portion).

PPP Settings

set vpn sstp ppp-options lcp-echo-failure <number>

Defines the maximum <*number*> of unanswered echo requests. Upon reaching the value <*number*>, the session will be reset.

set vpn sstp ppp-options lcp-echo-interval <interval>

If this option is specified and is greater than 0, then the PPP module will send LCP pings of the echo request every <*interval*> seconds.

set vpn sstp ppp-options lcp-echo-timeout

Specifies timeout in seconds to wait for any peer activity. If this option specified it turns on adaptive lcp echo functionality and "lcp-echo-failure" is not used.

set vpn sstp ppp-options mppe <require | prefer | deny>

Specifies MPPE (Microsoft Point-to-Point Encryption) negotioation preference.

- **require** - ask client for mppe, if it rejects drop connection
- **prefer** - ask client for mppe, if it rejects don't fail
- **deny** - deny mppe

Default behavior - don't ask client for mppe, but allow it if client wants. Please note that RADIUS may override this option by MS-MPPE-Encryption-Policy attribute.

RADIUS

Server

set vpn sstp authentication radius server <server> port <port>

Configure RADIUS <*server*> and its required port for authentication requests.

set vpn sstp authentication radius server <server> key <secret>

Configure RADIUS <*server*> and its required shared <*secret*> for communicating with the RADIUS server.

set vpn sstp authentication radius server <server> fail-time <time>

Mark RADIUS server as offline for this given <*time*> in seconds.

set vpn sstp authentication radius server <server> disable

Temporary disable this RADIUS server.

Options

set vpn sstp authentication radius acct-timeout <timeout>

Timeout to wait reply for Interim-Update packets. (default 3 seconds)

set vpn sstp authentication radius dynamic-author server <address>

Specifies IP address for Dynamic Authorization Extension server (DM/CoA)

set vpn sstp authentication radius dynamic-author port <port>

Port for Dynamic Authorization Extension server (DM/CoA)

set vpn sstp authentication radius dynamic-author key <secret>

Secret for Dynamic Authorization Extension server (DM/CoA)

set vpn sstp authentication radius max-try <number>

Maximum number of tries to send Access-Request/Accounting-Request queries

set vpn sstp authentication radius timeout <timeout>

Timeout to wait response from server (seconds)

set vpn sstp authentication radius nas-identifier <identifier>

Value to send to RADIUS server in NAS-Identifier attribute and to be matched in DM/CoA requests.

set vpn sstp authentication radius nas-ip-address <address>

Value to send to RADIUS server in NAS-IP-Address attribute and to be matched in DM/CoA requests. Also DM/CoA server will bind to that address.

set vpn sstp authentication radius source-address <address>

Source IPv4 address used in all RADIUS server queires.

set vpn sstp authentication radius rate-limit attribute <attribute>

Specifies which RADIUS server attribute contains the rate limit information. The default attribute is *Filter-Id*.

set vpn sstp authentication radius rate-limit enable

Enables bandwidth shaping via RADIUS.

set vpn sstp authentication radius rate-limit vendor

Specifies the vendor dictionary, dictionary needs to be in /usr/share/accel-ppp/radius.

Example

- Use local user *foo* with password *bar*
- Client IP addresses will be provided from pool *192.0.2.0/25*

```
set vpn sstp authentication local-users username vyos password vyos
set vpn sstp authentication mode local
set vpn sstp gateway-address 192.0.2.254
set vpn sstp client-ip-pool subnet 192.0.2.0/25
set vpn sstp name-server 10.0.0.1
set vpn sstp name-server 10.0.0.2
set vpn sstp ssl ca-cert-file /config/auth/ca.crt
```

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```
set vpn sstp ssl cert-file /config/auth/server.crt
set vpn sstp ssl key-file /config/auth/server.key
```

Testing SSTP

Once you have setup your SSTP server there comes the time to do some basic testing. The Linux client used for testing is called sstpc. sstpc requires a PPP configuration/peer file.

The following PPP configuration tests MSCHAP-v2:

```
$ cat /etc/ppp/peers/vyos
usepeerdns
#require-mppe
#require-pap
require-mschap-v2
noauth
lock
refuse-pap
refuse-eap
refuse-chap
refuse-mschap
#refuse-mschap-v2
nobsdcomp
nodeflate
debug
```

You can now "dial" the peer with the follwoing command: `sstpc --log-level 4 --log-stderr --user vyos --password vyos vpn.example.com -- call vyos`.

A connection attempt will be shown as:

```
$ sstpc --log-level 4 --log-stderr --user vyos --password vyos vpn.example.com -- call␣
↪vyos

Mar 22 13:29:12 sstpc[12344]: Resolved vpn.example.com to 192.0.2.1
Mar 22 13:29:12 sstpc[12344]: Connected to vpn.example.com
Mar 22 13:29:12 sstpc[12344]: Sending Connect-Request Message
Mar 22 13:29:12 sstpc[12344]: SEND SSTP CRTL PKT(14)
Mar 22 13:29:12 sstpc[12344]:   TYPE(1): CONNECT REQUEST, ATTR(1):
Mar 22 13:29:12 sstpc[12344]:     ENCAP PROTO(1): 6
Mar 22 13:29:12 sstpc[12344]: RECV SSTP CRTL PKT(48)
Mar 22 13:29:12 sstpc[12344]:   TYPE(2): CONNECT ACK, ATTR(1):
Mar 22 13:29:12 sstpc[12344]:     CRYPTO BIND REQ(4): 40
Mar 22 13:29:12 sstpc[12344]: Started PPP Link Negotiation
Mar 22 13:29:15 sstpc[12344]: Sending Connected Message
Mar 22 13:29:15 sstpc[12344]: SEND SSTP CRTL PKT(112)
Mar 22 13:29:15 sstpc[12344]:   TYPE(4): CONNECTED, ATTR(1):
Mar 22 13:29:15 sstpc[12344]:     CRYPTO BIND(3): 104
Mar 22 13:29:15 sstpc[12344]: Connection Established

$ ip addr show ppp0
164: ppp0: <POINTOPOINT,MULTICAST,NOARP,UP,LOWER_UP> mtu 1452 qdisc fq_codel state␣
```

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```
↪UNKNOWN group default qlen 3
    link/ppp  promiscuity 0
    inet 100.64.2.2 peer 100.64.1.1/32 scope global ppp0
       valid_lft forever preferred_lft forever
```

pages to sort

8.13.7 DMVPN

DMVPN (Dynamic Multipoint Virtual Private Network) is a dynamic VPN technology originally developed by Cisco. While their implementation was somewhat proprietary, the underlying technologies are actually standards based. The three technologies are:

- NHRP (Next Hop Resolution Protocol) **RFC 2332**
- mGRE (Multipoint Generic Routing Encapsulation) **RFC 1702**
- IPSec (IP Security) - too many RFCs to list, but start with **RFC 4301**

NHRP provides the dynamic tunnel endpoint discovery mechanism (endpoint registration, and endpoint discovery/lookup), mGRE provides the tunnel encapsulation itself, and the IPSec protocols handle the key exchange, and crypto mechanism.

In short, DMVPN provides the capability for creating a dynamic-mesh VPN network without having to pre-configure (static) all possible tunnel end-point peers.

Note: DMVPN only automates the tunnel endpoint discovery and setup. A complete solution also incorporates the use of a routing protocol. BGP is particularly well suited for use with DMVPN.

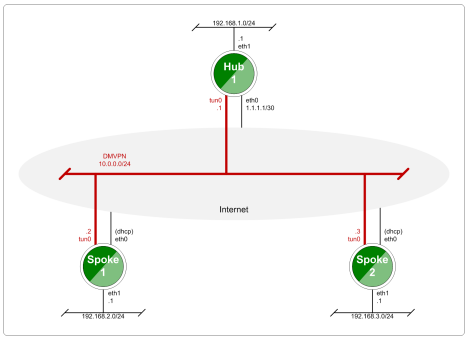

Fig. 6: Baseline DMVPN topology

Configuration

- Please refer to the *Tunnel* documentation for the individual tunnel related options.
- Please refer to the *IPsec* documentation for the individual IPSec related options.

set protocols nhrp tunnel <tunnel> cisco-authentication <secret>

Enables Cisco style authentication on NHRP packets. This embeds the secret plaintext password to the outgoing NHRP packets. Incoming NHRP packets on this interface are discarded unless the secret password is present. Maximum length of the secret is 8 characters.

set protocols nhrp tunnel <tunnel> dynamic-map <address> nbma-domain-name <fqdn>

Specifies that the NBMA (Non-broadcast multiple-access network) addresses of the next hop servers are defined in the domain name nbma-domain-name. For each A record opennhrp creates a dynamic NHS entry.

Each dynamic NHS will get a peer entry with the configured network address and the discovered NBMA address.

The first registration request is sent to the protocol broadcast address, and the server's real protocol address is dynamically detected from the first registration reply.

set protocols nhrp tunnel <tunnel> holding-time <timeout>

Specifies the holding time for NHRP Registration Requests and Resolution Replies sent from this interface or shortcut-target. The holdtime is specified in seconds and defaults to two hours.

set protocols nhrp tunnel <tunnel> map cisco

If the statically mapped peer is running Cisco IOS, specify the cisco keyword. It is used to fix statically the Registration Request ID so that a matching Purge Request can be sent if NBMA address has changed. This is to work around broken IOS which requires Purge Request ID to match the original Registration Request ID.

set protocols nhrp tunnel <tunnel> map nbma-address <address>

Creates static peer mapping of protocol-address to NBMA address.

If the IP prefix mask is present, it directs opennhrp to use this peer as a next hop server when sending Resolution Requests matching this subnet.

This is also known as the HUBs IP address or FQDN.

set protocols nhrp tunnel <tunnel> map register

The optional parameter register specifies that Registration Request should be sent to this peer on startup.

This option is required when running a DMVPN spoke.

set protocols nhrp tunnel <tunnel> multicast <dynamic | nhs>

Determines how opennhrp daemon should soft switch the multicast traffic. Currently, multicast traffic is captured by opennhrp daemon using a packet socket, and resent back to proper destinations. This means that multicast packet sending is CPU intensive.

Specfying nhs makes all multicast packets to be repeated to each statically configured next hop.

Synamic instructs to forward to all peers which we have a direct connection with. Alternatively, you can specify the directive multiple times for each protocol-address the multicast traffic should be sent to.

> **Warning:** It is very easy to misconfigure multicast repeating if you have multiple NHSes.

set protocols nhrp tunnel <tunnel> non-caching

Disables caching of peer information from forwarded NHRP Resolution Reply packets. This can be used to reduce memory consumption on big NBMA subnets.

Note: Currently does not do much as caching is not implemented.

set protocols nhrp tunnel <tunnel> redirect

Enable sending of Cisco style NHRP Traffic Indication packets. If this is enabled and opennhrp detects a forwarded packet, it will send a message to the original sender of the packet instructing it to create a direct connection with the destination. This is basically a protocol independent equivalent of ICMP redirect.

set protocols nhrp tunnel <tunnel> shortcut

Enable creation of shortcut routes.

A received NHRP Traffic Indication will trigger the resolution and establishment of a shortcut route.

set protocols nhrp tunnel <tunnel> shortcut-destination

This instructs opennhrp to reply with authorative answers on NHRP Resolution Requests destinied to addresses in this interface (instead of forwarding the packets). This effectively allows the creation of shortcut routes to subnets located on the interface.

When specified, this should be the only keyword for the interface.

set protocols nhrp tunnel <tunnel> shortcut-target <address>

Defines an off-NBMA network prefix for which the GRE interface will act as a gateway. This an alternative to defining local interfaces with shortcut-destination flag.

set protocols nhrp tunnel <tunnel> shortcut-target <address> holding-time <timeout>

Specifies the holding time for NHRP Registration Requests and Resolution Replies sent from this interface or shortcut-target. The holdtime is specified in seconds and defaults to two hours.

Example

This blueprint uses VyOS as the DMVPN Hub and Cisco (7206VXR) and VyOS as multiple spoke sites. The lab was build using EVE-NG (Emulated Virtual Environment NG).

Each node (Hub and Spoke) uses an IP address from the network 172.16.253.128/29.

The below referenced IP address *192.0.2.1* is used as example address representing a global unicast address under which the HUB can be contacted by each and every individual spoke.

Configuration

Hub

```
set interfaces ethernet eth0 address 192.0.2.1/24

set interfaces tunnel tun100 address '172.16.253.134/29'
set interfaces tunnel tun100 encapsulation 'gre'
set interfaces tunnel tun100 source-address '192.0.2.1'
set interfaces tunnel tun100 multicast 'enable'
set interfaces tunnel tun100 parameters ip key '1'
```

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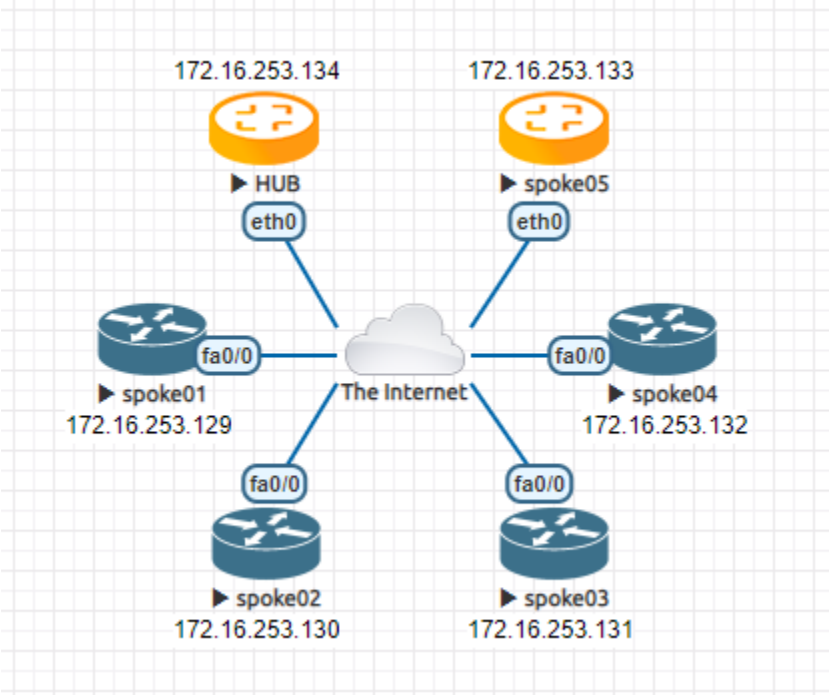

Fig. 7: DMVPN example network

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```
set protocols nhrp tunnel tun100 cisco-authentication 'secret'
set protocols nhrp tunnel tun100 holding-time '300'
set protocols nhrp tunnel tun100 multicast 'dynamic'
set protocols nhrp tunnel tun100 redirect
set protocols nhrp tunnel tun100 shortcut

set vpn ipsec esp-group ESP-HUB compression 'disable'
set vpn ipsec esp-group ESP-HUB lifetime '1800'
set vpn ipsec esp-group ESP-HUB mode 'transport'
set vpn ipsec esp-group ESP-HUB pfs 'dh-group2'
set vpn ipsec esp-group ESP-HUB proposal 1 encryption 'aes256'
set vpn ipsec esp-group ESP-HUB proposal 1 hash 'sha1'
set vpn ipsec esp-group ESP-HUB proposal 2 encryption '3des'
set vpn ipsec esp-group ESP-HUB proposal 2 hash 'md5'
set vpn ipsec ike-group IKE-HUB ikev2-reauth 'no'
set vpn ipsec ike-group IKE-HUB key-exchange 'ikev1'
set vpn ipsec ike-group IKE-HUB lifetime '3600'
set vpn ipsec ike-group IKE-HUB proposal 1 dh-group '2'
set vpn ipsec ike-group IKE-HUB proposal 1 encryption 'aes256'
set vpn ipsec ike-group IKE-HUB proposal 1 hash 'sha1'
set vpn ipsec ike-group IKE-HUB proposal 2 dh-group '2'
set vpn ipsec ike-group IKE-HUB proposal 2 encryption 'aes128'
set vpn ipsec ike-group IKE-HUB proposal 2 hash 'sha1'

set vpn ipsec ipsec-interfaces interface 'eth0'
```

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```
set vpn ipsec profile NHRPVPN authentication mode 'pre-shared-secret'
set vpn ipsec profile NHRPVPN authentication pre-shared-secret 'secret'
set vpn ipsec profile NHRPVPN bind tunnel 'tun100'
set vpn ipsec profile NHRPVPN esp-group 'ESP-HUB'
set vpn ipsec profile NHRPVPN ike-group 'IKE-HUB'
```

Note: Setting this up on AWS will require a "Custom Protocol Rule" for protocol number "47" (GRE) Allow Rule in TWO places. Firstly on the VPC Network ACL, and secondly on the security group network ACL attached to the EC2 instance. This has been tested as working for the official AMI image on the AWS Marketplace. (Locate the correct VPC and security group by navigating through the details pane below your EC2 instance in the AWS console).

Spoke

The individual spoke configurations only differ in the local IP address on the `tun10` interface. See the above diagram for the individual IP addresses.

spoke01-spoke04

```
crypto keyring DMVPN
  pre-shared-key address 192.0.2.1 key secret
!
crypto isakmp policy 10
 encr aes 256
 authentication pre-share
 group 2
crypto isakmp invalid-spi-recovery
crypto isakmp keepalive 30 30 periodic
crypto isakmp profile DMVPN
   keyring DMVPN
   match identity address 192.0.2.1 255.255.255.255
!
crypto ipsec transform-set DMVPN-AES256 esp-aes 256 esp-sha-hmac
 mode transport
!
crypto ipsec profile DMVPN
 set security-association idle-time 720
 set transform-set DMVPN-AES256
 set isakmp-profile DMVPN
!
interface Tunnel10
 ! individual spoke tunnel IP must change
 ip address 172.16.253.129 255.255.255.248
 no ip redirects
 ip nhrp authentication secret
 ip nhrp map 172.16.253.134 192.0.2.1
 ip nhrp map multicast 192.0.2.1
 ip nhrp network-id 1
```

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```
 ip nhrp holdtime 600
 ip nhrp nhs 172.16.253.134
 ip nhrp registration timeout 75
 tunnel source FastEthernet0/0
 tunnel mode gre multipoint
 tunnel protection ipsec profile DMVPN
 tunnel key 1
!
interface FastEthernet0/0
 ip address dhcp
 duplex half
```

spoke05

VyOS can also run in DMVPN spoke mode.

```
set interfaces ethernet eth0 address 'dhcp'

set interfaces tunnel tun100 address '172.16.253.133/29'
set interfaces tunnel tun100 source-address 0.0.0.0
set interfaces tunnel tun100 encapsulation 'gre'
set interfaces tunnel tun100 multicast 'enable'
set interfaces tunnel tun100 parameters ip key '1'

set protocols nhrp tunnel tun100 cisco-authentication 'secret'
set protocols nhrp tunnel tun100 holding-time '300'
set protocols nhrp tunnel tun100 map 172.16.253.134/29 nbma-address '192.0.2.1'
set protocols nhrp tunnel tun100 map 172.16.253.134/29 register
set protocols nhrp tunnel tun100 multicast 'nhs'
set protocols nhrp tunnel tun100 redirect
set protocols nhrp tunnel tun100 shortcut

set vpn ipsec esp-group ESP-HUB compression 'disable'
set vpn ipsec esp-group ESP-HUB lifetime '1800'
set vpn ipsec esp-group ESP-HUB mode 'transport'
set vpn ipsec esp-group ESP-HUB pfs 'dh-group2'
set vpn ipsec esp-group ESP-HUB proposal 1 encryption 'aes256'
set vpn ipsec esp-group ESP-HUB proposal 1 hash 'sha1'
set vpn ipsec esp-group ESP-HUB proposal 2 encryption '3des'
set vpn ipsec esp-group ESP-HUB proposal 2 hash 'md5'
set vpn ipsec ike-group IKE-HUB close-action 'none'
set vpn ipsec ike-group IKE-HUB ikev2-reauth 'no'
set vpn ipsec ike-group IKE-HUB key-exchange 'ikev1'
set vpn ipsec ike-group IKE-HUB lifetime '3600'
set vpn ipsec ike-group IKE-HUB proposal 1 dh-group '2'
set vpn ipsec ike-group IKE-HUB proposal 1 encryption 'aes256'
set vpn ipsec ike-group IKE-HUB proposal 1 hash 'sha1'
set vpn ipsec ike-group IKE-HUB proposal 2 dh-group '2'
set vpn ipsec ike-group IKE-HUB proposal 2 encryption 'aes128'
set vpn ipsec ike-group IKE-HUB proposal 2 hash 'sha1'
```

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```
set vpn ipsec ipsec-interfaces interface 'eth0'

set vpn ipsec profile NHRPVPN authentication mode 'pre-shared-secret'
set vpn ipsec profile NHRPVPN authentication pre-shared-secret 'secret'
set vpn ipsec profile NHRPVPN bind tunnel 'tun100'
set vpn ipsec profile NHRPVPN esp-group 'ESP-HUB'
set vpn ipsec profile NHRPVPN ike-group 'IKE-HUB'
```

8.13.8 Site-to-Site

Site-to-site mode provides a way to add remote peers, which could be configured to exchange encrypted information between them and VyOS itself or connected/routed networks.

To configure site-to-site connection you need to add peers with the `set vpn ipsec site-to-site` command.

You can identify a remote peer with:

- IPv4 or IPv6 address. This mode is easiest for configuration and mostly used when a peer has a public static IP address;
- Hostname. This mode is similar to IP address, only you define DNS name instead of an IP. Could be used when a peer has a public IP address and DNS name, but an IP address could be changed from time to time;
- Remote ID of the peer. In this mode, there is no predefined remote address nor DNS name of the peer. This mode is useful when a peer doesn't have a publicly available IP address (NAT between it and VyOS), or IP address could be changed.

Each site-to-site peer has the next options:

- `authentication` - configure authentication between VyOS and a remote peer. Suboptions:
  - `id` - ID for the local VyOS router. If defined, during the authentication it will be send to remote peer;
  - `mode` - mode for authentication between VyOS and remote peer:
  - `pre-shared-secret` - use predefined shared secret phrase, must be the same for local and remote side;
  - `rsa` - use simple shared RSA key. The key must be defined in the `set vpn rsa-keys` section;
  - `x509` - use certificates infrastructure for authentication.
  - `pre-shared-secret` - predefined shared secret. Used if configured `mode pre-shared-secret`;
  - `remote-id` - define an ID for remote peer, instead of using peer name or address. Useful in case if the remote peer is behind NAT or if `mode x509` is used;
  - `rsa-key-name` - shared RSA key for authentication. The key must be defined in the `set vpn rsa-keys` section;
  - `use-x509-id` - use local ID from x509 certificate. Cannot be used when `id` is defined;
  - `x509` - options for x509 authentication mode:
    - `ca-cert-file` - CA certificate file. Using for authenticating remote peer;
    - `cert-file` - certificate file, which will be used for authenticating local router on remote peer;
    - `crl-file` - file with the Certificate Revocation List. Using to check if a certificate for the remote peer is valid or revoked;

    - key - a private key, which will be used for authenticating local router on remote peer:
    - file - path to the key file;
    - password - passphrase private key, if needed.
- connection-type - how to handle this connection process. Possible variants:
- initiate - do initial connection to remote peer immediately after configuring and after boot. In this mode the connection will not be restarted in case of disconnection, therefore should be used only together with DPD or another session tracking methods;
- respond - do not try to initiate a connection to a remote peer. In this mode, the IPSec session will be established only after initiation from a remote peer. Could be useful when there is no direct connectivity to the peer due to firewall or NAT in the middle of the local and remote side.
- default-esp-group - ESP group to use by default for traffic encryption. Might be overwritten by individual settings for tunnel or VTI interface binding;
- description - description for this peer;
- dhcp-interface - use an IP address, received from DHCP for IPSec connection with this peer, instead of local-address;
- force-encapsulation - force encapsulation of ESP into UDP datagrams. Useful in case if between local and remote side is firewall or NAT, which not allows passing plain ESP packets between them;
- ike-group - IKE group to use for key exchanges;
- ikev2-reauth - reauthenticate remote peer during the rekeying process. Can be used only with IKEv2:
- yes - create a new IKE_SA from the scratch and try to recreate all IPsec SAs;
- no - rekey without uninstalling the IPsec SAs;
- inherit - use default behavior for the used IKE group.
- local-address - local IP address for IPSec connection with this peer. If defined any, then an IP address which configured on interface with default route will be used;
- tunnel - define criteria for traffic to be matched for encrypting and send it to a peer:
    - disable - disable this tunnel;
    - esp-group - define ESP group for encrypt traffic, defined by this tunnel;
    - local - define a local source for match traffic, which should be encrypted and send to this peer:
    - port - define port. Have effect only when used together with prefix;
    - prefix - IP network at local side.
    - protocol - define the protocol for match traffic, which should be encrypted and send to this peer;
    - remote - define the remote destination for match traffic, which should be encrypted and send to this peer:
    - port - define port. Have effect only when used together with prefix;
    - prefix - IP network at remote side.
- vti - use a VTI interface for traffic encryption. Any traffic, which will be send to VTI interface will be encrypted and send to this peer. Using VTI makes IPSec configuration much flexible and easier in complex situation, and allows to dynamically add/delete remote networks, reachable via a peer, as in this mode router don't need to create additional SA/policy for each remote network:
- bind - select a VTI interface to bind to this peer;

- `esp-group` - define ESP group for encrypt traffic, passed this VTI interface.

Examples:

IKEv1

Example:

- WAN interface on *eth1*
- left subnet: *192.168.0.0/24* site1, server side (i.e. locality, actually there is no client or server roles)
- left local_ip: *198.51.100.3* # server side WAN IP
- right subnet: *10.0.0.0/24* site2,remote office side
- right local_ip: *203.0.113.2* # remote office side WAN IP

```
# server config
set vpn ipsec esp-group office-srv-esp compression 'disable'
set vpn ipsec esp-group office-srv-esp lifetime '1800'
set vpn ipsec esp-group office-srv-esp mode 'tunnel'
set vpn ipsec esp-group office-srv-esp pfs 'enable'
set vpn ipsec esp-group office-srv-esp proposal 1 encryption 'aes256'
set vpn ipsec esp-group office-srv-esp proposal 1 hash 'sha1'
set vpn ipsec ike-group office-srv-ike ikev2-reauth 'no'
set vpn ipsec ike-group office-srv-ike key-exchange 'ikev1'
set vpn ipsec ike-group office-srv-ike lifetime '3600'
set vpn ipsec ike-group office-srv-ike proposal 1 encryption 'aes256'
set vpn ipsec ike-group office-srv-ike proposal 1 hash 'sha1'
set vpn ipsec ipsec-interfaces interface 'eth1'
set vpn ipsec site-to-site peer 203.0.113.2 authentication mode 'pre-shared-secret'
set vpn ipsec site-to-site peer 203.0.113.2 authentication pre-shared-secret
↪'SomePreSharedKey'
set vpn ipsec site-to-site peer 203.0.113.2 ike-group 'office-srv-ike'
set vpn ipsec site-to-site peer 203.0.113.2 local-address '198.51.100.3'
set vpn ipsec site-to-site peer 203.0.113.2 tunnel 0 allow-nat-networks 'disable'
set vpn ipsec site-to-site peer 203.0.113.2 tunnel 0 allow-public-networks 'disable'
set vpn ipsec site-to-site peer 203.0.113.2 tunnel 0 esp-group 'office-srv-esp'
set vpn ipsec site-to-site peer 203.0.113.2 tunnel 0 local prefix '192.168.0.0/24'
set vpn ipsec site-to-site peer 203.0.113.2 tunnel 0 remote prefix '10.0.0.0/21'

# remote office config
set vpn ipsec esp-group office-srv-esp compression 'disable'
set vpn ipsec esp-group office-srv-esp lifetime '1800'
set vpn ipsec esp-group office-srv-esp mode 'tunnel'
set vpn ipsec esp-group office-srv-esp pfs 'enable'
set vpn ipsec esp-group office-srv-esp proposal 1 encryption 'aes256'
set vpn ipsec esp-group office-srv-esp proposal 1 hash 'sha1'
set vpn ipsec ike-group office-srv-ike ikev2-reauth 'no'
set vpn ipsec ike-group office-srv-ike key-exchange 'ikev1'
set vpn ipsec ike-group office-srv-ike lifetime '3600'
set vpn ipsec ike-group office-srv-ike proposal 1 encryption 'aes256'
set vpn ipsec ike-group office-srv-ike proposal 1 hash 'sha1'
set vpn ipsec ipsec-interfaces interface 'eth1'
```

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```
set vpn ipsec site-to-site peer 198.51.100.3 authentication mode 'pre-shared-secret'
set vpn ipsec site-to-site peer 198.51.100.3 authentication pre-shared-secret
↪'SomePreSharedKey'
set vpn ipsec site-to-site peer 198.51.100.3 ike-group 'office-srv-ike'
set vpn ipsec site-to-site peer 198.51.100.3 local-address '203.0.113.2'
set vpn ipsec site-to-site peer 198.51.100.3 tunnel 0 allow-nat-networks 'disable'
set vpn ipsec site-to-site peer 198.51.100.3 tunnel 0 allow-public-networks 'disable'
set vpn ipsec site-to-site peer 198.51.100.3 tunnel 0 esp-group 'office-srv-esp'
set vpn ipsec site-to-site peer 198.51.100.3 tunnel 0 local prefix '10.0.0.0/21'
set vpn ipsec site-to-site peer 198.51.100.3 tunnel 0 remote prefix '192.168.0.0/24'
```

Show status of new setup:

```
vyos@srv-gw0:~$ show vpn ike sa
Peer ID / IP                            Local ID / IP
------------                            -------------
203.0.113.2                                 198.51.100.3
   State  Encrypt  Hash    D-H Grp  NAT-T  A-Time  L-Time
   -----  -------  ----    -------  -----  ------  ------
   up     aes256   sha1    5        no     734     3600

vyos@srv-gw0:~$ show vpn ipsec sa
Peer ID / IP                            Local ID / IP
------------                            -------------
203.0.113.2                                 198.51.100.3
   Tunnel  State  Bytes Out/In   Encrypt  Hash    NAT-T  A-Time  L-Time  Proto
   ------  -----  -------------  -------  ----    -----  ------  ------  -----
   0       up     7.5M/230.6K    aes256   sha1    no     567     1800    all
```

If there is SNAT rules on eth1, need to add exclude rule

```
# server side
set nat source rule 10 destination address '10.0.0.0/24'
set nat source rule 10 'exclude'
set nat source rule 10 outbound-interface 'eth1'
set nat source rule 10 source address '192.168.0.0/24'

# remote office side
set nat source rule 10 destination address '192.168.0.0/24'
set nat source rule 10 'exclude'
set nat source rule 10 outbound-interface 'eth1'
set nat source rule 10 source address '10.0.0.0/24'
```

To allow traffic to pass through to clients, you need to add the following rules. (if you used the default configuration at the top of this page)

```
# server side
set firewall name OUTSIDE-LOCAL rule 32 action 'accept'
set firewall name OUTSIDE-LOCAL rule 32 source address '10.0.0.0/24'

# remote office side
set firewall name OUTSIDE-LOCAL rule 32 action 'accept'
set firewall name OUTSIDE-LOCAL rule 32 source address '192.168.0.0/24'
```

IKEv2

Imagine the following topology

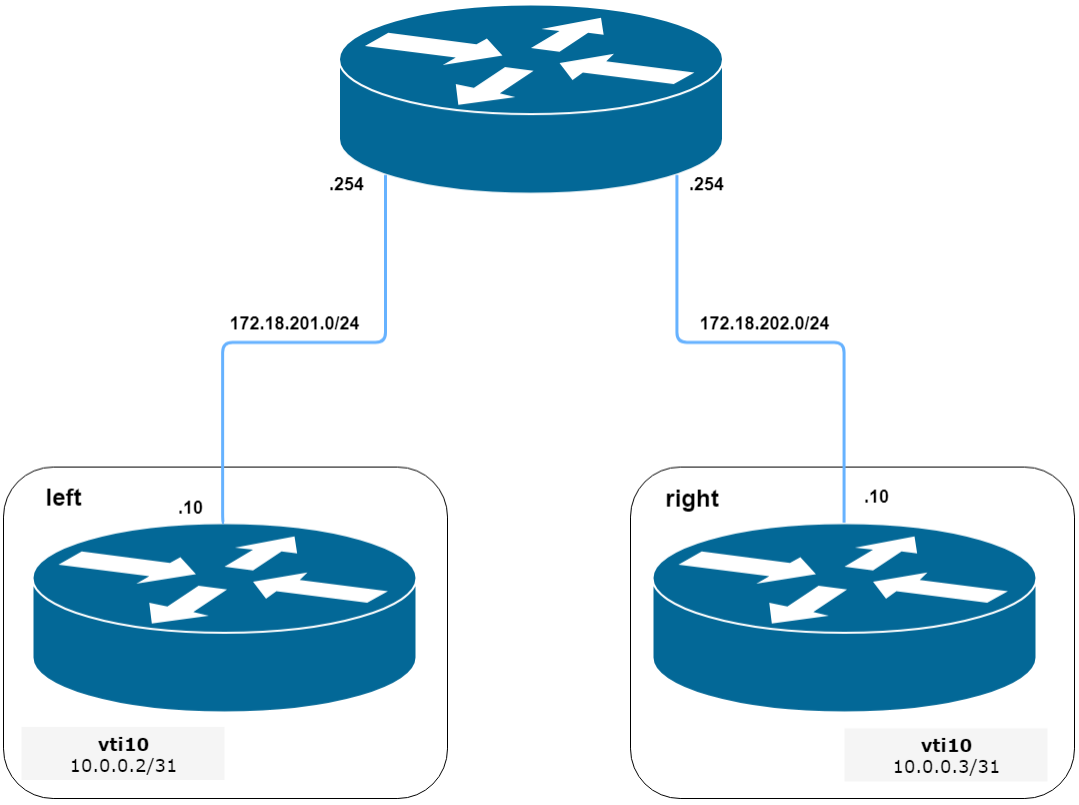

Fig. 8: IPSec IKEv2 site2site VPN (source ./draw.io/vpn_s2s_ikev2.drawio)

LEFT: * WAN interface on *eth0.201* * *eth0.201* interface IP: *172.18.201.10/24* * *vti10* interface IP: *10.0.0.2/31* * *dum0* interface IP: *10.0.11.1/24* (for testing purposes)

RIGHT: * WAN interface on *eth0.202* * *eth0.201* interface IP: *172.18.202.10/24* * *vti10* interface IP: *10.0.0.3/31* * *dum0* interface IP: *10.0.12.1/24* (for testing purposes)

Note: Don't get confused about the used /31 tunnel subnet. **RFC 3021** gives you additional information for using /31 subnets on point-to-point links.

LEFT

```
set interfaces ethernet eth0 vif 201 address '172.18.201.10/24'
set interfaces dummy dum0 address '10.0.11.1/24'
set interfaces vti vti10 address '10.0.0.2/31'

set vpn ipsec esp-group ESP_DEFAULT compression 'disable'
set vpn ipsec esp-group ESP_DEFAULT lifetime '3600'
set vpn ipsec esp-group ESP_DEFAULT mode 'tunnel'
set vpn ipsec esp-group ESP_DEFAULT pfs 'dh-group19'
set vpn ipsec esp-group ESP_DEFAULT proposal 10 encryption 'aes256gcm128'
set vpn ipsec esp-group ESP_DEFAULT proposal 10 hash 'sha256'
```

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```
set vpn ipsec ike-group IKEv2_DEFAULT dead-peer-detection action 'hold'
set vpn ipsec ike-group IKEv2_DEFAULT dead-peer-detection interval '30'
set vpn ipsec ike-group IKEv2_DEFAULT dead-peer-detection timeout '120'
set vpn ipsec ike-group IKEv2_DEFAULT ikev2-reauth 'no'
set vpn ipsec ike-group IKEv2_DEFAULT key-exchange 'ikev2'
set vpn ipsec ike-group IKEv2_DEFAULT lifetime '10800'
set vpn ipsec ike-group IKEv2_DEFAULT mobike 'disable'
set vpn ipsec ike-group IKEv2_DEFAULT proposal 10 dh-group '19'
set vpn ipsec ike-group IKEv2_DEFAULT proposal 10 encryption 'aes256gcm128'
set vpn ipsec ike-group IKEv2_DEFAULT proposal 10 hash 'sha256'
set vpn ipsec ipsec-interfaces interface 'eth0.201'
set vpn ipsec site-to-site peer 172.18.202.10 authentication id '172.18.201.10'
set vpn ipsec site-to-site peer 172.18.202.10 authentication mode 'pre-shared-secret'
set vpn ipsec site-to-site peer 172.18.202.10 authentication pre-shared-secret 'secretkey
↪'
set vpn ipsec site-to-site peer 172.18.202.10 authentication remote-id '172.18.202.10'
set vpn ipsec site-to-site peer 172.18.202.10 connection-type 'initiate'
set vpn ipsec site-to-site peer 172.18.202.10 ike-group 'IKEv2_DEFAULT'
set vpn ipsec site-to-site peer 172.18.202.10 ikev2-reauth 'inherit'
set vpn ipsec site-to-site peer 172.18.202.10 local-address '172.18.201.10'
set vpn ipsec site-to-site peer 172.18.202.10 vti bind 'vti10'
set vpn ipsec site-to-site peer 172.18.202.10 vti esp-group 'ESP_DEFAULT'

set protocols static interface-route 10.0.12.0/24 next-hop-interface vti10
```

RIGHT

```
set interfaces ethernet eth0 vif 202 address '172.18.202.10/24'
set interfaces dummy dum0 address '10.0.12.1/24'
set interfaces vti vti10 address '10.0.0.3/31'

set vpn ipsec esp-group ESP_DEFAULT compression 'disable'
set vpn ipsec esp-group ESP_DEFAULT lifetime '3600'
set vpn ipsec esp-group ESP_DEFAULT mode 'tunnel'
set vpn ipsec esp-group ESP_DEFAULT pfs 'dh-group19'
set vpn ipsec esp-group ESP_DEFAULT proposal 10 encryption 'aes256gcm128'
set vpn ipsec esp-group ESP_DEFAULT proposal 10 hash 'sha256'
set vpn ipsec ike-group IKEv2_DEFAULT dead-peer-detection action 'hold'
set vpn ipsec ike-group IKEv2_DEFAULT dead-peer-detection interval '30'
set vpn ipsec ike-group IKEv2_DEFAULT dead-peer-detection timeout '120'
set vpn ipsec ike-group IKEv2_DEFAULT ikev2-reauth 'no'
set vpn ipsec ike-group IKEv2_DEFAULT key-exchange 'ikev2'
set vpn ipsec ike-group IKEv2_DEFAULT lifetime '10800'
set vpn ipsec ike-group IKEv2_DEFAULT mobike 'disable'
set vpn ipsec ike-group IKEv2_DEFAULT proposal 10 dh-group '19'
set vpn ipsec ike-group IKEv2_DEFAULT proposal 10 encryption 'aes256gcm128'
set vpn ipsec ike-group IKEv2_DEFAULT proposal 10 hash 'sha256'
set vpn ipsec ipsec-interfaces interface 'eth0.202'
set vpn ipsec site-to-site peer 172.18.201.10 authentication id '172.18.202.10'
set vpn ipsec site-to-site peer 172.18.201.10 authentication mode 'pre-shared-secret'
set vpn ipsec site-to-site peer 172.18.201.10 authentication pre-shared-secret 'secretkey
↪'
```

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```
set vpn ipsec site-to-site peer 172.18.201.10 authentication remote-id '172.18.201.10'
set vpn ipsec site-to-site peer 172.18.201.10 connection-type 'initiate'
set vpn ipsec site-to-site peer 172.18.201.10 ike-group 'IKEv2_DEFAULT'
set vpn ipsec site-to-site peer 172.18.201.10 ikev2-reauth 'inherit'
set vpn ipsec site-to-site peer 172.18.201.10 local-address '172.18.202.10'
set vpn ipsec site-to-site peer 172.18.201.10 vti bind 'vti10'
set vpn ipsec site-to-site peer 172.18.201.10 vti esp-group 'ESP_DEFAULT'

set protocols static interface-route 10.0.11.0/24 next-hop-interface vti10
```

Key Parameters:

- `authentication local-id/remote-id` - IKE identification is used for validation of VPN peer devices during IKE negotiation. If you do not configure local/remote-identity, the device uses the IPv4 or IPv6 address that corresponds to the local/remote peer by default. In certain network setups (like ipsec interface with dynamic address, or behind the NAT), the IKE ID received from the peer does not match the IKE gateway configured on the device. This can lead to a Phase 1 validation failure. So, make sure to configure the local/remote id explicitly and ensure that the IKE ID is the same as the remote-identity configured on the peer device.
- `disable-route-autoinstall` - This option when configured disables the routes installed in the default table 220 for site-to-site ipsec. It is mostly used with VTI configuration.
- `dead-peer-detection action = clear | hold | restart` - R_U_THERE notification messages(IKEv1) or empty INFORMATIONAL messages (IKEv2) are periodically sent in order to check the liveliness of the IPsec peer. The values clear, hold, and restart all activate DPD and determine the action to perform on a timeout. With `clear` the connection is closed with no further actions taken. `hold` installs a trap policy, which will catch matching traffic and tries to re-negotiate the connection on demand. `restart` will immediately trigger an attempt to re-negotiate the connection.
- `close-action = none | clear | hold | restart` - defines the action to take if the remote peer unexpectedly closes a CHILD_SA (see above for meaning of values). A closeaction should not be used if the peer uses reauthentication or uniqueids.

  When the close-action option is set on the peers, the connection-type of each peer has to considered carefully. For example, if the option is set on both peers, then both would attempt to initiate and hold open multiple copies of each child SA. This might lead to instability of the device or cpu/memory utilization.

  Below flow-chart could be a quick reference for the close-action combination depending on how the peer is configured.

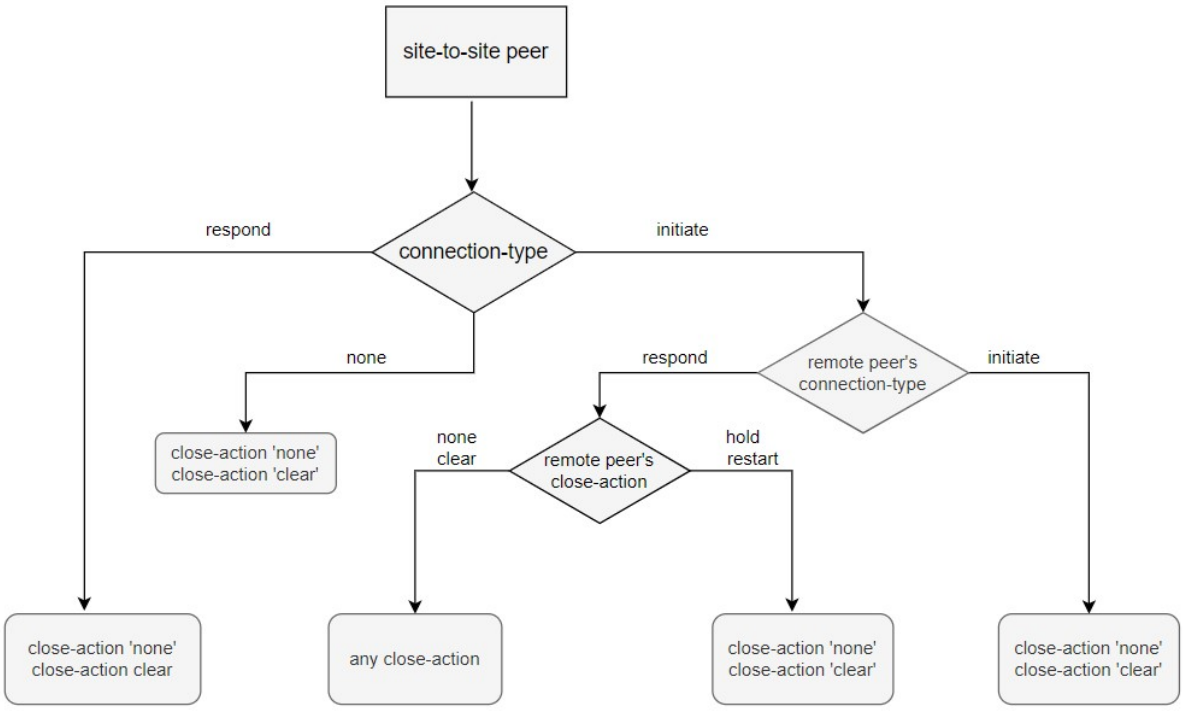

Fig. 9: Similar combinations are applicable for the dead-peer-detection.

8.14 VRF

VRF devices combined with ip rules provides the ability to create virtual routing and forwarding domains (aka VRFs, VRF-lite to be specific) in the Linux network stack. One use case is the multi-tenancy problem where each tenant has their own unique routing tables and in the very least need different default gateways.

8.14.1 Configuration

A VRF device is created with an associated route table. Network interfaces are then enslaved to a VRF device.

set vrf name <name>

Create new VRF instance with *<name>*. The name is used when placing individual interfaces into the VRF.

set vrf name <name> table <id>

Configure use routing table *<id>* used by VRF *<name>*.

Note: A routing table ID can not be modified once it is assigned. It can only be changed by deleting and re-adding the VRF instance.

---

set vrf bind-to-all

By default the scope of the port bindings for unbound sockets is limited to the default VRF. That is, it will not be matched by packets arriving on interfaces enslaved to a VRF and processes may bind to the same port if they bind to a VRF.

TCP & UDP services running in the default VRF context (ie., not bound to any VRF device) can work across all VRF domains by enabling this option.

Interfaces

Static

Static routes are manually configured routes, which, in general, cannot be updated dynamically from information VyOS learns about the network topology from other routing protocols. However, if a link fails, the router will remove routes, including static routes, from the RIPB that used this interface to reach the next hop. In general, static routes should only be used for very simple network topologies, or to override the behavior of a dynamic routing protocol for a small number of routes. The collection of all routes the router has learned from its configuration or from its dynamic routing protocols is stored in the RIB. Unicast routes are directly used to determine the forwarding table used for unicast packet forwarding.

Static Routes

set protocols vrf <name> static route <subnet> next-hop <address>

Configure next-hop <*address*> for an IPv4 static route in the VRF identified by <*name*>. Multiple static routes can be created.

set protocols vrf <name> static route <subnet> next-hop <address> disable

Disable IPv4 static route entry in the VRF identified by <*name*>

set protocols vrf <name> static route <subnet> next-hop <address> distance <distance>

Defines next-hop distance for this route, routes with smaller administrative distance are elected prior those with a higher distance.

Range is 1 to 255, default is 1.

set protocols vrf <name> static route6 <subnet> next-hop <address>

Configure next-hop <*address*> for an IPv6 static route in the VRF identified by <*name*>. Multiple IPv6 static routes can be created.

set protocols vrf <name> static route6 <subnet> next-hop <address> disable

Disable IPv6 static route entry in the VRF identified by <*name*>.

set protocols vrf <name> static route6 <subnet> next-hop <address> distance <distance>

Defines next-hop distance for this route, routes with smaller administrative distance are elected prior those with a higher distance.

Range is 1 to 255, default is 1.

Note: Routes with a distance of 255 are effectively disabled and not installed into the kernel.

Leaking

set protocols vrf <name> static route <subnet> next-hop <address> next-hop-vrf <default | vrf-name>

Use this command if you have shared services or routes that should be shared between multiple VRF instances. This will add an IPv4 route to VRF <*name*> routing table to reach a <*subnet*> via a next-hop gatewys <*address*> in a different VRF or leak it into the default VRF.

set protocols vrf <name> static route6 <subnet> next-hop <address> next-hop-vrf <default | vrf-name>

Use this command if you have shared services or routes that should be shared between multiple VRF instances. This will add an IPv6 route to VRF <*name*> routing table to reach a <*subnet*> via a next-hop gatewys <*address*> in a different VRF or leak it into the default VRF.

Interface Routes

set protocols vrf <name> static interface-route <subnet> next-hop-interface <interface>

Allows you to configure the next-hop interface for an interface-based IPv4 static route. <*interface*> will be the next-hop interface where trafic is routed for the given <*subnet*>.

set protocols vrf <name> static interface-route <subnet> next-hop-interface <interface> disable

Disables interface-based IPv4 static route.

set protocols vrf <name> static interface-route <subnet> next-hop-interface <interface> distance <distance>

Defines next-hop distance for this route, routes with smaller administrative distance are elected prior those with a higher distance.

Range is 1 to 255, default is 1.

set protocols vrf <name> static interface-route6 <subnet> next-hop-interface <interface>

Allows you to configure the next-hop interface for an interface-based IPv6 static route. <*interface*> will be the next-hop interface where trafic is routed for the given <*subnet*>.

set protocols vrf <name> static interface-route6 <subnet> next-hop-interface <interface> disable

Disables interface-based IPv6 static route.

set protocols vrf <name> static interface-route6 <subnet> next-hop-interface <interface> distance <distance>

Defines next-hop distance for this route, routes with smaller administrative distance are elected prior those with a higher distance.

Range is 1 to 255, default is 1.

Blackhole

set protocols vrf <name> static route <subnet> blackhole

Use this command to configure a "black-hole" route on the router. A black-hole route is a route for which the system silently discard packets that are matched. This prevents networks leaking out public interfaces, but it does not prevent them from being used as a more specific route inside your network.

set protocols vrf <name> static route <subnet> blackhole distance <distance>

Defines blackhole distance for this route, routes with smaller administrative distance are elected prior those with a higher distance.

set protocols vrf <name> static route6 <subnet> blackhole

Use this command to configure a "black-hole" route on the router. A black-hole route is a route for which the system silently discard packets that are matched. This prevents networks leaking out public interfaces, but it does not prevent them from being used as a more specific route inside your network.

set protocols vrf <name> static route6 <subnet> blackhole distance <distance>

Defines blackhole distance for this route, routes with smaller administrative distance are elected prior those with a higher distance.

8.14.2 Operation

It is not sufficient to only configure a VRF but VRFs must be maintained, too. For VRF maintenance, the following operational commands are in place.

show vrf

List VRFs that have been created

```
vyos@vyos:~$ show vrf
VRF name          state     mac address        flags                     interfaces
--------          -----     -----------        -----                     ----------
blue              up        00:53:12:d8:74:24  noarp,master,up,lower_up  dum200,
↪eth0.302
red               up        00:53:de:02:df:aa  noarp,master,up,lower_up  dum100,
↪eth0.300,bond0.100,peth0
```

Note: Command should probably be extended to list also the real interfaces assigned to this one VRF to get a better overview.

show vrf <name>

```
vyos@vyos:~$ show vrf name blue
VRF name          state     mac address        flags                     interfaces
--------          -----     -----------        -----                     ----------
blue              up        00:53:12:d8:74:24  noarp,master,up,lower_up  dum200,
↪eth0.302
```

show ip route vrf <name>

Display IPv4 routing table for VRF identified by <*name*>.

```
vyos@vyos:~$ show ip route vrf blue
Codes: K - kernel route, C - connected, S - static, R - RIP,
       O - OSPF, I - IS-IS, B - BGP, E - EIGRP, N - NHRP,
       T - Table, v - VNC, V - VNC-Direct, A - Babel, D - SHARP,
       F - PBR, f - OpenFabric,
       > - selected route, * - FIB route, q - queued route, r - rejected route

VRF blue:
K   0.0.0.0/0 [255/8192] unreachable (ICMP unreachable), 00:00:50
S>* 172.16.0.0/16 [1/0] via 192.0.2.1, dum1, 00:00:02
C>* 192.0.2.0/24 is directly connected, dum1, 00:00:06
```

show ipv6 route vrf <name>

Display IPv6 routing table for VRF identified by <*name*>.

```
vyos@vyos:~$ show ipv6 route vrf red
Codes: K - kernel route, C - connected, S - static, R - RIPng,
       O - OSPFv3, I - IS-IS, B - BGP, N - NHRP, T - Table,
       v - VNC, V - VNC-Direct, A - Babel, D - SHARP, F - PBR,
       f - OpenFabric,
       > - selected route, * - FIB route, q - queued route, r - rejected route

VRF red:
K   ::/0 [255/8192] unreachable (ICMP unreachable), 00:43:20
C>* 2001:db8::/64 is directly connected, dum1, 00:02:19
C>* fe80::/64 is directly connected, dum1, 00:43:19
K>* ff00::/8 [0/256] is directly connected, dum1, 00:43:19
```

ping <host> vrf <name>

The ping command is used to test whether a network host is reachable or not.

Ping uses ICMP protocol's mandatory ECHO_REQUEST datagram to elicit an ICMP ECHO_RESPONSE from a host or gateway. ECHO_REQUEST datagrams (pings) will have an IP and ICMP header, followed by "struct timeval" and an arbitrary number of pad bytes used to fill out the packet.

When doing fault isolation with ping, your should first run it on the local host, to verify that the local network interface is up and running. Then, continue with hosts and gateways further down the road towards your destination. Round-trip times and packet loss statistics are computed.

Duplicate packets are not included in the packet loss calculation, although the round-trip time of these packets is used in calculating the minimum/ average/maximum round-trip time numbers.

Ping command can be interrupted at any given time using <*Ctrl*>+*c*- A brief statistic is shown afterwards.

```
vyos@vyos:~$ ping 192.0.2.1 vrf red
PING 192.0.2.1 (192.0.2.1) 56(84) bytes of data.
64 bytes from 192.0.2.1: icmp_seq=1 ttl=64 time=0.070 ms
64 bytes from 192.0.2.1: icmp_seq=2 ttl=64 time=0.078 ms
^C
--- 192.0.2.1 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 4ms
rtt min/avg/max/mdev = 0.070/0.074/0.078/0.004 ms
```

traceroute vrf <name> [ipv4 | ipv6] <host>

Displays the route packets take to a network host utilizing VRF instance identified by <*name*>. When using the IPv4 or IPv6 option, display the route packets take to the for the given hosts IP address family. This option is useful when the host specified is a hostname rather than an IP address.

8.14.3 Example

VRF route leaking

The following example topology was build using EVE-NG.

- PC1 is in the `default` VRF and acting as e.g. a "fileserver"
- PC2 is in VRF `blue` which is the development department
- PC3 and PC4 are connected to a bridge device on router `R1` which is in VRF `red`. Say this is the HR department.
- R1 is managed through an out-of-band network that resides in VRF `mgmt`

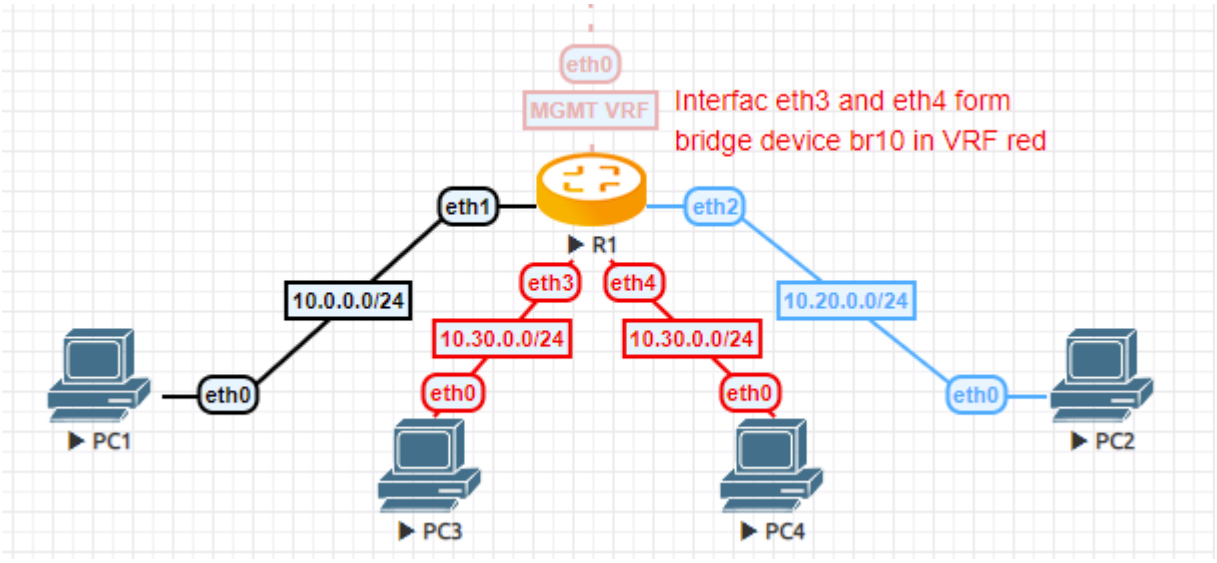

Fig. 10: VRF route leaking

Configuration

```
set interfaces bridge br10 address '10.30.0.254/24'
set interfaces bridge br10 member interface eth3
set interfaces bridge br10 member interface eth4
set interfaces bridge br10 vrf 'red'

set interfaces ethernet eth0 address 'dhcp'
set interfaces ethernet eth0 vrf 'mgmt'
set interfaces ethernet eth1 address '10.0.0.254/24'
set interfaces ethernet eth2 address '10.20.0.254/24'
set interfaces ethernet eth2 vrf 'blue'

set protocols static interface-route 10.20.0.0/24 next-hop-interface eth2 next-
↪hop-vrf 'blue'
set protocols static interface-route 10.30.0.0/24 next-hop-interface br10 next-
↪hop-vrf 'red'
set protocols vrf blue static interface-route 10.0.0.0/24 next-hop-interface␣
↪eth1 next-hop-vrf 'default'
set protocols vrf red static interface-route 10.0.0.0/24 next-hop-interface␣
↪eth1 next-hop-vrf 'default'

set service ssh disable-host-validation
set service ssh vrf 'mgmt'

set system domain-name 'vyos.net'
set system host-name 'R1'
set system name-server 'eth0'

set vrf name blue table '3000'
set vrf name mgmt table '1000'
set vrf name red table '2000'
```

Operation

After committing the configuration we can verify all leaked routes are installed, and try to ICMP ping PC1 from PC3.

```
PCS> ping 10.0.0.1

84 bytes from 10.0.0.1 icmp_seq=1 ttl=63 time=1.943 ms
84 bytes from 10.0.0.1 icmp_seq=2 ttl=63 time=1.618 ms
84 bytes from 10.0.0.1 icmp_seq=3 ttl=63 time=1.745 ms
```

```
VPCS> show ip

NAME        : VPCS[1]
IP/MASK     : 10.30.0.1/24
GATEWAY     : 10.30.0.254
DNS         :
MAC         : 00:50:79:66:68:0f
```

VRF default routing table

```
vyos@R1:~$ show ip route
Codes: K - kernel route, C - connected, S - static, R - RIP,
       O - OSPF, I - IS-IS, B - BGP, E - EIGRP, N - NHRP,
       T - Table, v - VNC, V - VNC-Direct, A - Babel, D - SHARP,
       F - PBR, f - OpenFabric,
       > - selected route, * - FIB route, q - queued, r - rejected, b - backup

C>* 10.0.0.0/24 is directly connected, eth1, 00:07:44
S>* 10.20.0.0/24 [1/0] is directly connected, eth2 (vrf blue), weight 1,␣
↪00:07:38
S>* 10.30.0.0/24 [1/0] is directly connected, br10 (vrf red), weight 1,␣
↪00:07:38
```

VRF red routing table

```
vyos@R1:~$ show ip route vrf red
Codes: K - kernel route, C - connected, S - static, R - RIP,
       O - OSPF, I - IS-IS, B - BGP, E - EIGRP, N - NHRP,
       T - Table, v - VNC, V - VNC-Direct, A - Babel, D - SHARP,
       F - PBR, f - OpenFabric,
       > - selected route, * - FIB route, q - queued, r - rejected, b - backup

VRF red:
K>* 0.0.0.0/0 [255/8192] unreachable (ICMP unreachable), 00:07:57
S>* 10.0.0.0/24 [1/0] is directly connected, eth1 (vrf default), weight 1,␣
↪00:07:40
C>* 10.30.0.0/24 is directly connected, br10, 00:07:54
```

VRF blue routing table

```
vyos@R1:~$ show ip route vrf blue
Codes: K - kernel route, C - connected, S - static, R - RIP,
       O - OSPF, I - IS-IS, B - BGP, E - EIGRP, N - NHRP,
       T - Table, v - VNC, V - VNC-Direct, A - Babel, D - SHARP,
       F - PBR, f - OpenFabric,
       > - selected route, * - FIB route, q - queued, r - rejected, b - backup

VRF blue:
K>* 0.0.0.0/0 [255/8192] unreachable (ICMP unreachable), 00:08:00
S>* 10.0.0.0/24 [1/0] is directly connected, eth1 (vrf default), weight 1,␣
↪00:07:44
C>* 10.20.0.0/24 is directly connected, eth2, 00:07:53
```

8.15 Zone Policy

In zone-based policy, interfaces are assigned to zones, and inspection policy is applied to traffic moving between the zones and acted on according to firewall rules. A Zone is a group of interfaces that have similar functions or features. It establishes the security borders of a network. A zone defines a boundary where traffic is subjected to policy restrictions as it crosses to another region of a network.

Key Points:

- A zone must be configured before an interface is assigned to it and an interface can be assigned to only a single zone.
- All traffic to and from an interface within a zone is permitted.
- All traffic between zones is affected by existing policies
- Traffic cannot flow between zone member interface and any interface that is not a zone member.
- You need 2 separate firewalls to define traffic: one for each direction.

Example: LAN Network is given SSH access to VyOS box.

Firewall rules:

```
set firewall name lan-local default-action 'drop'
set firewall name lan-local rule 1 action 'accept'
set firewall name lan-local rule 1 state established 'enable'
set firewall name lan-local rule 1 state related 'enable'
set firewall name lan-local rule 2 action 'drop'
set firewall name lan-local rule 2 state invalid 'enable'
set firewall name lan-local rule 2 log enable
set firewall name lan-local rule 100 action 'accept'
set firewall name lan-local rule 100 destination port '22'
set firewall name lan-local rule 100 log 'enable'
set firewall name lan-local rule 100 protocol 'tcp'
set firewall name local-lan default-action 'drop'
set firewall name local-lan rule 1 action 'accept'
set firewall name local-lan rule 1 state established 'enable'
set firewall name local-lan rule 1 state related 'enable'
set firewall name local-lan rule 2 action 'drop'
```

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```
set firewall name local-lan rule 2 state invalid 'enable'
set firewall name local-lan rule 2 log enable
set firewall name local-lan rule 100 action 'accept'
set firewall name local-lan rule 100 destination address '192.168.0.0/24'
set firewall name local-lan rule 100 log 'enable'
set firewall name local-lan rule 100 protocol 'tcp'
```

Zone-policy Config:

```
set zone-policy zone lan default-action 'drop'
set zone-policy zone lan description 'Local Area Network'
set zone-policy zone lan interface 'eth2'
set zone-policy zone lan from local firewall name 'lan-local'
set zone-policy zone local default-action 'drop'
set zone-policy zone local description 'system-defined zone'
set zone-policy zone local from lan firewall name 'local-lan'
set zone-policy zone local local-zone
```

A detailed zone-based policy example is written in the Configuration-Blueprints section.

CHAPTER

NINE

OPERATION MODE

9.1 Information

VyOS features a rich set of operational level commands to retrieve arbitrary information about your running system.

9.1.1 Hardware

USB

In the past serial interface have been defined as ttySx and ttyUSBx where x was an instance number of the serial interface. It was discovered that from system boot to system boot the mapping of USB based serial interfaces will differ, depending which driver was loaded first by the operating system. This will become rather painful if you not only have serial interfaces for a console server connected but in addition also a serial backed *WWAN - Wireless Wide-Area-Network*.

To overcome this issue and the fact that in almost 50% of all cheap USB to serial converters there is no serial number programmed, the USB to serial interface is now directly identified by the USB root bridge and bus it connects to. This somehow mimics the new network interface definitions we see in recend Linux distributions.

For additional details you can refer to https://vyos.dev/T2490.

show hardware usb

Retrieve a tree like representation of all connected USB devices.

Note: If a device is unplugged and re-plugged it will receive a new Port, Dev, If identification.

```
vyos@vyos:~$ show hardware usb
/:  Bus 03.Port 1: Dev 1, Class=root_hub, Driver=ehci-pci/2p, 480M
    |__ Port 1: Dev 2, If 0, Class=Hub, Driver=hub/4p, 480M
        |__ Port 3: Dev 4, If 0, Class=Vendor Specific Class, Driver=qcserial, 480M
        |__ Port 3: Dev 4, If 2, Class=Vendor Specific Class, Driver=qcserial, 480M
        |__ Port 3: Dev 4, If 3, Class=Vendor Specific Class, Driver=qcserial, 480M
        |__ Port 3: Dev 4, If 8, Class=Vendor Specific Class, Driver=qmi_wwan, 480M
/:  Bus 02.Port 1: Dev 1, Class=root_hub, Driver=xhci_hcd/2p, 5000M
/:  Bus 01.Port 1: Dev 1, Class=root_hub, Driver=xhci_hcd/2p, 480M
    |__ Port 1: Dev 2, If 0, Class=Vendor Specific Class, Driver=pl2303, 12M
    |__ Port 2: Dev 3, If 0, Class=Hub, Driver=hub/4p, 480M
        |__ Port 4: Dev 5, If 2, Class=Vendor Specific Class, Driver=ftdi_sio, 480M
        |__ Port 4: Dev 5, If 0, Class=Vendor Specific Class, Driver=ftdi_sio, 480M
```

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```
        |__ Port 4: Dev 5, If 3, Class=Vendor Specific Class, Driver=ftdi_sio, 480M
        |__ Port 4: Dev 5, If 1, Class=Vendor Specific Class, Driver=ftdi_sio, 480M
        |__ Port 3: Dev 4, If 0, Class=Hub, Driver=hub/4p, 480M
            |__ Port 3: Dev 6, If 0, Class=Hub, Driver=hub/4p, 480M
                |__ Port 4: Dev 8, If 2, Class=Vendor Specific Class, Driver=ftdi_
↪sio, 480M
                |__ Port 4: Dev 8, If 0, Class=Vendor Specific Class, Driver=ftdi_
↪sio, 480M
                |__ Port 4: Dev 8, If 3, Class=Vendor Specific Class, Driver=ftdi_
↪sio, 480M
                |__ Port 4: Dev 8, If 1, Class=Vendor Specific Class, Driver=ftdi_
↪sio, 480M
            |__ Port 4: Dev 7, If 3, Class=Vendor Specific Class, Driver=ftdi_sio,␣
↪480M
            |__ Port 4: Dev 7, If 1, Class=Vendor Specific Class, Driver=ftdi_sio,␣
↪480M
            |__ Port 4: Dev 7, If 2, Class=Vendor Specific Class, Driver=ftdi_sio,␣
↪480M
            |__ Port 4: Dev 7, If 0, Class=Vendor Specific Class, Driver=ftdi_sio,␣
↪480M
```

show hardware usb serial

Retrieve a list and description of all connected USB serial devices. The device name displayed, e.g. *usb0b2.4p1.0* can be directly used when accessing the serial console as console-server device.

```
vyos@vyos$ show hardware usb serial
Device           Model               Vendor
------           ------              ------
usb0b1.3p1.0     MC7710              Sierra Wireless, Inc.
usb0b1.3p1.2     MC7710              Sierra Wireless, Inc.
usb0b1.3p1.3     MC7710              Sierra Wireless, Inc.
usb0b1p1.0       USB-Serial_Controller_D Prolific Technology, Inc.
usb0b2.3.3.4p1.0 Quad_RS232-HS       Future Technology Devices International, Ltd
usb0b2.3.3.4p1.1 Quad_RS232-HS       Future Technology Devices International, Ltd
usb0b2.3.3.4p1.2 Quad_RS232-HS       Future Technology Devices International, Ltd
usb0b2.3.3.4p1.3 Quad_RS232-HS       Future Technology Devices International, Ltd
usb0b2.3.4p1.0   Quad_RS232-HS       Future Technology Devices International, Ltd
usb0b2.3.4p1.1   Quad_RS232-HS       Future Technology Devices International, Ltd
usb0b2.3.4p1.2   Quad_RS232-HS       Future Technology Devices International, Ltd
usb0b2.3.4p1.3   Quad_RS232-HS       Future Technology Devices International, Ltd
usb0b2.4p1.0     Quad_RS232-HS       Future Technology Devices International, Ltd
usb0b2.4p1.1     Quad_RS232-HS       Future Technology Devices International, Ltd
usb0b2.4p1.2     Quad_RS232-HS       Future Technology Devices International, Ltd
usb0b2.4p1.3     Quad_RS232-HS       Future Technology Devices International, Ltd
```

9.1.2 Version

show version

Return the current running VyOS version and build information. This includes also the name of the release train which is `crux` on VyOS 1.2, `equuleus` on VyOS 1.3 and `sagitta` on VyOS 1.4.

```
vyos@vyos:~$ show version

Version:          VyOS 1.3.0-rc4
Release Train:    equuleus

Built by:         Sentrium S.L.
Built on:         Mon 19 Apr 2021 08:28 UTC
Build UUID:       8d9996d2-511e-4dea-be4f-cd4515c404f3
Build Commit ID:  2aac286ccfe594

Architecture:     x86_64
Boot via:         installed image
System type:      VMware guest

Hardware vendor:  VMware, Inc.
Hardware model:   VMware Virtual Platform
Hardware S/N:     VMware-42 33 79 fe 73 64 2d 62-d5 62 ab 99 5a 3e d9 6d
Hardware UUID:    fe793342-6473-622d-d562-ab995a3ed96d

Copyright:        VyOS maintainers and contributors
```

show version kernel

Return version number of the Linux Kernel used in this release.

```
vyos@vyos:~$ show version kernel
5.4.128-amd64-vyos
```

show version frr

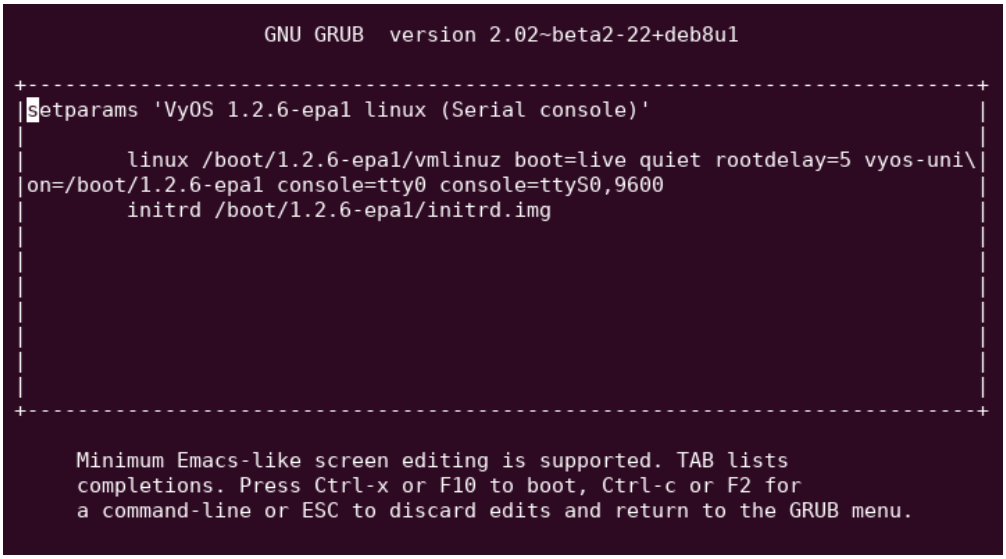
Return version number of FRR (Free Range Routing - https://frrouting.org/) used in this release. This is the routing control plane and a successor to GNU Zebra and Quagga.

```
vyos@vyos:~$ show version frr
FRRouting 7.5.1-20210625-00-gf07d935a2 (vyos).
Copyright 1996-2005 Kunihiro Ishiguro, et al.
```

9.2 Boot Options

Warning: This function may be highly disruptive. It may cause major service interruption, so make sure you really need it and verify your input carefully.

VyOS has several kernel command line options to modify the normal boot process. To add an option, select the desired image in GRUB menu at load time, press **e**, edit the first line, and press **Ctrl-x** to boot when ready.



9.2.1 Specify custom config file

Tells the system to use specified file instead of `/config/config.boot`. If specified file does not exist or is not readable, fall back to default config. No additional verification is performed, so make sure you specify a valid config file.

```
vyos-config=/path/to/file
```

To load the *factory default* config, use:

```
vyos-config=/opt/vyatta/etc/config.boot.default
```

9.2.2 Disable specific boot process steps

These options disable some boot steps. Make sure you understand the *boot process* well before using them!

no-vyos-migrate
: Do not perform config migration.

no-vyos-firewall
: Do not initialize default firewall chains, renders any firewall configuration unusable.

9.3 Password Recovery

Using the console, restart the VyOS router. The GRUB menu appears. Select the relevant option from the GRUB menu and press Enter. The option must start with "Lost password change."

The stand-alone user-password recovery tool starts running and prompts you to reset the local system user password.

```
Do you wish to reset the admin password? (y or n)
y
Which admin account do you want to reset?[vyos]
my_username
```

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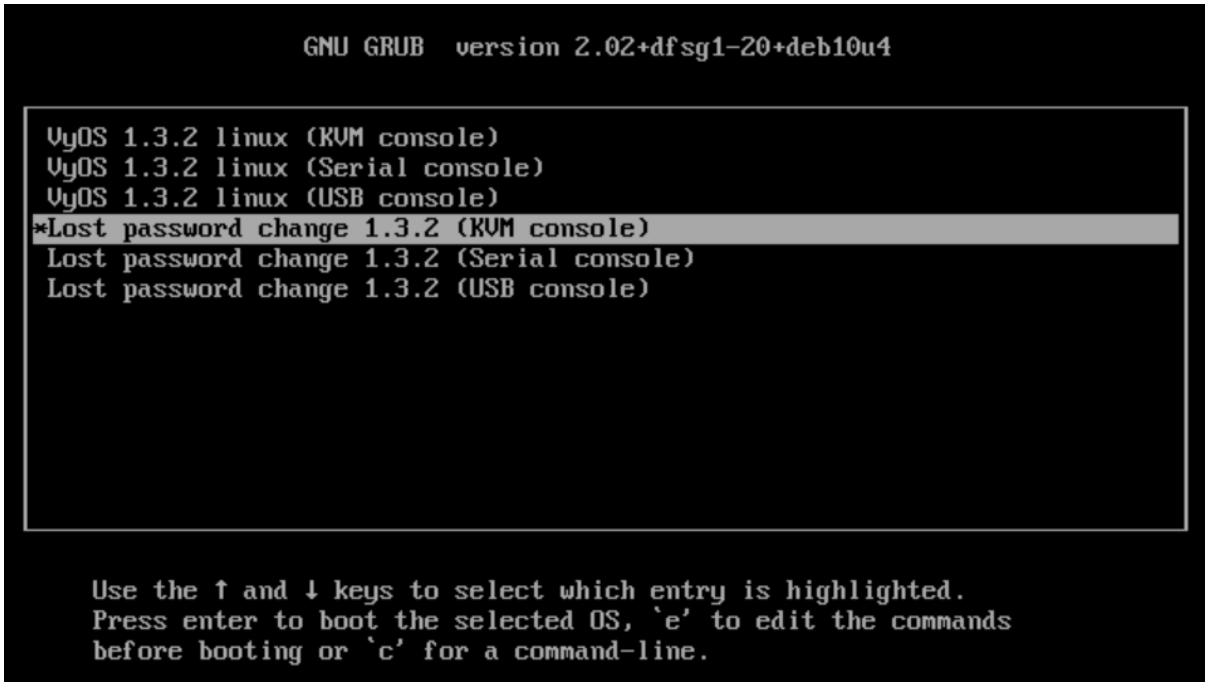

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```
Enter my_username password:
Retype my_username password:
System will reboot in 10 seconds...
```

9.4 RAID-1

A Redundant Array of Independent Disks (RAID) uses two or more hard disk drives to improve disk speed, store more data, and/or provide fault tolerance. There are several storage schemes possible in a RAID array, each offering a different combination of storage, reliability, and/or performance. The VyOS system supports a "RAID 1" deployment. RAID 1 allows two or more disks to mirror one another to provide system fault tolerance. In a RAID 1 solution, every sector of one disk is duplicated onto every sector of all disks in the array. Provided even one disk in the RAID 1 set is operational, the system continues to run, even through disk replacement (provided that the hardware supports in-service replacement of drives). RAID 1 can be implemented using special hardware or it can be implemented in software. The VyOS system supports software RAID 1 on two disks. The VyOS implementation of RAID 1 allows the following:

- Detection and reporting of disk failure
- The ability to maintain system operation with one failed disk
- The ability to boot the system with one failed disk
- The ability to replace a failed disk and initiate re-mirroring
- The ability to monitor the status of remirroring

9.4.1 Installation Implications

The VyOS systems installation utility provides several options for installing to a RAID 1 set. You can:

- Use the install system to create the RAID 1 set
- Use the underlying Linux commands to create a RAID 1 set before running the install system command.
- Use a previously-created RAID 1 set.

Note: Before a permanent installation, VyOS runs a live installation

9.4.2 Configuration

Single disk, install as normal

When the VyOS system is installed, it automatically detects the presence of two disks not currently part of a RAID array. In these cases, the VyOS installation utility automatically offers you the option of configuring RAID 1 mirroring for the drives, with the following prompt.

```
Would you like to configure RAID 1 mirroring on them?
```

- If you do not want to configure RAID 1 mirroring, enter "No" at the prompt and continue with installation in the normal way.

Empty 2+ Disk

If VyOS system detect two identical disks that are not currently part of a RAID-1 set, the VyOS installation utility automatically offers you the option of configuring RAID 1 mirroring for the drives, with the following prompt.

```
Would you like to configure RAID 1 mirroring on them?
```

1 - To create a new RAID 1 array, enter "Yes" at the prompt. If the system detects a filesystem on the partitions being used for RAID 1 it will prompt you to indicate whether you want to continue creating the RAID 1 array.

```
Continue creating array?
```

2 - To overwrite the old filesystem, enter "Yes".

3 - The system informs you that all data on both drives will be erased. You are prompted to confirm that you want to continue

```
Are you sure you want to do this?
```

4 - Enter "Yes" at the prompt to retain the current VyOS configuration once installation is complete. Enter "No" to delete the current VyOS configuration.

```
Would you like me to save the data on it before I delete it?
```

5 - Enter "Yes" at the prompt to retain the current VyOS configuration once installation is complete. Enter "No" to delete the current VyOS configuration.

6 - Continue with installation in the normal way.

Present RAID-1

When the VyOS software on a system with a RAID 1 set already configured, the installation utility will detect the array and will display the following prompt:

```
Would you like to use this one?
```

1 - To break apart the current RAID 1 set, enter "No" at the prompt. The

installation utility detects that there are two identical disks and offers you the option of configuring RAID 1 mirroring on them, displaying the following prompt:

```
Would you like to configure RAID 1 mirroring on them?
```

2 - To decline to set up a new RAID 1 configuration on the disks, enter "No" at the prompt. The system prompts you to indicate which partition you would like the system installed on.

```
Which partition should I install the root on? [sda1]:
```

3 - Enter the partition where you would like the system installed. The system then prompts you to indicate whether you want to save the old configuration data. This represents the current VyOS configuration.

```
Would you like me to save the data on it before I delete it?
```

4 - Enter "Yes" at the prompt to retain the current VyOS configuration once installation is complete. Enter "No" to delete the current VyOS configuration.

5 - Continue with installation in the normal way.

Detecting and Replacing a Failed RAID 1 Disk

The VyOS system automatically detects a disk failure within a RAID 1 set and reports it to the system console. You can verify the failure by issuing the show raid command.

To replace a bad disk within a RAID 1 set, perform the following steps:

1 - Remove the failed disk from the RAID 1 set by issuing the following command:

delete raid <RAID-1-device> member <disk-partition>

where RAID-1-device is the name of the RAID 1 device (for example, md0) and disk-partition is the name of the failed disk partition (for example, sdb2).

2- Physically remove the failed disk from the system. If the drives are not hot-swappable, then you must shut down the system before removing the disk.

3 - Replace the failed drive with a drive of the same size or larger.

4 - Format the new disk for RAID 1 by issuing the following command:

format disk <disk-device1> like <disk-device2>

where disk-device1 is the replacement disk (for example, sdb) and disk-device2 is the existing healthy disk (for example, sda).

5-Add the replacement disk to the RAID 1 set by issuing the following command:

add raid <RAID-1-device> member <disk-partition>

where RAID-1-device is the name of the RAID 1 device (for example, md0) and disk-partition is the name of the replacement disk partition (for example, sdb2).

9.4.3 Operation

This part introduces how to add a disk partition to a RAID-1 set initiates mirror synchronization, check and display information.

add raid <RAID-1-device> member <disk-partition>

Use this command to add a member disk partition to the RAID 1 set. Adding a disk partition to a RAID 1 set initiates mirror synchronization, where all data on the existing member partition is copied to the new partition.

format disk <disk-device1> like <disk-device2>

This command is typically used to prepare a disk to be added to a preexisting RAID 1 set (of which disk-device2 is already a member).

show raid <RAID-1-device>

shows output for show raid md0 as sdb1 is being added to the RAID 1 set and is in the process of being resynchronized.

```
vyos@vyos:~$ show raid md0
/dev/md0:
      Version : 00.90
Creation Time : Wed Oct 29 09:19:09 2008
   Raid Level : raid1
   Array Size : 1044800 (1020.48 MiB 1069.88 MB)
Used Dev Size : 1044800 (1020.48 MiB 1069.88 MB)
 Raid Devices : 2
Total Devices : 2
Preferred Minor : 0
  Persistence : Superblock is persistent
  Update Time : Wed Oct 29 19:34:23 2008
        State : active, degraded, recovering
Active Devices : 1
Working Devices : 2
Failed Devices : 0
Spare Devices : 1
Rebuild Status : 17% complete
         UUID : 981abd77:9f8c8dd8:fdbf4de4:3436c70f
       Events : 0.103
  Number   Major   Minor   RaidDevice State
     0       8        1        0      active sync   /dev/sda1
     2       8       17        1      spare rebuilding   /dev/sdb1
```

show raid <RAID-1-device>

Use this command to display the formatting of a hard disk.

```
vyos@vyos:~$ show disk sda format
Disk /dev/sda: 1073 MB, 1073741824 bytes
85 heads, 9 sectors/track, 2741 cylinders
Units = cylinders of 765 * 512 = 391680 bytes
Disk identifier: 0x000b7179
 Device Boot      Start         End      Blocks   Id  System
/dev/sda1               6        2737     1044922+  fd  Linux raid autodetect
```

CHAPTER

TEN

VYOS AUTOMATION

- Saltstack
- startup scripts

10.1 VyOS API

For configuration and enabling the API see *HTTP-API*

10.1.1 Authentication

All endpoints only listen on HTTP POST requests and the API KEY must set as `key` in the formdata.

Below see one example for curl and one for python. The rest of the documentation is reduced to curl.

```
curl --location --request POST 'https://vyos/retrieve' \
--form data='{"op": "showConfig", "path": []}' \
--form key='MY-HTTPS-API-PLAINTEXT-KEY'
```

```
import requests
url = "https://vyos/retrieve"
payload={'data': '{"op": "showConfig", "path": []}',
         'key': 'MY-HTTPS-API-PLAINTEXT-KEY'
        }
headers = {}
response = requests.request("POST", url, headers=headers, data=payload)
print(response.text)
```

10.1.2 API Endpoints

/retrieve

With the `retrieve` endpoint you get parts or the whole configuration.

To get the whole configuration, pass an empty list to the `path` field

```
curl --location --request POST 'https://vyos/retrieve' \
--form data='{"op": "showConfig", "path": []}' \
--form key='MY-HTTPS-API-PLAINTEXT-KEY'
```

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```
response (shorted)
{
   "success": true,
   "data": {
      "interfaces": {
            "ethernet": {
               "eth0": {
                  "address": "dhcp",
                  "duplex": "auto",
                  "hw-id": "50:00:00:01:00:00",
                  "speed": "auto"
               },
               "eth1": {
                  "duplex": "auto",
                  "hw-id": "50:00:00:01:00:01",
                  "speed": "auto"
   ...
   },
   "error": null
}
```

To only get a part of the configuration, for example `system syslog`.

```
curl -k --location --request POST 'https://vyos/retrieve' \
--form data='{"op": "showConfig", "path": ["system", "syslog"]}' \
--form key='MY-HTTPS-API-PLAINTEXT-KEY'


response:
{
   "success": true,
   "data": {
      "global": {
            "facility": {
               "all": {
                  "level": "info"
               },
               "protocols": {
                  "level": "debug"
               }
            }
      }
   },
   "error": null
}
```

if you just want the Value of a multi-valued node, use the `returnValues` operation.

For example, get the addresses of a `dum0` interface.

```
curl -k --location --request POST 'https://vyos/retrieve' \
```

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```
--form data='{"op": "returnValues", "path": ["interfaces","dummy","dum0","address"]}' \
--form key='MY-HTTPS-API-PLAINTEXT-KEY'

respone:
{
   "success": true,
   "data": [
      "10.10.10.10/24",
      "10.10.10.11/24",
      "10.10.10.12/24"
   ],
   "error": null
}
```

/reset

The `reset` endpoint run a `reset` command.

```
curl --location --request POST 'https://vyos/reset' \
--form data='{"op": "reset", "path": ["ip", "bgp", "192.0.2.11"]}' \
--form key='MY-HTTPS-API-PLAINTEXT-KEY'

respone:
{
  "success": true,
  "data": "",
  "error": null
}
```

/image

To add or delete an image, use the `/image` endpoint.

add an image

```
curl -k --location --request POST 'https://vyos/image' \
--form data='{"op": "add", "url": "https://downloads.vyos.io/rolling/current/amd64/vyos-
↪rolling-latest.iso"}' \
--form key='MY-HTTPS-API-PLAINTEXT-KEY'

respone (shorted):
{
   "success": true,
   "data": "Trying to fetch ISO file from https://downloads.vyos.io/rolling-latest.iso\n
            ...
            Setting up grub configuration...\nDone.\n",
   "error": null
}
```

delete an image, for example `1.3-rolling-202006070117`

```
curl -k --location --request POST 'https://vyos/image' \
--form data='{"op": "delete", "name": "1.3-rolling-202006070117"}' \
--form key='MY-HTTPS-API-PLAINTEXT-KEY'

response:
{
   "success": true,
   "data": "Deleting the \"1.3-rolling-202006070117\" image...\nDone\n",
   "error": null
}
```

/show

The `/show` endpoint is to show everything in the operational mode.

For example, show which images are installed.

```
curl -k --location --request POST 'https://vyos/show' \
--form data='{"op": "show", "path": ["system", "image"]}' \
--form key='MY-HTTPS-API-PLAINTEXT-KEY'

response:
{
   "success": true,
   "data": "The system currently has the following image(s) installed:\n\n
              1: 1.4-rolling-202102280559 (default boot)\n
              2: 1.4-rolling-202102230218\n
              3: 1.3-beta-202102210443\n\n",
   "error": null
}
```

/generate

The `generate` endpoint run a `generate` command.

```
curl -k --location --request POST 'https://vyos/generate' \
--form data='{"op": "generate", "path": ["wireguard", "default-keypair"]}' \
--form key='MY-HTTPS-API-PLAINTEXT-KEY'

response:
{
   "success": true,
   "data": "",
   "error": null
}
```

/configure

You can pass a `set`, `delete` or `comment` command to the `/configure` endpoint.

`set` a single command

```
curl -k --location --request POST 'https://vyos/configure' \
--form data='{"op": "set", "path": ["interfaces", "dummy", "dum1", "address", "10.11.0.1/
↪32"]}' \
--form key='MY-HTTPS-API-PLAINTEXT-KEY'

response:
{
   "success": true,
   "data": null,
   "error": null
}
```

`delete` a single command

```
curl -k --location --request POST 'https://vyos/configure' \
--form data='{"op": "delete", "path": ["interfaces", "dummy", "dum1", "address", "10.11.
↪0.1/32"]}' \
--form key='MY-HTTPS-API-PLAINTEXT-KEY'

response:
{
   "success": true,
   "data": null,
   "error": null
}
```

The API pushes every request to a session and commit it. But some of VyOS components like DHCP and PPPoE Servers, IPSec, VXLAN, and other tunnels require full configuration for commit. The endpoint will process multiple commands when you pass them as a list to the `data` field.

```
curl -k --location --request POST 'https://vyos/configure' \
--form data='[{"op": "set","path":["interfaces","vxlan","vxlan1","remote","203.0.113.99
↪"]}, {"op": "set","path":["interfaces","vxlan","vxlan1","vni","1"]}]' \
--form key='MY-HTTPS-API-PLAINTEXT-KEY'

response:
{
   "success": true,
   "data": null,
   "error": null
}
```

/config-file

The endpoint `/config-file` is to save or load a configuration.

Save a running configuration to the startup configuration. When you don't specify the file when saving, it saves to `/config/config.boot`.

```
curl -k --location --request POST 'https://vyos/config-file' \
--form data='{"op": "save"}' \
--form key='MY-HTTPS-API-PLAINTEXT-KEY'

response:
{
   "success": true,
   "data": "Saving configuration to '/config/config.boot'...\nDone\n",
   "error": null
}
```

Save a running configuration to a file.

```
curl -k --location --request POST 'https://vyos/config-file' \
--form data='{"op": "save", "file": "/config/test.config"}' \
--form key='MY-HTTPS-API-PLAINTEXT-KEY'

response:
{
   "success": true,
   "data": "Saving configuration to '/config/test.config'...\nDone\n",
   "error": null
}
```

To Load a configuration file.

```
curl -k --location --request POST 'https://vyos/config-file' \
--form data='{"op": "load", "file": "/config/test.config"}' \
--form key='MY-HTTPS-API-PLAINTEXT-KEY'

response:
{
   "success": true,
   "data": null,
   "error": null
}
```

10.2 Ansible

VyOS supports configuration via ansible. Need to install `ansible` and `python3-paramiko` module

Structure of files

```
.
├── ansible.cfg
├── files
```

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```
│   └── id_rsa_docker.pub
├── hosts
└── main.yml
```

10.2.1 File contents

ansible.cfg

```
[defaults]
host_key_checking = no
retry_files_enabled = False
ANSIBLE_INVENTORY_UNPARSED_FAILED = true
```

id_rsa_docker.pub. Needs to declare only public key exactly.

```
AAAAB3NzaC1yc2EAAAADAQABAAABAQCoDgfhQJuJRFWJijHn7ZinZ3NWp4hWVrt7HFcvn0kgtP/5PeCtMt
```

hosts

```
[vyos_hosts]
r11 ansible_ssh_host=192.0.2.11

[vyos_hosts:vars]
ansible_python_interpreter=/usr/bin/python3
ansible_user=vyos
ansible_ssh_pass=vyos
ansible_network_os=vyos
ansible_connection=network_cli
```

main.yml

```
---

- hosts: r11

  connection: network_cli
  gather_facts: 'no'

  tasks:
    - name: Configure remote r11
      vyos_config:
        lines:
          - set system host-name r11
          - set system name-server 203.0.113.254
          - set service ssh disable-host-validation
          - set system login user vyos authentication public-keys docker@work type ssh-
↪rsa
          - set system login user vyos authentication public-keys docker@work key "{{␣
↪lookup('file', 'id_rsa_docker.pub') }}"
          - set system time-zone America/Los_Angeles
          - set interfaces ethernet eth0 description WAN
```

10.2.2 Run ansible

```
$ ansible-playbook -i hosts main.yml

PLAY [r11]␣
↪*********************************************************************************************************************

TASK [Configure remote r11]␣
↪*********************************************************************************************************************
changed: [r11]

PLAY RECAP␣
↪*********************************************************************************************************************
r11                        : ok=1    changed=1    unreachable=0    failed=0    ␣
↪skipped=0    rescued=0    ignored=0
```

10.3 Napalm

VyOS supports some napalm functions for configuration and op-mode. It requires more tests.

Install `napalm-vyos` module

```
apt install python3-pip
pip3 install napalm
pip3 install napalm-vyos
```

10.3.1 Op-mode

```
#!/usr/bin/env python3

import json
from napalm import get_network_driver

driver = get_network_driver('vyos')

vyos_router = driver(
    hostname="192.0.2.1",
    username="vyos",
    password="vyospass",
    optional_args={"port": 22},
)

vyos_router.open()
output = vyos_router.get_facts()
print(json.dumps(output, indent=4))

output = vyos_router.get_arp_table()
print(json.dumps(output, indent=4))

vyos_router.close()
```

Output op-mode

```
$ ./vyos-napalm.py
{
    "uptime": 7185,
    "vendor": "VyOS",
    "os_version": "1.3.0-rc5",
    "serial_number": "",
    "model": "Standard PC (Q35 + ICH9, 2009)",
    "hostname": "r4-1.3",
    "fqdn": "vyos.local",
    "interface_list": [
        "eth0",
        "eth1",
        "eth2",
        "lo",
        "vtun10"
    ]
}
[
    {
        "interface": "eth1",
        "mac": "52:54:00:b2:38:2c",
        "ip": "192.0.2.2",
        "age": 0.0
    },
    {
        "interface": "eth0",
        "mac": "52:54:00:a2:b9:5b",
        "ip": "203.0.113.11",
        "age": 0.0
    }
]
```

10.3.2 Configuration

We need 2 files, commands.conf and script itself.

Content of commands.conf

```
set service ssh disable-host-validation
set service ssh port '2222'
set system name-server '192.0.2.8'
set system name-server '203.0.113.8'
set interfaces ethernet eth1 description 'FOO'
```

Script vyos-napalm.py

```
#!/usr/bin/env python3

from napalm import get_network_driver

driver = get_network_driver('vyos')
```

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```
vyos_router = driver(
    hostname="192.0.2.1",
    username="vyos",
    password="vyospass",
    optional_args={"port": 22},
)

vyos_router.open()
vyos_router.load_merge_candidate(filename='commands.conf')
diffs = vyos_router.compare_config()

if bool(diffs) == True:
    print(diffs)
    vyos_router.commit_config()
else:
    print('No configuration changes to commit')
    vyos_router.discard_config()

vyos_router.close()
```

Output

```
$./vyos-napalm.py
[edit interfaces ethernet eth1]
+description FOO
[edit service ssh]
+disable-host-validation
+port 2222
[edit system]
+name-server 192.0.2.8
+name-server 203.0.113.8
[edit]
```

10.4 Netmiko

VyOS supports configuration via netmiko. It requires to install `python3-netmiko` module.

10.4.1 Example

```
#!/usr/bin/env python3

from netmiko import ConnectHandler

vyos_router = {
  "device_type": "vyos",
  "host": "192.0.2.1",
  "username": "vyos",
  "password": "vyospass",
```

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```
  "port": 22,
  }

net_connect = ConnectHandler(**vyos_router)

config_commands = [
                    'set interfaces ethernet eth0 description WAN',
                    'set interfaces ethernet eth1 description LAN',
                   ]

# set congiguration
output = net_connect.send_config_set(config_commands, exit_config_mode=False)
print(output)

# commit configuration
output = net_connect.commit()
print(output)

# op-mode commands
output = net_connect.send_command("run show interfaces")
print(output)
```

Output

```
$ ./vyos-netmiko.py
configure
set interfaces ethernet eth0 description WAN
[edit]
vyos@r4-1.3# set interfaces ethernet eth1 description LAN
[edit]
vyos@r4-1.3#
commit
[edit]
vyos@r4-1.3#
Codes: S - State, L - Link, u - Up, D - Down, A - Admin Down
Interface        IP Address                        S/L  Description
---------        ----------                        ---  -----------
eth0             203.0.113.1/24                    u/u  WAN
eth1             192.0.2.1/30                      u/u  LAN
eth2             -                                 u/u
lo               127.0.0.1/8                       u/u
                 ::1/128
vtun10           10.10.0.1/24                      u/u
[edit]
```

10.5 Command Scripting

VyOS supports executing configuration and operational commands non-interactively from shell scripts.

To include VyOS specific functions and aliases you need to `source /opt/vyatta/etc/functions/script-template` files at the top of your script.

```
#!/bin/vbash
source /opt/vyatta/etc/functions/script-template
exit
```

10.5.1 Run configuration commands

Configuration commands are executed just like from a normal config session. For example, if you want to disable a BGP peer on VRRP transition to backup:

```
#!/bin/vbash
source /opt/vyatta/etc/functions/script-template
configure
set protocols bgp 65536 neighbor 192.168.2.1 shutdown
commit
exit
```

10.5.2 Run operational commands

Unlike a normal configuration session, all operational commands must be prepended with `run`, even if you haven't created a session with configure.

```
#!/bin/vbash
source /opt/vyatta/etc/functions/script-template
run show interfaces
exit
```

10.5.3 Run commands remotely

Sometimes you simply wan't to execute a bunch of op-mode commands via SSH on a remote VyOS system.

```
ssh 192.0.2.1 'vbash -s' <<EOF
source /opt/vyatta/etc/functions/script-template
run show interfaces
exit
EOF
```

Will return:

```
Welcome to VyOS
Codes: S - State, L - Link, u - Up, D - Down, A - Admin Down
Interface        IP Address                        S/L  Description
---------        ----------                        ---  -----------
eth0             192.0.2.1/24                      u/u
```

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```
lo               127.0.0.1/8                          u/u
                ::1/128
```

10.5.4 Other script languages

If you want to script the configs in a language other than bash you can have your script output commands and then source them in a bash script.

Here is a simple example:

```
#!/usr/bin/env python
print "delete firewall group address-group somehosts"
print "set firewall group address-group somehosts address '192.0.2.3'"
print "set firewall group address-group somehosts address '203.0.113.55'"
```

```
#!/bin/vbash
source /opt/vyatta/etc/functions/script-template
configure
source < /config/scripts/setfirewallgroup.py
commit
```

10.5.5 Executing Configuration Scripts

There is a pitfall when working with configuration scripts. It is tempting to call configuration scripts with "sudo" (i.e., temporary root permissions), because that's the common way on most Linux platforms to call system commands.

On VyOS this will cause the following problem: After modifying the configuration via script like this once, it is not possible to manually modify the config anymore:

```
sudo ./myscript.sh # Modifies config
configure
set ... # Any configuration parameter
```

This will result in the following error message: `Set failed` If this happens, a reboot is required to be able to edit the config manually again.

To avoid these problems, the proper way is to call a script with the `vyattacfg` group, e.g., by using the `sg` (switch group) command:

```
sg vyattacfg -c ./myscript.sh
```

To make sure that a script is not accidentally called without the `vyattacfg` group, the script can be safeguarded like this:

```
if [ "$(id -g -n)" != 'vyattacfg' ] ; then
    exec sg vyattacfg -c "/bin/vbash $(readlink -f $0) $@"
fi
```

10.5.6 Executing pre-hooks/post-hooks Scripts

VyOS has the ability to run custom scripts before and after each commit

The default directories where your custom Scripts should be located are:

```
/config/scripts/commit/pre-hooks.d   - Directory with scripts that run before
                                       each commit.

/config/scripts/commit/post-hooks.d  - Directory with scripts that run after
                                       each commit.
```

Scripts are run in alphabetical order. Their names must consist entirely of ASCII upper- and lower-case letters,ASCII digits, ASCII underscores, and ASCII minus-hyphens.No other characters are allowed.

Note: Custom scripts are not executed with root privileges (Use sudo inside if this is necessary).

A simple example is shown below, where the ops command executed in the post-hook script is "show interfaces".

```
vyos@vyos# set interfaces ethernet eth1  address 192.0.2.3/24
vyos@vyos# commit
Codes: S - State, L - Link, u - Up, D - Down, A - Admin Down
Interface        IP Address                        S/L  Description
---------        ----------                        ---  -----------
eth0             198.51.100.10/24                  u/u
eth1             192.0.2.3/24                      u/u
eth2             -                                 u/u
eth3             -                                 u/u
lo               203.0.113.5/24                    u/u
```

10.5.7 Preconfig on boot

The `/config/scripts/vyos-preconfig-bootup.script` script is called on boot before the VyOS configuration during boot process.

Any modifications were done to work around unfixed bugs and implement enhancements that are not complete in the VyOS system can be placed here.

The default file looks like this:

```
#!/bin/sh
# This script is executed at boot time before VyOS configuration is applied.
# Any modifications required to work around unfixed bugs or use
# services not available through the VyOS CLI system can be placed here.
```

10.5.8 Postconfig on boot

The `/config/scripts/vyos-postconfig-bootup.script` script is called on boot after the VyOS configuration is fully applied.

Any modifications were done to work around unfixed bugs and implement enhancements that are not complete in the VyOS system can be placed here.

The default file looks like this:

```
#!/bin/sh
# This script is executed at boot time after VyOS configuration is fully
# applied. Any modifications required to work around unfixed bugs or use
# services not available through the VyOS CLI system can be placed here.
```

Hint: For configuration/upgrade management issues, modification of this script should be the last option. Always try to find solutions based on CLI commands first.

10.6 VyOS cloud-init

Cloud and virtualized instances of VyOS are initialized using the industry-standard cloud-init. Via cloud-init, the system performs tasks such as injecting SSH keys and configuring the network. In addition, the user can supply a custom configuration at the time of instance launch.

10.6.1 Config Sources

VyOS support three types of config sources.

- Metadata - Metadata is sourced by the cloud platform or hypervisor. In some clouds, there is implemented as an HTTP endpoint at http://169.254.169.254.
- Network configuration - This config source informs the system about the network settings like IP addresses, routes, DNS. Available only in several cloud and virtualization platforms.
- User-data - User-data is specified by the user. This config source offers the ability to insert any CLI configuration commands into the configuration before the first boot.

10.6.2 User-data

Major cloud providers offer a means of providing user-data at the time of instance launch. It can be provided as plain text or as base64-encoded text, depending on cloud provider. Also, it can be compressed using gzip, which makes sense with a long configuration commands list, because of the hard limit to ~16384 bytes for the whole user-data.

The easiest way to configure the system via user-data is the Cloud-config syntax described below.

10.6.3 Cloud-config modules

In VyOS, by default, enabled three modules:

- `write_files` - this module allows to insert any files into the filesystem before the first boot, for example, pre-generated encryption keys, certificates, or even a whole `config.boot` file.
- `vyos_userdata` - the module accepts a list of CLI configuration commands in a `vyos_config_commands` section, which gives an easy way to configure the system during deployment.
- `vyos_install` - this module allows to install VyOS without human intervention.

10.6.4 cloud-config file format

A cloud-config document is written in YAML. The file must begin with `#cloud-config` line.

10.6.5 Module vyos_userdata

The key used to designate a VyOS configuration is `vyos_config_commands`. What follows is VyOS configuration using the "set-style" syntax. Both "set" and "delete" commands are supported.

Commands requirements:

- one command per line
- if command ends in a value, it must be inside single quotes
- a single-quote symbol is not allowed inside command or value

The commands list produced by the `show configuration commands` command on a VyOS router should comply with all the requirements, so it is easy to get a proper commands list by copying it from another router.

The configuration specified in the cloud-config document overwrites default configuration values and values configured via Metadata.

Here is an example cloud-config.

```
#cloud-config
vyos_config_commands:
  - set system host-name 'vyos-prod-ashburn'
  - set system ntp server 1.pool.ntp.org
  - set system ntp server 2.pool.ntp.org
  - delete interfaces ethernet eth1 address 'dhcp'
  - set interfaces ethernet eth1 address '192.0.2.247/24'
  - set protocols static route 198.51.100.0/24 next-hop '192.0.2.1'
```

10.6.6 Module vyos_install

This module allows to install VyOS without human intervention. It will be useful for the installation via a network like PXE or USB flash install. After network boot or USB drive boot, this module runs automatic system installation with predefined grub parameters. The next possible option can be used.

```
#cloud-config
vyos_install:
  activated: true # true - enable installer, false - disable. Default: false
```

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```
  post_reboot: true # true - reboot after installation, false - do not reboot. Default:␣
↪false
  ci_disable: true # true - disable cloud-init after installation, false - do not␣
↪disable. Default: false
  boot_params:
    console_type: serial # type of console: kvm, serial. Default: kvm
    serial_console_num: 1 # serial console number. Default: 0
    serial_console_speed: 115200 # serial console speed. Default: 9600
    cmdline_extra: nosmt mitigations=off # add extra parameters for kernel cmdline
```

10.6.7 System Defaults/Fallbacks

These are the VyOS defaults and fallbacks.

- SSH is configured on port 22
- `vyos/vyos` credentials if no others specified by data source
- DHCP on first Ethernet interface if no network configuration is provided

All of these can be overridden using the configuration in user-data.

10.6.8 Troubleshooting

If you encounter problems, verify that the cloud-config document contains valid YAML. Online resources such as https://www.yamllint.com/ provide a simple tool for validating YAML.

cloud-init logs to /var/log/cloud-init.log. This file can be helpful in determining why the configuration varies from what you expect. You can fetch the most important data filtering output for `vyos` keyword:

```
sudo grep vyos /var/log/cloud-init.log
```

CHAPTER

ELEVEN

TROUBLESHOOTING

Sometimes things break or don't work as expected. This section describes several troubleshooting tools provided by VyOS that can help when something goes wrong.

11.1 Connectivity Tests

11.1.1 Basic Connectivity Tests

Verifying connectivity can be done with the familiar *ping* and *traceroute* commands. The options for each are shown (the options for each command were displayed using the built-in help as described in the *Command Line Interface* section and are omitted from the output here):

ping <destination>

Send ICMP echo requests to destination host. There are multiple options to ping, inkl. VRF support.

```
vyos@vyos:~$ ping 10.1.1.1
Possible completions:
  <Enter>       Execute the current command
  adaptive      Ping options
  allow-broadcast
  audible
  bypass-route
  count
  deadline
  do-not-fragment
  flood
  interface
  interval
  mark
  no-loopback
  numeric
  pattern
  quiet
  record-route
  size
  timestamp
  tos
  ttl
  verbose
  vrf
```

traceroute <destination>

Trace path to target.

```
vyos@vyos:~$ traceroute
Possible completions:
  <hostname>    Track network path to specified node
  <x.x.x.x>
  <h:h:h:h:h:h:h:h>
  ipv4          Track network path to <hostname|IPv4 address>
  ipv6          Track network path to <hostname|IPv6 address>
```

11.1.2 Advanced Connectivity Tests

monitor traceroute <destination>

However, another helper is available which combines ping and traceroute into a single tool. An example of its output is shown:

```
vyos@vyos:~$ mtr 10.62.212.12

                           My traceroute  [v0.85]
vyos (0.0.0.0)
Keys:  Help   Display mode   Restart statistics   Order of fields   quit
                                Packets               Pings
Host                          Loss%   Snt   Last   Avg  Best  Wrst StDev
1. 10.11.110.4                 0.0%    34    0.5   0.5   0.4   0.8   0.1
2. 10.62.255.184               0.0%    34    1.1   1.0   0.9   1.4   0.1
3. 10.62.255.71                0.0%    34    1.4   1.4   1.3   2.0   0.1
4. 10.62.212.12                0.0%    34    1.6   1.6   1.6   1.7   0.0
```

Note: The output consumes the screen and will replace your command prompt.

Several options are available for changing the display output. Press *h* to invoke the built in help system. To quit, just press *q* and you'll be returned to the VyOS command prompt.

11.1.3 IPv6 Topology Discovery

IPv6 uses different techniques to discover its Neighbors/topology.

Router Discovery

force ipv6-rd interface <interface> [address <ipv6-address>]

Discover routers via eth0.

Example:

```
vyos@vyos:~$ force ipv6-rd interface eth0
Soliciting ff02::2 (ff02::2) on eth0...
```

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```
Hop limit                 :           60 (      0x3c)
Stateful address conf.    :           No
Stateful other conf.      :           No
Mobile home agent         :           No
Router preference         :         high
Neighbor discovery proxy  :           No
Router lifetime           :         1800 (0x00000708) seconds
Reachable time            :  unspecified (0x00000000)
Retransmit time           :  unspecified (0x00000000)
 Prefix                   : 240e:fe:8ca7:ea01::/64
  On-link                 :          Yes
  Autonomous address conf.:          Yes
  Valid time              :      2592000 (0x00278d00) seconds
  Pref. time              :        14400 (0x00003840) seconds
 Prefix                   : fc00:470:f1cd:101::/64
  On-link                 :          Yes
  Autonomous address conf.:          Yes
  Valid time              :      2592000 (0x00278d00) seconds
  Pref. time              :        14400 (0x00003840) seconds
 Recursive DNS server     : fc00:470:f1cd::ff00
  DNS server lifetime     :          600 (0x00000258) seconds
 Source link-layer address: 00:98:2B:F8:3F:11
 from fe80::298:2bff:fef8:3f11
```

Neighbor Discovery

force ipv6-nd interface <interface> address <ipv6-address>

Example:

```
vyos@vyos:~$ force ipv6-nd interface eth0 address fc00:470:f1cd:101::1

Soliciting fc00:470:f1cd:101::1 (fc00:470:f1cd:101::1) on eth0...
Target link-layer address: 00:98:2B:F8:3F:11 from fc00:470:f1cd:101::1
```

11.2 Interface names

If you find the names of your interfaces have changed, this could be because your MAC addresses have changed.

- For example, you have a VyOS VM with 4 Ethernet interfaces named eth0, eth1, eth2 and eth3. Then, you migrate your VyOS VM to a different host and find your interfaces now are eth4, eth5, eth6 and eth7.

  One way to fix this issue **taking control of the MAC addresses** is:

  Log into VyOS and run this command to display your interface settings.

  ```
  show interfaces detail
  ```

  Take note of MAC addresses.

  Now, in order to update a MAC address in the configuration, run this command specifying the interface name and MAC address you want.

```
set interfaces eth0 hw-id 00:0c:29:da:a4:fe
```

If it is a VM, go into the settings of the host and set the MAC address to the settings found in the config.boot file. You can also set the MAC to static if the host allows so.

- Another example could be when cloning VyOS VMs in GNS3 and you get into the same issue: interface names have changed.

  And **a more generic way to fix it** is just deleting every MAC address at the configuration file of the cloned machine. They will be correctly regenerated automatically.

11.3 Monitoring

VyOS features several monitoring tools.

```
vyos@vyos:~$ monitor
Possible completions:
  bandwidth     Monitor interface bandwidth in real time
  bandwidth-test
                Initiate or wait for bandwidth test
  cluster       Monitor clustering service
  command       Monitor an operational mode command (refreshes every 2 seconds)
  conntrack-sync
                Monitor conntrack-sync
  content-inspection
                Monitor Content-Inspection
  dhcp          Monitor Dynamic Host Control Protocol (DHCP)
  dns           Monitor a Domain Name Service (DNS) daemon
  firewall      Monitor Firewall
  https         Monitor the Secure Hypertext Transfer Protocol (HTTPS) service
  lldp          Monitor Link Layer Discovery Protocol (LLDP) daemon
  log           Monitor last lines of messages file
  nat           Monitor network address translation (NAT)
  ndp           Monitor the NDP information received by the router through the device
  openvpn       Monitor OpenVPN
  protocol      Monitor routing protocols
  snmp          Monitor Simple Network Management Protocol (SNMP) daemon
  stop-all      Stop all current background monitoring processes
  traceroute    Monitor the path to a destination in realtime
  traffic       Monitor traffic dumps
  vpn           Monitor VPN
  vrrp          Monitor Virtual Router Redundancy Protocol (VRRP)
  webproxy      Monitor Webproxy service
```

11.3.1 Traffic Dumps

To monitor interface traffic, issue the `monitor traffic interface <name>` command, replacing *<name>* with your chosen interface.

```
vyos@vyos:~$ monitor traffic interface eth0
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on eth0, link-type EN10MB (Ethernet), capture size 262144 bytes
15:54:28.581601 IP 192.168.0.1 > vyos: ICMP echo request, id 1870, seq 3848, length 64
15:54:28.581660 IP vyos > 192.168.0.1: ICMP echo reply, id 1870, seq 3848, length 64
15:54:29.583399 IP 192.168.0.1 > vyos: ICMP echo request, id 1870, seq 3849, length 64
15:54:29.583454 IP vyos > 192.168.0.1: ICMP echo reply, id 1870, seq 3849, length 64
^C
4 packets captured
4 packets received by filter
0 packets dropped by kernel
vyos@vyos:~$
```

To quit monitoring, press *Ctrl-c* and you'll be returned to the VyOS command prompt.

Traffic can be filtered and saved.

```
vyos@vyos:~$ monitor traffic interface eth0
Possible completions:
  <Enter>       Execute the current command
  filter        Monitor traffic matching filter conditions
  save          Save traffic dump from an interface to a file
```

11.3.2 Interface Bandwidth Usage

to take a quick view on the used bandwidth of an interface use the `monitor bandwidth` command

```
vyos@vyos:~$ monitor bandwidth interface eth0
```

show the following:

```
     B                      (RX Bytes/second)
198.00 .|....|.................................................
165.00 .|....|.................................................
132.00 ||..|.|.................................................
 99.00 ||..|.|.................................................
 66.00 |||||||.................................................
 33.00 |||||||.................................................
       1   5   10   15   20   25   30   35   40   45   50   55   60

   KiB                      (TX Bytes/second)
  3.67 ......|.................................................
  3.06 ......|.................................................
  2.45 ......|.................................................
  1.84 ......|.................................................
  1.22 ......|.................................................
  0.61 :::::||.................................................
       1   5   10   15   20   25   30   35   40   45   50   55   60
```

11.3.3 Interface Performance

To take a look on the network bandwidth between two nodes, the `monitor bandwidth-test` command is used to run iperf.

```
vyos@vyos:~$ monitor bandwidth-test
Possible completions:
  accept        Wait for bandwidth test connections (port TCP/5001)
  initiate      Initiate a bandwidth test
```

- The `accept` command opens a listening iperf server on TCP Port 5001
- The `initiate` command connects to that server to perform the test.

```
vyos@vyos:~$ monitor bandwidth-test initiate
Possible completions:
  <hostname>    Initiate a bandwidth test to specified host (port TCP/5001)
  <x.x.x.x>
  <h:h:h:h:h:h:h:h>
```

11.3.4 Monitor command

The `monitor command` command allows you to repeatedly run a command to view a continuously refreshed output. The command is run and output every 2 seconds, allowing you to monitor the output continuously without having to re-run the command. This can be useful to follow routing adjacency formation.

```
vyos@router:~$ monitor command "show interfaces"
```

Will clear the screen and show you the output of `show interfaces` every 2 seconds.

```
Every 2.0s: /opt/vyatta/bin/vyatta-op-cmd-wrapper    Sun Mar 26 02:49:46 2019

Codes: S - State, L - Link, u - Up, D - Down, A - Admin Down
Interface        IP Address                        S/L  Description
---------        ----------                        ---  -----------
eth0             192.168.1.1/24                    u/u
eth0.5           198.51.100.4/24                   u/u  WAN
lo               127.0.0.1/8                       u/u
                 ::1/128
vti0             172.25.254.2/30                   u/u
vti1             172.25.254.9/30                   u/u
```

11.4 Terminal/Console

Sometimes you need to clear counters or statistics to troubleshoot better.

To do this use the `clear` command in Operational mode.

to clear the console output

```
vyos@vyos:~$ clear console
```

to clear interface counters

```
# clear all interfaces
vyos@vyos:~$ clear interface ethernet counters
# clear specific interface
vyos@vyos:~$ clear interface ehternet eth0 counters
```

The command follow the same logic as the `set` command in configuration mode.

```
# clear all counters of a interface type
vyos@vyos:~$ clear interface <interface_type> counters
# clear counter of a interface in interface_type
vyos@vyos:~$ clear interface <interface_type> <interace_name> counters
```

to clear counters on firewall rulesets or single rules

```
vyos@vyos:~$ clear firewall name <ipv4 ruleset name> counters
vyos@vyos:~$ clear firewall name <ipv4 ruleset name> rule <rule#> counters

vyos@vyos:~$ clear firewall ipv6-name <ipv6 ruleset name> counters
vyos@vyos:~$ clear firewall ipv6-name <ipv6 ruleset name> rule <rule#> counters
```

11.5 System Information

11.5.1 Boot Steps

VyOS 1.2 uses Debian Jessie as the base Linux operating system. Jessie was the first version of Debian that uses systemd as the default init system.

These are the boot steps for VyOS 1.2

1. The BIOS loads Grub (or isolinux for the Live CD)
2. Grub then starts the Linux boot and loads the Linux Kernel `/boot/vmlinuz`
3. Kernel Launches Systemd `/lib/systemd/systemd`
4. Systemd loads the VyOS service file `/lib/systemd/system/vyos-router.service`
5. The service file launches the VyOS router init script `/usr/libexec/vyos/init/vyos-router` - this is part of the vyatta-cfg Debian package
    1. Starts FRR - successor to GNU Zebra and Quagga
    2. Initialises the boot configuration file - copies over `config.boot.default` if there is no configuration
    3. Runs the configuration migration, if the configuration is for an older version of VyOS
    4. Runs The pre-config script, if there is one `/config/scripts/vyos-preconfig-bootup.script`
    5. If the config file was upgraded, runs any post upgrade scripts `/config/scripts/post-upgrade.d`
    6. Starts `rl-system` and `firewall`
    7. Mounts the `/boot` partition
    8. The boot configuration file is then applied by `/opt/vyatta/sbin/vyatta-boot-config-loader/opt/vyatta/etc/config/config.boot`
    1. The config loader script writes log entries to `/var/log/vyatta-config-loader.log`

10. Runs `telinit q` to tell the init system to reload `/etc/inittab`
11. Finally it runs the post-config script `/config/scripts/vyos-postconfig-bootup.script`

CHAPTER

TWELVE

CONFIGURATION BLUEPRINTS

This chapter contains various configuration examples:

12.1 Zone-Policy example

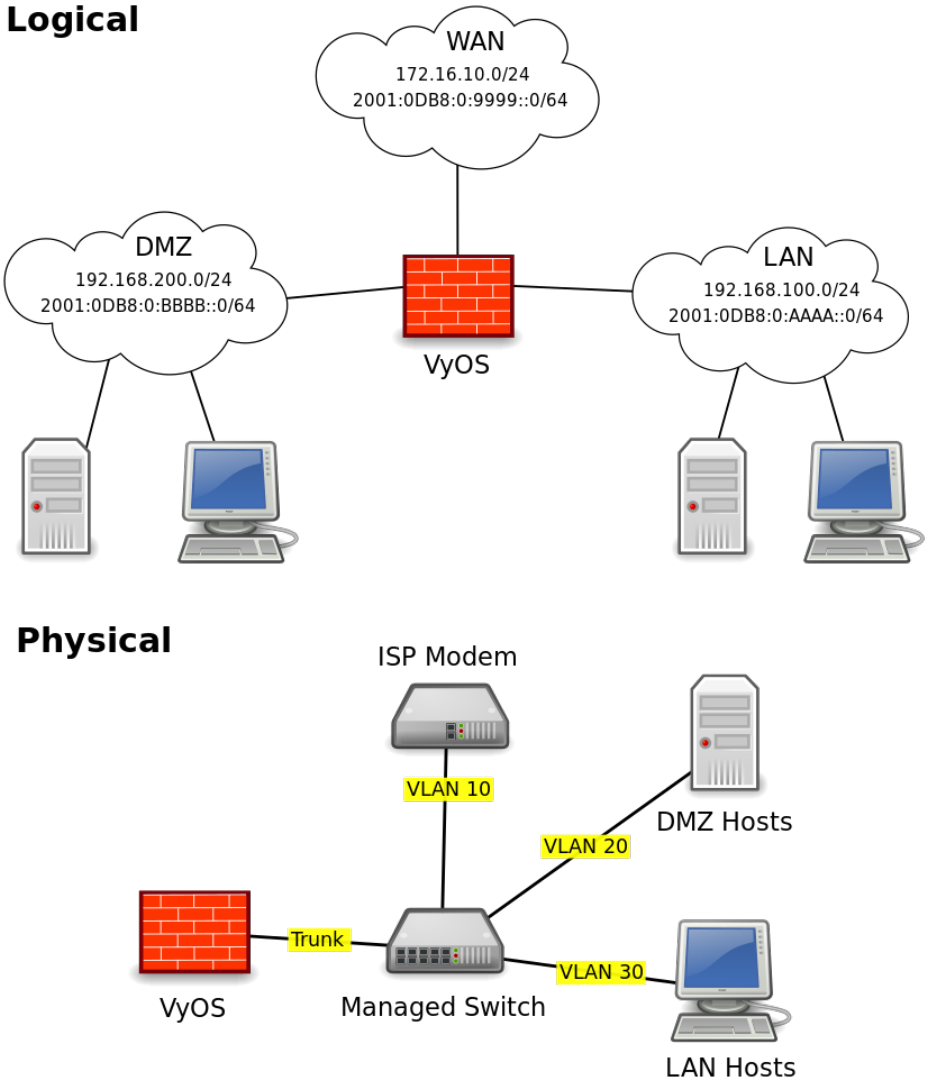
12.1.1 Native IPv4 and IPv6

We have three networks.

```
WAN - 172.16.10.0/24, 2001:0DB8:0:9999::0/64
LAN - 192.168.100.0/24, 2001:0DB8:0:AAAA::0/64
DMZ - 192.168.200.0/24, 2001:0DB8:0:BBBB::0/64
```

This specific example is for a router on a stick, but is very easily adapted for however many NICs you have:

- Internet - 192.168.200.100 - TCP/80
- Internet - 192.168.200.100 - TCP/443
- Internet - 192.168.200.100 - TCP/25
- Internet - 192.168.200.100 - TCP/53
- VyOS acts as DHCP, DNS forwarder, NAT, router and firewall.
- 192.168.200.200/2001:0DB8:0:BBBB::200 is an internal/external DNS, web and mail (SMTP/IMAP) server.
- 192.168.100.10/2001:0DB8:0:AAAA::10 is the administrator's console. It can SSH to VyOS.
- LAN and DMZ hosts have basic outbound access: Web, FTP, SSH.
- LAN can access DMZ resources.
- DMZ cannot access LAN resources.
- Inbound WAN connect to DMZ host.



The VyOS interface is assigned the .1/:1 address of their respective networks. WAN is on VLAN 10, LAN on VLAN 20, and DMZ on VLAN 30.

It will look something like this:

```
interfaces {
    ethernet eth0 {
        duplex auto
        hw-id 00:53:ed:6e:2a:92
        smp_affinity auto
        speed auto
        vif 10 {
            address 172.16.10.1/24
            address 2001:db8:0:9999::1/64
        }
        vif 20 {
            address 192.168.100.1/24
```

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```
            address 2001:db8:0:AAAA::1/64
        }
        vif 30 {
            address 192.168.200.1/24
            address 2001:db8:0:BBBB::1/64
        }
    }
    loopback lo {
    }
}
```

12.1.2 Zones Basics

Each interface is assigned to a zone. The interface can be physical or virtual such as tunnels (VPN, PPTP, GRE, etc) and are treated exactly the same.

Traffic flows from zone A to zone B. That flow is what I refer to as a zone-pair-direction. eg. A->B and B->A are two zone-pair-destinations.

Ruleset are created per zone-pair-direction.

I name rule sets to indicate which zone-pair-direction they represent. eg. ZoneA-ZoneB or ZoneB-ZoneA. LAN-DMZ, DMZ-LAN.

In VyOS, you have to have unique Ruleset names. In the event of overlap, I add a "-6" to the end of v6 rulesets. eg. LAN-DMZ, LAN-DMZ-6. This allows for each auto-completion and uniqueness.

In this example we have 4 zones. LAN, WAN, DMZ, Local. The local zone is the firewall itself.

If your computer is on the LAN and you need to SSH into your VyOS box, you would need a rule to allow it in the LAN-Local ruleset. If you want to access a webpage from your VyOS box, you need a rule to allow it in the Local-LAN ruleset.

In rules, it is good to keep them named consistently. As the number of rules you have grows, the more consistency you have, the easier your life will be.

```
Rule 1 - State Established, Related
Rule 2 - State Invalid
Rule 100 - ICMP
Rule 200 - Web
Rule 300 - FTP
Rule 400 - NTP
Rule 500 - SMTP
Rule 600 - DNS
Rule 700 - DHCP
Rule 800 - SSH
Rule 900 - IMAPS
```

The first two rules are to deal with the idiosyncrasies of VyOS and iptables.

Zones and Rulesets both have a default action statement. When using Zone-Policies, the default action is set by the zone-policy statement and is represented by rule 10000.

It is good practice to log both accepted and denied traffic. It can save you significant headaches when trying to troubleshoot a connectivity issue.

To add logging to the default rule, do:

```
set firewall name <ruleSet> enable-default-log
```

By default, iptables does not allow traffic for established sessions to return, so you must explicitly allow this. I do this by adding two rules to every ruleset. 1 allows established and related state packets through and rule 2 drops and logs invalid state packets. We place the established/related rule at the top because the vast majority of traffic on a network is established and the invalid rule to prevent invalid state packets from mistakenly being matched against other rules. Having the most matched rule listed first reduces CPU load in high volume environments. Note: I have filed a bug to have this added as a default action as well.

''It is important to note, that you do not want to add logging to the established state rule as you will be logging both the inbound and outbound packets for each session instead of just the initiation of the session. Your logs will be massive in a very short period of time."

In VyOS you must have the interfaces created before you can apply it to the zone and the rulesets must be created prior to applying it to a zone-policy.

I create/configure the interfaces first. Build out the rulesets for each zone-pair-direction which includes at least the three state rules. Then I setup the zone-policies.

Zones do not allow for a default action of accept; either drop or reject. It is important to remember this because if you apply an interface to a zone and commit, any active connections will be dropped. Specifically, if you are SSH'd into VyOS and add local or the interface you are connecting through to a zone and do not have rulesets in place to allow SSH and established sessions, you will not be able to connect.

The following are the rules that were created for this example (may not be complete), both in IPv4 and IPv6. If there is no IP specified, then the source/destination address is not explicit.

```
WAN - DMZ:192.168.200.200 - tcp/80
WAN - DMZ:192.168.200.200 - tcp/443
WAN - DMZ:192.168.200.200 - tcp/25
WAN - DMZ:192.168.200.200 - tcp/53
WAN - DMZ:2001:0DB8:0:BBBB::200 - tcp/80
WAN - DMZ:2001:0DB8:0:BBBB::200 - tcp/443
WAN - DMZ:2001:0DB8:0:BBBB::200 - tcp/25
WAN - DMZ:2001:0DB8:0:BBBB::200 - tcp/53

DMZ - Local - tcp/53
DMZ - Local - tcp/123
DMZ - Local - tcp/67,68

LAN - Local - tcp/53
LAN - Local - tcp/123
LAN - Local - tcp/67,68
LAN:192.168.100.10 - Local - tcp/22
LAN:2001:0DB8:0:AAAA::10 - Local - tcp/22

LAN - WAN - tcp/80
LAN - WAN - tcp/443
LAN - WAN - tcp/22
LAN - WAN - tcp/20,21

DMZ - WAN - tcp/80
DMZ - WAN - tcp/443
DMZ - WAN - tcp/22
DMZ - WAN - tcp/20,21
```

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```
DMZ - WAN - tcp/53
DMZ - WAN - udp/53

Local - WAN - tcp/80
Local - WAN - tcp/443
Local - WAN - tcp/20,21

Local - DMZ - tcp/25
Local - DMZ - tcp/67,68
Local - DMZ - tcp/53
Local - DMZ - udp/53

Local - LAN - tcp/67,68

LAN - DMZ - tcp/80
LAN - DMZ - tcp/443
LAN - DMZ - tcp/993
LAN:2001:0DB8:0:AAAA::10 - DMZ:2001:0DB8:0:BBBB::200 - tcp/22
LAN:192.168.100.10 - DMZ:192.168.200.200 - tcp/22
```

Since we have 4 zones, we need to setup the following rulesets.

```
Lan-wan
Lan-local
Lan-dmz
Wan-lan
Wan-local
Wan-dmz
Local-lan
Local-wan
Local-dmz
Dmz-lan
Dmz-wan
Dmz-local
```

Even if the two zones will never communicate, it is a good idea to create the zone-pair-direction rulesets and set enable-default-log. This will allow you to log attempts to access the networks. Without it, you will never see the connection attempts.

This is an example of the three base rules.

```
name wan-lan {
  default-action drop
  enable-default-log
  rule 1 {
    action accept
    state {
      established enable
      related enable
    }
  }
  rule 2 {
    action drop
```

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```
    log enable
    state {
      invalid enable
    }
  }
}
```

Here is an example of an IPv6 DMZ-WAN ruleset.

```
ipv6-name dmz-wan-6 {
  default-action drop
  enable-default-log
  rule 1 {
    action accept
    state {
      established enable
      related enable
    }
  }
  rule 2 {
    action drop
    log enable
    state {
      invalid enable
  }
  rule 100 {
    action accept
    log enable
    protocol ipv6-icmp
  }
  rule 200 {
    action accept
    destination {
      port 80,443
    }
    log enable
    protocol tcp
  }
  rule 300 {
    action accept
    destination {
      port 20,21
    }
    log enable
    protocol tcp
  }
  rule 500 {
    action accept
    destination {
      port 25
    }
    log enable
```

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```
    protocol tcp
    source {
      address 2001:db8:0:BBBB::200
    }
  }
  rule 600 {
    action accept
    destination {
      port 53
    }
    log enable
    protocol tcp_udp
    source {
      address 2001:db8:0:BBBB::200
    }
  }
  rule 800 {
    action accept
    destination {
    port 22
    }
    log enable
    protocol tcp
  }
}
```

Once you have all of your rulesets built, then you need to create your zone-policy.

Start by setting the interface and default action for each zone.

```
set zone-policy zone dmz default-action drop
set zone-policy zone dmz interface eth0.30
```

In this case, we are setting the v6 ruleset that represents traffic sourced from the LAN, destined for the DMZ. Because the zone-policy firewall syntax is a little awkward, I keep it straight by thinking of it backwards.

```
set zone-policy zone dmz from lan firewall ipv6-name lan-dmz-6
```

DMZ-LAN policy is LAN-DMZ. You can get a rhythm to it when you build out a bunch at one time.

In the end, you will end up with something like this config. I took out everything but the Firewall, Interfaces, and zone-policy sections. It is long enough as is.

12.1.3 IPv6 Tunnel

If you are using a IPv6 tunnel from HE.net or someone else, the basis is the same except you have two WAN interfaces. One for v4 and one for v6.

You would have 5 zones instead of just 4 and you would configure your v6 ruleset between your tunnel interface and your LAN/DMZ zones instead of to the WAN.

LAN, WAN, DMZ, local and TUN (tunnel)

v6 pairs would be:

```
lan-tun
lan-local
lan-dmz
tun-lan
tun-local
tun-dmz
local-lan
local-tun
local-dmz
dmz-lan
dmz-tun
dmz-local
```

Notice, none go to WAN since WAN wouldn't have a v6 address on it.

You would have to add a couple of rules on your wan-local ruleset to allow protocol 41 in.

Something like:

```
rule 400 {
  action accept
  destination {
    address 172.16.10.1
  }
  log enable
  protocol 41
  source {
    address ip.of.tunnel.broker
  }
}
```

12.2 BGP IPv6 unnumbered with extended nexthop

General information can be found in the *BGP* chapter.

12.2.1 Configuration

- Router A:

```
set protocols bgp 64496 address-family ipv4-unicast redistribute connected
set protocols bgp 64496 address-family ipv6-unicast redistribute connected
set protocols bgp 64496 neighbor eth1 interface v6only
set protocols bgp 64496 neighbor eth1 interface v6only peer-group 'fabric'
set protocols bgp 64496 neighbor eth2 interface v6only
set protocols bgp 64496 neighbor eth2 interface v6only peer-group 'fabric'
set protocols bgp 64496 parameters bestpath as-path multipath-relax
set protocols bgp 64496 parameters bestpath compare-routerid
set protocols bgp 64496 parameters default no-ipv4-unicast
set protocols bgp 64496 parameters router-id '192.168.0.1'
set protocols bgp 64496 peer-group fabric address-family ipv4-unicast
set protocols bgp 64496 peer-group fabric address-family ipv6-unicast
```

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```
set protocols bgp 64496 peer-group fabric capability extended-nexthop
set protocols bgp 64496 peer-group fabric remote-as 'external'
```

- Router B:

```
set protocols bgp 64499 address-family ipv4-unicast redistribute connected
set protocols bgp 64499 address-family ipv6-unicast redistribute connected
set protocols bgp 64499 neighbor eth1 interface v6only
set protocols bgp 64499 neighbor eth1 interface v6only peer-group 'fabric'
set protocols bgp 64499 neighbor eth2 interface v6only
set protocols bgp 64499 neighbor eth2 interface v6only peer-group 'fabric'
set protocols bgp 64499 parameters bestpath as-path multipath-relax
set protocols bgp 64499 parameters bestpath compare-routerid
set protocols bgp 64499 parameters default no-ipv4-unicast
set protocols bgp 64499 parameters router-id '192.168.0.2'
set protocols bgp 64499 peer-group fabric address-family ipv4-unicast
set protocols bgp 64499 peer-group fabric address-family ipv6-unicast
set protocols bgp 64499 peer-group fabric capability extended-nexthop
set protocols bgp 64499 peer-group fabric remote-as 'external'
```

12.2.2 Results

- Router A:

```
vyos@vyos:~$ show interfaces
Codes: S - State, L - Link, u - Up, D - Down, A - Admin Down
Interface        IP Address                        S/L  Description
---------        ----------                        ---  -----------
eth0             198.51.100.34/24                  u/u
eth1             -                                 u/u
eth2             -                                 u/u
lo               127.0.0.1/8                       u/u
                 192.168.0.1/32
                 ::1/128
```

```
vyos@vyos:~$ show ip route
Codes: K - kernel route, C - connected, S - static, R - RIP,
       O - OSPF, I - IS-IS, B - BGP, E - EIGRP, N - NHRP,
       T - Table, v - VNC, V - VNC-Direct, A - Babel, D - SHARP,
       F - PBR, f - OpenFabric,
       > - selected route, * - FIB route

S>* 0.0.0.0/0 [210/0] via 198.51.100.34, eth0, 03:21:53
C>* 198.51.100.0/24 is directly connected, eth0, 03:21:53
C>* 192.168.0.1/32 is directly connected, lo, 03:21:56
B>* 192.168.0.2/32 [20/0] via fe80::a00:27ff:fe3b:7ed2, eth2, 00:05:07
  *                       via fe80::a00:27ff:fe7b:4000, eth1, 00:05:07
```

```
vyos@vyos:~$ ping 192.168.0.2
PING 192.168.0.2 (192.168.0.2) 56(84) bytes of data.
```

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```
64 bytes from 192.168.0.2: icmp_seq=1 ttl=64 time=0.575 ms
64 bytes from 192.168.0.2: icmp_seq=2 ttl=64 time=0.628 ms
64 bytes from 192.168.0.2: icmp_seq=3 ttl=64 time=0.581 ms
64 bytes from 192.168.0.2: icmp_seq=4 ttl=64 time=0.682 ms
64 bytes from 192.168.0.2: icmp_seq=5 ttl=64 time=0.597 ms

--- 192.168.0.2 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4086ms
rtt min/avg/max/mdev = 0.575/0.612/0.682/0.047 ms
```

```
vyos@vyos:~$ show ip bgp summary

IPv4 Unicast Summary:
BGP router identifier 192.168.0.1, local AS number 65020 vrf-id 0
BGP table version 4
RIB entries 5, using 800 bytes of memory
Peers 2, using 41 KiB of memory
Peer groups 1, using 64 bytes of memory

Neighbor        V         AS MsgRcvd MsgSent   TblVer  InQ OutQ  Up/Down State/PfxRcd
eth1            4      64499      13      13        0    0    0 00:05:33            2
eth2            4      64499      13      14        0    0    0 00:05:29            2

Total number of neighbors 2
```

- Router B:

```
vyos@vyos:~$ show interfaces
Codes: S - State, L - Link, u - Up, D - Down, A - Admin Down
Interface        IP Address                        S/L  Description
---------        ----------                        ---  -----------
eth0             198.51.100.33/24                  u/u
eth1             -                                 u/u
eth2             -                                 u/u
lo               127.0.0.1/8                       u/u
                 192.168.0.2/32
                 ::1/128
```

```
vyos@vyos:~$ show ip route
Codes: K - kernel route, C - connected, S - static, R - RIP,
       O - OSPF, I - IS-IS, B - BGP, E - EIGRP, N - NHRP,
       T - Table, v - VNC, V - VNC-Direct, A - Babel, D - SHARP,
       F - PBR, f - OpenFabric,
       > - selected route, * - FIB route

S>* 0.0.0.0/0 [210/0] via 198.51.100.33, eth0, 00:44:08
C>* 198.51.100.0/24 is directly connected, eth0, 00:44:09
B>* 192.168.0.1/32 [20/0] via fe80::a00:27ff:fe2d:205d, eth1, 00:06:18
  *                       via fe80::a00:27ff:fe93:e142, eth2, 00:06:18
C>* 192.168.0.2/32 is directly connected, lo, 00:44:11
```

```
vyos@vyos:~$ ping 192.168.0.1
PING 192.168.0.1 (192.168.0.1) 56(84) bytes of data.
64 bytes from 192.168.0.1: icmp_seq=1 ttl=64 time=0.427 ms
64 bytes from 192.168.0.1: icmp_seq=2 ttl=64 time=0.471 ms
64 bytes from 192.168.0.1: icmp_seq=3 ttl=64 time=0.782 ms
64 bytes from 192.168.0.1: icmp_seq=4 ttl=64 time=0.715 ms

--- 192.168.0.1 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3051ms
rtt min/avg/max/mdev = 0.427/0.598/0.782/0.155 ms
```

```
vyos@vyos:~$ show ip bgp summary
IPv4 Unicast Summary:
BGP router identifier 192.168.0.2, local AS number 65021 vrf-id 0
BGP table version 4
RIB entries 5, using 800 bytes of memory
Peers 2, using 41 KiB of memory
Peer groups 1, using 64 bytes of memory

Neighbor        V         AS MsgRcvd MsgSent   TblVer  InQ OutQ  Up/Down State/PfxRcd
eth1            4      64496      14      14        0    0    0 00:06:40            2
eth2            4      64496      14      14        0    0    0 00:06:37            2

Total number of neighbors 2
```

12.3 OSPF unnumbered with ECMP

General information can be found in the *OSPF* chapter.

12.3.1 Configuration

- Router A:

```
set interfaces ethernet eth0 address '10.0.0.1/24'
set interfaces ethernet eth1 address '192.168.0.1/32'
set interfaces ethernet eth1 ip ospf authentication md5 key-id 1 md5-key 'yourpassword'
set interfaces ethernet eth1 ip ospf network 'point-to-point'
set interfaces ethernet eth2 address '192.168.0.1/32'
set interfaces ethernet eth2 ip ospf authentication md5 key-id 1 md5-key 'yourpassword'
set interfaces ethernet eth2 ip ospf network 'point-to-point'
set interfaces loopback lo address '192.168.0.1/32'
set protocols ospf area 0.0.0.0 authentication 'md5'
set protocols ospf area 0.0.0.0 network '192.168.0.1/32'
set protocols ospf parameters router-id '192.168.0.1'
set protocols ospf redistribute connected
```

- Router B:

```
set interfaces ethernet eth0 address '10.0.0.2/24'
set interfaces ethernet eth1 address '192.168.0.2/32'
```

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```
set interfaces ethernet eth1 ip ospf authentication md5 key-id 1 md5-key 'yourpassword'
set interfaces ethernet eth1 ip ospf network 'point-to-point'
set interfaces ethernet eth2 address '192.168.0.2/32'
set interfaces ethernet eth2 ip ospf authentication md5 key-id 1 md5-key 'yourpassword'
set interfaces ethernet eth2 ip ospf network 'point-to-point'
set interfaces loopback lo address '192.168.0.2/32'
set protocols ospf area 0.0.0.0 authentication 'md5'
set protocols ospf area 0.0.0.0 network '192.168.0.2/32'
set protocols ospf parameters router-id '192.168.0.2'
set protocols ospf redistribute connected
```

12.3.2 Results

- Router A:

```
vyos@vyos:~$ show interfaces
Codes: S - State, L - Link, u - Up, D - Down, A - Admin Down
Interface        IP Address                        S/L  Description
---------        ----------                        ---  -----------
eth0             10.0.0.1/24                       u/u
eth1             192.168.0.1/32                    u/u
eth2             192.168.0.1/32                    u/u
lo               127.0.0.1/8                       u/u
                 192.168.0.1/32
                 ::1/128
```

```
vyos@vyos:~$ show ip route
Codes: K - kernel route, C - connected, S - static, R - RIP,
       O - OSPF, I - IS-IS, B - BGP, E - EIGRP, N - NHRP,
       T - Table, v - VNC, V - VNC-Direct, A - Babel, D - SHARP,
       F - PBR, f - OpenFabric,
       > - selected route, * - FIB route, q - queued route, r - rejected route

S>* 0.0.0.0/0 [210/0] via 10.0.0.254, eth0, 00:57:34
O   10.0.0.0/24 [110/20] via 192.168.0.2, eth1 onlink, 00:13:21
                           via 192.168.0.2, eth2 onlink, 00:13:21
C>* 10.0.0.0/24 is directly connected, eth0, 00:57:35
O   192.168.0.1/32 [110/0] is directly connected, lo, 00:48:53
C * 192.168.0.1/32 is directly connected, eth2, 00:56:31
C * 192.168.0.1/32 is directly connected, eth1, 00:56:31
C>* 192.168.0.1/32 is directly connected, lo, 00:57:36
O>* 192.168.0.2/32 [110/1] via 192.168.0.2, eth1 onlink, 00:29:03
  *                        via 192.168.0.2, eth2 onlink, 00:29:03
```

- Router B:

```
vyos@vyos:~$ show interfaces
Codes: S - State, L - Link, u - Up, D - Down, A - Admin Down
Interface        IP Address                        S/L  Description
---------        ----------                        ---  -----------
eth0             10.0.0.2/24                       u/u
```

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```
eth1            192.168.0.2/32                  u/u
eth2            192.168.0.2/32                  u/u
lo              127.0.0.1/8                     u/u
                192.168.0.2/32
                ::1/128
```

```
vyos@vyos:~$ show ip route
Codes: K - kernel route, C - connected, S - static, R - RIP,
       O - OSPF, I - IS-IS, B - BGP, E - EIGRP, N - NHRP,
       T - Table, v - VNC, V - VNC-Direct, A - Babel, D - SHARP,
       F - PBR, f - OpenFabric,
       > - selected route, * - FIB route, q - queued route, r - rejected route

S>* 0.0.0.0/0 [210/0] via 10.0.0.254, eth0, 00:57:34
O   10.0.0.0/24 [110/20] via 192.168.0.1, eth1 onlink, 00:13:21
                          via 192.168.0.1, eth2 onlink, 00:13:21
C>* 10.0.0.0/24 is directly connected, eth0, 00:57:35
O   192.168.0.2/32 [110/0] is directly connected, lo, 00:48:53
C * 192.168.0.2/32 is directly connected, eth2, 00:56:31
C * 192.168.0.2/32 is directly connected, eth1, 00:56:31
C>* 192.168.0.2/32 is directly connected, lo, 00:57:36
O>* 192.168.0.1/32 [110/1] via 192.168.0.1, eth1 onlink, 00:29:03
  *                        via 192.168.0.1, eth2 onlink, 00:29:03
```

12.4 Route-Based Site-to-Site VPN to Azure (BGP over IKEv2/IPsec)

This guide shows an example of a route-based IKEv2 site-to-site VPN to Azure using VTI and BGP for dynamic routing updates.

For redundant / active-active configurations see *Route-Based Redundant Site-to-Site VPN to Azure (BGP over IKEv2/IPsec)*

12.4.1 Prerequisites

- A pair of Azure VNet Gateways deployed in active-passive configuration with BGP enabled.
- A local network gateway deployed in Azure representing the Vyos device, matching the below Vyos settings except for address space, which only requires the Vyos private IP, in this example 10.10.0.5/32
- A connection resource deployed in Azure linking the Azure VNet gateway and the local network gateway representing the Vyos device.

12.4.2 Example

WAN Interface	eth0
On-premises address space	10.10.0.0/16
Azure address space	10.0.0.0/16
Vyos public IP	198.51.100.3
Vyos private IP	10.10.0.5
Azure VNet Gateway public IP	203.0.113.2
Azure VNet Gateway BGP IP	10.0.0.4
Pre-shared key	ch00s3-4-s3cur3-psk
Vyos ASN	64499
Azure ASN	65540

12.4.3 Vyos configuration

- Configure the IKE and ESP settings to match a subset of those supported by Azure:

```
set vpn ipsec esp-group AZURE compression 'disable'
set vpn ipsec esp-group AZURE lifetime '3600'
set vpn ipsec esp-group AZURE mode 'tunnel'
set vpn ipsec esp-group AZURE pfs 'dh-group2'
set vpn ipsec esp-group AZURE proposal 1 encryption 'aes256'
set vpn ipsec esp-group AZURE proposal 1 hash 'sha1'

set vpn ipsec ike-group AZURE dead-peer-detection action 'restart'
set vpn ipsec ike-group AZURE dead-peer-detection interval '15'
set vpn ipsec ike-group AZURE dead-peer-detection timeout '30'
set vpn ipsec ike-group AZURE ikev2-reauth 'yes'
set vpn ipsec ike-group AZURE key-exchange 'ikev2'
set vpn ipsec ike-group AZURE lifetime '28800'
set vpn ipsec ike-group AZURE proposal 1 dh-group '2'
set vpn ipsec ike-group AZURE proposal 1 encryption 'aes256'
set vpn ipsec ike-group AZURE proposal 1 hash 'sha1'
```

- Enable IPsec on eth0

```
set vpn ipsec ipsec-interfaces interface 'eth0'
```

- Configure a VTI with a dummy IP address

```
set interfaces vti vti1 address '10.10.1.5/32'
set interfaces vti vti1 description 'Azure Tunnel'
```

- Clamp the VTI's MSS to 1350 to avoid PMTU blackholes.

```
set firewall options interface vti1 adjust-mss 1350
```

- Configure the VPN tunnel

```
set vpn ipsec site-to-site peer 203.0.113.2 authentication id '198.51.100.3'
set vpn ipsec site-to-site peer 203.0.113.2 authentication mode 'pre-shared-secret'
set vpn ipsec site-to-site peer 203.0.113.2 authentication pre-shared-secret 'ch00s3-4-
```

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```
↪s3cur3-psk'
set vpn ipsec site-to-site peer 203.0.113.2 authentication remote-id '203.0.113.2'
set vpn ipsec site-to-site peer 203.0.113.2 connection-type 'respond'
set vpn ipsec site-to-site peer 203.0.113.2 description 'AZURE PRIMARY TUNNEL'
set vpn ipsec site-to-site peer 203.0.113.2 ike-group 'AZURE'
set vpn ipsec site-to-site peer 203.0.113.2 ikev2-reauth 'inherit'
set vpn ipsec site-to-site peer 203.0.113.2 local-address '10.10.0.5'
set vpn ipsec site-to-site peer 203.0.113.2 vti bind 'vti1'
set vpn ipsec site-to-site peer 203.0.113.2 vti esp-group 'AZURE'
```

- **Important**: Add an interface route to reach Azure's BGP listener

```
set protocols static interface-route 10.0.0.4/32 next-hop-interface vti1
```

- Configure your BGP settings

```
set protocols bgp 64499 neighbor 10.0.0.4 remote-as '65540'
set protocols bgp 64499 neighbor 10.0.0.4 address-family ipv4-unicast soft-
↪reconfiguration 'inbound'
set protocols bgp 64499 neighbor 10.0.0.4 timers holdtime '30'
set protocols bgp 64499 neighbor 10.0.0.4 timers keepalive '10'
```

- **Important**: Disable connected check

```
set protocols bgp 64499 neighbor 10.0.0.4 disable-connected-check
```

12.5 Route-Based Redundant Site-to-Site VPN to Azure (BGP over IKEv2/IPsec)

This guide shows an example of a redundant (active-active) route-based IKEv2 site-to-site VPN to Azure using VTI and BGP for dynamic routing updates.

12.5.1 Prerequisites

- A pair of Azure VNet Gateways deployed in active-active configuration with BGP enabled.
- A local network gateway deployed in Azure representing the Vyos device, matching the below Vyos settings except for address space, which only requires the Vyos private IP, in this example 10.10.0.5/32
- A connection resource deployed in Azure linking the Azure VNet gateway and the local network gateway representing the Vyos device.

12.5.2 Example

WAN Interface	eth0
On-premises address space	10.10.0.0/16
Azure address space	10.0.0.0/16
Vyos public IP	198.51.100.3
Vyos private IP	10.10.0.5
Azure VNet Gateway 1 public IP	203.0.113.2
Azure VNet Gateway 2 public IP	203.0.113.3
Azure VNet Gateway BGP IP	10.0.0.4,10.0.0.5
Pre-shared key	ch00s3-4-s3cur3-psk
Vyos ASN	64499
Azure ASN	65540

12.5.3 Vyos configuration

- Configure the IKE and ESP settings to match a subset of those supported by Azure:

```
set vpn ipsec esp-group AZURE compression 'disable'
set vpn ipsec esp-group AZURE lifetime '3600'
set vpn ipsec esp-group AZURE mode 'tunnel'
set vpn ipsec esp-group AZURE pfs 'dh-group2'
set vpn ipsec esp-group AZURE proposal 1 encryption 'aes256'
set vpn ipsec esp-group AZURE proposal 1 hash 'sha1'

set vpn ipsec ike-group AZURE dead-peer-detection action 'restart'
set vpn ipsec ike-group AZURE dead-peer-detection interval '15'
set vpn ipsec ike-group AZURE dead-peer-detection timeout '30'
set vpn ipsec ike-group AZURE ikev2-reauth 'yes'
set vpn ipsec ike-group AZURE key-exchange 'ikev2'
set vpn ipsec ike-group AZURE lifetime '28800'
set vpn ipsec ike-group AZURE proposal 1 dh-group '2'
set vpn ipsec ike-group AZURE proposal 1 encryption 'aes256'
set vpn ipsec ike-group AZURE proposal 1 hash 'sha1'
```

- Enable IPsec on eth0

```
set vpn ipsec ipsec-interfaces interface 'eth0'
```

- Configure two VTIs with a dummy IP address each

```
set interfaces vti vti1 address '10.10.1.5/32'
set interfaces vti vti1 description 'Azure Primary Tunnel'

set interfaces vti vti2 address '10.10.1.6/32'
set interfaces vti vti2 description 'Azure Secondary Tunnel'
```

- Clamp the VTI's MSS to 1350 to avoid PMTU blackholes.

```
set firewall options interface vti1 adjust-mss 1350
set firewall options interface vti2 adjust-mss 1350
```

- Configure the VPN tunnels

```
set vpn ipsec site-to-site peer 203.0.113.2 authentication id '198.51.100.3'
set vpn ipsec site-to-site peer 203.0.113.2 authentication mode 'pre-shared-secret'
set vpn ipsec site-to-site peer 203.0.113.2 authentication pre-shared-secret 'ch00s3-4-
↪s3cur3-psk'
set vpn ipsec site-to-site peer 203.0.113.2 authentication remote-id '203.0.113.2'
set vpn ipsec site-to-site peer 203.0.113.2 connection-type 'respond'
set vpn ipsec site-to-site peer 203.0.113.2 description 'AZURE PRIMARY TUNNEL'
set vpn ipsec site-to-site peer 203.0.113.2 ike-group 'AZURE'
set vpn ipsec site-to-site peer 203.0.113.2 ikev2-reauth 'inherit'
set vpn ipsec site-to-site peer 203.0.113.2 local-address '10.10.0.5'
set vpn ipsec site-to-site peer 203.0.113.2 vti bind 'vti1'
set vpn ipsec site-to-site peer 203.0.113.2 vti esp-group 'AZURE'

set vpn ipsec site-to-site peer 203.0.113.3 authentication id '198.51.100.3'
set vpn ipsec site-to-site peer 203.0.113.3 authentication mode 'pre-shared-secret'
set vpn ipsec site-to-site peer 203.0.113.3 authentication pre-shared-secret 'ch00s3-4-
↪s3cur3-psk'
set vpn ipsec site-to-site peer 203.0.113.3 authentication remote-id '203.0.113.3'
set vpn ipsec site-to-site peer 203.0.113.3 connection-type 'respond'
set vpn ipsec site-to-site peer 203.0.113.3 description 'AZURE SECONDARY TUNNEL'
set vpn ipsec site-to-site peer 203.0.113.3 ike-group 'AZURE'
set vpn ipsec site-to-site peer 203.0.113.3 ikev2-reauth 'inherit'
set vpn ipsec site-to-site peer 203.0.113.3 local-address '10.10.0.5'
set vpn ipsec site-to-site peer 203.0.113.3 vti bind 'vti2'
set vpn ipsec site-to-site peer 203.0.113.3 vti esp-group 'AZURE'
```

- **Important**: Add an interface route to reach both Azure's BGP listeners

```
set protocols static interface-route 10.0.0.4/32 next-hop-interface vti1
set protocols static interface-route 10.0.0.5/32 next-hop-interface vti2
```

- Configure your BGP settings

```
set protocols bgp 64499 neighbor 10.0.0.4 remote-as '65540'
set protocols bgp 64499 neighbor 10.0.0.4 address-family ipv4-unicast soft-
↪reconfiguration 'inbound'
set protocols bgp 64499 neighbor 10.0.0.4 timers holdtime '30'
set protocols bgp 64499 neighbor 10.0.0.4 timers keepalive '10'

set protocols bgp 64499 neighbor 10.0.0.5 remote-as '65540'
set protocols bgp 64499 neighbor 10.0.0.5 address-family ipv4-unicast soft-
↪reconfiguration 'inbound'
set protocols bgp 64499 neighbor 10.0.0.5 timers holdtime '30'
set protocols bgp 64499 neighbor 10.0.0.5 timers keepalive '10'
```

- **Important**: Disable connected check, otherwise the routes learned from Azure will not be imported into the routing table.

```
set protocols bgp 64499 neighbor 10.0.0.4 disable-connected-check
set protocols bgp 64499 neighbor 10.0.0.5 disable-connected-check
```

12.6 High Availability Walkthrough

This document walks you through a complete HA setup of two VyOS machines. This design is based on a VM as the primary router and a physical machine as a backup, using VRRP, BGP, OSPF, and conntrack sharing.

This document aims to walk you through setting everything up, so at a point where you can reboot any machine and not lose more than a few seconds worth of connectivity.

12.6.1 Design

This is based on a real-life production design. One of the complex issues is ensuring you have redundant data INTO your network. We do this with a pair of Cisco Nexus switches and using Virtual PortChannels that are spanned across them. As a bonus, this also allows for complete switch failure without an outage. How you achieve this yourself is left as an exercise to the reader. But our setup is documented here.

Walkthrough suggestion

The `commit` command is implied after every section. If you make an error, `commit` will warn you and you can fix it before getting too far into things. Please ensure you commit early and commit often.

If you are following through this document, it is strongly suggested you complete the entire document, ONLY doing the virtual router1 steps, and then come back and walk through it AGAIN on the backup hardware router.

This ensures you don't go too fast or miss a step. However, it will make your life easier to configure the fixed IP address and default route now on the hardware router.

Example Network

In this document, we have been allocated 203.0.113.0/24 by our upstream provider, which we are publishing on VLAN100.

They want us to establish a BGP session to their routers on 192.0.2.11 and 192.0.2.12 from our routers 192.0.2.21 and 192.0.2.22. They are AS 65550 and we are AS 65551.

Our routers are going to have a floating IP address of 203.0.113.1, and use .2 and .3 as their fixed IPs.

We are going to use 10.200.201.0/24 for an 'internal' network on VLAN201.

When traffic is originated from the 10.200.201.0/24 network, it will be masqueraded to 203.0.113.1

For connection between sites, we are running a WireGuard link to two REMOTE routers and using OSPF over those links to distribute routes. That remote site is expected to send traffic from anything in 10.201.0.0/16

VLANs

These are the vlans we will be using:

- 50: Upstream, using the 192.0.2.0/24 network allocated by them.
- 100: 'Public' network, using our 203.0.113.0/24 network.
- 201: 'Internal' network, using 10.200.201.0/24

Hardware

- switch1 (Nexus 10gb Switch)
- switch2 (Nexus 10gb Switch)
- compute1 (VMware ESXi 6.5)
- compute2 (VMware ESXi 6.5)
- compute3 (VMware ESXi 6.5)
- router2 (Random 1RU machine with 4 NICs)

Note that router1 is a VM that runs on one of the compute nodes.

Network Cabling

- From Datacenter - This connects into port 1 on both switches, and is tagged as VLAN 50
- Cisco VPC Crossconnect - Ports 39 and 40 bonded between each switch
- Hardware Router - Port 8 of each switch
- compute1 - Port 9 of each switch
- compute2 - Port 10 of each switch
- compute3 - Port 11 of each switch

This is ignoring the extra Out-of-band management networking, which should be on totally different switches, and a different feed into the rack, and is out of scope of this.

Note: Our implementation uses VMware's Distributed Port Groups, which allows VMware to use LACP. This is a part of the ENTERPRISE licence, and is not available on a free licence. If you are implementing this and do not have access to DPGs, you should not use VMware, and use some other virtualization platform instead.

12.6.2 Basic Setup (via console)

Create your router1 VM. So it can withstand a VM Host failing or a network link failing. Using VMware, this is achieved by enabling vSphere DRS, vSphere Availability, and creating a Distributed Port Group that uses LACP.

Many other Hypervisors do this, and I'm hoping that this document will be expanded to document how to do this for others.

Create an 'All VLANs' network group, that passes all trunked traffic through to the VM. Attach this network group to router1 as eth0.

Note: VMware: You must DISABLE SECURITY on this Port group. Make sure that `Promiscuous Mode`, `MAC address changes` and `Forged transmits` are enabled. All of these will be done as part of failover.

Bonding on Hardware Router

Create a LACP bond on the hardware router. We are assuming that eth0 and eth1 are connected to port 8 on both switches, and that those ports are configured as a Port-Channel.

```
set interfaces bonding bond0 description 'Switch Port-Channel'
set interfaces bonding bond0 hash-policy 'layer2'
set interfaces bonding bond0 member interface 'eth0'
set interfaces bonding bond0 member interface 'eth1'
set interfaces bonding bond0 mode '802.3ad'
```

Assign external IP addresses

VLAN 100 and 201 will have floating IP addresses, but VLAN50 does not, as this is talking directly to upstream. Create our IP address on vlan50.

For the hardware router, replace `eth0` with `bond0`. As (almost) every command is identical, this will not be specified unless different things need to be performed on different hosts.

```
set interfaces ethernet eth0 vif 50 address '192.0.2.21/24'
```

In this case, the hardware router has a different IP, so it would be

```
set interfaces ethernet bond0 vif 50 address '192.0.2.22/24'
```

Add (temporary) default route

It is assumed that the routers provided by upstream are capable of acting as a default router, add that as a static route.

```
set protocols static route 0.0.0.0/0 next-hop 192.0.2.11
commit
save
```

Enable SSH

Enable SSH so you can now SSH into the routers, rather than using the console.

```
set service ssh
commit
save
```

At this point, you should be able to SSH into both of them, and will no longer need access to the console (unless you break something!)

12.6.3 VRRP Configuration

We are setting up VRRP so that it does NOT fail back when a machine returns into service, and it prioritizes router1 over router2.

Internal Network

This has a floating IP address of 10.200.201.1/24, using virtual router ID 201. The difference between them is the interface name, hello-source-address, and peer-address.

router1

```
set interfaces ethernet eth0 vif 201 address 10.200.201.2/24
set high-availability vrrp group int hello-source-address '10.200.201.2'
set high-availability vrrp group int interface 'eth0.201'
set high-availability vrrp group int peer-address '10.200.201.3'
set high-availability vrrp group int no-preempt
set high-availability vrrp group int priority '200'
set high-availability vrrp group int virtual-address '10.200.201.1/24'
set high-availability vrrp group int vrid '201'
```

router2

```
set interfaces ethernet bond0 vif 201 address 10.200.201.3/24
set high-availability vrrp group int hello-source-address '10.200.201.3'
set high-availability vrrp group int interface 'bond0.201'
set high-availability vrrp group int peer-address '10.200.201.2'
set high-availability vrrp group int no-preempt
set high-availability vrrp group int priority '100'
set high-availability vrrp group int virtual-address '10.200.201.1/24'
set high-availability vrrp group int vrid '201'
```

Public Network

This has a floating IP address of 203.0.113.1/24, using virtual router ID 113. The virtual router ID is just a random number between 1 and 254, and can be set to whatever you want. Best practices suggest you try to keep them unique enterprise-wide.

router1

```
set interfaces ethernet eth0 vif 100 address 203.0.113.2/24
set high-availability vrrp group public hello-source-address '203.0.113.2'
set high-availability vrrp group public interface 'eth0.100'
set high-availability vrrp group public peer-address '203.0.113.3'
set high-availability vrrp group public no-preempt
set high-availability vrrp group public priority '200'
set high-availability vrrp group public virtual-address '203.0.113.1/24'
set high-availability vrrp group public vrid '113'
```

router2

```
set interfaces ethernet bond0 vif 100 address 203.0.113.3/24
set high-availability vrrp group public hello-source-address '203.0.113.3'
```

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```
set high-availability vrrp group public interface 'bond0.100'
set high-availability vrrp group public peer-address '203.0.113.2'
set high-availability vrrp group public no-preempt
set high-availability vrrp group public priority '100'
set high-availability vrrp group public virtual-address '203.0.113.1/24'
set high-availability vrrp group public vrid '113'
```

Create VRRP sync-group

The sync group is used to replicate connection tracking. It needs to be assigned to a random VRRP group, and we are creating a sync group called `sync` using the vrrp group `int`.

```
set high-availability vrrp sync-group sync member 'int'
```

Testing

At this point, you should be able to see both IP addresses when you run `show interfaces`, and `show vrrp` should show both interfaces in MASTER state (and SLAVE state on router2).

```
vyos@router1:~$ show vrrp
Name      Interface      VRID  State    Last Transition
--------  -----------  ------  -------  -----------------
int       eth0.201        201  MASTER   100s
public    eth0.100        113  MASTER   200s
vyos@router1:~$
```

You should be able to ping to and from all the IPs you have allocated.

12.6.4 NAT and conntrack-sync

Masquerade Traffic originating from 10.200.201.0/24 that is heading out the public interface.

Note: We explicitly exclude the primary upstream network so that BGP or OSPF traffic doesn't accidentally get NAT'ed.

```
set nat source rule 10 destination address '!192.0.2.0/24'
set nat source rule 10 outbound-interface 'eth0.50'
set nat source rule 10 source address '10.200.201.0/24'
set nat source rule 10 translation address '203.0.113.1'
```

Configure conntrack-sync and enable helpers

Conntrack helper modules are enabled by default, but they tend to cause more problems than they're worth in complex networks. You can disable all of them at one go.

```
delete system conntrack modules
```

Now enable replication between nodes. Replace eth0.201 with bond0.201 on the hardware router.

```
set service conntrack-sync accept-protocol 'tcp,udp,icmp'
set service conntrack-sync event-listen-queue-size '8'
set service conntrack-sync failover-mechanism vrrp sync-group 'sync'
set service conntrack-sync interface eth0.201
set service conntrack-sync mcast-group '224.0.0.50'
set service conntrack-sync sync-queue-size '8'
```

Testing

The simplest way to test is to look at the connection tracking stats on the standby hardware router with the command `show conntrack-sync statistics`. The numbers should be very close to the numbers on the primary router.

When you have both routers up, you should be able to establish a connection from a NAT'ed machine out to the internet, reboot the active machine, and that connection should be preserved, and will not drop out.

12.6.5 OSPF Over WireGuard

Wireguard doesn't have the concept of an up or down link, due to its design. This complicates AND simplifies using it for network transport, as for reliable state detection you need to use SOMETHING to detect when the link is down.

If you use a routing protocol itself, you solve two problems at once. This is only a basic example, and is provided as a starting point.

Configure Wireguard

There is plenty of instructions and documentation on setting up Wireguard. The only important thing you need to remember is to only use one WireGuard interface per OSPF connection.

We use small /30's from 10.254.60/24 for the point-to-point links.

router1

Replace the 203.0.113.3 with whatever the other router's IP address is.

```
set interfaces wireguard wg01 address '10.254.60.1/30'
set interfaces wireguard wg01 description 'router1-to-offsite1'
set interfaces wireguard wg01 ip ospf authentication md5 key-id 1 md5-key
↪'i360KoCwUGZvPq7e'
set interfaces wireguard wg01 ip ospf cost '11'
set interfaces wireguard wg01 ip ospf dead-interval '5'
set interfaces wireguard wg01 ip ospf hello-interval '1'
set interfaces wireguard wg01 ip ospf network 'point-to-point'
set interfaces wireguard wg01 ip ospf priority '1'
set interfaces wireguard wg01 ip ospf retransmit-interval '5'
```

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```
set interfaces wireguard wg01 ip ospf transmit-delay '1'
set interfaces wireguard wg01 peer OFFSITE1 allowed-ips '0.0.0.0/0'
set interfaces wireguard wg01 peer OFFSITE1 endpoint '203.0.113.3:50001'
set interfaces wireguard wg01 peer OFFSITE1 persistent-keepalive '15'
set interfaces wireguard wg01 peer OFFSITE1 pubkey 'GEFMOWzAyau42/
↪HwdwfXnrfHdIISQF8YHj35rOgSZ0o='
set interfaces wireguard wg01 port '50001'
```

offsite1

This is connecting back to the STATIC IP of router1, not the floating.

```
set interfaces wireguard wg01 address '10.254.60.2/30'
set interfaces wireguard wg01 description 'offsite1-to-router1'
set interfaces wireguard wg01 ip ospf authentication md5 key-id 1 md5-key
↪'i360KoCwUGZvPq7e'
set interfaces wireguard wg01 ip ospf cost '11'
set interfaces wireguard wg01 ip ospf dead-interval '5'
set interfaces wireguard wg01 ip ospf hello-interval '1'
set interfaces wireguard wg01 ip ospf network 'point-to-point'
set interfaces wireguard wg01 ip ospf priority '1'
set interfaces wireguard wg01 ip ospf retransmit-interval '5'
set interfaces wireguard wg01 ip ospf transmit-delay '1'
set interfaces wireguard wg01 peer ROUTER1 allowed-ips '0.0.0.0/0'
set interfaces wireguard wg01 peer ROUTER1 endpoint '192.0.2.21:50001'
set interfaces wireguard wg01 peer ROUTER1 persistent-keepalive '15'
set interfaces wireguard wg01 peer ROUTER1 pubkey 'CKwMV3ZaLntMule2Kd3G7UyVBR7zE8/
↪qoZgLb82EE2Q='
set interfaces wireguard wg01 port '50001'
```

Test WireGuard

Make sure you can ping 10.254.60.1 and .2 from both routers.

Create Export Filter

We only want to export the networks we know. Always do a whitelist on your route filters, both importing and exporting. A good rule of thumb is **'If you are not the default router for a network, don't advertise it'**. This means we explicitly do not want to advertise the 192.0.2.0/24 network (but do want to advertise 10.200.201.0 and 203.0.113.0, which we ARE the default route for). This filter is applied to `redistribute connected`. If we WERE to advertise it, the remote machines would see 192.0.2.21 available via their default route, establish the connection, and then OSPF would say '192.0.2.0/24 is available via this tunnel', at which point the tunnel would break, OSPF would drop the routes, and then 192.0.2.0/24 would be reachable via default again. This is called 'flapping'.

```
set policy access-list 150 description 'Outbound OSPF Redistribution'
set policy access-list 150 rule 10 action 'permit'
set policy access-list 150 rule 10 destination any
set policy access-list 150 rule 10 source inverse-mask '0.0.0.255'
set policy access-list 150 rule 10 source network '10.200.201.0'
set policy access-list 150 rule 20 action 'permit'
set policy access-list 150 rule 20 destination any
```

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```
set policy access-list 150 rule 20 source inverse-mask '0.0.0.255'
set policy access-list 150 rule 20 source network '203.0.113.0'
set policy access-list 150 rule 100 action 'deny'
set policy access-list 150 rule 100 destination any
set policy access-list 150 rule 100 source any
```

Create Import Filter

We only want to import networks we know. Our OSPF peer should only be advertising networks in the 10.201.0.0/16 range. Note that this is an INVERSE MATCH. You deny in access-list 100 to accept the route.

```
set policy access-list 100 description 'Inbound OSPF Routes from Peers'
set policy access-list 100 rule 10 action 'deny'
set policy access-list 100 rule 10 destination any
set policy access-list 100 rule 10 source inverse-mask '0.0.255.255'
set policy access-list 100 rule 10 source network '10.201.0.0'
set policy access-list 100 rule 100 action 'permit'
set policy access-list 100 rule 100 destination any
set policy access-list 100 rule 100 source any
set policy route-map PUBOSPF rule 100 action 'deny'
set policy route-map PUBOSPF rule 100 match ip address access-list '100'
set policy route-map PUBOSPF rule 500 action 'permit'
```

Enable OSPF

Every router **must** have a unique router-id. The 'reference-bandwidth' is used because when OSPF was originally designed, the idea of a link faster than 1gbit was unheard of, and it does not scale correctly.

```
set protocols ospf area 0.0.0.0 authentication 'md5'
set protocols ospf area 0.0.0.0 network '10.254.60.0/24'
set protocols ospf auto-cost reference-bandwidth '10000'
set protocols ospf log-adjacency-changes
set protocols ospf parameters abr-type 'cisco'
set protocols ospf parameters router-id '10.254.60.2'
set protocols ospf route-map PUBOSPF
```

Test OSPF

When you have enabled OSPF on both routers, you should be able to see each other with the command `show ip ospf neighbour`. The state must be 'Full' or '2-Way'. If it is not, then there is a network connectivity issue between the hosts. This is often caused by NAT or MTU issues. You should not see any new routes (unless this is the second pass) in the output of `show ip route`

12.6.6 Advertise connected routes

As a reminder, only advertise routes that you are the default router for. This is why we are NOT announcing the 192.0.2.0/24 network, because if that was announced into OSPF, the other routers would try to connect to that network over a tunnel that connects to that network!

```
set protocols ospf access-list 150 export 'connected'
set protocols ospf redistribute connected
```

You should now be able to see the advertised network on the other host.

Duplicate configuration

At this point, you now need to create the X link between all four routers. Use amdifferent /30 for each link.

Priorities

Set the cost on the secondary links to be 200. This means that they will not be used unless the primary links are down.

```
set interfaces wireguard wg01 ip ospf cost '10'
set interfaces wireguard wg02 ip ospf cost '200'
```

This will be visible in 'show ip route'.

12.6.7 BGP

BGP is an extremely complex network protocol. An example is provided here.

Note: Router id's must be unique.

---

router1

The `redistribute ospf` command is there purely as an example of how this can be expanded. In this walkthrough, it will be filtered by BGPOUT rule 10000, as it is not 203.0.113.0/24.

```
set policy prefix-list BGPOUT description 'BGP Export List'
set policy prefix-list BGPOUT rule 10 action 'deny'
set policy prefix-list BGPOUT rule 10 description 'Do not advertise short masks'
set policy prefix-list BGPOUT rule 10 ge '25'
set policy prefix-list BGPOUT rule 10 prefix '0.0.0.0/0'
set policy prefix-list BGPOUT rule 100 action 'permit'
set policy prefix-list BGPOUT rule 100 description 'Our network'
set policy prefix-list BGPOUT rule 100 prefix '203.0.113.0/24'
set policy prefix-list BGPOUT rule 10000 action 'deny'
set policy prefix-list BGPOUT rule 10000 prefix '0.0.0.0/0'
set policy route-map BGPOUT description 'BGP Export Filter'
set policy route-map BGPOUT rule 10 action 'permit'
set policy route-map BGPOUT rule 10 match ip address prefix-list 'BGPOUT'
set policy route-map BGPOUT rule 10000 action 'deny'
set policy route-map BGPPREPENDOUT description 'BGP Export Filter'
set policy route-map BGPPREPENDOUT rule 10 action 'permit'
```

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```
set policy route-map BGPPREPENDOUT rule 10 set as-path-prepend '65551 65551 65551'
set policy route-map BGPPREPENDOUT rule 10 match ip address prefix-list 'BGPOUT'
set policy route-map BGPPREPENDOUT rule 10000 action 'deny'
set protocols bgp 65551 address-family ipv4-unicast network 192.0.2.0/24
set protocols bgp 65551 address-family ipv4-unicast redistribute connected metric '50'
set protocols bgp 65551 address-family ipv4-unicast redistribute ospf metric '50'
set protocols bgp 65551 neighbor 192.0.2.11 address-family ipv4-unicast route-map export
↪'BGPOUT'
set protocols bgp 65551 neighbor 192.0.2.11 address-family ipv4-unicast soft-
↪reconfiguration inbound
set protocols bgp 65551 neighbor 192.0.2.11 remote-as '65550'
set protocols bgp 65551 neighbor 192.0.2.11 update-source '192.0.2.21'
set protocols bgp 65551 parameters router-id '192.0.2.21'
```

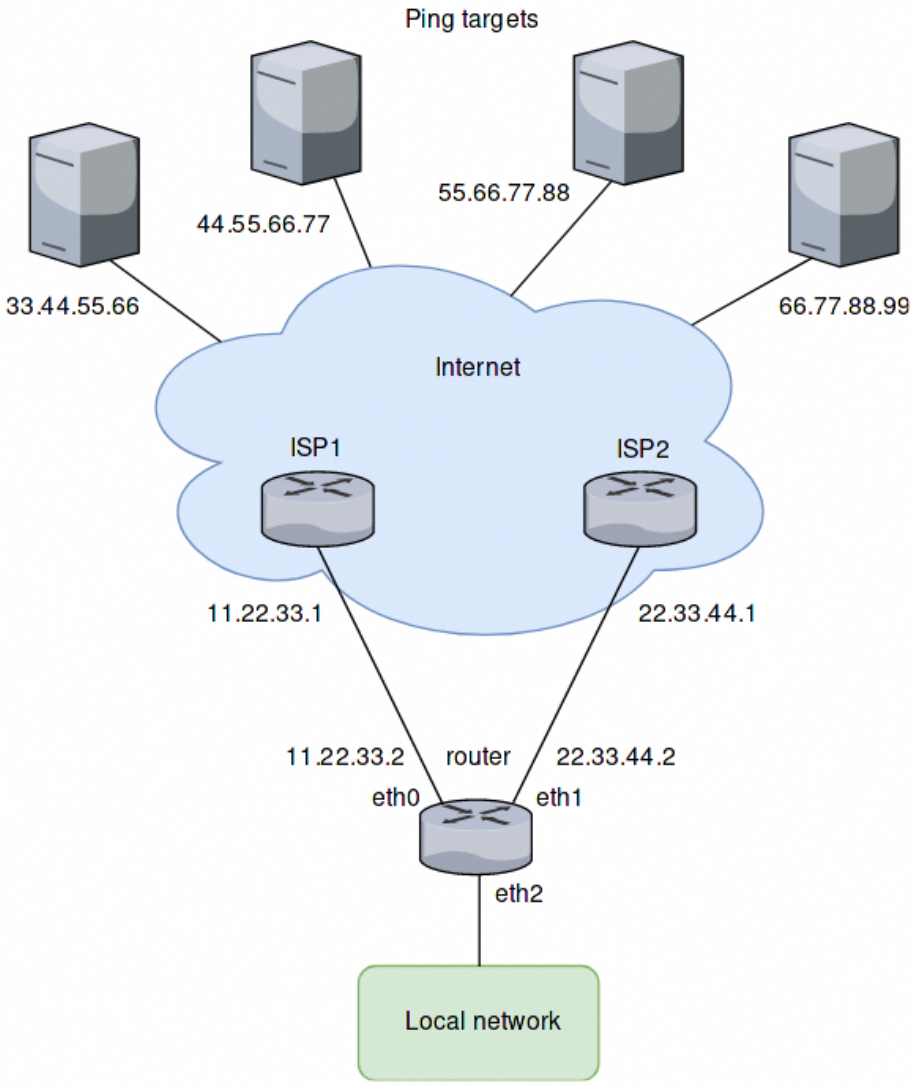
router2

This is identical, but you use the BGPPREPENDOUT route-map to advertise the route with a longer path.

12.7 WAN Load Balancer examples

12.7.1 Example 1: Distributing load evenly

The setup used in this example is shown in the following diagram:



Overview

- All traffic coming in through eth2 is balanced between eth0 and eth1 on the router.
- Pings will be sent to four targets for health testing (33.44.55.66, 44.55.66.77, 55.66.77.88 and 66.77.88.99).
- All outgoing packets are assigned the source address of the assigned interface (SNAT).
- eth0 is set to be removed from the load balancer's interface pool after 5 ping failures, eth1 will be removed after 4 ping failures.

Create static routes to ping targets

Create static routes through the two ISPs towards the ping targets and commit the changes:

```
set protocols static route 33.44.55.66/32 next-hop 11.22.33.1
set protocols static route 44.55.66.77/32 next-hop 11.22.33.1
set protocols static route 55.66.77.88/32 next-hop 22.33.44.1
set protocols static route 66.77.88.99/32 next-hop 22.33.44.1
```

Configure the load balancer

Configure the WAN load balancer with the parameters described above:

```
set load-balancing wan interface-health eth0 failure-count 5
set load-balancing wan interface-health eth0 nexthop 11.22.33.1
set load-balancing wan interface-health eth0 test 10 type ping
set load-balancing wan interface-health eth0 test 10 target 33.44.55.66
set load-balancing wan interface-health eth0 test 20 type ping
set load-balancing wan interface-health eth0 test 20 target 44.55.66.77
set load-balancing wan interface-health eth1 failure-count 4
set load-balancing wan interface-health eth1 nexthop 22.33.44.1
set load-balancing wan interface-health eth1 test 10 type ping
set load-balancing wan interface-health eth1 test 10 target 55.66.77.88
set load-balancing wan interface-health eth1 test 20 type ping
set load-balancing wan interface-health eth1 test 20 target 66.77.88.99
set load-balancing wan rule 10 inbound-interface eth2
set load-balancing wan rule 10 interface eth0
set load-balancing wan rule 10 interface eth1
```

12.7.2 Example 2: Failover based on interface weights

This example uses the failover mode.

Overview

In this example, eth0 is the primary interface and eth1 is the secondary interface. To provide simple failover functionality. If eth0 fails, eth1 takes over.

Create interface weight based configuration

The configuration steps are the same as in the previous example, except rule 10. So we keep the configuration, remove rule 10 and add a new rule for the failover mode:

```
delete load-balancing wan rule 10
set load-balancing wan rule 10 failover
set load-balancing wan rule 10 inbound-interface eth2
set load-balancing wan rule 10 interface eth0 weight 10
set load-balancing wan rule 10 interface eth1 weight 1
```

12.7.3 Example 3: Failover based on rule order

The previous example used the failover command to send traffic through eth1 if eth0 fails. In this example, failover functionality is provided by rule order.

Overview

Two rules will be created, the first rule directs traffic coming in from eth2 to eth0 and the second rule directs the traffic to eth1. If eth0 fails the first rule is bypassed and the second rule matches, directing traffic to eth1.

Create rule order based configuration

We keep the configuration from the previous example, delete rule 10 and create the two new rules as described:

```
delete load-balancing wan rule 10
set load-balancing wan rule 10 inbound-interface eth2
set load-balancing wan rule 10 interface eth0
set load-balancing wan rule 20 inbound-interface eth2
set load-balancing wan rule 20 interface eth1
```

12.7.4 Example 4: Failover based on rule order - priority traffic

Overview

A rule order for prioritizing traffic is useful in scenarios where the secondary link has a lower speed and should only carry high priority traffic. It is assumed for this example that eth1 is connected to a slower connection than eth0 and should prioritize VoIP traffic.

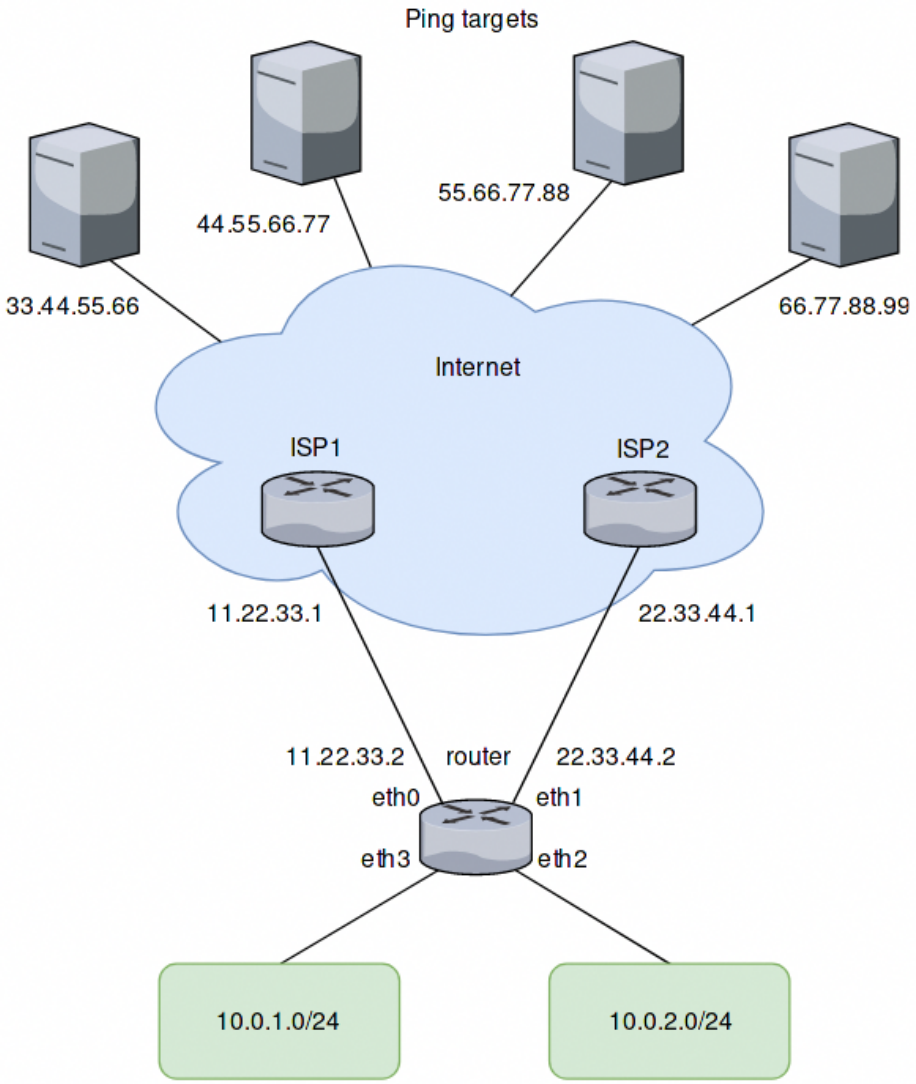
Create rule order based configuration with low speed secondary link

We keep the configuration from the previous example, delete rule 20 and create a new rule as described:

```
delete load-balancing wan rule 20
set load-balancing wan rule 20 inbound-interface eth2
set load-balancing wan rule 20 interface eth1
set load-balancing wan rule 20 destination port sip
set load-balancing wan rule 20 protocol tcp
set protocols static route 0.0.0.0/0 next-hop 11.22.33.1
```

12.7.5 Example 5: Exclude traffic from load balancing

In this example two LAN interfaces exist in different subnets instead of one like in the previous examples:



Adding a rule for the second interface

Based on the previous example, another rule for traffic from the second interface eth3 can be added to the load balancer. However, traffic meant to flow between the LAN subnets will be sent to eth0 and eth1 as well. To prevent this, another rule is required. This rule excludes traffic between the local subnets from the load balancer. It also excludes locally-sources packets (required for web caching with load balancing). eth+ is used as an alias that refers to all ethernet interfaces:

```
set load-balancing wan rule 5 exclude
set load-balancing wan rule 5 inbound-interface eth+
set load-balancing wan rule 5 destination address 10.0.0.0/8
```

12.8 Dual-Hub DMVPN with VyOS

DMVPN is a Dynamic Multipoint VPN technology that provides the capability for creating a dynamic-mesh VPN network without having to pre-configure (static) all possible tunnel end-point peers those simplifying deployment and management of the newly added remote sites. There are 3 main protocols primarily used to implement DMVPN:

- NHRP - provides the dynamic tunnel endpoint discovery mechanism (endpoint registration, and endpoint discovery/lookup)
- mGRE - provides the tunnel encapsulation itself
- IPSec - protocols handle the key exchange, and crypto mechanism

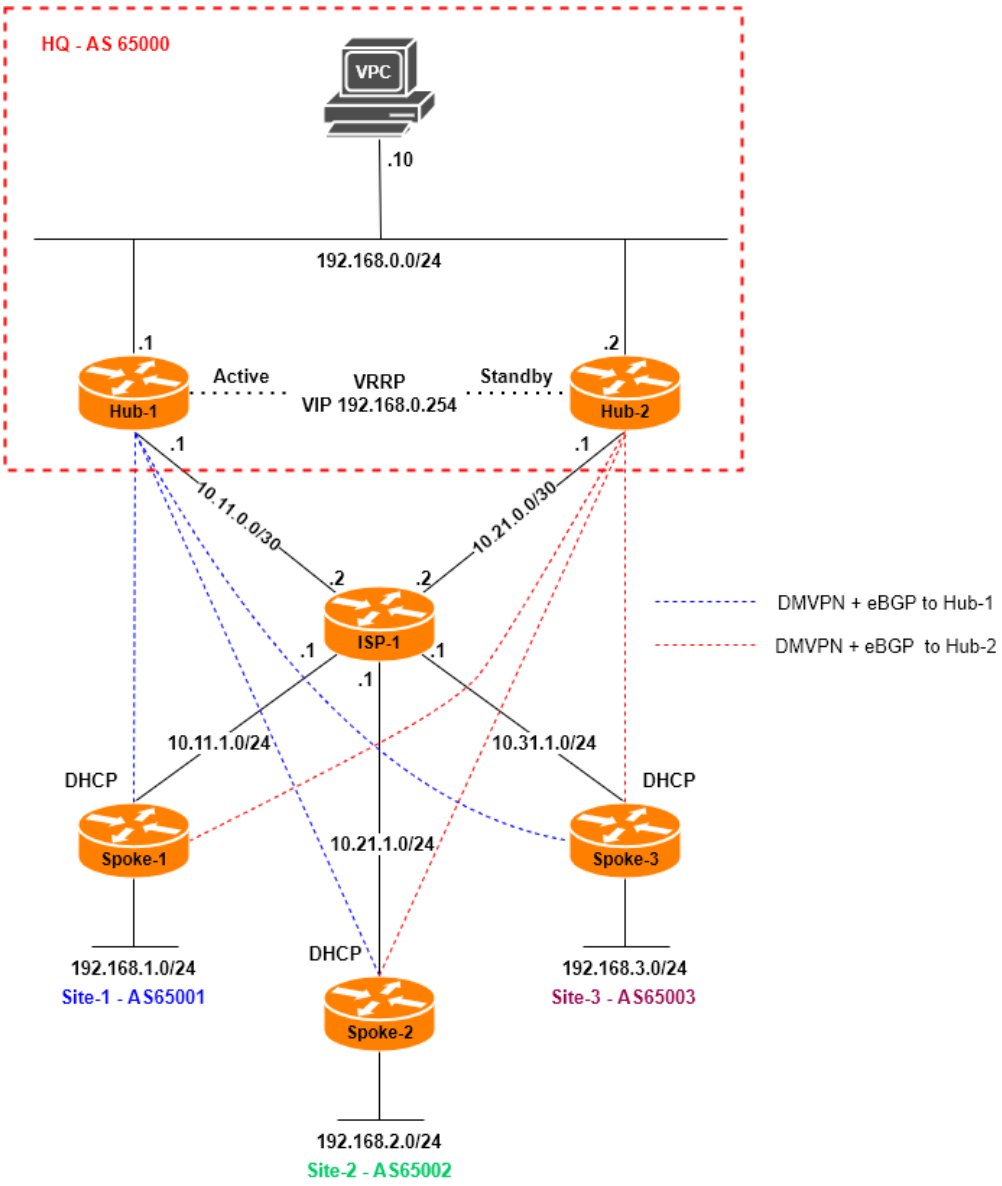
For this example we are using the following devices:

- 2 x Hubs
- 3 x Spokes
- 1 x Client device (VPC)
- 1 x ISP router

The following software was used in the creation of this document:

- Operating system: VyOS
- Version: 1.3-beta-202112090443
- Image name: vyos-1.3-beta-202112090443-amd64.iso

12.8.1 Topology



12.8.2 Network Addressing and Protocol Parameters

The following ip addressing schema used for the devices IPv4 connectivity:

10.X1.0.0/30 - p2p Hubs to ISP networks, where X is Hub site number
10.Y1.1.0/24 - p2p Spokes to ISP networks(DHCP), where Y is Spoke site number
172.16.253.0/29 - tunnels addressing for Hub-1 connections
172.16.254.0/29 - tunnels addressing for Hub-2 connections
192.168.0.0/24 - HQ site local network
192.168.Z.0/24 - remote sites local network, where Z is Spoke site number

eBGP parameters for the routers:

AS65000 - HQ (Hub-1 and Hub-2)
AS6500X - Spokes, where X is Spoke site number

12.8.3 Configuration

Step-1: Basic connectivity configuration

- Hub-1:

```
set interfaces ethernet eth0 address '10.11.0.1/30'
set interfaces ethernet eth1 address '192.168.0.1/24'
set protocols static route 0.0.0.0/0 next-hop 10.11.0.2
set system host-name 'Hub-1'
```

- Hub-2:

```
set interfaces ethernet eth0 address '10.21.0.1/30'
set interfaces ethernet eth1 address '192.168.0.2/24'
set protocols static route 0.0.0.0/0 next-hop 10.21.0.2
set system host-name 'Hub-2'
```

- Spoke-1:

```
set interfaces ethernet eth0 address 'dhcp'
set interfaces ethernet eth1 address '192.168.1.1/24'
set system host-name 'Spoke-1'
```

- Spoke-2:

```
set interfaces ethernet eth0 address 'dhcp'
set interfaces ethernet eth1 address '192.168.2.1/24'
set system host-name 'Spoke-2'
```

- Spoke-3:

```
set interfaces ethernet eth0 address 'dhcp'
set interfaces ethernet eth1 address '192.168.3.1/24'
set system host-name 'Spoke-3'
```

- ISP-1:

```
set interfaces ethernet eth0 address '10.11.0.2/30'
set interfaces ethernet eth1 address '10.21.0.2/30'
set interfaces ethernet eth2 address '10.31.1.1/24'
set interfaces ethernet eth3 address '10.21.1.1/24'
set interfaces ethernet eth4 address '10.11.1.1/24'
set service dhcp-server shared-network-name SPK-1 authoritative
set service dhcp-server shared-network-name SPK-1 subnet 10.11.1.0/24 default-router '10.
↪11.1.1'
set service dhcp-server shared-network-name SPK-1 subnet 10.11.1.0/24 range 1 start '10.
↪11.1.10'
set service dhcp-server shared-network-name SPK-1 subnet 10.11.1.0/24 range 1 stop '10.
```

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```
↪11.1.100'
set service dhcp-server shared-network-name SPK-2 authoritative
set service dhcp-server shared-network-name SPK-2 subnet 10.21.1.0/24 default-router '10.
↪21.1.1'
set service dhcp-server shared-network-name SPK-2 subnet 10.21.1.0/24 range 1 start '10.
↪21.1.10'
set service dhcp-server shared-network-name SPK-2 subnet 10.21.1.0/24 range 1 stop '10.
↪21.1.100'
set service dhcp-server shared-network-name SPK-3 authoritative
set service dhcp-server shared-network-name SPK-3 subnet 10.31.1.0/24 default-router '10.
↪31.1.1'
set service dhcp-server shared-network-name SPK-3 subnet 10.31.1.0/24 range 1 start '10.
↪31.1.10'
set service dhcp-server shared-network-name SPK-3 subnet 10.31.1.0/24 range 1 stop '10.
↪31.1.100'
set system host-name 'ISP1'
```

Step-2: VRRP configuration for HQ Local network redundancy

Here we are using VRRP as a local redundancy protocol between Hub-1 and Hub-2. Initially, Hub-1 operates as an Active and Hub-2 as a Standby router. Additionally, health-check and script are used to track uplinks and properly switch mastership between Hub nodes based on the upstream router reachability (ISP-1). **Note, that before adding local paths to the scripts into configuration, you have to create and make them executable first**.

Hub-1 and Hub-2 VRRP health-check script:

- /config/scripts/vrrp-check.sh

```
#!/bin/bash

eth0status="$(cat /sys/class/net/eth0/operstate | grep 'up')"

if [[ ! -z ${eth0status} ]]; then
 eth0gw="$(ip -j r show 0.0.0.0/0 dev eth0 | awk 'match($0, /\"gateway":\"([[:digit:]\.
↪]+)/, gw) {print gw[1]}')"
 if [[ ! -z $eth0gw ]]; then
  /bin/ping -I eth0 -c 1 -W 1 $eth0gw && exit 0 || exit 1
 else
  exit 1
 fi
else
 #Exit 0 because eth0 down is handled by vrrp transition
 exit 0
fi
```

Note: some parts of the script might be dependent on your network topology and connectivity. Be careful before using it on your own devices.

Hub-1 and Hub-2 VRRP configuration:

- Hub-1

```
set high-availability vrrp group HQ health-check failure-count '3'
set high-availability vrrp group HQ health-check interval '1'
set high-availability vrrp group HQ health-check script '/config/scripts/vrrp-check.sh'
set high-availability vrrp group HQ interface 'eth1'
set high-availability vrrp group HQ no-preempt
set high-availability vrrp group HQ priority '200'
set high-availability vrrp group HQ rfc3768-compatibility
set high-availability vrrp group HQ virtual-address '192.168.0.254/24'
set high-availability vrrp group HQ vrid '1'
```

- Hub-2:

```
set high-availability vrrp group HQ health-check failure-count '3'
set high-availability vrrp group HQ health-check interval '1'
set high-availability vrrp group HQ health-check script '/config/scripts/vrrp-check.sh'
set high-availability vrrp group HQ interface 'eth1'
set high-availability vrrp group HQ no-preempt
set high-availability vrrp group HQ priority '100'
set high-availability vrrp group HQ rfc3768-compatibility
set high-availability vrrp group HQ virtual-address '192.168.0.254/24'
set high-availability vrrp group HQ vrid '1'
```

Step-3: DMVPN configuration between Hub and Spoke devices

This section provides an example configuration of the DMVPN enabled devices. Hub devices are configured with static IPv4 addresses on the uplink interfaces while Spoke devices receive addresses dynamically from a pre-defined DHCP pool configured on ISP router. For redundancy purposes, we use 1 tunnel interface on each Hub device and 2 tunnel interfaces on Spoke devices destined to each of the Hubs. For the optimal tunnel operation timers are significantly decreased and set to the following values:

NHRP tunnel holding time - 30 seconds

IKE DPD enabled with “restart” action set, interval 3 and timeout 30 seconds

Note: these values are used only for the lab demonstration and may not suit exclusive production networks.

- Hub-1:

```
set interfaces tunnel tun100 address '172.16.253.134/29'
set interfaces tunnel tun100 encapsulation 'gre'
set interfaces tunnel tun100 multicast 'enable'
set interfaces tunnel tun100 parameters ip key '1'
set interfaces tunnel tun100 source-address '10.11.0.1'

set protocols nhrp tunnel tun100 cisco-authentication 'secret'
set protocols nhrp tunnel tun100 holding-time '30'
set protocols nhrp tunnel tun100 multicast 'dynamic'
set protocols nhrp tunnel tun100 redirect
set protocols nhrp tunnel tun100 shortcut
```

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```
set vpn ipsec esp-group ESP-HUB compression 'disable'
set vpn ipsec esp-group ESP-HUB lifetime '1800'
set vpn ipsec esp-group ESP-HUB mode 'transport'
set vpn ipsec esp-group ESP-HUB pfs 'dh-group2'
set vpn ipsec esp-group ESP-HUB proposal 1 encryption 'aes256'
set vpn ipsec esp-group ESP-HUB proposal 1 hash 'sha1'
set vpn ipsec esp-group ESP-HUB proposal 2 encryption '3des'
set vpn ipsec esp-group ESP-HUB proposal 2 hash 'md5'
set vpn ipsec ike-group IKE-HUB close-action 'none'
set vpn ipsec ike-group IKE-HUB dead-peer-detection action 'restart'
set vpn ipsec ike-group IKE-HUB dead-peer-detection interval '3'
set vpn ipsec ike-group IKE-HUB dead-peer-detection timeout '30'
set vpn ipsec ike-group IKE-HUB ikev2-reauth 'no'
set vpn ipsec ike-group IKE-HUB key-exchange 'ikev2'
set vpn ipsec ike-group IKE-HUB lifetime '3600'
set vpn ipsec ike-group IKE-HUB proposal 1 dh-group '2'
set vpn ipsec ike-group IKE-HUB proposal 1 encryption 'aes256'
set vpn ipsec ike-group IKE-HUB proposal 1 hash 'sha1'
set vpn ipsec ike-group IKE-HUB proposal 2 dh-group '2'
set vpn ipsec ike-group IKE-HUB proposal 2 encryption 'aes128'
set vpn ipsec ike-group IKE-HUB proposal 2 hash 'sha1'
set vpn ipsec ipsec-interfaces interface 'eth0'
set vpn ipsec profile NHRPVPN authentication mode 'pre-shared-secret'
set vpn ipsec profile NHRPVPN authentication pre-shared-secret 'secret'
set vpn ipsec profile NHRPVPN bind tunnel 'tun100'
set vpn ipsec profile NHRPVPN esp-group 'ESP-HUB'
set vpn ipsec profile NHRPVPN ike-group 'IKE-HUB'
```

- Hub-2:

```
set interfaces tunnel tun100 address '172.16.254.134/29'
set interfaces tunnel tun100 encapsulation 'gre'
set interfaces tunnel tun100 multicast 'enable'
set interfaces tunnel tun100 parameters ip key '2'
set interfaces tunnel tun100 source-address '10.21.0.1'

set protocols nhrp tunnel tun100 cisco-authentication 'secret'
set protocols nhrp tunnel tun100 holding-time '30'
set protocols nhrp tunnel tun100 multicast 'dynamic'
set protocols nhrp tunnel tun100 redirect
set protocols nhrp tunnel tun100 shortcut

set vpn ipsec esp-group ESP-HUB compression 'disable'
set vpn ipsec esp-group ESP-HUB lifetime '1800'
set vpn ipsec esp-group ESP-HUB mode 'transport'
set vpn ipsec esp-group ESP-HUB pfs 'dh-group2'
set vpn ipsec esp-group ESP-HUB proposal 1 encryption 'aes256'
set vpn ipsec esp-group ESP-HUB proposal 1 hash 'sha1'
set vpn ipsec esp-group ESP-HUB proposal 2 encryption '3des'
set vpn ipsec esp-group ESP-HUB proposal 2 hash 'md5'
set vpn ipsec ike-group IKE-HUB close-action 'none'
set vpn ipsec ike-group IKE-HUB dead-peer-detection action 'restart'
```

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```
set vpn ipsec ike-group IKE-HUB dead-peer-detection interval '3'
set vpn ipsec ike-group IKE-HUB dead-peer-detection timeout '30'
set vpn ipsec ike-group IKE-HUB ikev2-reauth 'no'
set vpn ipsec ike-group IKE-HUB key-exchange 'ikev2'
set vpn ipsec ike-group IKE-HUB lifetime '3600'
set vpn ipsec ike-group IKE-HUB proposal 1 dh-group '2'
set vpn ipsec ike-group IKE-HUB proposal 1 encryption 'aes256'
set vpn ipsec ike-group IKE-HUB proposal 1 hash 'sha1'
set vpn ipsec ike-group IKE-HUB proposal 2 dh-group '2'
set vpn ipsec ike-group IKE-HUB proposal 2 encryption 'aes128'
set vpn ipsec ike-group IKE-HUB proposal 2 hash 'sha1'
set vpn ipsec ipsec-interfaces interface 'eth0'
set vpn ipsec profile NHRPVPN authentication mode 'pre-shared-secret'
set vpn ipsec profile NHRPVPN authentication pre-shared-secret 'secret'
set vpn ipsec profile NHRPVPN bind tunnel 'tun100'
set vpn ipsec profile NHRPVPN esp-group 'ESP-HUB'
set vpn ipsec profile NHRPVPN ike-group 'IKE-HUB'
```

- Spoke-1:

```
set interfaces tunnel tun100 address '172.16.253.131/29'
set interfaces tunnel tun100 encapsulation 'gre'
set interfaces tunnel tun100 multicast 'enable'
set interfaces tunnel tun100 parameters ip key '1'
set interfaces tunnel tun100 source-address '0.0.0.0'
set interfaces tunnel tun200 address '172.16.254.131/29'
set interfaces tunnel tun200 encapsulation 'gre'
set interfaces tunnel tun200 multicast 'enable'
set interfaces tunnel tun200 parameters ip key '2'
set interfaces tunnel tun200 source-address '0.0.0.0'

set protocols nhrp tunnel tun100 cisco-authentication 'secret'
set protocols nhrp tunnel tun100 holding-time '30'
set protocols nhrp tunnel tun100 map 172.16.253.134/29 nbma-address '10.11.0.1'
set protocols nhrp tunnel tun100 map 172.16.253.134/29 register
set protocols nhrp tunnel tun100 multicast 'nhs'
set protocols nhrp tunnel tun100 redirect
set protocols nhrp tunnel tun100 shortcut
set protocols nhrp tunnel tun200 cisco-authentication 'secret'
set protocols nhrp tunnel tun200 holding-time '30'
set protocols nhrp tunnel tun200 map 172.16.254.134/29 nbma-address '10.21.0.1'
set protocols nhrp tunnel tun200 map 172.16.254.134/29 register
set protocols nhrp tunnel tun200 multicast 'nhs'
set protocols nhrp tunnel tun200 redirect
set protocols nhrp tunnel tun200 shortcut

set vpn ipsec esp-group ESP-HUB compression 'disable'
set vpn ipsec esp-group ESP-HUB lifetime '1800'
set vpn ipsec esp-group ESP-HUB mode 'transport'
set vpn ipsec esp-group ESP-HUB pfs 'dh-group2'
set vpn ipsec esp-group ESP-HUB proposal 1 encryption 'aes256'
set vpn ipsec esp-group ESP-HUB proposal 1 hash 'sha1'
```

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```
set vpn ipsec esp-group ESP-HUB proposal 2 encryption '3des'
set vpn ipsec esp-group ESP-HUB proposal 2 hash 'md5'
set vpn ipsec ike-group IKE-HUB close-action 'none'
set vpn ipsec ike-group IKE-HUB dead-peer-detection action 'restart'
set vpn ipsec ike-group IKE-HUB dead-peer-detection interval '3'
set vpn ipsec ike-group IKE-HUB dead-peer-detection timeout '30'
set vpn ipsec ike-group IKE-HUB ikev2-reauth 'no'
set vpn ipsec ike-group IKE-HUB key-exchange 'ikev2'
set vpn ipsec ike-group IKE-HUB lifetime '3600'
set vpn ipsec ike-group IKE-HUB proposal 1 dh-group '2'
set vpn ipsec ike-group IKE-HUB proposal 1 encryption 'aes256'
set vpn ipsec ike-group IKE-HUB proposal 1 hash 'sha1'
set vpn ipsec ike-group IKE-HUB proposal 2 dh-group '2'
set vpn ipsec ike-group IKE-HUB proposal 2 encryption 'aes128'
set vpn ipsec ike-group IKE-HUB proposal 2 hash 'sha1'
set vpn ipsec ipsec-interfaces interface 'eth0'
set vpn ipsec profile NHRPVPN authentication mode 'pre-shared-secret'
set vpn ipsec profile NHRPVPN authentication pre-shared-secret 'secret'
set vpn ipsec profile NHRPVPN bind tunnel 'tun100'
set vpn ipsec profile NHRPVPN bind tunnel 'tun200'
set vpn ipsec profile NHRPVPN esp-group 'ESP-HUB'
set vpn ipsec profile NHRPVPN ike-group 'IKE-HUB'
```

- Spoke-2:

```
set interfaces tunnel tun100 address '172.16.253.132/29'
set interfaces tunnel tun100 encapsulation 'gre'
set interfaces tunnel tun100 multicast 'enable'
set interfaces tunnel tun100 parameters ip key '1'
set interfaces tunnel tun100 source-address '0.0.0.0'
set interfaces tunnel tun200 address '172.16.254.132/29'
set interfaces tunnel tun200 encapsulation 'gre'
set interfaces tunnel tun200 multicast 'enable'
set interfaces tunnel tun200 parameters ip key '2'
set interfaces tunnel tun200 source-address '0.0.0.0'

set protocols nhrp tunnel tun100 cisco-authentication 'secret'
set protocols nhrp tunnel tun100 holding-time '30'
set protocols nhrp tunnel tun100 map 172.16.253.134/29 nbma-address '10.11.0.1'
set protocols nhrp tunnel tun100 map 172.16.253.134/29 register
set protocols nhrp tunnel tun100 multicast 'nhs'
set protocols nhrp tunnel tun100 redirect
set protocols nhrp tunnel tun100 shortcut
set protocols nhrp tunnel tun200 cisco-authentication 'secret'
set protocols nhrp tunnel tun200 holding-time '30'
set protocols nhrp tunnel tun200 map 172.16.254.134/29 nbma-address '10.21.0.1'
set protocols nhrp tunnel tun200 map 172.16.254.134/29 register
set protocols nhrp tunnel tun200 multicast 'nhs'
set protocols nhrp tunnel tun200 redirect
set protocols nhrp tunnel tun200 shortcut

set vpn ipsec esp-group ESP-HUB compression 'disable'
```

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```
set vpn ipsec esp-group ESP-HUB lifetime '1800'
set vpn ipsec esp-group ESP-HUB mode 'transport'
set vpn ipsec esp-group ESP-HUB pfs 'dh-group2'
set vpn ipsec esp-group ESP-HUB proposal 1 encryption 'aes256'
set vpn ipsec esp-group ESP-HUB proposal 1 hash 'sha1'
set vpn ipsec esp-group ESP-HUB proposal 2 encryption '3des'
set vpn ipsec esp-group ESP-HUB proposal 2 hash 'md5'
set vpn ipsec ike-group IKE-HUB close-action 'none'
set vpn ipsec ike-group IKE-HUB dead-peer-detection action 'restart'
set vpn ipsec ike-group IKE-HUB dead-peer-detection interval '3'
set vpn ipsec ike-group IKE-HUB dead-peer-detection timeout '30'
set vpn ipsec ike-group IKE-HUB ikev2-reauth 'no'
set vpn ipsec ike-group IKE-HUB key-exchange 'ikev2'
set vpn ipsec ike-group IKE-HUB lifetime '3600'
set vpn ipsec ike-group IKE-HUB proposal 1 dh-group '2'
set vpn ipsec ike-group IKE-HUB proposal 1 encryption 'aes256'
set vpn ipsec ike-group IKE-HUB proposal 1 hash 'sha1'
set vpn ipsec ike-group IKE-HUB proposal 2 dh-group '2'
set vpn ipsec ike-group IKE-HUB proposal 2 encryption 'aes128'
set vpn ipsec ike-group IKE-HUB proposal 2 hash 'sha1'
set vpn ipsec ipsec-interfaces interface 'eth0'
set vpn ipsec profile NHRPVPN authentication mode 'pre-shared-secret'
set vpn ipsec profile NHRPVPN authentication pre-shared-secret 'secret'
set vpn ipsec profile NHRPVPN bind tunnel 'tun100'
set vpn ipsec profile NHRPVPN bind tunnel 'tun200'
set vpn ipsec profile NHRPVPN esp-group 'ESP-HUB'
set vpn ipsec profile NHRPVPN ike-group 'IKE-HUB'
```

- Spoke-3:

```
set interfaces tunnel tun100 address '172.16.253.133/29'
set interfaces tunnel tun100 encapsulation 'gre'
set interfaces tunnel tun100 multicast 'enable'
set interfaces tunnel tun100 parameters ip key '1'
set interfaces tunnel tun100 source-address '0.0.0.0'
set interfaces tunnel tun200 address '172.16.254.133/29'
set interfaces tunnel tun200 encapsulation 'gre'
set interfaces tunnel tun200 multicast 'enable'
set interfaces tunnel tun200 parameters ip key '2'
set interfaces tunnel tun200 source-address '0.0.0.0'

set protocols nhrp tunnel tun100 cisco-authentication 'secret'
set protocols nhrp tunnel tun100 holding-time '30'
set protocols nhrp tunnel tun100 map 172.16.253.134/29 nbma-address '10.11.0.1'
set protocols nhrp tunnel tun100 map 172.16.253.134/29 register
set protocols nhrp tunnel tun100 multicast 'nhs'
set protocols nhrp tunnel tun100 redirect
set protocols nhrp tunnel tun100 shortcut
set protocols nhrp tunnel tun200 cisco-authentication 'secret'
set protocols nhrp tunnel tun200 holding-time '30'
set protocols nhrp tunnel tun200 map 172.16.254.134/29 nbma-address '10.21.0.1'
set protocols nhrp tunnel tun200 map 172.16.254.134/29 register
```

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```
set protocols nhrp tunnel tun200 multicast 'nhs'
set protocols nhrp tunnel tun200 redirect
set protocols nhrp tunnel tun200 shortcut

set vpn ipsec esp-group ESP-HUB compression 'disable'
set vpn ipsec esp-group ESP-HUB lifetime '1800'
set vpn ipsec esp-group ESP-HUB mode 'transport'
set vpn ipsec esp-group ESP-HUB pfs 'dh-group2'
set vpn ipsec esp-group ESP-HUB proposal 1 encryption 'aes256'
set vpn ipsec esp-group ESP-HUB proposal 1 hash 'sha1'
set vpn ipsec esp-group ESP-HUB proposal 2 encryption '3des'
set vpn ipsec esp-group ESP-HUB proposal 2 hash 'md5'
set vpn ipsec ike-group IKE-HUB close-action 'none'
set vpn ipsec ike-group IKE-HUB dead-peer-detection action 'restart'
set vpn ipsec ike-group IKE-HUB dead-peer-detection interval '3'
set vpn ipsec ike-group IKE-HUB dead-peer-detection timeout '30'
set vpn ipsec ike-group IKE-HUB ikev2-reauth 'no'
set vpn ipsec ike-group IKE-HUB key-exchange 'ikev2'
set vpn ipsec ike-group IKE-HUB lifetime '3600'
set vpn ipsec ike-group IKE-HUB proposal 1 dh-group '2'
set vpn ipsec ike-group IKE-HUB proposal 1 encryption 'aes256'
set vpn ipsec ike-group IKE-HUB proposal 1 hash 'sha1'
set vpn ipsec ike-group IKE-HUB proposal 2 dh-group '2'
set vpn ipsec ike-group IKE-HUB proposal 2 encryption 'aes128'
set vpn ipsec ike-group IKE-HUB proposal 2 hash 'sha1'
set vpn ipsec ipsec-interfaces interface 'eth0'
set vpn ipsec profile NHRPVPN authentication mode 'pre-shared-secret'
set vpn ipsec profile NHRPVPN authentication pre-shared-secret 'secret'
set vpn ipsec profile NHRPVPN bind tunnel 'tun100'
set vpn ipsec profile NHRPVPN bind tunnel 'tun200'
set vpn ipsec profile NHRPVPN esp-group 'ESP-HUB'
set vpn ipsec profile NHRPVPN ike-group 'IKE-HUB'
```

Step-4: Enabling eBGP as a Dynamic Routing Protocol between Hubs and Spokes

For the simplified and better network management we're using eBGP for routing information exchange between devices. As we're using Active-Standby mode in this example, Hub-2 is configured with AS-prepand as an export route-policy and VRRP transition scripts are used for switching mastership based on the current link/device state. Also, we use multihop BFD for faster eBGP failure detection.

Hub-1 and Hub-2 VRRP transition scripts:

- /config/scripts/vrrp-master.sh

```
#!/bin/vbash

if [ $(id -gn) != vyattacfg ]; then
    exec sg vyattacfg "$0 $*"
fi
```

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```
source /opt/vyatta/etc/functions/script-template

configure
delete protocols bgp 65000 peer-group DMVPN address-family ipv4-unicast route-map export␣
↪AS65000-PREP
commit

exit
```

- /config/scripts/vrrp-fail.sh

```
#!/bin/vbash

if [ $(id -gn) != vyattacfg ]; then
    exec sg vyattacfg "$0 $*"
fi

source /opt/vyatta/etc/functions/script-template

configure
set protocols bgp 65000 peer-group DMVPN address-family ipv4-unicast route-map export␣
↪AS65000-PREP
commit

exit
```

Note: some parts of the script might be dependent on your network topology and connectivity. Be careful before using it on your own devices.

Hub devices configuration:

- Hub-1:

```
set high-availability vrrp group HQ transition-script backup '/config/scripts/vrrp-fail.
↪sh'
set high-availability vrrp group HQ transition-script fault '/config/scripts/vrrp-fail.sh
↪'
set high-availability vrrp group HQ transition-script master '/config/scripts/vrrp-
↪master.sh'
set high-availability vrrp group HQ transition-script stop '/config/scripts/vrrp-fail.sh'

set policy route-map AS65000-PREP rule 1 action 'permit'
set policy route-map AS65000-PREP rule 1 set as-path-prepend '65000 65000 65000'

set protocols bfd peer 172.16.253.131 interval multiplier '3'
set protocols bfd peer 172.16.253.131 interval receive '300'
set protocols bfd peer 172.16.253.131 interval transmit '300'
set protocols bfd peer 172.16.253.131 multihop
set protocols bfd peer 172.16.253.131 source address '172.16.253.134'
set protocols bfd peer 172.16.253.132 interval multiplier '3'
set protocols bfd peer 172.16.253.132 interval receive '300'
```

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```
set protocols bfd peer 172.16.253.132 interval transmit '300'
set protocols bfd peer 172.16.253.132 multihop
set protocols bfd peer 172.16.253.132 source address '172.16.253.134'
set protocols bfd peer 172.16.253.133 interval multiplier '3'
set protocols bfd peer 172.16.253.133 interval receive '300'
set protocols bfd peer 172.16.253.133 interval transmit '300'
set protocols bfd peer 172.16.253.133 multihop
set protocols bfd peer 172.16.253.133 source address '172.16.253.134'

set protocols bgp 65000 address-family ipv4-unicast network 192.168.0.0/24
set protocols bgp 65000 neighbor 172.16.253.131 peer-group 'DMVPN'
set protocols bgp 65000 neighbor 172.16.253.131 remote-as '65001'
set protocols bgp 65000 neighbor 172.16.253.132 peer-group 'DMVPN'
set protocols bgp 65000 neighbor 172.16.253.132 remote-as '65002'
set protocols bgp 65000 neighbor 172.16.253.133 peer-group 'DMVPN'
set protocols bgp 65000 neighbor 172.16.253.133 remote-as '65003'
set protocols bgp 65000 parameters log-neighbor-changes
set protocols bgp 65000 parameters network-import-check
set protocols bgp 65000 peer-group DMVPN bfd
```

- Hub-2:

```
set high-availability vrrp group HQ transition-script backup '/config/scripts/vrrp-fail.
↪sh'
set high-availability vrrp group HQ transition-script fault '/config/scripts/vrrp-fail.sh
↪'
set high-availability vrrp group HQ transition-script master '/config/scripts/vrrp-
↪master.sh'
set high-availability vrrp group HQ transition-script stop '/config/scripts/vrrp-fail.sh'

set policy route-map AS65000-PREP rule 1 action 'permit'
set policy route-map AS65000-PREP rule 1 set as-path-prepend '65000 65000 65000'

set protocols bfd peer 172.16.254.131 interval multiplier '3'
set protocols bfd peer 172.16.254.131 interval receive '300'
set protocols bfd peer 172.16.254.131 interval transmit '300'
set protocols bfd peer 172.16.254.131 multihop
set protocols bfd peer 172.16.254.131 source address '172.16.254.134'
set protocols bfd peer 172.16.254.132 interval multiplier '3'
set protocols bfd peer 172.16.254.132 interval receive '300'
set protocols bfd peer 172.16.254.132 interval transmit '300'
set protocols bfd peer 172.16.254.132 multihop
set protocols bfd peer 172.16.254.132 source address '172.16.254.134'
set protocols bfd peer 172.16.254.133 interval multiplier '3'
set protocols bfd peer 172.16.254.133 interval receive '300'
set protocols bfd peer 172.16.254.133 interval transmit '300'
set protocols bfd peer 172.16.254.133 multihop
set protocols bfd peer 172.16.254.133 source address '172.16.254.134'

set protocols bgp 65000 address-family ipv4-unicast network 192.168.0.0/24
set protocols bgp 65000 neighbor 172.16.254.131 peer-group 'DMVPN'
set protocols bgp 65000 neighbor 172.16.254.131 remote-as '65001'
```

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```
set protocols bgp 65000 neighbor 172.16.254.132 peer-group 'DMVPN'
set protocols bgp 65000 neighbor 172.16.254.132 remote-as '65002'
set protocols bgp 65000 neighbor 172.16.254.133 peer-group 'DMVPN'
set protocols bgp 65000 neighbor 172.16.254.133 remote-as '65003'
set protocols bgp 65000 parameters log-neighbor-changes
set protocols bgp 65000 parameters network-import-check
set protocols bgp 65000 peer-group DMVPN address-family ipv4-unicast route-map export
↪'AS65000-PREP'
set protocols bgp 65000 peer-group DMVPN bfd
```

Spoke devices configuration:

- Spoke-1:

```
set protocols bfd peer 172.16.253.134 interval multiplier '3'
set protocols bfd peer 172.16.253.134 interval receive '300'
set protocols bfd peer 172.16.253.134 interval transmit '300'
set protocols bfd peer 172.16.253.134 multihop
set protocols bfd peer 172.16.253.134 source address '172.16.253.131'
set protocols bfd peer 172.16.254.134 interval multiplier '3'
set protocols bfd peer 172.16.254.134 interval receive '300'
set protocols bfd peer 172.16.254.134 interval transmit '300'
set protocols bfd peer 172.16.254.134 multihop
set protocols bfd peer 172.16.254.134 source address '172.16.254.131'

set protocols bgp 65001 address-family ipv4-unicast network 192.168.1.0/24
set protocols bgp 65001 neighbor 172.16.253.134 address-family ipv4-unicast
set protocols bgp 65001 neighbor 172.16.253.134 bfd
set protocols bgp 65001 neighbor 172.16.253.134 remote-as '65000'
set protocols bgp 65001 neighbor 172.16.254.134 address-family ipv4-unicast
set protocols bgp 65001 neighbor 172.16.254.134 bfd
set protocols bgp 65001 neighbor 172.16.254.134 remote-as '65000'
set protocols bgp 65001 parameters log-neighbor-changes
```

- Spoke-2:

```
set protocols bfd peer 172.16.253.134 interval multiplier '3'
set protocols bfd peer 172.16.253.134 interval receive '300'
set protocols bfd peer 172.16.253.134 interval transmit '300'
set protocols bfd peer 172.16.253.134 multihop
set protocols bfd peer 172.16.253.134 source address '172.16.253.132'
set protocols bfd peer 172.16.254.134 interval multiplier '3'
set protocols bfd peer 172.16.254.134 interval receive '300'
set protocols bfd peer 172.16.254.134 interval transmit '300'
set protocols bfd peer 172.16.254.134 multihop
set protocols bfd peer 172.16.254.134 source address '172.16.254.132'

set protocols bgp 65002 address-family ipv4-unicast network 192.168.2.0/24
set protocols bgp 65002 neighbor 172.16.253.134 address-family ipv4-unicast
set protocols bgp 65002 neighbor 172.16.253.134 bfd
set protocols bgp 65002 neighbor 172.16.253.134 remote-as '65000'
```

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```
set protocols bgp 65002 neighbor 172.16.254.134 address-family ipv4-unicast
set protocols bgp 65002 neighbor 172.16.254.134 bfd
set protocols bgp 65002 neighbor 172.16.254.134 remote-as '65000'
set protocols bgp 65002 parameters log-neighbor-changes
```

- Spoke-3:

```
set protocols bfd peer 172.16.253.134 interval multiplier '3'
set protocols bfd peer 172.16.253.134 interval receive '300'
set protocols bfd peer 172.16.253.134 interval transmit '300'
set protocols bfd peer 172.16.253.134 multihop
set protocols bfd peer 172.16.253.134 source address '172.16.253.133'
set protocols bfd peer 172.16.254.134 interval multiplier '3'
set protocols bfd peer 172.16.254.134 interval receive '300'
set protocols bfd peer 172.16.254.134 interval transmit '300'
set protocols bfd peer 172.16.254.134 multihop
set protocols bfd peer 172.16.254.134 source address '172.16.254.133'

set protocols bgp 65003 address-family ipv4-unicast network 192.168.3.0/24
set protocols bgp 65003 neighbor 172.16.253.134 address-family ipv4-unicast
set protocols bgp 65003 neighbor 172.16.253.134 bfd
set protocols bgp 65003 neighbor 172.16.253.134 remote-as '65000'
set protocols bgp 65003 neighbor 172.16.254.134 address-family ipv4-unicast
set protocols bgp 65003 neighbor 172.16.254.134 bfd
set protocols bgp 65003 neighbor 172.16.254.134 remote-as '65000'
set protocols bgp 65003 parameters log-neighbor-changes
```

Note: In case if you're using VyOS version that has a VRRP transition scripts issues after a device reboot, as a temporary solution you may add postconfig-bootup script that reloads **keepalived** process additionally after the device booted.

- Hub devices /config/scripts/vyos-postconfig-bootup.script:

```
#!/bin/sh
# This script is executed at boot time after VyOS configuration is fully applied.
# Any modifications required to work around unfixed bugs
# or use services not available through the VyOS CLI system can be placed here.

echo "Reloading VRRP process"
sudo systemctl restart keepalived.service
echo "VRRP process reload completed"
```

Step-5: Verification

Now, it's time to check that all protocols are working as expected and mastership during the failover switches correctly between Hub devices.

- Checking VRRP state between Hub-1 and Hub-2:

```
vyos@Hub-1:~$ show vrrp
Name    Interface      VRID  State      Priority  Last Transition
------  -----------  ------  -------  ----------  -----------------
HQ      eth1v1            1  MASTER          200  14s
```

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```
vyos@Hub-2:~$ show vrrp
Name    Interface      VRID  State      Priority  Last Transition
------  -----------  ------  -------  ----------  -----------------
HQ      eth1v1            1  BACKUP          100  29s
```

- Checking NHRP and eBGP sessions between Hub and Spoke devices:

```
vyos@Hub-1:~$ show nhrp tunnel
Status: ok

Interface: tun100
Type: local
Protocol-Address: 172.16.253.135/32
Alias-Address: 172.16.253.134
Flags: up

Interface: tun100
Type: local
Protocol-Address: 172.16.253.134/32
Flags: up

Interface: tun100
Type: dynamic
Protocol-Address: 172.16.253.131/32
NBMA-Address: 10.11.1.11
Flags: up
Expires-In: 0:23

Interface: tun100
Type: dynamic
Protocol-Address: 172.16.253.133/32
NBMA-Address: 10.31.1.11
Flags: up
Expires-In: 0:22

Interface: tun100
Type: dynamic
Protocol-Address: 172.16.253.132/32
NBMA-Address: 10.21.1.11
Flags: up
Expires-In: 0:21

vyos@Hub-1:~$ show bgp summary

IPv4 Unicast Summary:
BGP router identifier 192.168.0.1, local AS number 65000 vrf-id 0
BGP table version 20
RIB entries 7, using 1344 bytes of memory
Peers 3, using 64 KiB of memory
Peer groups 1, using 64 bytes of memory
```

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```
Neighbor        V         AS   MsgRcvd   MsgSent   TblVer  InQ OutQ  Up/Down State/
↪PfxRcd   PfxSnt
172.16.253.131  4      65001     26519     26526        0    0    0 00:43:38          ␣
↪1        4
172.16.253.132  4      65002     26545     26540        0    0    0 00:46:36          ␣
↪1        4
172.16.253.133  4      65003     26528     26520        0    0    0 00:41:59          ␣
↪1        4

Total number of neighbors 3


vyos@Hub-2:~$ show nhrp tunnel
Status: ok

Interface: tun100
Type: local
Protocol-Address: 172.16.254.135/32
Alias-Address: 172.16.254.134
Flags: up

Interface: tun100
Type: local
Protocol-Address: 172.16.254.134/32
Flags: up

Interface: tun100
Type: dynamic
Protocol-Address: 172.16.254.132/32
NBMA-Address: 10.21.1.11
Flags: up
Expires-In: 0:28

Interface: tun100
Type: dynamic
Protocol-Address: 172.16.254.131/32
NBMA-Address: 10.11.1.11
Flags: up
Expires-In: 0:21

Interface: tun100
Type: dynamic
Protocol-Address: 172.16.254.133/32
NBMA-Address: 10.31.1.11
Flags: up
Expires-In: 0:20

vyos@Hub-2:~$ show bgp summary

IPv4 Unicast Summary:
BGP router identifier 192.168.0.2, local AS number 65000 vrf-id 0
BGP table version 14
```

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```
RIB entries 7, using 1344 bytes of memory
Peers 3, using 64 KiB of memory
Peer groups 1, using 64 bytes of memory

Neighbor        V         AS   MsgRcvd   MsgSent   TblVer  InQ OutQ  Up/Down State/
↪PfxRcd   PfxSnt
172.16.254.131  4      65001     26516     26516        0    0    0 00:43:03          ␣
↪1        4
172.16.254.132  4      65002     26563     26562        0    0    0 00:48:27          ␣
↪1        4
172.16.254.133  4      65003     26518     26516        0    0    0 00:42:20          ␣
↪1        4

Total number of neighbors 3
```

- Checking BFD sessions between Hub and Spoke devices:

```
vyos@Hub-1:~$ show protocols bfd peers
Session count: 6
SessionId  LocalAddress                             PeerAddress                       ␣
↪    Status
=========  ============                             ===========                       ␣
↪    ======
3600626867 172.16.253.134                           172.16.253.133                    ␣
↪    up
1123939978 172.16.253.134                           172.16.253.131                    ␣
↪    up
374394280  172.16.253.134                           172.16.253.132                    ␣
↪    up
1786735466 172.16.253.134                           172.16.253.132                    ␣
↪    up
1440522544 172.16.253.134                           172.16.253.131                    ␣
↪    up
1106910911 172.16.253.134                           172.16.253.133                    ␣
↪    up


vyos@Hub-2:~$ show protocols bfd peers
Session count: 6
SessionId  LocalAddress                             PeerAddress                       ␣
↪    Status
=========  ============                             ===========                       ␣
↪    ======
2442966178 172.16.254.134                           172.16.254.133                    ␣
↪    up
393258775  172.16.254.134                           172.16.254.131                    ␣
↪    up
2990308682 172.16.254.134                           172.16.254.133                    ␣
↪    up
2267910949 172.16.254.134                           172.16.254.132                    ␣
↪    up
3542474595 172.16.254.134                           172.16.254.131                    ␣
```

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```
↪   up
4239538185 172.16.254.134                          172.16.254.132                ␣
↪   up
```

- Checking routing information and connectivity between Hub and Spoke devices:

```
vyos@Hub-1:~$ show ip bgp
BGP table version is 20, local router ID is 192.168.0.1, vrf id 0
Default local pref 100, local AS 65000
Status codes:  s suppressed, d damped, h history, * valid, > best, = multipath,
               i internal, r RIB-failure, S Stale, R Removed
Nexthop codes: @NNN nexthop's vrf id, < announce-nh-self
Origin codes:  i - IGP, e - EGP, ? - incomplete

   Network          Next Hop            Metric LocPrf Weight Path
*> 192.168.0.0/24   0.0.0.0                  0         32768 i
*> 192.168.1.0/24   172.16.253.131           0             0 65001 i
*> 192.168.2.0/24   172.16.253.132           0             0 65002 i
*> 192.168.3.0/24   172.16.253.133           0             0 65003 i

Displayed  4 routes and 4 total paths


vyos@Hub-2:~$ show ip bgp
BGP table version is 14, local router ID is 192.168.0.2, vrf id 0
Default local pref 100, local AS 65000
Status codes:  s suppressed, d damped, h history, * valid, > best, = multipath,
               i internal, r RIB-failure, S Stale, R Removed
Nexthop codes: @NNN nexthop's vrf id, < announce-nh-self
Origin codes:  i - IGP, e - EGP, ? - incomplete

   Network          Next Hop            Metric LocPrf Weight Path
*> 192.168.0.0/24   0.0.0.0                  0         32768 i
*> 192.168.1.0/24   172.16.254.131           0             0 65001 i
*> 192.168.2.0/24   172.16.254.132           0             0 65002 i
*> 192.168.3.0/24   172.16.254.133           0             0 65003 i

Displayed  4 routes and 4 total paths


vyos@Spoke-1:~$ show ip bgp
BGP table version is 19, local router ID is 192.168.1.1, vrf id 0
Default local pref 100, local AS 65001
Status codes:  s suppressed, d damped, h history, * valid, > best, = multipath,
               i internal, r RIB-failure, S Stale, R Removed
Nexthop codes: @NNN nexthop's vrf id, < announce-nh-self
Origin codes:  i - IGP, e - EGP, ? - incomplete

   Network          Next Hop            Metric LocPrf Weight Path
*  192.168.0.0/24   172.16.254.134          0             0 65000 65000 65000 65000 i
*>                  172.16.253.134          0             0 65000 i
*> 192.168.1.0/24   0.0.0.0                  0         32768 i
```

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```
*  192.168.2.0/24   172.16.254.132                          0 65000 65000 65000 65000␣
↪65002 i
*>                  172.16.253.132                          0 65000 65002 i
*  192.168.3.0/24   172.16.254.133                          0 65000 65000 65000 65000␣
↪65003 i
*>                  172.16.253.133                          0 65000 65003 i

Displayed  4 routes and 7 total paths
```

As you can see, Hub-2 announces routes with longer(prepended) AS path as we've configured it previously, those, traffic towards HQ subnet will be forwarded over Hub-1 which is operating as an Active VRRP router. Let's check connectivity and the path from Spoke-1 to the HQ local network:

```
vyos@Spoke-1:~$ ping 192.168.0.10 count 5 interface 192.168.1.1
PING 192.168.0.10 (192.168.0.10) from 192.168.1.1 : 56(84) bytes of data.
64 bytes from 192.168.0.10: icmp_seq=1 ttl=63 time=3.50 ms
64 bytes from 192.168.0.10: icmp_seq=2 ttl=63 time=2.45 ms
64 bytes from 192.168.0.10: icmp_seq=3 ttl=63 time=2.34 ms
64 bytes from 192.168.0.10: icmp_seq=4 ttl=63 time=2.20 ms
64 bytes from 192.168.0.10: icmp_seq=5 ttl=63 time=2.44 ms

--- 192.168.0.10 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 11ms
rtt min/avg/max/mdev = 2.195/2.583/3.496/0.465 ms

vyos@Spoke-1:~$ traceroute 192.168.0.10
traceroute to 192.168.0.10 (192.168.0.10), 30 hops max, 60 byte packets
 1  172.16.253.134 (172.16.253.134)  0.913 ms  0.884 ms  0.819 ms
 2  192.168.0.10 (192.168.0.10)  1.352 ms  1.446 ms  1.391 ms
```

From the output, we can confirm successful connectivity between Spoke-1 and HQ local networks. From the traceroute we see that the traffic pass through the Hub-1.

Now, let's check traffic between Spoke sites. Based on our configuration, Spoke sites are using shortcut for direct reachability between each other. First, let's check NHRP tunnels before passing the traffic between Spoke-1 and Spoke-2:

```
vyos@Spoke-1:~$ show nhrp tunnel
Status: ok

Interface: tun200
Type: local
Protocol-Address: 172.16.254.135/32
Alias-Address: 172.16.254.131
Flags: up

Interface: tun200
Type: local
Protocol-Address: 172.16.254.131/32
Flags: up

Interface: tun100
Type: local
```

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```
Protocol-Address: 172.16.253.135/32
Alias-Address: 172.16.253.131
Flags: up

Interface: tun100
Type: local
Protocol-Address: 172.16.253.131/32
Flags: up

Interface: tun200
Type: static
Protocol-Address: 172.16.254.134/29
NBMA-Address: 10.21.0.1
Flags: used up

Interface: tun100
Type: static
Protocol-Address: 172.16.253.134/29
NBMA-Address: 10.11.0.1
Flags: used up

vyos@Spoke-2:~$ show nhrp tunnel
Status: ok

Interface: tun100
Type: local
Protocol-Address: 172.16.253.135/32
Alias-Address: 172.16.253.132
Flags: up

Interface: tun100
Type: local
Protocol-Address: 172.16.253.132/32
Flags: up

Interface: tun200
Type: local
Protocol-Address: 172.16.254.135/32
Alias-Address: 172.16.254.132
Flags: up

Interface: tun200
Type: local
Protocol-Address: 172.16.254.132/32
Flags: up

Interface: tun100
Type: static
Protocol-Address: 172.16.253.134/29
NBMA-Address: 10.11.0.1
Flags: used up
```

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```
Interface: tun200
Type: static
Protocol-Address: 172.16.254.134/29
NBMA-Address: 10.21.0.1
```

After passing traffic we could see that there is additional shortcut tunnel created between Spoke-1 and Spoke-2 for the direct communication:

```
vyos@Spoke-1:~$ ping 192.168.2.1 count 5 interface 192.168.1.1
PING 192.168.2.1 (192.168.2.1) from 192.168.1.1 : 56(84) bytes of data.
64 bytes from 192.168.2.1: icmp_seq=1 ttl=64 time=1.03 ms
64 bytes from 192.168.2.1: icmp_seq=2 ttl=64 time=0.820 ms
64 bytes from 192.168.2.1: icmp_seq=3 ttl=64 time=1.13 ms
64 bytes from 192.168.2.1: icmp_seq=4 ttl=63 time=1.41 ms
64 bytes from 192.168.2.1: icmp_seq=5 ttl=64 time=0.988 ms

--- 192.168.2.1 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 10ms
rtt min/avg/max/mdev = 0.820/1.075/1.412/0.197 ms

vyos@Spoke-1:~$ traceroute 192.168.2.1
traceroute to 192.168.2.1 (192.168.2.1), 30 hops max, 60 byte packets
 1  192.168.2.1 (192.168.2.1)  1.172 ms  1.109 ms  1.151 ms

vyos@Spoke-1:~$ show nhrp tunnel
Status: ok

Interface: tun200
Type: local
Protocol-Address: 172.16.254.135/32
Alias-Address: 172.16.254.131
Flags: up

Interface: tun200
Type: local
Protocol-Address: 172.16.254.131/32
Flags: up

Interface: tun100
Type: local
Protocol-Address: 172.16.253.135/32
Alias-Address: 172.16.253.131
Flags: up

Interface: tun100
Type: local
Protocol-Address: 172.16.253.131/32
Flags: up

Interface: tun200
Type: static
Protocol-Address: 172.16.254.134/29
```

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```
NBMA-Address: 10.21.0.1
Flags: used up

_____________________________________
Interface: tun100
Type: cached
Protocol-Address: 172.16.253.132/32
NBMA-Address: 10.21.1.11
Flags: used up
Expires-In: 0:24
_____________________________________

Interface: tun100
Type: static
Protocol-Address: 172.16.253.134/29
NBMA-Address: 10.11.0.1
Flags: used up
```

The same applies to the rest of the devices and works with the same logic. As we've already confirmed successfull connectivity between Hub and Spoke devices, let's check failover process.

- Failover on the health-check failure on Hub-1:

```
# disabling interface towards Hub-1 on ISP router
vyos@ISP1:~$ configure
[edit]
vyos@ISP1# set interfaces ethernet eth0 disable
[edit]
vyos@ISP1# commit
[edit]
vyos@ISP1#


# checking VRRP state and eBGP configuration on Hub-1:
vyos@Hub-1:~$ show vrrp
Name    Interface      VRID  State      Priority  Last Transition
------  -----------  ------  -------  ----------  -----------------
HQ      eth1v1            1  FAULT           200  1m15s

vyos@Hub-1:~$ show configuration commands | match bgp
set protocols bgp 65000 address-family ipv4-unicast network 192.168.0.0/24
set protocols bgp 65000 neighbor 172.16.253.131 peer-group 'DMVPN'
set protocols bgp 65000 neighbor 172.16.253.131 remote-as '65001'
set protocols bgp 65000 neighbor 172.16.253.132 peer-group 'DMVPN'
set protocols bgp 65000 neighbor 172.16.253.132 remote-as '65002'
set protocols bgp 65000 neighbor 172.16.253.133 peer-group 'DMVPN'
set protocols bgp 65000 neighbor 172.16.253.133 remote-as '65003'
set protocols bgp 65000 parameters log-neighbor-changes
set protocols bgp 65000 peer-group DMVPN address-family ipv4-unicast route-map export
↪'AS65000-PREP'
set protocols bgp 65000 peer-group DMVPN bfd
```

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```
# consecutive pings check from Spoke-1 to the HQ local network during the failure
--- 192.168.0.10 ping statistics ---
223 packets transmitted, 219 received, 1.79372% packet loss, time 679ms
rtt min/avg/max/mdev = 0.918/2.191/2.957/0.364 ms
vyos@Spoke-1:~$


# consecutive pings check from Spoke-3 to the Spoke-2 local network during the failure
--- 192.168.2.1 ping statistics ---
265 packets transmitted, 265 received, 0% packet loss, time 690ms
rtt min/avg/max/mdev = 0.663/1.128/2.272/0.285 ms
vyos@Spoke-3:~$
```

Note: After bringing ISP interface towards Hub-1 back to UP state, VRRP state will remain unchanged due to "no-preempt" option enabled under the VRRP configuration on the Hub-1 and Hub-2 and will be changed only during link/device failure on Hub-2.

- Failover during Hub-2 device failure:

```
# Checking VRRP state and eBGP configuration on Hub-2 before reboot
vyos@Hub-2:~$ show vrrp
Name    Interface      VRID  State      Priority  Last Transition
------  -----------  ------  -------  ----------  -----------------
HQ      eth1v1            1  MASTER          100  20m22s

vyos@Hub-2:~$ show configuration commands | match bgp
set protocols bgp 65000 address-family ipv4-unicast network 192.168.0.0/24
set protocols bgp 65000 neighbor 172.16.254.131 peer-group 'DMVPN'
set protocols bgp 65000 neighbor 172.16.254.131 remote-as '65001'
set protocols bgp 65000 neighbor 172.16.254.132 peer-group 'DMVPN'
set protocols bgp 65000 neighbor 172.16.254.132 remote-as '65002'
set protocols bgp 65000 neighbor 172.16.254.133 peer-group 'DMVPN'
set protocols bgp 65000 neighbor 172.16.254.133 remote-as '65003'
set protocols bgp 65000 parameters log-neighbor-changes
set protocols bgp 65000 peer-group DMVPN address-family ipv4-unicast route-map
set protocols bgp 65000 peer-group DMVPN bfd


# Rebooting Hub-2
vyos@Hub-2:~$ reboot
Are you sure you want to reboot this system? [y/N]  y


# Checking VRRP state and eBGP configuration on Hub-1
vyos@Hub-1:~$ show vrrp
Name    Interface      VRID  State      Priority  Last Transition
------  -----------  ------  -------  ----------  -----------------
HQ      eth1v1            1  MASTER          200  1m57s

vyos@Hub-1:~$ show configuration commands | match bgp
set protocols bgp 65000 address-family ipv4-unicast network 192.168.0.0/24
set protocols bgp 65000 neighbor 172.16.253.131 peer-group 'DMVPN'
set protocols bgp 65000 neighbor 172.16.253.131 remote-as '65001'
```

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```
set protocols bgp 65000 neighbor 172.16.253.132 peer-group 'DMVPN'
set protocols bgp 65000 neighbor 172.16.253.132 remote-as '65002'
set protocols bgp 65000 neighbor 172.16.253.133 peer-group 'DMVPN'
set protocols bgp 65000 neighbor 172.16.253.133 remote-as '65003'
set protocols bgp 65000 parameters log-neighbor-changes
set protocols bgp 65000 peer-group DMVPN address-family ipv4-unicast route-map
set protocols bgp 65000 peer-group DMVPN bfd


# Checking VRRP state and eBGP configuration on Hub-2 after reboot completed
vyos@Hub-2:~$ show vrrp
Name    Interface      VRID  State      Priority  Last Transition
------  -----------  ------  -------  ----------  -----------------
HQ      eth1v1            1  BACKUP          100  1m46s

vyos@Hub-2:~$ show configuration commands | match bgp
set protocols bgp 65000 address-family ipv4-unicast network 192.168.0.0/24
set protocols bgp 65000 neighbor 172.16.254.131 peer-group 'DMVPN'
set protocols bgp 65000 neighbor 172.16.254.131 remote-as '65001'
set protocols bgp 65000 neighbor 172.16.254.132 peer-group 'DMVPN'
set protocols bgp 65000 neighbor 172.16.254.132 remote-as '65002'
set protocols bgp 65000 neighbor 172.16.254.133 peer-group 'DMVPN'
set protocols bgp 65000 neighbor 172.16.254.133 remote-as '65003'
set protocols bgp 65000 parameters log-neighbor-changes
set protocols bgp 65000 peer-group DMVPN address-family ipv4-unicast route-map export
↪'AS65000-PREP'
set protocols bgp 65000 peer-group DMVPN bfd


# consecutive pings check from Spoke-1 to the HQ local network during the failure
--- 192.168.0.10 ping statistics ---
1182 packets transmitted, 1182 received, 0% packet loss, time 1921ms
rtt min/avg/max/mdev = 0.890/1.692/3.305/0.503 ms
vyos@Spoke-1:~$


# consecutive pings check from Spoke-3 to the Spoke-2 local network during the failure
--- 192.168.2.1 ping statistics ---
1186 packets transmitted, 1186 received, 0% packet loss, time 2100ms
rtt min/avg/max/mdev = 0.506/1.236/8.497/0.369 ms
vyos@Spoke-3:~$
```

From the results, we can see that the switchover performed as expected with 0 packets loss both from Spoke-1 to HQ and Spoke-3 to Spoke-2 networks.

CHAPTER

THIRTEEN

CONFIGURATION BLUEPRINTS (AUTOTEST)

The next pages contains automatic full tested configuration examples.

Each lab will build an test from an external script. The page content will generate, so changes will not take an effect.

A host `vyos-oobm` will use as a ssh proxy. This host is just necessary for the Lab test.

The process will do the following steps:

1. create the lab on a eve-ng server
2. configure each host in the lab
3. do some defined tests
4. optional do an upgrade to a higher version and do step 3 again.
5. generate the documentation and include files
6. shutdown and destroy the lab, if there is no error

13.1 Tunnelbroker.net (IPv6)

Testdate: 2023-12-28
Version: 1.3.5
Upgrade Version: 1.5-rolling-202312261220

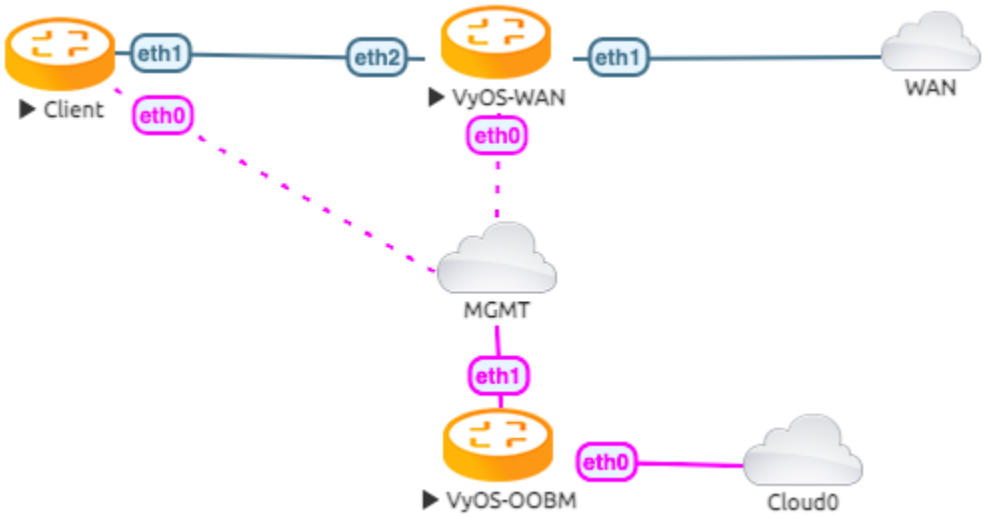
This guide walks through the setup of https://www.tunnelbroker.net/ for an IPv6 Tunnel.

13.1.1 Prerequisites

- A public, routable IPv4 address. This does not necessarily need to be static, but you will need to update the tunnel endpoint when/if your IP address changes, which can be done with a script and a scheduled task.
- Account at https://www.tunnelbroker.net/
- Requested a "Regular Tunnel". You want to choose a location that is closest to your physical location for the best response time.

Topology

The example topology has 2 VyOS routers. One as The WAN Router and on as a Client, to test a single LAN setup



Configuration

First, we configure the `vyos-wan` interface to get a DHCP address.

```
set interfaces ethernet eth1 address dhcp
```

Now we are able to setup the tunnel interface.

```
set interfaces tunnel tun0 address '2001:470:6c:779::2/64' #Tunnelbroker Client IPv6␣
↪Address
set interfaces tunnel tun0 description 'HE.NET IPv6 Tunnel'
set interfaces tunnel tun0 encapsulation 'sit'
set interfaces tunnel tun0 remote '216.66.86.114' #Tunnelbroker Server IPv4 Address
set interfaces tunnel tun0 source-address '172.29.129.60' # Tunnelbroker Client IPv4␣
↪Address or if there is NAT the current WAN interface address
```

Setup the ipv6 default route to the tunnel interface

```
set protocols static interface-route6 ::/0 next-hop-interface tun0
```

Now you should be able to ping a public IPv6 Address

```
vyos@vyos-wan:~$ ping 2001:470:20::2 count 4
PING 2001:470:20::2(2001:470:20::2) 56 data bytes
64 bytes from 2001:470:20::2: icmp_seq=1 ttl=64 time=29.8 ms
64 bytes from 2001:470:20::2: icmp_seq=2 ttl=64 time=29.6 ms
64 bytes from 2001:470:20::2: icmp_seq=3 ttl=64 time=29.3 ms
64 bytes from 2001:470:20::2: icmp_seq=4 ttl=64 time=77.6 ms

--- 2001:470:20::2 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 8ms
rtt min/avg/max/mdev = 29.316/41.573/77.550/20.773 ms
```

Assuming the pings are successful, you need to add some DNS servers. Some options:

```
set system name-server 2001:470:20::2 #Tunnelbroker DNS Server
```

You should now be able to ping something by IPv6 DNS name:

```
vyos@vyos-wan:~$ ping tunnelbroker.net count 4
PING tunnelbroker.net(tunnelbroker.net (2001:470:0:63::2)) 56 data bytes
64 bytes from tunnelbroker.net (2001:470:0:63::2): icmp_seq=1 ttl=48 time=176 ms
64 bytes from tunnelbroker.net (2001:470:0:63::2): icmp_seq=2 ttl=48 time=175 ms
64 bytes from tunnelbroker.net (2001:470:0:63::2): icmp_seq=3 ttl=48 time=175 ms

--- tunnelbroker.net ping statistics ---
4 packets transmitted, 3 received, 25% packet loss, time 4ms
rtt min/avg/max/mdev = 174.877/175.387/175.962/0.561 ms
```

LAN Configuration

At this point, your VyOS install should have full IPv6, but now your LAN devices need access.

With Tunnelbroker.net, you have two options:

- Routed /64. This is the default assignment. In IPv6-land, it's good for a single "LAN", and is somewhat equivalent to a /24.
- Routed /48. This is something you can request by clicking the "Assign /48" link in the Tunnelbroker.net tunnel config. It allows you to have up to 65k

Unlike IPv4, IPv6 is really not designed to be broken up smaller than /64. So if you ever want to have multiple LANs, VLANs, DMZ, etc, you'll want to ignore the assigned /64, and request the /48 and use that.

13.1.2 Single LAN Setup

Single LAN setup where eth2 is your LAN interface. Use the Tunnelbroker Routed /64 prefix:

```
set interface ethernet eth2 address '2001:470:6d:778::1/64' # Tunnelbroker Routed /64␣
↪prefix
set service router-advert interface eth2 name-server '2001:470:20::2'
set service router-advert interface eth2 prefix 2001:470:6d:778::/64 # Tunnelbroker␣
↪Routed /64 prefix
```

Please note, 'autonomous-flag' and 'on-link-flag' are enabled by default, 'valid-lifetime' and 'preferred-lifetime' are set to default values of 30 days and 4 hours respectively.

And the `client` to receive an IPv6 address with stateless autoconfig.

```
set interfaces ethernet eth1 ipv6 address autoconf
```

This accomplishes a few things:

- Sets your LAN interface's IP address
- Enables router advertisements. This is an IPv6 alternative for DHCP (though DHCPv6 can still be used). With RAs, Your devices will automatically find the information they need for routing and DNS.

Now the Client is able to ping a public IPv6 address

```
vyos@client:~$ ping 2001:470:20::2 count 4
PING 2001:470:20::2(2001:470:20::2) 56 data bytes
64 bytes from 2001:470:20::2: icmp_seq=1 ttl=63 time=30.1 ms
64 bytes from 2001:470:20::2: icmp_seq=2 ttl=63 time=29.9 ms
64 bytes from 2001:470:20::2: icmp_seq=3 ttl=63 time=29.9 ms
64 bytes from 2001:470:20::2: icmp_seq=4 ttl=63 time=76.4 ms

--- 2001:470:20::2 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 7ms
rtt min/avg/max/mdev = 29.880/41.572/76.377/20.096 ms
```

13.1.3 Multiple LAN/DMZ Setup

That's how you can expand the example above. Use the *Routed /48* information. This allows you to assign a different /64 to every interface, LAN, or even device. Or you could break your network into smaller chunks like /56 or /60.

The format of these addresses:

- *2001:470:xxxx::/48*: The whole subnet. xxxx should come from Tunnelbroker.
- *2001:470:xxxx:1::/64*: A subnet suitable for a LAN
- *2001:470:xxxx:2::/64*: Another subnet
- *2001:470:xxxx:ffff:/64*: The last usable /64 subnet.

In the above examples, 1,2,ffff are all chosen by you. You can use 1-ffff (1-65535).

So, when your LAN is eth1, your DMZ is eth2, your cameras are on eth3, etc:

```
set interfaces ethernet eth1 address '2001:470:xxxx:1::1/64'
set service router-advert interface eth1 name-server '2001:470:20::2'
set service router-advert interface eth1 prefix 2001:470:xxxx:1::/64

set interfaces ethernet eth2 address '2001:470:xxxx:2::1/64'
set service router-advert interface eth2 name-server '2001:470:20::2'
set service router-advert interface eth2 prefix 2001:470:xxxx:2::/64

set interfaces ethernet eth3 address '2001:470:xxxx:3::1/64'
set service router-advert interface eth3 name-server '2001:470:20::2'
set service router-advert interface eth3 prefix 2001:470:xxxx:3::/64
```

Please note, 'autonomous-flag' and 'on-link-flag' are enabled by default, 'valid-lifetime' and 'preferred-lifetime' are set to default values of 30 days and 4 hours respectively.

13.1.4 Firewall

Finally, don't forget the *Firewall*. The usage is identical, except for instead of *set firewall name NAME*, you would use *set firewall ipv6-name NAME*.

Similarly, to attach the firewall, you would use *set interfaces ethernet eth0 firewall in ipv6-name* or *set zone-policy zone LOCAL from WAN firewall ipv6-name*.

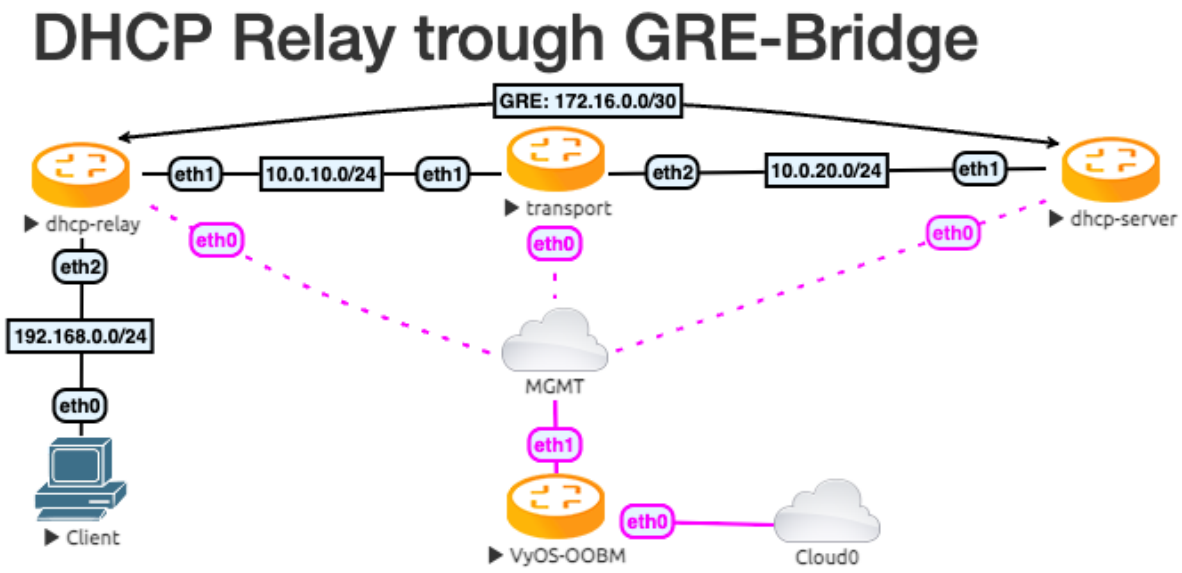
13.2 DHCP Relay trough GRE-Bridge

Testdate: 2023-12-28
Version: 1.3.5
Upgrade Version: 1.5-rolling-202312261220

This simple structure shows how to configure a DHCP Relay over a GRE Bridge interface.

13.2.1 Topology

The topology has 3 VyOS routers and one client. Between the DHCP Server and the DHCP Relay is a GRE tunnel. The *transport* VyOS represent a large Network.



13.2.2 Configuration

First, we configure the transport network and the Tunnel interface.

Transport:

```
set interfaces ethernet eth1 address '10.0.10.254/24'
set interfaces ethernet eth2 address '10.0.20.254/24'
```

DHCP-Server

```
set interfaces ethernet eth1 address '10.0.20.10/24'
set interfaces tunnel tun100 address '172.16.0.1/30'
set interfaces tunnel tun100 encapsulation 'gretap'
set interfaces tunnel tun100 remote '10.0.10.10'
set interfaces tunnel tun100 source-address '10.0.20.10'
set protocols static route 0.0.0.0/0 next-hop 172.16.0.2
```

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```
set protocols static route 10.0.10.0/24 next-hop 10.0.20.254
set protocols static route 192.168.0.0/24 next-hop 127.16.0.2
```

DHCP-Relay

```
set interfaces ethernet eth1 address '10.0.10.10/24'
set interfaces ethernet eth2 address '192.168.0.254/24'
set interfaces tunnel tun100 address '172.16.0.2/30'
set interfaces tunnel tun100 encapsulation 'gretap'
set interfaces tunnel tun100 remote '10.0.20.10'
set interfaces tunnel tun100 source-address '10.0.10.10'
set protocols static route 0.0.0.0/0 next-hop 172.16.0.1
set protocols static route 10.0.20.0/24 next-hop 10.0.10.254
```

After this, we need the DHCP-Server and Relay configuration. To get a testable result, we just have one IP in the DHCP range. Expand it as you need it.

DHCP-Server

```
set service dhcp-server listen-address '172.16.0.1'
set service dhcp-server shared-network-name DHCPTun100 authoritative
set service dhcp-server shared-network-name DHCPTun100 subnet 192.168.0.0/24 default-
↪router '192.168.0.254'
set service dhcp-server shared-network-name DHCPTun100 subnet 192.168.0.0/24 range 0␣
↪start '192.168.0.30'
set service dhcp-server shared-network-name DHCPTun100 subnet 192.168.0.0/24 range 0␣
↪stop '192.168.0.30'
```

DHCP-Relay

```
set service dhcp-relay interface 'eth2'
set service dhcp-relay interface 'tun100'
```

13.2.3 Test the result

Ping the Client from the DHCP Server.

```
vyos@dhcp-server:~$ ping 192.168.0.30 count 4
PING 192.168.0.30 (192.168.0.30) 56(84) bytes of data.
64 bytes from 192.168.0.30: icmp_seq=1 ttl=63 time=0.960 ms
64 bytes from 192.168.0.30: icmp_seq=2 ttl=63 time=1.03 ms
64 bytes from 192.168.0.30: icmp_seq=3 ttl=63 time=1.18 ms
64 bytes from 192.168.0.30: icmp_seq=4 ttl=63 time=1.20 ms

--- 192.168.0.30 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 7ms
rtt min/avg/max/mdev = 0.960/1.093/1.200/0.100 ms
```

And show all DHCP Leases

```
vyos@dhcp-server:~$ show dhcp server leases
IP address    Hardware address    State    Lease start         Lease expiration    ␣
```

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```
↪Remaining    Pool        Hostname
------------  ------------------  -------  -------------------  -------------------  ----
↪-------  ----------  ----------
192.168.0.30  00:50:79:66:68:05   active   2023/12/28 12:34:56  2023/12/29 12:34:56 ␣
↪23:59:16     DHCPTun100  VPCS
```

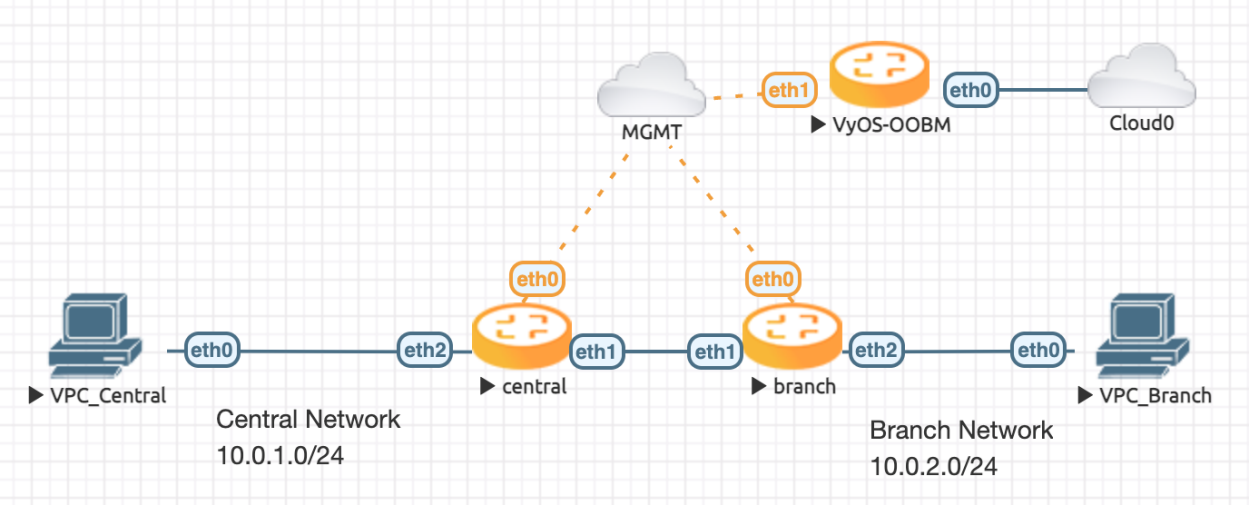
13.3 Wireguard

Testdate: 2023-12-28
Version: 1.3.5
Upgrade Version: 1.5-rolling-202312261220

This simple structure show how to connect two offices. One remote branch and the central office.

13.3.1 Topology

The topology have a central and a branch VyOS router and one client, to test, in each site.



13.3.2 Configuration

Set the local subnet on eth2 and the public ip address eth1 on each site.

Central

```
set interface ethernet eth2 address 10.0.1.254/24
set interface ethernet eth1 address 198.51.100.1/24
```

Branch

```
set interface ethernet eth2 address 10.0.2.254/24
set interface ethernet eth1 address 198.51.100.2/24
```

Next thing to do, is to create a wireguard keypair on each side. After this, the public key can be displayed, to save for later.

```
vyos@central:~$ generate wireguard default-keypair
vyos@central:~$ show wireguard keypairs pubkey default
3VjawuSrQ6quMS4HDWjJw8UnPXMB+7x2B31YihThXio=
```

After you have each public key. The wireguard interfaces can be setup.

Central

```
set interfaces wireguard wg01 address 192.168.0.1/24
set interfaces wireguard wg01 description 'VPN-to-Branch'
set interfaces wireguard wg01 peer branch allowed-ips 10.0.2.0/24
set interfaces wireguard wg01 peer branch allowed-ips 192.168.0.0/24
set interfaces wireguard wg01 peer branch address 198.51.100.2
set interfaces wireguard wg01 peer branch port 51820
set interfaces wireguard wg01 peer branch pubkey
↪"mV384TUZYv3V3vWaqGcAXZE++1WHGjpAA1+nkFtH9xE="
set interfaces wireguard wg01 port 51820
```

Branch

```
set interfaces wireguard wg01 address 192.168.0.2/24
set interfaces wireguard wg01 description 'VPN-to-central'
set interfaces wireguard wg01 peer central allowed-ips 10.0.1.0/24
set interfaces wireguard wg01 peer central allowed-ips 192.168.0.0/24
set interfaces wireguard wg01 peer central address 198.51.100.1
set interfaces wireguard wg01 peer central port 51820
set interfaces wireguard wg01 peer central pubkey
↪"3VjawuSrQ6quMS4HDWjJw8UnPXMB+7x2B31YihThXio="
set interfaces wireguard wg01 port 51820
```

To reach the network, a route must be set on each VyOS host. In this structure, a static interface route will fit the requirements.

Central

```
set protocols static interface-route 10.0.2.0/24 next-hop-interface wg01
```

Branch

```
set protocols static interface-route 10.0.1.0/24 next-hop-interface wg01
```

13.3.3 Testing and debugging

After all is done and commit, let's take a look if the Wireguard interface is up and running.

```
vyos@central:~$ show interfaces wireguard
Codes: S - State, L - Link, u - Up, D - Down, A - Admin Down
Interface        IP Address                        S/L  Description
---------        ----------                        ---  -----------
wg01             192.168.0.1/24                    u/u  VPN-to-Branch
```

And ping the Branch PC from your central router to check the response.

```
vyos@central:~$ ping 10.0.2.100 count 4
PING 10.0.2.100 (10.0.2.100) 56(84) bytes of data.
64 bytes from 10.0.2.100: icmp_seq=1 ttl=63 time=0.605 ms
64 bytes from 10.0.2.100: icmp_seq=2 ttl=63 time=0.816 ms
64 bytes from 10.0.2.100: icmp_seq=3 ttl=63 time=0.840 ms
64 bytes from 10.0.2.100: icmp_seq=4 ttl=63 time=0.932 ms

--- 10.0.2.100 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 48ms
rtt min/avg/max/mdev = 0.605/0.798/0.932/0.121 ms
```

CHAPTER

FOURTEEN

CONTRIBUTING

14.1 Build VyOS

14.1.1 Prerequisites

There are different ways you can build VyOS.

Building using a *Docker* container, although not the only way, is the easiest way as all dependencies are managed for you. However, you can also set up your own build machine and run a *Native Build*.

Note: Starting with VyOS 1.2 the release model of VyOS has changed. VyOS is now **free as in speech, but not as in beer**. This means that while VyOS is still an open source project, the release ISOs are no longer free and can only be obtained via subscription, or by contributing to the community.

The source code remains public and an ISO can be built using the process outlined in this chapter.

Due to some differences in the version update and construction process, this page no longer includes content related to VyOS 1.4 and above.

Native Build

To build VyOS natively you require a properly configured build host with the following Debian versions installed:

- Debian Jessie for VyOS 1.2 (crux)
- Debian Buster for VyOS 1.3 (equuleus)

To start, clone the repository to your local machine:

```
# For VyOS 1.2 (crux)
$ git clone -b crux --single-branch https://github.com/vyos/vyos-build

# For VyOS 1.3 (equuleus)
$ git clone -b equuleus --single-branch https://github.com/vyos/vyos-build

$ cd vyos-build

# For VyOS 1.2 (crux) and VyOS 1.3 (equuleus)
$ ./configure --architecture amd64 --build-by "j.randomhacker@vyos.io"
$ sudo make iso
```

For the packages required, you can refer to the `docker/Dockerfile` file in the repository. The `./build-vyos-image` script will also warn you if any dependencies are missing.

Docker

This will guide you though the process of building a VyOS ISO using Docker. This process has been tested on clean installs of Debian Bullseye (11) and Bookworm (12).

Installing Docker and prerequisites:

Hint: Due to the updated version of Docker, the following examples may become invalid.

On Debian

```
# Add Docker's official GPG key:
sudo apt-get update
sudo apt-get install ca-certificates curl gnupg
sudo install -m 0755 -d /etc/apt/keyrings
curl -fsSL https://download.docker.com/linux/debian/gpg | sudo gpg --dearmor -o /etc/apt/
↪keyrings/docker.gpg
sudo chmod a+r /etc/apt/keyrings/docker.gpg

# Add the repository to Apt sources:
echo \
  "deb [arch=$(dpkg --print-architecture) signed-by=/etc/apt/keyrings/docker.gpg] https:/
↪/download.docker.com/linux/debian \
  $(. /etc/os-release && echo "$VERSION_CODENAME") stable" | \
  sudo tee /etc/apt/sources.list.d/docker.list > /dev/null

sudo apt-get update
sudo apt-get install docker-ce docker-ce-cli containerd.io docker-buildx-plugin docker-
↪compose-plugin
```

On Ubuntu

```
# Add Docker's official GPG key:
sudo apt-get update
sudo apt-get install ca-certificates curl gnupg
sudo install -m 0755 -d /etc/apt/keyrings
curl -fsSL https://download.docker.com/linux/ubuntu/gpg | sudo gpg --dearmor -o /etc/apt/
↪keyrings/docker.gpg
sudo chmod a+r /etc/apt/keyrings/docker.gpg

# Add the repository to Apt sources:
echo \
  "deb [arch="$(dpkg --print-architecture)" signed-by=/etc/apt/keyrings/docker.gpg]␣
↪https://download.docker.com/linux/ubuntu \
  "$(. /etc/os-release && echo "$VERSION_CODENAME")" stable" | \
  sudo tee /etc/apt/sources.list.d/docker.list > /dev/null
sudo apt-get update
sudo apt-get install docker-ce docker-ce-cli containerd.io
```

On Fedora

```
sudo dnf -y install dnf-plugins-core
sudo dnf config-manager \
    --add-repo \
    https://download.docker.com/linux/fedora/docker-ce.repo
sudo dnf install -y docker-ce docker-ce-cli containerd.io
```

On CentOS and similar

```
sudo yum install -y yum-utils
sudo yum-config-manager \
    --add-repo \
    https://download.docker.com/linux/centos/docker-ce.repo
sudo yum install -y docker-ce docker-ce-cli containerd.io
```

To be able to use Docker without `sudo`, the current non-root user must be added to the `docker` group by calling: `sudo usermod -aG docker yourusername`.

Hint: Doing so grants privileges equivalent to the `root` user! It is recommended to remove the non-root user from the `docker` group after building the VyOS ISO. See also Docker as non-root.

Note: The build process needs to be built on a local file system, building on SMB or NFS shares will result in the container failing to build properly! VirtualBox Drive Share is also not an option as block device operations are not implemented and the drive is always mounted as "nodev"

Build Container

The container can built by hand or by fetching the pre-built one from DockerHub. Using the pre-built containers from the VyOS DockerHub organisation will ensure that the container is always up-to-date. A rebuild is triggered once the container changes (please note this will take 2-3 hours after pushing to the vyos-build repository).

Note: If you are using the pre-built container, it will be automatically downloaded from DockerHub if it is not found on your local machine when you build the ISO.

Dockerhub

To manually download the container from DockerHub, run:

```
$ docker pull vyos/vyos-build:crux       # For VyOS 1.2
$ docker pull vyos/vyos-build:equuleus   # For VyOS 1.3
```

Build from source

The container can also be built directly from source:

```
# For VyOS 1.2 (crux)
$ git clone -b crux --single-branch https://github.com/vyos/vyos-build
# For VyOS 1.3 (equuleus)
$ git clone -b equuleus --single-branch https://github.com/vyos/vyos-build

$ cd vyos-build
$ docker build -t vyos/vyos-build:crux docker      # For VyOS 1.2
$ docker build -t vyos/vyos-build:equuleus docker  # For VyOS 1.3
```

Note: Since VyOS has switched to Debian (11) Bullseye in its `current` branch, you will require individual container for *current*, *equuleus* and *crux* builds.

Tips and Tricks

You can create yourself some handy Bash aliases to always launch the latest - per release train (*current*, *equuleus* or *crux*) - container. Add the following to your `.bash_aliases` file:

```
# latest release
alias vybld='docker pull vyos/vyos-build:current && docker run --rm -it \
    -v "$(pwd)":/vyos \
    -v "$HOME/.gitconfig":/etc/gitconfig \
    -v "$HOME/.bash_aliases":/home/vyos_bld/.bash_aliases \
    -v "$HOME/.bashrc":/home/vyos_bld/.bashrc \
    -w /vyos --privileged --sysctl net.ipv6.conf.lo.disable_ipv6=0 \
    -e GOSU_UID=$(id -u) -e GOSU_GID=$(id -g) \
    vyos/vyos-build:current bash'

# v1.3
alias vybld_equuleus='docker pull vyos/vyos-build:equuleus && docker run --rm -it \
    -v "$(pwd)":/vyos \
    -v "$HOME/.gitconfig":/etc/gitconfig \
    -v "$HOME/.bash_aliases":/home/vyos_bld/.bash_aliases \
    -v "$HOME/.bashrc":/home/vyos_bld/.bashrc \
    -w /vyos --privileged --sysctl net.ipv6.conf.lo.disable_ipv6=0 \
    -e GOSU_UID=$(id -u) -e GOSU_GID=$(id -g) \
    vyos/vyos-build:equuleus bash'

# v1.2
alias vybld_crux='docker pull vyos/vyos-build:crux && docker run --rm -it \
    -v "$(pwd)":/vyos \
    -v "$HOME/.gitconfig":/etc/gitconfig \
    -v "$HOME/.bash_aliases":/home/vyos_bld/.bash_aliases \
    -v "$HOME/.bashrc":/home/vyos_bld/.bashrc \
    -w /vyos --privileged --sysctl net.ipv6.conf.lo.disable_ipv6=0 \
    -e GOSU_UID=$(id -u) -e GOSU_GID=$(id -g) \
    vyos/vyos-build:crux bash'
```

Now you are prepared with three new aliases `vybld`, `vybld_equuleus`, and `vybld_crux` to spawn your development containers in your current working directory.

Note: Some VyOS packages (namely vyos-1x) come with build-time tests which verify some of the internal library calls that they work as expected. Those tests are carried out through the Python Unittest module. If you wan't to build the `vyos-1x` package (which is our main development package) you need to start your Docker container using the following argument: `--sysctl net.ipv6.conf.lo.disable_ipv6=0`, otherwise those tests will fail.

14.1.2 Build ISO

Now as you are aware of the prerequisites we can continue and build our own ISO from source. For this we have to fetch the latest source code from GitHub. Please note as this will differ for both *current* and *equuleus*.

```
# For VyOS 1.2 (crux)
$ git clone -b crux --single-branch https://github.com/vyos/vyos-build

# For VyOS 1.3 (equuleus)
$ git clone -b equuleus --single-branch https://github.com/vyos/vyos-build
```

Now a fresh build of the VyOS ISO can begin. Change directory to the `vyos-build` directory and run:

```
$ cd vyos-build
# For VyOS 1.2 (crux)
$ docker run --rm -it --privileged -v $(pwd):/vyos -w /vyos vyos/vyos-build:crux bash

# For VyOS 1.3 (equuleus)
$ docker run --rm -it --privileged -v $(pwd):/vyos -w /vyos vyos/vyos-build:equuleus bash
```

Start the build:

```
vyos_bld@d4220bb519a0:/vyos# ./configure --architecture amd64 --build-by "j.
↪randomhacker@vyos.io"
vyos_bld@d4220bb519a0:/vyos# sudo make iso
```

When the build is successful, the resulting iso can be found inside the `build` directory as `live-image-[architecture].hybrid.iso`.

Good luck!

Hint: Attempting to use the Docker build image on MacOS will fail as Docker does not expose all the filesystem feature required to the container. Building within a VirtualBox server on Mac however possible.

Hint: Building VyOS on Windows WSL2 with Docker integrated into WSL2 will work like a charm. No problems are known so far!

Customize

This ISO can be customized with the following list of configure options. The full and current list can be generated with `./configure --help`:

```
$ ./configure --help
usage: configure [-h] [--architecture ARCHITECTURE] [--build-by BUILD_BY]
                 [--debian-mirror DEBIAN_MIRROR]
                 [--debian-security-mirror DEBIAN_SECURITY_MIRROR]
                 [--pbuilder-debian-mirror PBUILDER_DEBIAN_MIRROR]
                 [--vyos-mirror VYOS_MIRROR] [--build-type BUILD_TYPE]
                 [--version VERSION] [--build-comment BUILD_COMMENT] [--debug]
                 [--custom-apt-entry CUSTOM_APT_ENTRY]
                 [--custom-apt-key CUSTOM_APT_KEY]
                 [--custom-package CUSTOM_PACKAGE]

optional arguments:
  -h, --help            show this help message and exit
  --architecture ARCHITECTURE
                        Image target architecture (amd64 or i386 or armhf)
  --build-by BUILD_BY   Builder identifier (e.g. jrandomhacker@example.net)
  --debian-mirror DEBIAN_MIRROR
                        Debian repository mirror for ISO build
  --debian-security-mirror DEBIAN_SECURITY_MIRROR
                        Debian security updates mirror
  --pbuilder-debian-mirror PBUILDER_DEBIAN_MIRROR
                        Debian repository mirror for pbuilder env bootstrap
  --vyos-mirror VYOS_MIRROR
                        VyOS package mirror
  --build-type BUILD_TYPE
                        Build type, release or development
  --version VERSION     Version number (release builds only)
  --build-comment BUILD_COMMENT
                        Optional build comment
  --debug               Enable debug output
  --custom-apt-entry CUSTOM_APT_ENTRY
                        Custom APT entry
  --custom-apt-key CUSTOM_APT_KEY
                        Custom APT key file
  --custom-package CUSTOM_PACKAGE
                        Custom package to install from repositories
```

Linux Kernel

The Linux kernel used by VyOS is heavily tied to the ISO build process. The file `data/defaults.json` hosts a JSON definition of the kernel version used `kernel_version` and the `kernel_flavor` of the kernel which represents the kernel's LOCAL_VERSION. Both together form the kernel version variable in the system:

```
vyos@vyos:~$ uname -r
5.10.135-amd64-vyos
```

Note: `5.10.135-amd64-vyos` represents the kernel version at the time the documentation was updated for VyOS

1.4 (Sagitta). It may not reflect the version used in the latest release. VyOS 1.3 (Equuleus) uses 5.4.x Linux kernels. https://phabricator.vyos.net/T3318 tracks Kernel changes for the current release.

Other packages (e.g. vyos-1x) add dependencies to the ISO build procedure on e.g. the wireguard-modules package which itself adds a dependency on the kernel version used due to the module it ships. This may change (for WireGuard) in future kernel releases but as long as we have out-of-tree modules.

- WireGuard
- Accel-PPP
- Intel NIC drivers
- Inter QAT

Each of those modules holds a dependency on the kernel version and if you are lucky enough to receive an ISO build error which sounds like:

```
I: Create initramfs if it does not exist.
Extra argument '4.19.146-amd64-vyos'
Usage: update-initramfs {-c|-d|-u} [-k version] [-v] [-b directory]
Options:
 -k version     Specify kernel version or 'all'
 -c             Create a new initramfs
 -u             Update an existing initramfs
 -d             Remove an existing initramfs
 -b directory   Set alternate boot directory
 -v             Be verbose
See update-initramfs(8) for further details.
E: config/hooks/live/17-gen_initramfs.chroot failed (exit non-zero). You should check␣
↪for errors.
```

The most obvious reasons could be:

- `vyos-build` repo is outdated, please `git pull` to update to the latest release kernel version from us.
- You have your own custom kernel **.deb* packages in the *packages* folder but neglected to create all required out-of tree modules like Accel-PPP, WireGuard, Intel QAT, Intel NIC

Building The Kernel

The kernel build is quite easy, most of the required steps can be found in the `vyos-build/packages/linux-kernel/Jenkinsfile` but we will walk you through it.

Clone the kernel source to *vyos-build/packages/linux-kernel/*:

```
$ cd vyos-build/packages/linux-kernel/
$ git clone https://git.kernel.org/pub/scm/linux/kernel/git/stable/linux.git
```

Check out the required kernel version - see `vyos-build/data/defaults.json` file (example uses kernel 4.19.146):

```
$ cd vyos-build/packages/linux-kernel/linux
$ git checkout v4.19.146
Checking out files: 100% (61536/61536), done.
Note: checking out 'v4.19.146'.
```

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```
You are in 'detached HEAD' state. You can look around, make experimental
changes and commit them, and you can discard any commits you make in this
state without impacting any branches by performing another checkout.

If you want to create a new branch to retain commits you create, you may
do so (now or later) by using -b with the checkout command again. Example:

  git checkout -b <new-branch-name>

HEAD is now at 015e94d0e37b Linux 4.19.146
```

Now we can use the helper script `build-kernel.sh` which does all the necessary voodoo by applying required patches from the *vyos-build/packages/linux-kernel/patches* folder, copying our kernel configuration `x86_64_vyos_defconfig` to the right location, and finally building the Debian packages.

Note: Building the kernel will take some time depending on the speed and quantity of your CPU/cores and disk speed. Expect 20 minutes (or even longer) on lower end hardware.

```
(18:59) vyos_bld 412374ca36b8:/vyos/vyos-build/packages/linux-kernel [current] # ./build-
↪kernel.sh
I: Copy Kernel config (x86_64_vyos_defconfig) to Kernel Source
I: Apply Kernel patch: /vyos/vyos-build/packages/linux-kernel/patches/kernel/0001-VyOS-
↪Add-linkstate-IP-device-attribute.patch
patching file Documentation/networking/ip-sysctl.txt
patching file include/linux/inetdevice.h
patching file include/linux/ipv6.h
patching file include/uapi/linux/ip.h
patching file include/uapi/linux/ipv6.h
patching file net/ipv4/devinet.c
Hunk #1 succeeded at 2319 (offset 1 line).
patching file net/ipv6/addrconf.c
patching file net/ipv6/route.c
I: Apply Kernel patch: /vyos/vyos-build/packages/linux-kernel/patches/kernel/0002-VyOS-
↪add-inotify-support-for-stackable-filesystems-o.patch
patching file fs/notify/inotify/Kconfig
patching file fs/notify/inotify/inotify_user.c
patching file fs/overlayfs/super.c
Hunk #2 succeeded at 1713 (offset 9 lines).
Hunk #3 succeeded at 1739 (offset 9 lines).
Hunk #4 succeeded at 1762 (offset 9 lines).
patching file include/linux/inotify.h
I: Apply Kernel patch: /vyos/vyos-build/packages/linux-kernel/patches/kernel/0003-RFC-
↪builddeb-add-linux-tools-package-with-perf.patch
patching file scripts/package/builddeb
I: make x86_64_vyos_defconfig
  HOSTCC  scripts/basic/fixdep
  HOSTCC  scripts/kconfig/conf.o
  YACC    scripts/kconfig/zconf.tab.c
  LEX     scripts/kconfig/zconf.lex.c
  HOSTCC  scripts/kconfig/zconf.tab.o
  HOSTLD  scripts/kconfig/conf
```

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```
#
# configuration written to .config
#
I: Generate environment file containing Kernel variable
I: Build Debian Kernel package
  UPD     include/config/kernel.release
/bin/sh ./scripts/package/mkdebian
dpkg-buildpackage -r"fakeroot -u" -a$(cat debian/arch) -b -nc -uc
dpkg-buildpackage: info: source package linux-4.19.146-amd64-vyos
dpkg-buildpackage: info: source version 4.19.146-1
dpkg-buildpackage: info: source distribution buster
dpkg-buildpackage: info: source changed by vyos_bld <christian@poessinger.com>
dpkg-buildpackage: info: host architecture amd64
dpkg-buildpackage: warning: debian/rules is not executable; fixing that
 dpkg-source --before-build .
 debian/rules build
make KERNELRELEASE=4.19.146-amd64-vyos ARCH=x86         KBUILD_BUILD_VERSION=1 KBUILD_
↪SRC=
  SYSTBL  arch/x86/include/generated/asm/syscalls_32.h

...

dpkg-shlibdeps: warning: binaries to analyze should already be installed in their package
↪'s directory
dpkg-shlibdeps: warning: binaries to analyze should already be installed in their package
↪'s directory
dpkg-shlibdeps: warning: binaries to analyze should already be installed in their package
↪'s directory
dpkg-shlibdeps: warning: binaries to analyze should already be installed in their package
↪'s directory
dpkg-shlibdeps: warning: binaries to analyze should already be installed in their package
↪'s directory
dpkg-shlibdeps: warning: binaries to analyze should already be installed in their package
↪'s directory
dpkg-shlibdeps: warning: binaries to analyze should already be installed in their package
↪'s directory
dpkg-shlibdeps: warning: binaries to analyze should already be installed in their package
↪'s directory
dpkg-shlibdeps: warning: binaries to analyze should already be installed in their package
↪'s directory
dpkg-shlibdeps: warning: binaries to analyze should already be installed in their package
↪'s directory
dpkg-shlibdeps: warning: binaries to analyze should already be installed in their package
↪'s directory
dpkg-shlibdeps: warning: package could avoid a useless dependency if /vyos/vyos-build/
↪packages/linux-kernel/linux/debian/toolstmp/usr/bin/trace /vyos/vyos-build/packages/
↪linux-kernel/linux/debian/toolstmp/usr/bin/perf were not linked against libcrypto.so.1.
↪1 (they use none of the library's symbols)
dpkg-shlibdeps: warning: package could avoid a useless dependency if /vyos/vyos-build/
↪packages/linux-kernel/linux/debian/toolstmp/usr/bin/trace /vyos/vyos-build/packages/
```

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```
↪linux-kernel/linux/debian/toolstmp/usr/bin/perf were not linked against libcrypt.so.1␣
↪(they use none of the library's symbols)
dpkg-deb: building package 'linux-tools-4.19.146-amd64-vyos' in '../linux-tools-4.19.146-
↪amd64-vyos_4.19.146-1_amd64.deb'.
 dpkg-genbuildinfo --build=binary
 dpkg-genchanges --build=binary >../linux-4.19.146-amd64-vyos_4.19.146-1_amd64.changes
dpkg-genchanges: warning: package linux-image-4.19.146-amd64-vyos-dbg in control file␣
↪but not in files list
dpkg-genchanges: info: binary-only upload (no source code included)
 dpkg-source --after-build .
dpkg-buildpackage: info: binary-only upload (no source included)
```

In the end you will be presented with the kernel binary packages which you can then use in your custom ISO build process, by placing all the **.deb* files in the vyos-build/packages folder where they will be used automatically when building VyOS as documented above.

Firmware

If you upgrade your kernel or include new drivers you may need new firmware. Build a new `vyos-linux-firmware` package with the included helper scripts.

```
$ cd vyos-build/packages/linux-kernel
$ git clone https://git.kernel.org/pub/scm/linux/kernel/git/firmware/linux-firmware.git
$ ./build-linux-firmware.sh
$ cp vyos-linux-firmware_*.deb ../
```

This tries to automatically detect which blobs are needed based on which drivers were built. If it fails to find the correct files you can add them manually to `vyos-build/packages/linux-kernel/build-linux-firmware.sh`:

```
ADD_FW_FILES="iwlwifi* ath11k/QCA6390/*/*.bin"
```

Building Out-Of-Tree Modules

Building the kernel is one part, but now you also need to build the required out-of-tree modules so everything is lined up and the ABIs match. To do so, you can again take a look at `vyos-build/packages/linux-kernel/Jenkinsfile` to see all of the required modules and their selected versions. We will show you how to build all the current required modules.

WireGuard

First, clone the source code and check out the appropriate version by running:

```
$ cd vyos-build/packages/linux-kernel
$ git clone https://salsa.debian.org/debian/wireguard-linux-compat.git
$ cd wireguard-linux-compat
$ git checkout debian/1.0.20200712-1_bpo10+1
```

We again make use of a helper script and some patches to make the build work. Just run the following command:

```
$ cd vyos-build/packages/linux-kernel
$ ./build-wireguard-modules.sh
I: Apply WireGuard patch: /vyos/packages/linux-kernel/patches/wireguard-linux-compat/
↪0001-Debian-build-wireguard-modules-package.patch
patching file debian/control
patching file debian/rules
I: Build Debian WireGuard package
dpkg-buildpackage: info: source package wireguard-linux-compat
dpkg-buildpackage: info: source version 1.0.20200712-1~bpo10+1
dpkg-buildpackage: info: source distribution buster-backports
dpkg-buildpackage: info: source changed by Unit 193 <unit193@debian.org>
dpkg-buildpackage: info: host architecture amd64
 dpkg-source --before-build .
dpkg-source: info: using patch list from debian/patches/series
dpkg-source: info: applying 0001-Makefile-do-not-use-git-to-get-version-number.patch
dpkg-source: info: applying 0002-Avoid-trying-to-compile-on-debian-5.5-kernels-Closes.
↪patch

...

dpkg-genchanges: info: binary-only upload (no source code included)
 debian/rules clean
dh clean
   dh_clean
 dpkg-source --after-build .
dpkg-source: info: unapplying 0002-Avoid-trying-to-compile-on-debian-5.5-kernels-Closes.
↪patch
dpkg-source: info: unapplying 0001-Makefile-do-not-use-git-to-get-version-number.patch
dpkg-buildpackage: info: binary-only upload (no source included)
```

After compiling the packages you will find yourself the newly generated *.*deb* binaries in `vyos-build/packages/linux-kernel` from which you can copy them to the `vyos-build/packages` folder for inclusion during the ISO build.

Accel-PPP

First, clone the source code and check out the appropriate version by running:

```
$ cd vyos-build/packages/linux-kernel
$ git clone https://github.com/accel-ppp/accel-ppp.git
```

We again make use of a helper script and some patches to make the build work. Just run the following command:

```
$ ./build-accel-ppp.sh
I: Build Accel-PPP Debian package
CMake Deprecation Warning at CMakeLists.txt:3 (cmake_policy):
  The OLD behavior for policy CMP0003 will be removed from a future version
  of CMake.

  The cmake-policies(7) manual explains that the OLD behaviors of all
  policies are deprecated and that a policy should be set to OLD only under
  specific short-term circumstances.  Projects should be ported to the NEW
```

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```
  behavior and not rely on setting a policy to OLD.

-- The C compiler identification is GNU 8.3.0

...

CPack: Create package using DEB
CPack: Install projects
CPack: - Run preinstall target for: accel-ppp
CPack: - Install project: accel-ppp
CPack: Create package
CPack: - package: /vyos/vyos-build/packages/linux-kernel/accel-ppp/build/accel-ppp.deb␣
↪generated.
```

After compiling the packages you will find yourself the newly generated *.*deb* binaries in `vyos-build/packages/linux-kernel` from which you can copy them to the `vyos-build/packages` folder for inclusion during the ISO build.

Intel NIC

The Intel NIC drivers do not come from a Git repository, instead we just fetch the tarballs from our mirror and compile them.

Simply use our wrapper script to build all of the driver modules.

```
./build-intel-drivers.sh
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100  490k  100  490k    0     0   648k      0 --:--:-- --:--:-- --:--:--  648k
I: Compile Kernel module for Intel ixgbe driver

...

I: Building Debian package vyos-intel-iavf
Doing `require 'backports'` is deprecated and will not load any backport in the next␣
↪major release.
Require just the needed backports instead, or 'backports/latest'.
Debian packaging tools generally labels all files in /etc as config files, as mandated␣
↪by policy, so fpm defaults to this behavior for deb packages. You can disable this␣
↪default behavior with --deb-no-default-config-files flag {:level=>:warn}
Created package {:path=>"vyos-intel-iavf_4.0.1-0_amd64.deb"}
I: Cleanup iavf source
```

After compiling the packages you will find yourself the newly generated *.*deb* binaries in `vyos-build/packages/linux-kernel` from which you can copy them to the `vyos-build/packages` folder for inclusion during the ISO build.

Intel QAT

The Intel QAT (Quick Assist Technology) drivers do not come from a Git repository, instead we just fetch the tarballs from 01.org, Intel's open-source website.

Simply use our wrapper script to build all of the driver modules.

```
$ ./build-intel-qat.sh
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100 5065k  100 5065k    0     0  1157k      0  0:00:04  0:00:04 --:--:-- 1157k
I: Compile Kernel module for Intel qat driver
checking for a BSD-compatible install... /usr/bin/install -c
checking whether build environment is sane... yes
checking for a thread-safe mkdir -p... /bin/mkdir -p
checking for gawk... gawk
checking whether make sets $(MAKE)... yes

...

I: Building Debian package vyos-intel-qat
Doing `require 'backports'` is deprecated and will not load any backport in the next␣
↪major release.
Require just the needed backports instead, or 'backports/latest'.
Debian packaging tools generally labels all files in /etc as config files, as mandated␣
↪by policy, so fpm defaults to this behavior for deb packages. You can disable this␣
↪default behavior with --deb-no-default-config-files flag {:level=>:warn}
Created package {:path=>"vyos-intel-qat_1.7.l.4.9.0-00008-0_amd64.deb"}
I: Cleanup qat source
```

After compiling the packages you will find yourself the newly generated **.deb* binaries in `vyos-build/packages/linux-kernel` from which you can copy them to the `vyos-build/packages` folder for inclusion during the ISO build.

Packages

If you are brave enough to build yourself an ISO image containing any modified package from our GitHub organisation - this is the place to be.

Any "modified" package may refer to an altered version of e.g. vyos-1x package that you would like to test before filing a pull request on GitHub.

Building an ISO with any customized package is in no way different then building a regular (customized or not) ISO image. Simply place your modified **.deb* package inside the *packages* folder within *vyos-build*. The build process will then pickup your custom package and integrate it into your ISO.

Troubleshooting

Debian APT is not very verbose when it comes to errors. If your ISO build breaks for whatever reason and you suspect it's a problem with APT dependencies or installation you can add this small patch which increases the APT verbosity during ISO build.

```
diff --git i/scripts/live-build-config w/scripts/live-build-config
index 1b3b454..3696e4e 100755
--- i/scripts/live-build-config
+++ w/scripts/live-build-config
@@ -57,7 +57,8 @@ lb config noauto \
         --firmware-binary false \
         --updates true \
         --security true \
-        --apt-options "--yes -oAcquire::Check-Valid-Until=false" \
+        --apt-options "--yes -oAcquire::Check-Valid-Until=false -oDebug::BuildDeps=true␣
↪-oDebug::pkgDepCache::AutoInstall=true \
+                               -oDebug::pkgDepCache::Marker=true -
↪oDebug::pkgProblemResolver=true -oDebug::Acquire::gpgv=true" \
         --apt-indices false
         "${@}"
 """
```

Virtualization Platforms

QEMU

Run following command after building the ISO image.

```
$ make qemu
```

VMware

Requires ovftool already installed.

Run following command after building the ISO image.

```
$ make vmware
```

14.1.3 Packages

VyOS itself comes with a bunch of packages that are specific to our system and thus cannot be found in any Debian mirror. Those packages can be found at the VyOS GitHub project in their source format can easily be compiled into a custom Debian (*.*deb*) package.

The easiest way to compile your package is with the above mentioned *Docker* container, it includes all required dependencies for all VyOS related packages.

Assume we want to build the vyos-1x package on our own and modify it to our needs. We first need to clone the repository from GitHub.

```
$ git clone https://github.com/vyos/vyos-1x
```

Build

Launch Docker container and build package

```
# For VyOS 1.3 (equuleus)
$ docker run --rm -it --privileged -v $(pwd):/vyos -w /vyos vyos/vyos-build:equuleus bash

# Change to source directory
$ cd vyos-1x

# Build DEB
$ dpkg-buildpackage -uc -us -tc -b
```

After a minute or two you will find the generated DEB packages next to the vyos-1x source directory:

```
# ls -al ../vyos-1x*.deb
-rw-r--r-- 1 vyos_bld vyos_bld 567420 Aug  3 12:01 ../vyos-1x_1.3dev0-1847-gb6dcb0a8_all.
↪deb
-rw-r--r-- 1 vyos_bld vyos_bld   3808 Aug  3 12:01 ../vyos-1x-vmware_1.3dev0-1847-
↪gb6dcb0a8_amd64.deb
```

Install

To take your newly created package on a test drive you can simply SCP it to a running VyOS instance and install the new **.deb* package over the current running one.

Just install using the following commands:

```
vyos@vyos:~$ dpkg --install /tmp/vyos-1x_1.3dev0-1847-gb6dcb0a8_all.deb
(Reading database ... 58209 files and directories currently installed.)
Preparing to unpack .../vyos-1x_1.3dev0-1847-gb6dcb0a8_all.deb ...
Unpacking vyos-1x (1.3dev0-1847-gb6dcb0a8) over (1.3dev0-1847-gb6dcb0a8) ...
Setting up vyos-1x (1.3dev0-1847-gb6dcb0a8) ...
Processing triggers for rsyslog (8.1901.0-1) ...
```

You can also place the generated **.deb* into your ISO build environment to include it in a custom iso, see *Linux Kernel* for more information.

Warning: Any packages in the packages directory will be added to the iso during build, replacing the upstream ones. Make sure you delete them (both the source directories and built deb packages) if you want to build an iso from purely upstream packages.

14.2 Development

All VyOS source code is hosted on GitHub under the VyOS organization which can be found here: https://github.com/vyos

Our code is split into several modules. VyOS is composed of multiple individual packages, some of them are forks of upstream packages and are periodically synced with upstream, so keeping the whole source under a single repository would be very inconvenient and slow. There is now an ongoing effort to consolidate all VyOS-specific framework/config packages into vyos-1x package, but the basic structure is going to stay the same, just with fewer and fewer packages while the base code is rewritten from Perl/BASH into Python using and XML based interface definition for the CLI.

The repository that contains all the ISO build scripts is: https://github.com/vyos/vyos-build

The README.md file will guide you to use the this top level repository.

14.2.1 Submit a Patch

Patches are always more then welcome. To have a clean and easy to maintain repository we have some guidelines when working with Git. A clean repository eases the automatic generation of a changelog file.

A good approach for writing commit messages is actually to have a look at the file(s) history by invoking `git log path/to/file.txt`.

Prepare patch/commit

In a big system, such as VyOS, that is comprised of multiple components, it's impossible to keep track of all the changes and bugs/feature requests in one's head. We use a bugtracker known as Phabricator for it ("issue tracker" would be a better term, but this one stuck).

The information is used in three ways:

- Keep track of the progress (what we've already done in this branch and what we still need to do).
- Prepare release notes for upcoming releases
- Help future maintainers of VyOS (it could be you!) to find out why certain things have been changed in the codebase or why certain features have been added

To make this approach work, every change must be associated with a task number (prefixed with **T**) and a component. If there is no bug report/feature request for the changes you are going to make, you have to create a Phabricator task first. Once there is an entry in Phabricator, you should reference its id in your commit message, as shown below:

- `ddclient: T1030: auto create runtime directories`
- `Jenkins: add current Git commit ID to build description`

If there is no Phabricator reference in the commits of your pull request, we have to ask you to amend the commit message. Otherwise we will have to reject it.

Writing good commit messages

The format should be and is inspired by: https://git-scm.com/book/ch5-2.html It is also worth reading https://chris.beams.io/posts/git-commit/

- A single, short, summary of the commit (recommended 50 characters or less, not exceeding 80 characters) containing a prefix of the changed component and the corresponding Phabricator reference e.g. `snmp: T1111:` or `ethernet: T2222:` - multiple components could be concatenated as in `snmp: ethernet: T3333`
- In some contexts, the first line is treated as the subject of an email and the rest of the text as the body. The blank line separating the summary from the body is critical (unless you omit the body entirely); tools like rebase can get confused if you run the two together.
- Followed by a message which describes all the details like:
  - What/why/how something has been changed, makes everyone's life easier when working with *git bisect*
  - All text of the commit message should be wrapped at 72 characters if possible which makes reading commit logs easier with `git log` on a standard terminal (which happens to be 80x25)
  - If applicable a reference to a previous commit should be made linking those commits nicely when browsing the history: `After commit abcd12ef ("snmp: this is a headline") a Python import statement is missing, throwing the following exception: ABCDEF`
- Always use the `-x` option to the `git cherry-pick` command when back or forward porting an individual commit. This automatically appends the line: `(cherry picked from commit <ID>)` to the original authors commit message making it easier when bisecting problems.
- Every change set must be consistent (self containing)! Do not fix multiple bugs in a single commit. If you already worked on multiple fixes in the same file use *git add –patch* to only add the parts related to the one issue into your upcoming commit.

Limits:

- We only accept bugfixes in packages other than https://github.com/vyos/vyos-1x as no new functionality should use the old style templates (`node.def` and Perl/BASH code. Use the new style XML/Python interface instead.

Please submit your patches using the well-known GitHub pull-request against our repositories found in the VyOS GitHub organisation at https://github.com/vyos

Determinine source package

Suppose you want to make a change in the webproxy script but yet you do not know which of the many VyOS packages ship this file. You can determine the VyOS package name in question by using Debian's `dpkg -S` command of your running VyOS installation.

```
vyos@vyos:~ dpkg -S /opt/vyatta/sbin/vyatta-update-webproxy.pl
vyatta-webproxy: /opt/vyatta/sbin/vyatta-update-webproxy.pl
```

This means the file in question (`/opt/vyatta/sbin/vyatta-update-webproxy.pl`) is located in the `vyatta-webproxy` package which can be found here: https://github.com/vyos/vyatta-webproxy

Fork Repository and submit Patch

Forking the repository and submitting a GitHub pull-request is the preferred way of submitting your changes to VyOS. You can fork any VyOS repository to your very own GitHub account by just appending `/fork` to any repository's URL on GitHub. To e.g. fork the `vyos-1x` repository, open the following URL in your favourite browser: https://github.com/vyos/vyos-1x/fork

You then can proceed with cloning your fork or add a new remote to your local repository:

- Clone: `git clone https://github.com/<user>/vyos-1x.git`
- Fork: `git remote add myfork https://github.com/<user>/vyos-1x.git`

In order to record you as the author of the fix please identify yourself to Git by setting up your name and email. This can be done local for this one and only repository `git config` or globally using `git config --global`.

```
git config --global user.name "J. Random Hacker"
git config --global user.email "jrhacker@example.net"
```

Make your changes and save them. Do the following for all changes files to record them in your created Git commit:

- Add file to Git index using `git add myfile`, or for a whole directory: `git add somedir/*`
- Commit the changes by calling `git commit`. Please use a meaningful commit headline (read above) and don't forget to reference the Phabricator ID.
- Submit the patch `git push` and create the GitHub pull-request.

Attach patch to Phabricator task

Follow the above steps on how to "Fork repository to submit a Patch". Instead of uploading "pushing" your changes to GitHub you can export the patches/ commits and send it to maintainers@vyos.net or attach it directly to the bug (preferred over email)

- Export last commit to patch file: `git format-patch` or export the last two commits into its appropriate patch files: `git format-patch -2`

14.2.2 Coding Guidelines

Like any other project we have some small guidelines about our source code, too. The rules we have are not there to punish you - the rules are in place to help us all. By having a consistent coding style it becomes very easy for new and also longtime contributors to navigate through the sources and all the implied logic of any one source file..

Python 3 **shall** be used. How long can we keep Python 2 alive anyway? No considerations for Python 2 compatibility **should** be taken at any time.

Formatting

- Python: Tabs **shall not** be used. Every indentation level should be 4 spaces
- XML: Tabs **shall not** be used. Every indentation level should be 2 spaces

---

Note: There are extensions to e.g. VIM (xmllint) which will help you to get your indention levels correct. Add to following to your .vimrc file: `au FileType xml setlocal equalprg=xmllint\ --format\ --recover\ -\ 2>/dev/null` now you can call the linter using `gg=G` in command mode.

Text generation

Template processor **should** be used for generating config files. Built-in string formatting **may** be used for simple line-oriented formats where every line is self-contained, such as iptables rules. Template processor **must** be used for structured, multi-line formats such as those used by ISC DHCPd.

The default template processor for VyOS code is Jinja2.

Summary

When modifying the source code, remember these rules of the legacy elimination campaign:

- No new features in Perl
- No old style command definitions
- No code incompatible with Python3

14.2.3 Python

The switch to the Python programming language for new code is not merely a change of the language, but a chance to rethink and improve the programming approach.

Let's face it: VyOS is full of spaghetti code where logic for reading the VyOS config, generating daemon configs, and restarting processes is all mixed up.

Python (or any other language, for that matter) does not provide automatic protection from bad design, so we need to also devise design guidelines and follow them to keep the system extensible and maintainable.

But we are here to assist you and want to guide you through how you can become a good VyOS contributor. The rules we have are not there to punish you - the rules are in place to help us all. What does it mean? By having a consistent coding style it becomes very easy for new contributors and also longtime contributors to navigate through the sources and all the implied logic of the spaghetti code.

Please use the following template as good starting point when developing new modules or even rewrite a whole bunch of code in the new style XML/Pyhon interface.

Configuration Script Structure and Behaviour

Your configuration script or operation mode script which is also written in Python3 should have a line break on 80 characters. This seems to be a bit odd nowadays but as some people also work remotely or program using vi(m) this is a fair good standard which I hope we can rely on.

In addition this also helps when browsing the GitHub codebase on a mobile device if you happen to be a crazy scientist.

```
#!/usr/bin/env python3
#
# Copyright (C) 2020 VyOS maintainers and contributors
#
# This program is free software; you can redistribute it and/or modify
# it under the terms of the GNU General Public License version 2 or later as
# published by the Free Software Foundation.
#
# This program is distributed in the hope that it will be useful,
# but WITHOUT ANY WARRANTY; without even the implied warranty of
```

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```
# MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the
# GNU General Public License for more details.
#
# You should have received a copy of the GNU General Public License
# along with this program.  If not, see <http://www.gnu.org/licenses/>.

import sys

from vyos.config import Config
from vyos import ConfigError

def get_config():
    if config:
        conf = config
    else:
        conf = Config()

    # Base path to CLI nodes
    base = ['...', '...']
    # Convert the VyOS config to an abstract internal representation
    config_data = conf.get_config_dict(base, key_mangling=('-', '_'), get_first_key=True)
    return config_data

def verify(config):
    # Verify that configuration is valid
    if invalid:
        raise ConfigError("Descriptive message")
    return True

def generate(config):
    # Generate daemon configs
    pass

def apply(config):
    # Apply the generated configs to the live system
    pass

try:
    c = get_config()
    verify(c)
    generate(c)
    apply(c)
except ConfigError as e:
    print(e)
    sys.exit(1)
```

The `get_config()` function must convert the VyOS config to an abstract, internal representation. No other function is allowed to call the `vyos.config. Config` object method directly. The rationale for it is that when config reads are mixed with other logic, it's very hard to change the config syntax since you need to weed out every occurrence of the old syntax. If syntax-specific code is confined to a single function, the rest of the code can be left untouched as long as the internal representation remains compatible.

Another advantage is testability of the code. Mocking the entire config subsystem is hard, while constructing an internal

representation by hand is way simpler.

The `verify()` function takes your internal representation of the config and checks if it's valid, otherwise it must raise `ConfigError` with an error message that describes the problem and possibly suggests how to fix it. It must not make any changes to the system. The rationale for it is again testability and, in the future when the config backend is ready and every script is rewritten in this fashion, ability to execute commit dry run ("commit test" like in JunOS) and abort commit before making any changes to the system if an error is found in any component.

The `generate()` function generates config files for system components.

The `apply()` function applies the generated configuration to the live system. It should use non-disruptive reload whenever possible. It may execute disruptive operations such as daemon process restart if a particular component does not support non-disruptive reload, or when the expected service degradation is minimal (for example, in case of auxiliary services such as LLDPd). In case of high impact services such as VPN daemon and routing protocols, when non- disruptive reload is supported for some but not all types of configuration changes, scripts authors should make effort to determine if a configuration change can be done in a non-disruptive way and only resort to disruptive restart if it cannot be avoided.

Unless absolutely necessary, configuration scripts should not modify the active configuration of system components directly. Whenever at all possible, scripts should generate a configuration file or files that can be applied with a single command such as reloading a service through systemd init. Inserting statements one by one is particularly discouraged, for example, when configuring netfilter rules, saving them to a file and loading it with iptables-restore should always be preferred to executing iptables directly.

The `apply()` and `generate()` functions may `raise ConfigError` if, for example, the daemon failed to start with the updated config. It shouldn't be a substitute for proper config checking in the `verify()` function. All reasonable effort should be made to verify that generated configuration is valid and will be accepted by the daemon, including, when necessary, cross- checks with other VyOS configuration subtrees.

Exceptions, including `VyOSError` (which is raised by `vyos.config.Config` on improper config operations, such as trying to use `list_nodes()` on a non-tag node) should not be silenced or caught and re-raised as config error. Sure this will not look pretty on user's screen, but it will make way better bug reports, and help users (and most VyOS users are IT professionals) do their own debugging as well.

For easy orientation we suggest you take a look on the `ntp.py` or `interfaces-bonding.py` (for tag nodes) implementation. Both files can be found in the vyos-1x repository.

14.2.4 XML (used for CLI definitions)

The bash (or better vbash) completion in VyOS is defined in *templates*. Templates are text files (called `node.def`) stored in a directory tree. The directory names define the command names, and template files define the command behaviour. Before VyOS 1.2 (crux) this files were created by hand. After a complex redesign process the new style template are automatically generated from a XML input file.

XML interface definitions for VyOS come with a RelaxNG schema and are located in the vyos-1x module. This schema is a slightly modified schema from VyConf alias VyOS 2.0 So VyOS 1.2.x interface definitions will be reusable in Nextgen VyOS Versions with very minimal changes.

The great thing about schemas is not only that people can know the complete grammar for certain, but also that it can be automatically verified. The *scripts/build-command-templates* script that converts the XML definitions to old style templates also verifies them against the schema, so a bad definition will cause the package build to fail. I do agree that the format is verbose, but there is no other format now that would allow this. Besides, a specialized XML editor can alleviate the issue with verbosity.

Example:

```
<?xml version="1.0"?>
<!-- Cron configuration -->
<interfaceDefinition>
  <node name="system">
    <children>
      <node name="task-scheduler">
        <properties>
          <help>Task scheduler settings</help>
        </properties>
        <children>
          <tagNode name="task" owner="${vyos_conf_scripts_dir}/task_scheduler.py">
            <properties>
              <help>Scheduled task</help>
              <valueHelp>
                <format>&lt;string&gt;</format>
                <description>Task name</description>
              </valueHelp>
              <priority>999</priority>
            </properties>
            <children>
              <leafNode name="crontab-spec">
                <properties>
                  <help>UNIX crontab time specification string</help>
                </properties>
              </leafNode>
              <leafNode name="interval">
                <properties>
                  <help>Execution interval</help>
                  <valueHelp>
                    <format>&lt;minutes&gt;</format>
                    <description>Execution interval in minutes</description>
                  </valueHelp>
                  <valueHelp>
                    <format>&lt;minutes&gt;m</format>
                    <description>Execution interval in minutes</description>
                  </valueHelp>
                  <valueHelp>
                    <format>&lt;hours&gt;h</format>
                    <description>Execution interval in hours</description>
                  </valueHelp>
                  <valueHelp>
                    <format>&lt;days&gt;d</format>
                    <description>Execution interval in days</description>
                  </valueHelp>
                  <constraint>
                    <regex>[1-9]([0-9]*)([mhd]{0,1})</regex>
                  </constraint>
                </properties>
              </leafNode>
              <node name="executable">
                <properties>
                  <help>Executable path and arguments</help>
                </properties>
```

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```
                <children>
                  <leafNode name="path">
                    <properties>
                      <help>Path to executable</help>
                    </properties>
                  </leafNode>
                  <leafNode name="arguments">
                    <properties>
                      <help>Arguments passed to the executable</help>
                    </properties>
                  </leafNode>
                </children>
              </node>
            </children>
          </tagNode>
        </children>
      </node>
    </children>
  </node>
</interfaceDefinition>
```

Command definitions are purely declarative, and cannot contain any logic. All logic for generating config files for target applications, restarting services and so on is implemented in configuration scripts instead.

GNU Preprocessor

XML interface definition files use the *xml.in* file extension which was implemented in T1843. XML interface definitions tend to have a lot of duplicated code in areas such as:

- VIF (incl. VIF-S/VIF-C)
- Address
- Description
- Enabled/Disabled

Instead of supplying all those XML nodes multiple times there are now include files with predefined features. Brief overview:

- IPv4, IPv6 and DHCP(v6) address assignment
- IPv4, IPv6 address assignment
- VLAN (VIF) definition
- MAC address assignment

All interface definition XML input files (.in suffix) will be sent to the GCC preprocess and the output is stored in the *build/interface-definitions* folder. The previously mentioned *scripts/build-command-templates* script operates on the *build/interface-definitions* folder to generate all required CLI nodes.

```
$ make interface_definitions
install -d -m 0755 build/interface-definitions
install -d -m 0755 build/op-mode-definitions
Generating build/interface-definitions/intel_qat.xml from interface-definitions/intel_
```

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```
↪qat.xml.in
Generating build/interface-definitions/interfaces-bonding.xml from interface-definitions/
↪interfaces-bonding.xml.in
Generating build/interface-definitions/cron.xml from interface-definitions/cron.xml.in
Generating build/interface-definitions/pppoe-server.xml from interface-definitions/pppoe-
↪server.xml.in
Generating build/interface-definitions/mdns-repeater.xml from interface-definitions/mdns-
↪repeater.xml.in
Generating build/interface-definitions/tftp-server.xml from interface-definitions/tftp-
↪server.xml.in
[...]
```

Guidelines

Use of numbers

Use of numbers in command names **should** be avoided unless a number is a part of a protocol name or similar. Thus, `protocols ospfv3` is perfectly fine, but something like `server-1` is questionable at best.

Help String

To ensure uniform look and feel, and improve readability, we should follow a set of guidelines consistently.

Capitalization and punctuation

The first word of every help string **must** be capitalized. There **must not** be a period at the end of help strings.

Rationale: this seems to be the unwritten standard in network device CLIs, and a good aesthetic compromise.

Examples:

- Good: “Frobnication algorithm”
- Bad: “frobnication algorithm”
- Bad: “Frobnication algorithm.”
- Horrible: “frobnication algorithm.”

Use of abbreviations and acronyms

Abbreviations and acronyms **must** be capitalized.

Examples:

- Good: “TCP connection timeout”
- Bad: “tcp connection timeout”
- Horrible: “Tcp connection timeout”

Acronyms also **must** be capitalized to visually distinguish them from normal words:

Examples:

- Good: RADIUS (as in remote authentication for dial-in user services)
- Bad: radius (unless it's about the distance between a center of a circle and any of its points)

Some abbreviations are traditionally written in mixed case. Generally, if it contains words "over" or "version", the letter **should** be lowercase. If there's an accepted spelling (especially if defined by an RFC or another standard), it **must** be followed.

Examples:

- Good: PPPoE, IPsec
- Bad: PPPOE, IPSEC
- Bad: pppoe, ipsec

Use of verbs

Verbs **should** be avoided. If a verb can be omitted, omit it.

Examples:

- Good: "TCP connection timeout"
- Bad: "Set TCP connection timeout"

If a verb is essential, keep it. For example, in the help text of `set system ipv6 disable-forwarding`, "Disable IPv6 forwarding on all interfaces" is a perfectly justified wording.

Prefer infinitives

Verbs, when they are necessary, **should** be in their infinitive form.

Examples:

- Good: "Disable IPv6 forwarding"
- Bad: "Disables IPv6 forwarding"

Migrating old CLI

Old concept/syntax	New syntax	Notes
mynode/node.def	<node name=”mynode”> </node>	Leaf nodes (nodes with values) use <leafNode> tag instead
mynode/node.tag , tag:	<tagNode name=”mynode> </node>	
help: My node	<properties> <help>My node</help>	
val_help: <format>; some string	<properties> <valueHelp> <format> format </format> <description> some string </description>	Do not add angle brackets around the format, they will be inserted automatically
syntax:expression: pattern	<properties> <constraint> <regex> …	<constraintErrorMessage> will be displayed on failure
syntax:expression: $VAR(@) in “foo”, “bar”, “baz”	None	Use regex
syntax:expression: exec …	<properties> <constraint> <validator> <name =”foo” argument=”bar”>	“${vyos_libexecdir}/validators/foo bar $VAR(@)” will be executed, <constraintErrorMessage> will be displayed on failure
syntax:expression: (arithmetic expression)	None	External arithmetic validator may be added if there’s demand, complex validation is better left to commit-time scripts
priority: 999	<properties> <priority>999</priority>	Please leave a comment explaining why the priority was chosen (e.g. “after interfaces are configured”)
multi:	<properties> <multi/>	Only applicable to leaf nodes
allowed: echo foo bar	<properties> <completionHelp> <list> foo bar </list>	
allowed: cli-shell-api listNodes vpn ipsec esp-group	<properties> <completionHelp> <path> vpn ipsec esp-group </path> …	
allowed: /path/to/script	<properties> <completionHelp> <script> /path/to/script </script> …	
default:	None	Move default values to scripts
commit:expression:	None	All commit time checks should be in the verify() function of the script
begin:/create:/delete:	None	All logic should be in the scripts

14.2.5 Continuous Integration

VyOS makes use of Jenkins as our Continuous Integration (CI) service. Our VyOS CI server is publicly accessible here: https://ci.vyos.net. You can get a brief overview of all required components shipped in a VyOS ISO.

To build our modules we utilize a CI/CD Pipeline script. Each and every VyOS component comes with it's own `Jenkinsfile` which is (more or less) a copy. The Pipeline utilizes the Docker container from the *Build ISO* section - but instead of building it from source on every run, we rather always fetch a fresh copy (if needed) from Dockerhub.

Each module is build on demand if a new commit on the branch in question is found. After a successful run the resulting Debian Package(s) will be deployed to our Debian repository which is used during build time. It is located here: http://dev.packages.vyos.net/repositories/.

14.3 Issues/Feature requests

14.3.1 Bug Report/Issue

Issues or bugs are found in any software project. VyOS is not an exception.

All issues should be reported to the developers. This lets the developers know what is not working properly. Without this sort of feedback every developer will believe that everything is working correctly.

I have found a bug, what should I do?

When you believe you have found a bug, it is always a good idea to verify the issue prior to opening a bug request.

- Consult the documentation to ensure that you have configured your system correctly
- Get community support via Slack or our Forum

Ensure the problem is reproducible

When you are able to verify that it is actually a bug, spend some time to document how to reproduce the issue. This documentation can be invaluable.

When you wish to have a developer fix a bug that you found, helping them reproduce the issue is beneficial to everyone. Be sure to include information about the hardware you are using, commands that you were running, any other activities that you may have been doing at the time. This additional information can be very useful.

- What were you attempting to achieve?
- What was the configuration prior to the change?
- What commands did you use? Use e.g. `run show configuration commands`

Include output

The output you get when you find a bug can provide lots of information. If you get an error message on the screen, copy it exactly. Having the exact message can provide detail that the developers can use. Like wise if you have any log messages that also are from the time of the issue, include those. They may also contain information that is helpful for the development team.

Report a Bug

In order to open up a bug-report/feature request you need to create yourself an account on VyOS Phabricator. On the left side of the specific project (VyOS 1.2 or VyOS 1.3) you will find quick-links for opening a bug-report/feature request.

- Provide as much information as you can
- Which version of VyOS are you using? `run show version`
- How can we reproduce this Bug?

14.3.2 Feature Request

You have an idea of how to make VyOS better or you are in need of a specific feature which all users of VyOS would benefit from? To send a feature request please search Phabricator if there is already a request pending. You can enhance it or if you don't find one, create a new one by use the quick link in the left side under the specific project.

14.4 Upstream packages

Many base system packages are pulled straight from Debian's main and contrib repositories, but there are exceptions.

This chapter lists those exceptions and gives you a brief overview what we have done on those packages. If you only want to build yourself a fresh ISO you can completely skip this chapter. It may become interesting once you have a VyOS deep dive.

14.4.1 vyos-netplug

Due to issues in the upstream version that sometimes set interfaces down, a modified version is used.

The source is located at https://github.com/vyos/vyos-netplug

In the future, we may switch to using systemd infrastructure instead. Building it doesn't require a special procedure.

14.4.2 keepalived

Keepalived normally isn't updated to newer feature releases between Debian versions, so we are building it from source.

Debian does keep their package in git, but it's upstream tarball imported into git without its original commit history. To be able to merge new tags in, we keep a fork of the upstream repository with packaging files imported from Debian at https://github.com/vyos/keepalived-upstream

14.4.3 strongswan

Our StrongSWAN build differs from the upstream:

- strongswan-nm package build is disabled since we don't use NetworkManager
- Patches for DMVPN are merged in

The source is at https://github.com/vyos/vyos-strongswan

DMVPN patches are added by this commit: https://github.com/vyos/vyos-strongswan/commit/1cf12b0f2f921bfc51affa3b81226

Our op mode scripts use the python-vici module, which is not included in Debian's build, and isn't quite easy to integrate in that build. For this reason we debianize that module by hand now, using this procedure:

0. Install https://pypi.org/project/stdeb/
1. *cd vyos-strongswan*
2. *./configure –enable-python-eggs*
3. *cd src/libcharon/plugins/vici/python*
4. *make*
5. *python3 setup.py –command-packages=stdeb.command bdist_deb*

The package ends up in deb_dist dir.

14.4.4 mdns-repeater

This package doesn't exist in Debian. A debianized fork is kept at https://github.com/vyos/mdns-repeater

No special build procedure is required.

14.4.5 udp-broadcast-relay

This package doesn't exist in Debian. A debianized fork is kept at https://github.com/vyos/udp-broadcast-relay

No special build procedure is required.

14.4.6 hvinfo

A fork with packaging changes for VyOS is kept at https://github.com/vyos/hvinfo

The original repo is at https://github.com/dmbaturin/hvinfo

It's an Ada program and requires GNAT and gprbuild for building, dependencies are properly specified so just follow debuild's suggestions.

CHAPTER

FIFTEEN

DEBUGGING

There are two flags available to aid in debugging configuration scripts. Since configuration loading issues will manifest during boot, the flags are passed as kernel boot parameters.

15.1 System Startup

The system startup can be debugged (like loading in the configuration file from `/config/config.boot`. This can be achieve by extending the Kernel command-line in the bootloader.

15.1.1 Kernel

- `vyos-debug` - Adding the parameter to the linux boot line will produce timing results for the execution of scripts during commit. If one is seeing an unexpected delay during manual or boot commit, this may be useful in identifying bottlenecks. The internal flag is `VYOS_DEBUG`, and is found in vyatta-cfg. Output is directed to `/var/log/vyatta/cfg-stdout.log`.

  In addition this setting creates the runtime debug files for some Live system components (see below). Those files are: `/tmp/vyos-config-status`, `/tmp/vyos.frr.debug`, `/tmp/vyos.ifconfig.debug`.

- `vyos-config-debug` - During development, coding errors can lead to a commit failure on boot, possibly resulting in a failed initialization of the CLI. In this circumstance, the kernel boot parameter `vyos-config-debug` will ensure access to the system as user `vyos`, and will log a Python stack trace to the file `/tmp/boot-config-trace`. File `boot-config-trace` will generate only if config loaded with a failure status.

15.2 Live System

A number of flags can be set up to change the behaviour of VyOS at runtime. These flags can be toggled using either environment variables or creating files.

For each feature, a file called `vyos.feature.debug` can be created to toggle the feature on. If a parameter is required it can be placed inside the file as its first line.

The file can be placed in `/tmp` for one time debugging (as the file will be removed on reboot) or placed in '/config' to stay permanently.

For example, `/tmp/vyos.ifconfig.debug` can be created to enable interface debugging.

It is also possible to set up the debugging using environment variables. In that case, the name will be (in uppercase) VYOS_FEATURE_DEBUG.

For example running, `export VYOS_IFCONFIG_DEBUG=""` on your vbash, will have the same effect as `touch /tmp/vyos.ifconfig.debug`.

- `ifconfig` - Once set, all commands used, and their responses received from the OS, will be presented on the screen for inspection.
- `command` - Once set, all commands used, and their responses received from the OS, will be presented on the screen for inspection.
- `developer` - Should a command fail, instead of printing a message to the user explaining how to report issues, the python interpreter will start a PBD post-mortem session to allow the developer to debug the issue. As the debugger will wait from input from the developer, it has the capacity to prevent a router to boot and therefore should only be permanently set up on production if you are ready to see the OS fail to boot.
- `log` - In some rare cases, it may be useful to see what the OS is doing, including during boot. This option sends all commands used by VyOS to a file. The default file is `/tmp/full-log` but it can be changed.

Note: In order to retrieve the debug output on the command-line you need to disable `vyos-configd` in addition. This can be run either one-time by calling `sudo systemctl stop vyos-configd` or make this reboot-safe by calling `sudo systemctl disable vyos-configd`.

15.2.1 Debugging Python Code with PDB

Sometimes it might be useful to debug Python code interactively on the live system rather than a IDE. This can be achieved using pdb.

Let us assume you want to debug a Python script that is called by an op-mode command. After you found the script by looking up the op-mode-defitions you can edit the script in the live system using e.g. vi: `vi /usr/libexec/vyos/op_mode/show_xyz.py`

Insert the following statement right before the section where you want to investigate a problem (e.g. a statement you see in a backtrace): `import pdb; pdb.set_trace()` Optionally you can surrounded this statement by an `if` which only triggers under the condition you are interested in.

Once you run `show xyz` and your condition is triggered you should be dropped into the python debugger:

```
> /usr/libexec/vyos/op_mode/show_nat_translations.py(109)process()
-> rule_type = rule.get('type', '')
(Pdb)
```

You can type `help` to get an overview of the available commands, and `help command` to get more information on each command.

Useful commands are:

- examine variables using `pp(var)`
- contine execution using `cont`
- get a backtrace using `bt`

15.2.2 Config Migration Scripts

When writing a new configuration migrator it may happen that you see an error when you try to invoke it manually on a development system. This error will look like:

```
vyos@vyos:~$ /opt/vyatta/etc/config-migrate/migrate/ssh/0-to-1 /tmp/config.boot
Traceback (most recent call last):
  File "/opt/vyatta/etc/config-migrate/migrate/ssh/0-to-1", line 31, in <module>
    config = ConfigTree(config_file)
  File "/usr/lib/python3/dist-packages/vyos/configtree.py", line 134, in __init__
    raise ValueError("Failed to parse config: {0}".format(msg))
ValueError: Failed to parse config: Syntax error on line 240, character 1: Invalid␣
↪syntax.
```

The reason is that the configuration migration backend is rewritten and uses a new form of "magic string" which is applied on demand when real config migration is run on boot. When runnint individual migrators for testing, you need to convert the "magic string" on your own by:

```
vyos@vyos:~$ /usr/libexec/vyos/run-config-migration.py --virtual --set-vintage vyos /tmp/
↪config.boot
```

15.2.3 Configuration Error on System Boot

Beeing brave and running the latest rolling releases will sometimes trigger bugs due to corner cases we missed in our design. Those bugs should be filed via Phabricator but you can help us to narrow doen the issue. Login to your VyOS system and change into configuration mode by typing `configure`. Now re-load your boot configuration by simply typing `load` followed by return.

You shoudl now see a Python backtrace which will help us to handle the issue, please attach it to the Phabricator task.

15.2.4 Boot Timing

During the migration and extensive rewrite of functionality from Perl into Python a significant increase in the overall system boottime was noticed. The system boot time can be analysed and a graph can be generated in the end which shows in detail who called whom during the system startup phase.

This is done by utilizing the `systemd-bootchart` package which is now installed by default on the VyOS 1.3 (equuleus) branch. The configuration is also versioned so we get comparable results. `systemd-bootchart` is configured using this file: bootchart.conf

To enable boot time graphing change the Kernel commandline and add the folowing string: `init=/usr/lib/systemd/systemd-bootchart`

This can also be done permanently by changing `/boot/grub/grub.cfg`.

15.3 Priorities

VyOS CLI is all about priorities. Every CLI node has a corresponding `node.def` file and possibly an attached script that is executed when the node is present. Nodes can have a priority, and on system bootup - or any other `commit` to the config all scripts are executed from lowest to higest priority. This is good as this gives a deterministic behavior.

To debug issues in priorities or to see what's going on in the background you can use the `/opt/vyatta/sbin/priority.pl` script which lists to you the execution order of the scripts.

CHAPTER

SIXTEEN

TESTING

One of the major advantages introduced in VyOS 1.3 is an automated test framework. When assembling an ISO image multiple things can go wrong badly and publishing a faulty ISO makes no sense. The user is disappointed by the quality of the image and the developers get flodded with bug reports over and over again.

As the VyOS documentation is not only for users but also for the developers - and we keep no secret documentation - this section describes how the automated testing works.

16.1 Jenkins CI

Our VyOS CI system is based on Jenkins and builds all our required packages for VyOS 1.2 to 1.4. In addition to the package build, there is the vyos-build Job which builds and tests the VyOS ISO image which is published after a successfull test drive.

We differentiate in two independent tests, which are both run in parallel by two separate QEmu instances which are launched via `make test` and `make testc` from within the vyos-build repository.

16.2 Smoketests

Smoketests executes predefined VyOS CLI commands and checks if the desired daemon/service configuration is rendert - that is how to put it "short".

When and ISO image is assembled by the VyOS CI, the `BUILD_SMOKETEST` parameter is enabled by default, which will extend the ISO configuration line with the following packages:

```
def CUSTOM_PACKAGES = ''
  if (params.BUILD_SMOKETESTS)
    CUSTOM_PACKAGES = '--custom-package vyos-1x-smoketest'
```

So if you plan to build your own custom ISO image and wan't to make use of our smoketests, ensure that you have the *vyos-1x-smoketest* package installed.

The `make test` command from the vyos-build repository will launch a new QEmu instance and the ISO image is first installed to the virtual harddisk.

After its first boot into the newly installed system the main Smoketest script is executed, it can be found here: */usr/bin/vyos-smoketest*

The script only searches for executable "test-cases" under `/usr/libexec/vyos/tests/smoke/cli/` and executes them one by one.

Note: As Smoketests will alter the system configuration and you are logged in remote you may loose your connection to the system.

16.2.1 Manual Smoketest Run

On the other hand - as each test is contain in its own file - one can always execute a single Smoketest by hand by simply running the Python test scripts.

Example:

```
vyos@vyos:~$ /usr/libexec/vyos/tests/smoke/cli/test_protocols_bgp.py
test_bgp_01_simple (__main__.TestProtocolsBGP) ... ok
test_bgp_02_neighbors (__main__.TestProtocolsBGP) ... ok
test_bgp_03_peer_groups (__main__.TestProtocolsBGP) ... ok
test_bgp_04_afi_ipv4 (__main__.TestProtocolsBGP) ... ok
test_bgp_05_afi_ipv6 (__main__.TestProtocolsBGP) ... ok
test_bgp_06_listen_range (__main__.TestProtocolsBGP) ... ok
test_bgp_07_l2vpn_evpn (__main__.TestProtocolsBGP) ... ok
test_bgp_08_zebra_route_map (__main__.TestProtocolsBGP) ... ok
test_bgp_09_distance_and_flowspec (__main__.TestProtocolsBGP) ... ok
test_bgp_10_vrf_simple (__main__.TestProtocolsBGP) ... ok
test_bgp_11_confederation (__main__.TestProtocolsBGP) ... ok
test_bgp_12_v6_link_local (__main__.TestProtocolsBGP) ... ok
test_bgp_13_solo (__main__.TestProtocolsBGP) ... ok

----------------------------------------------------------------------
Ran 13 tests in 348.191s

OK
```

16.2.2 Interface based tests

Our smoketests not only test daemons and serives, but also check if what we configure for an interface works. Thus there is a common base classed named: `base_interfaces_test.py` which holds all the common code that an interface supports and is tested.

Those common tests consists out of:

- Add one or more IP addresses
- DHCP client and DHCPv6 prefix delegation
- MTU size
- IP and IPv6 options
- Port description
- Port disable
- VLANs (QinQ and regular 802.1q)
- …

Note: When you are working on interface configuration and you also wan't to test if the Smoketests pass you would normally loose the remote SSH connection to your DUT (Device Under Test). To handle this issue, some of the interface based tests can be called with an environment variable beforehand to limit the number of interfaces used in the test. By default all interface e.g. all Ethernet interfaces are used.

```
vyos@vyos:~$ TEST_ETH="eth1 eth2" /usr/libexec/vyos/tests/smoke/cli/test_interfaces_
↪bonding.py
test_add_multiple_ip_addresses (__main__.BondingInterfaceTest) ... ok
test_add_single_ip_address (__main__.BondingInterfaceTest) ... ok
test_bonding_hash_policy (__main__.BondingInterfaceTest) ... ok
test_bonding_lacp_rate (__main__.BondingInterfaceTest) ... ok
test_bonding_min_links (__main__.BondingInterfaceTest) ... ok
test_bonding_remove_member (__main__.BondingInterfaceTest) ... ok
test_dhcpv6_client_options (__main__.BondingInterfaceTest) ... ok
test_dhcpv6pd_auto_sla_id (__main__.BondingInterfaceTest) ... ok
test_dhcpv6pd_manual_sla_id (__main__.BondingInterfaceTest) ... ok
test_interface_description (__main__.BondingInterfaceTest) ... ok
test_interface_disable (__main__.BondingInterfaceTest) ... ok
test_interface_ip_options (__main__.BondingInterfaceTest) ... ok
test_interface_ipv6_options (__main__.BondingInterfaceTest) ... ok
test_interface_mtu (__main__.BondingInterfaceTest) ... ok
test_ipv6_link_local_address (__main__.BondingInterfaceTest) ... ok
test_mtu_1200_no_ipv6_interface (__main__.BondingInterfaceTest) ... ok
test_span_mirror (__main__.BondingInterfaceTest) ... ok
test_vif_8021q_interfaces (__main__.BondingInterfaceTest) ... ok
test_vif_8021q_lower_up_down (__main__.BondingInterfaceTest) ... ok
test_vif_8021q_mtu_limits (__main__.BondingInterfaceTest) ... ok
test_vif_8021q_qos_change (__main__.BondingInterfaceTest) ... ok
test_vif_s_8021ad_vlan_interfaces (__main__.BondingInterfaceTest) ... ok
test_vif_s_protocol_change (__main__.BondingInterfaceTest) ... ok

----------------------------------------------------------------------
Ran 23 tests in 244.694s

OK
```

This will limit the *bond* interface test to only make use of *eth1* and *eth2* as member ports.

16.3 Config Load Tests

The other part of our tests are called "config load tests". The config load tests will load - one after another - arbitrary configuration files to test if the configuration migration scripts work as designed and that a given set of functionality still can be loaded with a fresh VyOS ISO image.

The configurations are all derived from production systems and can not only act as a testcase but also as reference if one wants to enable a certain feature. The configurations can be found here: https://github.com/vyos/vyos-1x/tree/current/smoketest/configs

The entire test is controlled by the main wrapper script `/usr/bin/vyos-configtest` which behaves in the same way as the main smoketest script. It scans the folder for potential configuration files and issues a `load` command one after another.

16.3.1 Manual config load test

One is not bound to load all configurations one after another but can also load individual test configurations on his own.

```
vyos@vyos:~$ configure
load[edit]

vyos@vyos# load /usr/libexec/vyos/tests/config/ospf-small
Loading configuration from '/usr/libexec/vyos/tests/config/ospf-small'
Load complete. Use 'commit' to make changes effective.
[edit]
vyos@vyos# compare
[edit interfaces ethernet eth0]
-hw-id 00:50:56:bf:c5:6d
[edit interfaces ethernet eth1]
+duplex auto
-hw-id 00:50:56:b3:38:c5
+speed auto
[edit interfaces]
-ethernet eth2 {
-    hw-id 00:50:56:b3:9c:1d
-}
-vti vti1 {
-    address 192.0.2.1/30
-}
...

vyos@vyos# commit
vyos@vyos#
```

Note: Some of the configurations have preconditions which need to be met. Those most likely include generation of crypographic keys before the config can be applied - you will get a commit error otherwise. If you are interested how those preconditions are fulfilled check the vyos-build repository and the `scripts/check-qemu-install` file.

CHAPTER

SEVENTEEN

DOCUMENTATION

As most software projects we also have a lack in documentation. We encourage every VyOS user to help us improve our documentation. This will not only be beneficial for you (when reading something up) but also for the whole world.

If you are willing to contribute to our documentation this is the definite guide how to do so.

Note: In contrast to submitting code patches, there is no requirement that you open up a Phabricator task prior to submitting a Pull-Request to the documentation.

VyOS documentation is written in reStructuredText and generated to Read the Docs pages with Sphinx, as per the Python tradition, as well as PDF files for offline use through LaTeX. We welcome all sorts of contributions to the documentation. Not just new additions but also corrections to existing documentation.

The documentation source is kept in the Git repository at https://github.com/vyos/vyos-documentation and you can follow the instructions in the README.md to build and test your changes.

You can either install Sphinx (and TeX Live for PDF output) and build the documentation locally, or use the Dockerfile to build it in a container.

17.1 Guidelines

There are a few things to keep in mind when contributing to the documentation, for the sake of consistency and readability.

Take a look at the *Documentation* page for an intricate explanation of the documentation process.

The following is a quick summary of the rules:

- Use American English at all times. It's always a good idea to run your text through a grammar and spell checker, such as Grammarly.
- Don't forget to update `index.rst` when adding a new node.
- Try not to exceed 80 characters per line, but don't break URLs over this.
- Properly quote commands, filenames and brief code snippets with double backticks.
- Use literal blocks for longer snippets.
- Leave a newline before and after a header.
- Indent with two spaces.
- When in doubt, follow the style of existing documentation.

And finally, remember that the reStructuredText files aren't exclusively for generating HTML and PDF. They should be human-readable and easily perused from a console.

17.2 Forking Workflow

The Forking Workflow is fundamentally different than other popular Git workflows. Instead of using a single server-side repository to act as the "central" codebase, it gives every developer their own server-side repository. This means that each contributor has not one, but two Git repositories: a private local one and a public server-side one.

The main advantage of the Forking Workflow is that contributions can be integrated without the need for everybody to push to a single central repository. Developers push to their own server-side repositories, and only the project maintainer can push to the official repository. This allows the maintainer to accept commits from any developer without giving them write access to the official codebase.

Note: Updates to our documentation should be delivered by a GitHub pull-request. This requires you already have a GitHub account.

- Fork this project on GitHub https://github.com/vyos/vyos-documentation/fork
- Clone fork to local machine, then change to that directory `$ cd vyos-documentation`
- Install the requirements `$ pip install -r requirements.txt` (or something similar)
- Create new branch for your work, use a descriptive name of your work: `$ git checkout -b <branch-name>`
- Make all your changes - please keep our commit rules in mind (*Prepare patch/commit*). This mainly applies to proper commit messages describing your change (how and why). Please check out the documentation of Sphinx-doc or reStructuredText if you are not familiar with it. This is used for writing our docs. Additional directives how to write in RST can be obtained from reStructuredTextDirectives.
- Check your changes by locally building the documentation `$ make livehtml`. Sphinx will build the html files in the `docs/_build` folder. We provide you with a Docker container for an easy to use user experience. Check the README.md file of this repository.
- View modified files by calling `$ git status`. You will get an overview of all files modified by you. You can add individual files to the Git Index in the next step.
- Add modified files to Git index `$ git add path/to/filename` or add all unstaged files `$ git add .`. All files added to the Git index will be part of you following Git commit.
- Commit your changes with the message, `$ git commit -m "<commit message>"` or use `$ git commit -v` to have your configured editor launched. You can type in a commit message. Again please make yourself comfortable with out rules (*Prepare patch/commit*).
- Push commits to your GitHub project: `$ git push -u origin <branch-name>`
- Submit pull-request. In GitHub visit the main repository and you should see a banner suggesting to make a pull request. Fill out the form and describe what you do.
- Once pull resquests have been approved, you may want to locally update your forked repository too. First you'll have to add a second remote called *upstream* which points to our main repository. `$ git remote add upstream https://github.com/vyos/vyos-documentation.git`

  Check your configured remote repositories:

```
$ git remote -v
origin    https://github.com/<username>/vyos-documentation.git (fetch)
```

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```
origin    https://github.com/<username>/vyos.documentation.git (push)
upstream  https://github.com/vyos/vyos-documentation.git (fetch)
upstream  https://github.com/vyos/vyos-documentation.git (push)
```

Your remote repo on Github is called `origin`, while the original repo you have forked is called `upstream`. Now you can locally update your forked repo.

```
$ git fetch upstream
$ git checkout master
$ git merge upstream/master
```

- If you want to update your fork on GitHub, too use the following: `$ git push origin master`

17.3 Style Guide

17.3.1 Formating and Sphinxmarkup

TOC Level

We use the following syntax for Headlines.

```
#####
Title
#####

********
Chapters
********

Sections
========

Subsections
-----------

Subsubsections
^^^^^^^^^^^^^^

Paragraphs
""""""""""""
```

Address space

Note the following RFCs (**RFC 5737**, **RFC 3849**, **RFC 5389** and **RFC 7042**), which describe the reserved public IP addresses and autonomous system numbers for the documentation:

- `192.0.2.0/24`
- `198.51.100.0/24`
- `203.0.113.0/24`
- `2001:db8::/32`
- 16bit ASN: `64496 - 64511`
- 32bit ASN: `65536 - 65551`
- Unicast MAC Addresses: `00-53-00` to `00-53-FF`
- Multicast MAC-Addresses: `90-10-00` to `90-10-FF`

Please don't use other public address space.

Line length

Limit all lines to a maximum of 80 characters.

Except in `.. code-block::` because it will use the html tag <pre> which have the save line format as in the rst file.

Autolinter

Each GitHub Pull request will automatically lint against the Address space and line length.

Sometimes it is necessary to provide real IP Addresses like in the *Configuration Blueprints*. For this please use the sphinx comment syntax `.. stop_vyoslinter` to stop the linter and `.. start_vyoslinter` to start.

Custom Sphinx-doc Markup

When writing the documentation custom commands have been developed. Please make yourself comfortable with those commands as this eases the way we render the documentation.

cfgcmd

When documenting CLI commands use the `.. cfgcmd::` directive for all configuration mode commands. An explanation of the described command should be added below this statement. Replace all variable contents with <value> or somthing similar.

With those custom commands it will be possible to render them in a more descriptive way in the resulting HTML/PDF manual.

```
.. cfgcmd:: protocols static arp <ipaddress> hwaddr <macaddress>

   This will configure a static ARP entry always resolving `192.0.2.100` to
   `00:53:27:de:23:aa`.
```

For a inline configuration level command use `:cfgcmd:`

```
:cfgcmd:`set interface ethernet eth0`
```

To extract a defaultvalue from the XML definitions add a `:defaultvalue:` to `.. cfgcmd::` directive. To have this feature locally, the vyos-1x submodule must be initialized before. Please be aware to not update the submodule in your PR.

```
.. cfgcmd:: set system conntrack table-size <1-50000000>
    :defaultvalue:

    The connection tracking table contains one entry for each connection being
    tracked by the system.
```

opcmd

When documenting operational level command use the `.. opcmd::` directive. An explanation of the described command should be added below this statement.

With those custom commands it will be possible to render them in a more descriptive way in the resulting HTML/PDF manual.

```
.. opcmd:: show protocols static arp

   Display all known ARP table entries spanning across all interfaces
```

For a inline operational level command use `:opcmd:`

```
:opcmd:`add system image`
```

cmdinclude

To minimize redundancy there is a special include directive. It include a txt file and replace the `{{ var0 }}` - `{{ var9 }}` with the correct value

```
.. cmdinclude:: /_include/interface-address.txt
   :var0: ethernet
   :var1: eth1
```

the content of interface-address.txt looks like this

```
.. cfgcmd:: set interfaces {{ var0 }} <interface> address <address | dhcp |
   dhcpv6>

   Configure interface `<interface>` with one or more interface
   addresses.

   * **address** can be specified multiple times as IPv4 and/or IPv6
   address, e.g. 192.0.2.1/24 and/or 2001:db8::1/64
   * **dhcp** interface address is received by DHCP from a DHCP server
   on this segment.
   * **dhcpv6** interface address is received by DHCPv6 from a DHCPv6
   server on this segment.
```

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```
  Example:

  .. code-block:: none

     set interfaces {{ var0 }} {{ var1 }} address 192.0.2.1/24
     set interfaces {{ var0 }} {{ var1 }} address 192.0.2.2/24
     set interfaces {{ var0 }} {{ var1 }} address 2001:db8::ffff/64
     set interfaces {{ var0 }} {{ var1 }} address 2001:db8:100::ffff/64
```

vytask

When referencing to VyOS Phabricator Tasks, there is a custom Sphinx Markup command called `vytask` which automatically renders to a proper Phabricator URL. This is heavily used in the *Changelog* section.

```
* :vytask:`T1605` Fixed regression in L2TP/IPsec server
* :vytask:`T1613` Netflow/sFlow captures IPv6 traffic correctly
```

17.3.2 Page content

The documentation have 3 different types of pages, the same kind of pages must have the same structure to achieve a recognition factor.

All RST files must follow the same TOC Level syntax and have to start with

```
#####
Titel
#####
```

Configuration mode pages

A configuration mode folder and article covers a specific level of a command. The exact level depends on the command. This should provide stability for URLs used in the forum or blogpost.

For example:

- `set zone-policy` is written in `zone-policy/index.rst`
- `set interfaces ethernet` is written in `interfaces/ethernet.rst`

The article starts with a short intruducing about the command or the technologie. Please include some helpfull links or background informations.

After this a optional section follows. Some commands have requirements like the compatible hardware (e.g. Wifi) or some commands you have to set before. For example it is recommended to set a route-map before configure bgp.

In the configuration part of the page all possible confiuration options should be documented. Use `.. cfgcmd::` like described above.

Related Operation command must be documented in the next part of the article. Use `::opcmd..` for these commands.

If there some troubleshooting guides releated to the commands. Explain it in the next optional part.

Operation mode pages

Operation mode commands, which didn't fit in a related configuraton mode command must documented in this part of the documentation.

General concepts for troubleshooting belong here as well as detailed process descriptions.

Anything else

Anything else what is not a configuration or a operation command have no predefined structure.

CHAPTER

EIGHTEEN

COVERAGE

Overview over all commands, which are documented in the `.. cfgcmd::` or `.. opcmd::` Directives.

The build process take all xml definition files from vyos-1x and a periodical export of all VyOS commands and extract each leaf command or executable command. After this the commands are compare and shown in the following two tables. The script compare only the fixed part of a command. All varables or values will be erase and then compare:

for example there are these two commands:

- documentation: `interfaces ethernet <interface> address <address | dhcp | dhcpv6>`
- xml: `interfaces ethernet <ethernet> address <address>`
- VyOS: `interfaces ethernet <text> address <value>`

Now the script earse all in between < and > and simply compare the strings.

There are 3 kind of problems:

`Not documented yet`

- A XML command are not found in `.. cfgcmd::` or `.. opcmd::` Commands
- The command should be documented

`Nothing found in XML Definitions`

- `.. cfgcmd::` or `.. opcmd::` Command are not found in a XML command
- Maybe the command where changed in the XML Definition, the feature is not anymore in VyOS, or there is a typo

`Nothing found in VyOS`

- `.. cfgcmd::` or `.. opcmd::` Command are not found in a VyOS command
- Maybe the command where changed, the feature is not anymore in VyOS, or there is a typo

18.1 Configuration Commands

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	*set*	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	Nothing found in XML Definitions	cluster dead-interval <value>

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	cluster group <text> auto-failback <value>
×	not yet documented	Nothing found in XML Definitions	cluster group <text> monitor <value>
×	not yet documented	Nothing found in XML Definitions	cluster group <text> primary <value>
×	not yet documented	Nothing found in XML Definitions	cluster group <text> secondary <value>
×	not yet documented	Nothing found in XML Definitions	cluster group <text> service <value>
×	not yet documented	Nothing found in XML Definitions	cluster interface <value>
×	not yet documented	Nothing found in XML Definitions	cluster keepalive-interval <value>
×	not yet documented	Nothing found in XML Definitions	cluster mcast-group <value>
×	not yet documented	Nothing found in XML Definitions	cluster monitor-dead-interval <value>
×	not yet documented	Nothing found in XML Definitions	cluster pre-shared-secret <value>
×	*comment <config node> "comment text"*	Nothing found in XML Definitions	Nothing found in VyOS
×	*commit*	Nothing found in XML Definitions	Nothing found in VyOS
×	*commit-confirm <minutes>*	Nothing found in XML Definitions	Nothing found in VyOS
×	*compare <saved | N> <M>*	Nothing found in XML Definitions	Nothing found in VyOS
✓	*set container name <name> allow-host-networks*	container.xml.in: container name <name> allow-host-networks	container name <text> allow-host-networks
×	not yet documented	container.xml.in: container name <name> arguments	container name <text> arguments <value>
✓	*container name <name> cap-add <text>*	container.xml.in: container name <name> cap-add	container name <text> cap-add <value>
×	not yet documented	container.xml.in: container name <name> command	container name <text> command <value>
✓	*set container name <name> description <text>*	container.xml.in: container name <name> description	container name <text> description <value>
✓	*set container name <name> device <devicename> destination <path>*	container.xml.in: container name <name> device <device> destination	container name <text> device <text> destination <value>

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set container name <name> device <devicename> source <path>*	container.xml.in: container name <name> device <device> source	container name <text> device <text> source <value>
✓	*set container name <name> disable*	container.xml.in: container name <name> disable	container name <text> disable
×	not yet documented	container.xml.in: container name <name> entrypoint	container name <text> entrypoint <value>
✓	*set container name <name> environment <key> value <value>*	container.xml.in: container name <name> environment <environment> value	container name <text> environment <text> value <value>
×	not yet documented	container.xml.in: container name <name> host-name	container name <text> host-name <value>
✓	*set container name <name> image*	container.xml.in: container name <name> image	container name <text> image <value>
✓	*set container name <name> memory <MB>*	container.xml.in: container name <name> memory	container name <text> memory <value>
×	*set container name <name> network <networkname>*	Nothing found in XML Definitions	Nothing found in VyOS
✓	*set container name <name> network <networkname> address <address>*	container.xml.in: container name <name> network <network> address	container name <text> network <text> address <value>
✓	*set container name <name> port <portname> destination <portnumber>*	container.xml.in: container name <name> port <port> destination	container name <text> port <text> destination <value>
✓	*set container name <name> port <portname> protocol <tcp | udp>*	container.xml.in: container name <name> port <port> protocol	container name <text> port <text> protocol <value>
✓	*set container name <name> port <portname> source <portnumber>*	container.xml.in: container name <name> port <port> source	container name <text> port <text> source <value>
✓	*set container name <name> restart [no | on-failure | always]*	container.xml.in: container name <name> restart	container name <text> restart <value>
×	not yet documented	container.xml.in: container name <name> shared-memory	container name <text> shared-memory <value>

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set container name <name> volume <volumename> destination <path>*	container.xml.in: container name <name> volume <volume> destination	container name <text> volume <text> destination <value>
✓	*set container name <name> volume <volumename> mode <ro | rw>*	container.xml.in: container name <name> volume <volume> mode	container name <text> volume <text> mode <value>
✓	*set container name <name> volume <volumename> source <path>*	container.xml.in: container name <name> volume <volume> source	container name <text> volume <text> source <value>
×	*set container network <networkname>*	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	container.xml.in: container network <network> description	container network <text> description <value>
×	not yet documented	container.xml.in: container network <network> prefix	container network <text> prefix <value>
×	*set container registry <name>*	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	container.xml.in: container registry <registry> authentication password	container registry <text> authentication password <value>
×	not yet documented	container.xml.in: container registry <registry> authentication user	container registry <text> authentication user <value>
×	not yet documented	container.xml.in: container registry <registry> disable	container registry <text> disable
×	*copy*	Nothing found in XML Definitions	Nothing found in VyOS
×	*delete*	Nothing found in XML Definitions	Nothing found in VyOS
×	*delete protocols static route 0.0.0.0/0*	Nothing found in XML Definitions	Nothing found in VyOS
×	*exit [discard]*	Nothing found in XML Definitions	Nothing found in VyOS
✓	*set firewall all-ping [enable | disable]*	Nothing found in XML Definitions	firewall all-ping <value>
✓	*set firewall broadcast-ping [enable | disable]*	Nothing found in XML Definitions	firewall broadcast-ping <value>

continues on next page

Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	firewall config-trap <value>
✓	*set firewall group address-group <name> address [address | address range]*	Nothing found in XML Definitions	firewall group address-group <text> address <value>
✓	*set firewall group address-group <name> description <text>*	Nothing found in XML Definitions	firewall group address-group <text> description <value>
✓	*set firewall group ipv6-address-group <name> address <address>*	Nothing found in XML Definitions	firewall group ipv6-address-group <text> address <value>
✓	*set firewall group ipv6-address-group <name> description <text>*	Nothing found in XML Definitions	firewall group ipv6-address-group <text> description <value>
✓	*set firewall group ipv6-network-group <name> description <text>*	Nothing found in XML Definitions	firewall group ipv6-network-group <text> description <value>
✓	*set firewall group ipv6-network-group <name> network <CIDR>*	Nothing found in XML Definitions	firewall group ipv6-network-group <text> network <value>
✓	*set firewall group network-group <name> description <text>*	Nothing found in XML Definitions	firewall group network-group <text> description <value>
✓	*set firewall group network-group <name> network <CIDR>*	Nothing found in XML Definitions	firewall group network-group <text> network <value>
✓	*set firewall group port-group <name> description <text>*	Nothing found in XML Definitions	firewall group port-group <text> description <value>
✓	*set firewall group port-group <name> port [portname | portnumber | startport-endport]*	Nothing found in XML Definitions	firewall group port-group <text> port <value>
✓	*set firewall ip-src-route [enable | disable]*	Nothing found in XML Definitions	firewall ip-src-route <value>
✓	*set firewall ipv6-name <name> default-action [drop | reject | accept]*	Nothing found in XML Definitions	firewall ipv6-name <text> default-action <value>
✓	*set firewall ipv6-name <name> description <text>*	Nothing found in XML Definitions	firewall ipv6-name <text> description <value>

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set firewall ipv6-name <name> enable-default-log*	Nothing found in XML Definitions	firewall ipv6-name <text> enable-default-log
✓	*set firewall ipv6-name <name> rule <1-999999> action [drop | reject | accept]*	Nothing found in XML Definitions	firewall ipv6-name <text> rule <text> action <value>
✓	*set firewall ipv6-name <name> rule <1-999999> description <text>*	Nothing found in XML Definitions	firewall ipv6-name <text> rule <text> description <value>
✓	*set firewall ipv6-name <name> rule <1-999999> destination address [address | addressrange | CIDR]*	Nothing found in XML Definitions	firewall ipv6-name <text> rule <text> destination address <value>
✓	*set firewall ipv6-name <name> rule <1-999999> destination group address-group <name>*	Nothing found in XML Definitions	firewall ipv6-name <text> rule <text> destination group address-group <value>
✓	*set firewall ipv6-name <name> rule <1-999999> destination group network-group <name>*	Nothing found in XML Definitions	firewall ipv6-name <text> rule <text> destination group network-group <value>
✓	*set firewall ipv6-name <name> rule <1-999999> destination group port-group <name>*	Nothing found in XML Definitions	firewall ipv6-name <text> rule <text> destination group port-group <value>
✓	*set firewall ipv6-name <name> rule <1-999999> destination port [1-65535 | portname | start-end]*	Nothing found in XML Definitions	firewall ipv6-name <text> rule <text> destination port <value>
✓	*set firewall ipv6-name <name> rule <1-999999> disable*	Nothing found in XML Definitions	firewall ipv6-name <text> rule <text> disable
×	not yet documented	Nothing found in XML Definitions	firewall ipv6-name <text> rule <text> hop-limit eq <value>

continues on next page

Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	firewall ipv6-name <text> rule <text> hop-limit gt <value>
×	not yet documented	Nothing found in XML Definitions	firewall ipv6-name <text> rule <text> hop-limit lt <value>
×	not yet documented	Nothing found in XML Definitions	firewall ipv6-name <text> rule <text> icmpv6 type <value>
×	not yet documented	Nothing found in XML Definitions	firewall ipv6-name <text> rule <text> ipsec match-ipsec
×	not yet documented	Nothing found in XML Definitions	firewall ipv6-name <text> rule <text> ipsec match-none
×	not yet documented	Nothing found in XML Definitions	firewall ipv6-name <text> rule <text> limit burst <value>
×	not yet documented	Nothing found in XML Definitions	firewall ipv6-name <text> rule <text> limit rate <value>
✓	*set firewall ipv6-name <name> rule <1-999999> log [disable | enable]*	Nothing found in XML Definitions	firewall ipv6-name <text> rule <text> log <value>
×	not yet documented	Nothing found in XML Definitions	firewall ipv6-name <text> rule <text> p2p all
×	not yet documented	Nothing found in XML Definitions	firewall ipv6-name <text> rule <text> p2p applejuice
×	not yet documented	Nothing found in XML Definitions	firewall ipv6-name <text> rule <text> p2p bittorrent
×	not yet documented	Nothing found in XML Definitions	firewall ipv6-name <text> rule <text> p2p directconnect
×	not yet documented	Nothing found in XML Definitions	firewall ipv6-name <text> rule <text> p2p edonkey
×	not yet documented	Nothing found in XML Definitions	firewall ipv6-name <text> rule <text> p2p gnutella
×	not yet documented	Nothing found in XML Definitions	firewall ipv6-name <text> rule <text> p2p kazaa
✓	*set firewall ipv6-name <name> rule <1-999999> protocol [<text> | <0-255> | all | tcp_udp]*	Nothing found in XML Definitions	firewall ipv6-name <text> rule <text> protocol <value>

continues on next page

Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set firewall ipv6-name <name> rule <1-999999> recent count <1-255>*	Nothing found in XML Definitions	firewall ipv6-name <text> rule <text> recent count <value>
✓	*set firewall ipv6-name <name> rule <1-999999> recent time <second | minute | hour>*	Nothing found in XML Definitions	firewall ipv6-name <text> rule <text> recent time <value>
✓	*set firewall ipv6-name <name> rule <1-999999> source address [address | addressrange | CIDR]*	Nothing found in XML Definitions	firewall ipv6-name <text> rule <text> source address <value>
✓	*set firewall ipv6-name <name> rule <1-999999> source group address-group <name>*	Nothing found in XML Definitions	firewall ipv6-name <text> rule <text> source group address-group <value>
✓	*set firewall ipv6-name <name> rule <1-999999> source group network-group <name>*	Nothing found in XML Definitions	firewall ipv6-name <text> rule <text> source group network-group <value>
✓	*set firewall ipv6-name <name> rule <1-999999> source group port-group <name>*	Nothing found in XML Definitions	firewall ipv6-name <text> rule <text> source group port-group <value>
✓	*set firewall ipv6-name <name> rule <1-999999> source mac-address <mac-address>*	Nothing found in XML Definitions	firewall ipv6-name <text> rule <text> source mac-address <value>
✓	*set firewall ipv6-name <name> rule <1-999999> source port [1-65535 | portname | start-end]*	Nothing found in XML Definitions	firewall ipv6-name <text> rule <text> source port <value>

continues on next page

Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	*set firewall ipv6-name <name> rule <1-999999> state [established | invalid | new | related] [enable | disable]*	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	Nothing found in XML Definitions	firewall ipv6-name <text> rule <text> state established <value>
×	not yet documented	Nothing found in XML Definitions	firewall ipv6-name <text> rule <text> state invalid <value>
×	not yet documented	Nothing found in XML Definitions	firewall ipv6-name <text> rule <text> state new <value>
×	not yet documented	Nothing found in XML Definitions	firewall ipv6-name <text> rule <text> state related <value>
✓	*set firewall ipv6-name <name> rule <1-999999> tcp flags <text>*	Nothing found in XML Definitions	firewall ipv6-name <text> rule <text> tcp flags <value>
×	not yet documented	Nothing found in XML Definitions	firewall ipv6-name <text> rule <text> time monthdays <value>
×	not yet documented	Nothing found in XML Definitions	firewall ipv6-name <text> rule <text> time startdate <value>
×	not yet documented	Nothing found in XML Definitions	firewall ipv6-name <text> rule <text> time starttime <value>
×	not yet documented	Nothing found in XML Definitions	firewall ipv6-name <text> rule <text> time stopdate <value>
×	not yet documented	Nothing found in XML Definitions	firewall ipv6-name <text> rule <text> time stoptime <value>
×	not yet documented	Nothing found in XML Definitions	firewall ipv6-name <text> rule <text> time utc
×	not yet documented	Nothing found in XML Definitions	firewall ipv6-name <text> rule <text> time weekdays <value>
✓	*set firewall ipv6-receive-redirect [enable | disable]*	Nothing found in XML Definitions	firewall ipv6-receive-redirects <value>
✓	*set firewall ipv6-src-route [enable | disable]*	Nothing found in XML Definitions	firewall ipv6-src-route <value>

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set firewall log-martians [enable | disable]*	Nothing found in XML Definitions	firewall log-martians <value>
✓	*set firewall name <name> default-action [drop | reject | accept]*	Nothing found in XML Definitions	firewall name <text> default-action <value>
✓	*set firewall name <name> description <text>*	Nothing found in XML Definitions	firewall name <text> description <value>
✓	*set firewall name <name> enable-default-log*	Nothing found in XML Definitions	firewall name <text> enable-default-log
✓	*set firewall name <name> rule <1-999999> action [drop | reject | accept]*	Nothing found in XML Definitions	firewall name <text> rule <text> action <value>
✓	*set firewall name <name> rule <1-999999> description <text>*	Nothing found in XML Definitions	firewall name <text> rule <text> description <value>
✓	*set firewall name <name> rule <1-999999> destination address [address | addressrange | CIDR]*	Nothing found in XML Definitions	firewall name <text> rule <text> destination address <value>
✓	*set firewall name <name> rule <1-999999> destination group address-group <name>*	Nothing found in XML Definitions	firewall name <text> rule <text> destination group address-group <value>
✓	*set firewall name <name> rule <1-999999> destination group network-group <name>*	Nothing found in XML Definitions	firewall name <text> rule <text> destination group network-group <value>
✓	*set firewall name <name> rule <1-999999> destination group port-group <name>*	Nothing found in XML Definitions	firewall name <text> rule <text> destination group port-group <value>

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set firewall name <name> rule <1-999999> destination port [1-65535 | portname | start-end]*	Nothing found in XML Definitions	firewall name <text> rule <text> destination port <value>
✓	*set firewall name <name> rule <1-999999> disable*	Nothing found in XML Definitions	firewall name <text> rule <text> disable
×	not yet documented	Nothing found in XML Definitions	firewall name <text> rule <text> fragment match-frag
×	not yet documented	Nothing found in XML Definitions	firewall name <text> rule <text> fragment match-non-frag
×	not yet documented	Nothing found in XML Definitions	firewall name <text> rule <text> icmp code <value>
×	not yet documented	Nothing found in XML Definitions	firewall name <text> rule <text> icmp type <value>
×	not yet documented	Nothing found in XML Definitions	firewall name <text> rule <text> icmp type-name <value>
×	not yet documented	Nothing found in XML Definitions	firewall name <text> rule <text> ipsec match-ipsec
×	not yet documented	Nothing found in XML Definitions	firewall name <text> rule <text> ipsec match-none
×	not yet documented	Nothing found in XML Definitions	firewall name <text> rule <text> limit burst <value>
×	not yet documented	Nothing found in XML Definitions	firewall name <text> rule <text> limit rate <value>
✓	*set firewall name <name> rule <1-999999> log [disable | enable]*	Nothing found in XML Definitions	firewall name <text> rule <text> log <value>
✓	*set firewall name <name> rule <1-999999> protocol [<text> | <0-255> | all | tcp_udp]*	Nothing found in XML Definitions	firewall name <text> rule <text> protocol <value>
✓	*set firewall name <name> rule <1-999999> recent count <1-255>*	Nothing found in XML Definitions	firewall name <text> rule <text> recent count <value>
✓	*set firewall name <name> rule <1-999999> recent time <second | minute | hour>*	Nothing found in XML Definitions	firewall name <text> rule <text> recent time <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set firewall name <name> rule <1-999999> source address [address | addressrange | CIDR]*	Nothing found in XML Definitions	firewall name <text> rule <text> source address <value>
✓	*set firewall name <name> rule <1-999999> source group address-group <name>*	Nothing found in XML Definitions	firewall name <text> rule <text> source group address-group <value>
✓	*set firewall name <name> rule <1-999999> source group network-group <name>*	Nothing found in XML Definitions	firewall name <text> rule <text> source group network-group <value>
✓	*set firewall name <name> rule <1-999999> source group port-group <name>*	Nothing found in XML Definitions	firewall name <text> rule <text> source group port-group <value>
✓	*set firewall name <name> rule <1-999999> source mac-address <mac-address>*	Nothing found in XML Definitions	firewall name <text> rule <text> source mac-address <value>
✓	*set firewall name <name> rule <1-999999> source port [1-65535 | portname | start-end]*	Nothing found in XML Definitions	firewall name <text> rule <text> source port <value>
×	*set firewall name <name> rule <1-999999> state [established | invalid | new | related] [enable | disable]*	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	Nothing found in XML Definitions	firewall name <text> rule <text> state established <value>
×	not yet documented	Nothing found in XML Definitions	firewall name <text> rule <text> state invalid <value>
×	not yet documented	Nothing found in XML Definitions	firewall name <text> rule <text> state new <value>
×	not yet documented	Nothing found in XML Definitions	firewall name <text> rule <text> state related <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set firewall name <name> rule <1-999999> tcp flags <text>*	Nothing found in XML Definitions	firewall name <text> rule <text> tcp flags <value>
×	not yet documented	Nothing found in XML Definitions	firewall name <text> rule <text> time monthdays <value>
×	not yet documented	Nothing found in XML Definitions	firewall name <text> rule <text> time startdate <value>
×	not yet documented	Nothing found in XML Definitions	firewall name <text> rule <text> time starttime <value>
×	not yet documented	Nothing found in XML Definitions	firewall name <text> rule <text> time stopdate <value>
×	not yet documented	Nothing found in XML Definitions	firewall name <text> rule <text> time stoptime <value>
×	not yet documented	Nothing found in XML Definitions	firewall name <text> rule <text> time utc
×	not yet documented	Nothing found in XML Definitions	firewall name <text> rule <text> time weekdays <value>
✓	*set firewall options interface <interface> adjust-mss <mss | clamp-mss-to-pmtu>*	firewall-options.xml.in: firewall options interface <interface> adjust-mss	firewall options interface <text> adjust-mss <value>
✓	*set firewall options interface <interface> adjust-mss6 <mss | clamp-mss-to-pmtu>*	firewall-options.xml.in: firewall options interface <interface> adjust-mss6	firewall options interface <text> adjust-mss6 <value>
×	not yet documented	firewall-options.xml.in: firewall options interface <interface> disable	firewall options interface <text> disable
✓	*set firewall receive-redirects [enable | disable]*	Nothing found in XML Definitions	firewall receive-redirects <value>
✓	*set firewall send-redirects [enable | disable]*	Nothing found in XML Definitions	firewall send-redirects <value>
✓	*set firewall source-validation [strict | loose | disable]*	Nothing found in XML Definitions	firewall source-validation <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set firewall state-policy established action [accept | drop | reject]*	Nothing found in XML Definitions	firewall state-policy established action <value>
✓	*set firewall state-policy established log enable*	Nothing found in XML Definitions	firewall state-policy established log enable
✓	*set firewall state-policy invalid action [accept | drop | reject]*	Nothing found in XML Definitions	firewall state-policy invalid action <value>
✓	*set firewall state-policy invalid log enable*	Nothing found in XML Definitions	firewall state-policy invalid log enable
✓	*set firewall state-policy related action [accept | drop | reject]*	Nothing found in XML Definitions	firewall state-policy related action <value>
✓	*set firewall state-policy related log enable*	Nothing found in XML Definitions	firewall state-policy related log enable
✓	*set firewall syn-cookies [enable | disable]*	Nothing found in XML Definitions	firewall syn-cookies <value>
✓	*set firewall twa-hazards-protectio [enable | disable]*	Nothing found in XML Definitions	firewall twa-hazards-protection <value>
×	not yet documented	vrrp.xml.in: high-availability vrrp global-parameters garp interval	Nothing found in VyOS
×	not yet documented	vrrp.xml.in: high-availability vrrp global-parameters garp master-delay	Nothing found in VyOS
×	not yet documented	vrrp.xml.in: high-availability vrrp global-parameters garp master-refresh	Nothing found in VyOS
×	not yet documented	vrrp.xml.in: high-availability vrrp global-parameters garp master-refresh-repeat	Nothing found in VyOS
×	not yet documented	vrrp.xml.in: high-availability vrrp global-parameters garp master-repeat	Nothing found in VyOS

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	vrrp.xml.in: high-availability vrrp global-parameters startup-delay	high-availability vrrp global-parameters startup-delay <value>
×	not yet documented	vrrp.xml.in: high-availability vrrp global-parameters version	Nothing found in VyOS
×	not yet documented	vrrp.xml.in: high-availability vrrp group <group> advertise-interval	high-availability vrrp group <text> advertise-interval <value>
×	not yet documented	vrrp.xml.in: high-availability vrrp group <group> authentication password	high-availability vrrp group <text> authentication password <value>
×	not yet documented	vrrp.xml.in: high-availability vrrp group <group> authentication type	high-availability vrrp group <text> authentication type <value>
×	not yet documented	vrrp.xml.in: high-availability vrrp group <group> description	high-availability vrrp group <text> description <value>
×	not yet documented	vrrp.xml.in: high-availability vrrp group <group> disable	high-availability vrrp group <text> disable
×	not yet documented	vrrp.xml.in: high-availability vrrp group <group> garp interval	Nothing found in VyOS
×	not yet documented	vrrp.xml.in: high-availability vrrp group <group> garp master-delay	Nothing found in VyOS
×	not yet documented	vrrp.xml.in: high-availability vrrp group <group> garp master-refresh	Nothing found in VyOS
×	not yet documented	vrrp.xml.in: high-availability vrrp group <group> garp master-refresh-repeat	Nothing found in VyOS
×	not yet documented	vrrp.xml.in: high-availability vrrp group <group> garp master-repeat	Nothing found in VyOS
×	not yet documented	vrrp.xml.in: high-availability vrrp group <group> health-check failure-count	high-availability vrrp group <text> health-check failure-count <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	vrrp.xml.in: high-availability vrrp group <group> health-check interval	high-availability vrrp group <text> health-check interval <value>
×	not yet documented	vrrp.xml.in: high-availability vrrp group <group> health-check script	high-availability vrrp group <text> health-check script <value>
×	not yet documented	vrrp.xml.in: high-availability vrrp group <group> hello-source-address	high-availability vrrp group <text> hello-source-address <value>
×	not yet documented	vrrp.xml.in: high-availability vrrp group <group> interface	high-availability vrrp group <text> interface <value>
×	not yet documented	vrrp.xml.in: high-availability vrrp group <group> no-preempt	high-availability vrrp group <text> no-preempt
×	not yet documented	vrrp.xml.in: high-availability vrrp group <group> peer-address	high-availability vrrp group <text> peer-address <value>
×	not yet documented	vrrp.xml.in: high-availability vrrp group <group> preempt-delay	high-availability vrrp group <text> preempt-delay <value>
×	not yet documented	vrrp.xml.in: high-availability vrrp group <group> priority	high-availability vrrp group <text> priority <value>
×	not yet documented	vrrp.xml.in: high-availability vrrp group <group> rfc3768-compatibility	high-availability vrrp group <text> rfc3768-compatibility
×	not yet documented	vrrp.xml.in: high-availability vrrp group <group> track exclude-vrrp-interface	high-availability vrrp group <text> track exclude-vrrp-interface
×	not yet documented	vrrp.xml.in: high-availability vrrp group <group> track interface	high-availability vrrp group <text> track interface <value>
×	not yet documented	vrrp.xml.in: high-availability vrrp group <group> transition-script backup	high-availability vrrp group <text> transition-script backup <value>
×	not yet documented	vrrp.xml.in: high-availability vrrp group <group> transition-script fault	high-availability vrrp group <text> transition-script fault <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	vrrp.xml.in: high-availability vrrp group <group> transition-script master	high-availability vrrp group <text> transition-script master <value>
×	not yet documented	vrrp.xml.in: high-availability vrrp group <group> transition-script mode-force	high-availability vrrp group <text> transition-script mode-force
×	not yet documented	vrrp.xml.in: high-availability vrrp group <group> transition-script stop	high-availability vrrp group <text> transition-script stop <value>
×	not yet documented	vrrp.xml.in: high-availability vrrp group <group> virtual-address-excluded	high-availability vrrp group <text> virtual-address-excluded <value>
×	not yet documented	vrrp.xml.in: high-availability vrrp group <group> virtual-address <virtual-address> interface	high-availability vrrp group <text> virtual-address <text> interface <value>
×	not yet documented	vrrp.xml.in: high-availability vrrp group <group> vrid	high-availability vrrp group <text> vrid <value>
×	not yet documented	vrrp.xml.in: high-availability vrrp snmp	Nothing found in VyOS
×	not yet documented	vrrp.xml.in: high-availability vrrp sync-group <sync-group> member	high-availability vrrp sync-group <text> member <value>
×	not yet documented	vrrp.xml.in: high-availability vrrp sync-group <sync-group> transition-script backup	high-availability vrrp sync-group <text> transition-script backup <value>
×	not yet documented	vrrp.xml.in: high-availability vrrp sync-group <sync-group> transition-script fault	high-availability vrrp sync-group <text> transition-script fault <value>
×	not yet documented	vrrp.xml.in: high-availability vrrp sync-group <sync-group> transition-script master	high-availability vrrp sync-group <text> transition-script master <value>
×	not yet documented	vrrp.xml.in: high-availability vrrp sync-group <sync-group> transition-script stop	high-availability vrrp sync-group <text> transition-script stop <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	*set interface ethernet <ethN> firewall [in | out | local] [name | ipv6-name] <rule-set>*	Nothing found in XML Definitions	Nothing found in VyOS
✓	*set interfaces bonding <interface> address <address | dhcp | dhcpv6>*	interfaces-bonding.xml.in: interfaces bonding <bonding> address	interfaces bonding <text> address <value>
✓	*set interfaces bonding <interface> arp-monitor interval <time>*	interfaces-bonding.xml.in: interfaces bonding <bonding> arp-monitor interval	interfaces bonding <text> arp-monitor interval <value>
✓	*set interfaces bonding <interface> arp-monitor target <address>*	interfaces-bonding.xml.in: interfaces bonding <bonding> arp-monitor target	interfaces bonding <text> arp-monitor target <value>
✓	*set interfaces bonding <interface> description <description>*	interfaces-bonding.xml.in: interfaces bonding <bonding> description	interfaces bonding <text> description <value>
✓	*set interfaces bonding <interface> dhcp-options client-id <description>*	interfaces-bonding.xml.in: interfaces bonding <bonding> dhcp-options client-id	interfaces bonding <text> dhcp-options client-id <value>
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> dhcp-options default-route-distance	interfaces bonding <text> dhcp-options default-route-distance <value>
✓	*set interfaces bonding <interface> dhcp-options host-name <hostname>*	interfaces-bonding.xml.in: interfaces bonding <bonding> dhcp-options host-name	interfaces bonding <text> dhcp-options host-name <value>
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> dhcp-options mtu	interfaces bonding <text> dhcp-options mtu
✓	*set interfaces bonding <interface> dhcp-options no-default-route*	interfaces-bonding.xml.in: interfaces bonding <bonding> dhcp-options no-default-route	interfaces bonding <text> dhcp-options no-default-route
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> dhcp-options reject	interfaces bonding <text> dhcp-options reject <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set interfaces bonding <interface> dhcp-options vendor-class-id <vendor-id>*	interfaces-bonding.xml.in: interfaces bonding <bonding> dhcp-options vendor-class-id	interfaces bonding <text> dhcp-options vendor-class-id <value>
✓	*set interfaces bonding <interface> dhcpv6-options duid <duid>*	interfaces-bonding.xml.in: interfaces bonding <bonding> dhcpv6-options duid	interfaces bonding <text> dhcpv6-options duid <value>
✓	*set interfaces bonding <interface> dhcpv6-options parameters-only*	interfaces-bonding.xml.in: interfaces bonding <bonding> dhcpv6-options parameters-only	interfaces bonding <text> dhcpv6-options parameters-only
✓	*set interfaces bonding <interface> dhcpv6-options pd <id> interface <delegatee> address <address>*	interfaces-bonding.xml.in: interfaces bonding <bonding> dhcpv6-options pd <pd> interface <interface> address	interfaces bonding <text> dhcpv6-options pd <text> interface <text> address <value>
✓	*set interfaces bonding <interface> dhcpv6-options pd <id> interface <delegatee> sla-id <id>*	interfaces-bonding.xml.in: interfaces bonding <bonding> dhcpv6-options pd <pd> interface <interface> sla-id	interfaces bonding <text> dhcpv6-options pd <text> interface <text> sla-id <value>
✓	*set interfaces bonding <interface> dhcpv6-options pd <id> length <length>*	interfaces-bonding.xml.in: interfaces bonding <bonding> dhcpv6-options pd <pd> length	interfaces bonding <text> dhcpv6-options pd <text> length <value>
✓	*set interfaces bonding <interface> dhcpv6-options rapid-commit*	interfaces-bonding.xml.in: interfaces bonding <bonding> dhcpv6-options rapid-commit	interfaces bonding <text> dhcpv6-options rapid-commit
✓	*set interfaces bonding <interface> dhcpv6-options temporary*	interfaces-bonding.xml.in: interfaces bonding <bonding> dhcpv6-options temporary	interfaces bonding <text> dhcpv6-options temporary
✓	*set interfaces bonding <interface> disable*	interfaces-bonding.xml.in: interfaces bonding <bonding> disable	interfaces bonding <text> disable
×	*set interfaces bonding <interface> disable-flow-control*	Nothing found in XML Definitions	Nothing found in VyOS

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set interfaces bonding <interface> disable-link-detect*	interfaces-bonding.xml.in: interfaces bonding <bonding> disable-link-detect	interfaces bonding <text> disable-link-detect
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> firewall in ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> firewall in name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> firewall local ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> firewall local name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> firewall out ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> firewall out name <value>
✓	*set interfaces bonding <interface> hash-policy <policy>*	interfaces-bonding.xml.in: interfaces bonding <bonding> hash-policy	interfaces bonding <text> hash-policy <value>
✓	*set interfaces bonding <interface> ip arp-cache-timeout*	interfaces-bonding.xml.in: interfaces bonding <bonding> ip arp-cache-timeout	interfaces bonding <text> ip arp-cache-timeout <value>
✓	*set interfaces bonding <interface> ip disable-arp-filter*	interfaces-bonding.xml.in: interfaces bonding <bonding> ip disable-arp-filter	interfaces bonding <text> ip disable-arp-filter
✓	*set interfaces bonding <interface> ip disable-forwarding*	interfaces-bonding.xml.in: interfaces bonding <bonding> ip disable-forwarding	interfaces bonding <text> ip disable-forwarding
✓	*set interfaces bonding <interface> ip enable-arp-accept*	interfaces-bonding.xml.in: interfaces bonding <bonding> ip enable-arp-accept	interfaces bonding <text> ip enable-arp-accept
✓	*set interfaces bonding <interface> ip enable-arp-announce*	interfaces-bonding.xml.in: interfaces bonding <bonding> ip enable-arp-announce	interfaces bonding <text> ip enable-arp-announce
✓	*set interfaces bonding <interface> ip enable-arp-ignore*	interfaces-bonding.xml.in: interfaces bonding <bonding> ip enable-arp-ignore	interfaces bonding <text> ip enable-arp-ignore

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	***set interfaces bonding <interface> ip enable-proxy-arp***	interfaces-bonding.xml.in: interfaces bonding <bonding> ip enable-proxy-arp	interfaces bonding <text> ip enable-proxy-arp
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> ip ospf authentication md5 key-id <text> md5-key <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> ip ospf authentication plaintext-password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> ip ospf bandwidth <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> ip ospf bfd
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> ip ospf cost <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> ip ospf dead-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> ip ospf hello-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> ip ospf mtu-ignore
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> ip ospf network <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> ip ospf priority <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> ip ospf retransmit-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> ip ospf transmit-delay <value>
✓	***set interfaces bonding <interface> ip proxy-arp-pvlan***	interfaces-bonding.xml.in: interfaces bonding <bonding> ip proxy-arp-pvlan	interfaces bonding <text> ip proxy-arp-pvlan
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> ip rip authentication md5 <text> password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> ip rip authentication plaintext-password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> ip rip split-horizon disable

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> ip rip split-horizon poison-reverse
✓	***set interfaces bonding <interface> ip source-validation <strict | loose | disable>***	interfaces-bonding.xml.in: interfaces bonding <bonding> ip source-validation	interfaces bonding <text> ip source-validation <value>
✓	***set interfaces bonding <interface> ipv6 address autoconf***	interfaces-bonding.xml.in: interfaces bonding <bonding> ipv6 address autoconf	interfaces bonding <text> ipv6 address autoconf
✓	***set interfaces bonding <interface> ipv6 address eui64 <prefix>***	interfaces-bonding.xml.in: interfaces bonding <bonding> ipv6 address eui64	interfaces bonding <text> ipv6 address eui64 <value>
✓	***set interfaces bonding <interface> ipv6 address no-default-link-local***	interfaces-bonding.xml.in: interfaces bonding <bonding> ipv6 address no-default-link-local	interfaces bonding <text> ipv6 address no-default-link-local
✓	***set interfaces bonding <interface> ipv6 disable-forwarding***	interfaces-bonding.xml.in: interfaces bonding <bonding> ipv6 disable-forwarding	interfaces bonding <text> ipv6 disable-forwarding
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> ipv6 dup-addr-detect-transmits	interfaces bonding <text> ipv6 dup-addr-detect-transmits <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> ipv6 ospfv3 bfd
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> ipv6 ospfv3 cost <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> ipv6 ospfv3 dead-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> ipv6 ospfv3 hello-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> ipv6 ospfv3 ifmtu <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> ipv6 ospfv3 instance-id <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> ipv6 ospfv3 mtu-ignore

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> ipv6 ospfv3 network <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> ipv6 ospfv3 passive
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> ipv6 ospfv3 priority <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> ipv6 ospfv3 retransmit-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> ipv6 ospfv3 transmit-delay <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> ipv6 ripng split-horizon disable
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> ipv6 ripng split-horizon poison-reverse
✓	*set interfaces bonding <interface> lacp-rate <slow|fast>*	interfaces-bonding.xml.in: interfaces bonding <bonding> lacp-rate	interfaces bonding <text> lacp-rate <value>
✓	*set interfaces bonding <interface> mac <xx:xx:xx:xx:xx:xx>*	interfaces-bonding.xml.in: interfaces bonding <bonding> mac	interfaces bonding <text> mac <value>
✓	*set interfaces bonding <interface> member interface <member>*	interfaces-bonding.xml.in: interfaces bonding <bonding> member interface	interfaces bonding <text> member interface <value>
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> mii-mon-interval	interfaces bonding <text> mii-mon-interval <value>
✓	*set interfaces bonding <interface> min-links <0-16>*	interfaces-bonding.xml.in: interfaces bonding <bonding> min-links	interfaces bonding <text> min-links <value>
✓	*set interfaces bonding <interface> mirror egress <monitor-interface>*	interfaces-bonding.xml.in: interfaces bonding <bonding> mirror egress	interfaces bonding <text> mirror egress <value>
✓	*set interfaces bonding <interface> mirror ingress <monitor-interface>*	interfaces-bonding.xml.in: interfaces bonding <bonding> mirror ingress	interfaces bonding <text> mirror ingress <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set interfaces bonding <interface> mode <802.3ad | active-backup | broadcast | round-robin | transmit-load-balance | adaptive-load-balance | xor-hash>*	interfaces-bonding.xml.in: interfaces bonding <bonding> mode	interfaces bonding <text> mode <value>
✓	*set interfaces bonding <interface> mtu <mtu>*	interfaces-bonding.xml.in: interfaces bonding <bonding> mtu	interfaces bonding <text> mtu <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> policy ipv6-route <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> policy route <value>
✓	*set interfaces bonding <interface> primary <interface>*	interfaces-bonding.xml.in: interfaces bonding <bonding> primary	interfaces bonding <text> primary <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> redirect <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> traffic-policy in <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> traffic-policy out <value>
×	*set interfaces bonding <interface> vif <vlan-id>*	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> address	interfaces bonding <text> vif-s <text> address <value>
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> description	interfaces bonding <text> vif-s <text> description <value>
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> dhcp-options client-id	interfaces bonding <text> vif-s <text> dhcp-options client-id <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> dhcp-options default-route-distance	interfaces bonding <text> vif-s <text> dhcp-options default-route-distance <value>
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> dhcp-options host-name	interfaces bonding <text> vif-s <text> dhcp-options host-name <value>
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> dhcp-options mtu	interfaces bonding <text> vif-s <text> dhcp-options mtu
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> dhcp-options no-default-route	interfaces bonding <text> vif-s <text> dhcp-options no-default-route
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> dhcp-options reject	interfaces bonding <text> vif-s <text> dhcp-options reject <value>
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> dhcp-options vendor-class-id	interfaces bonding <text> vif-s <text> dhcp-options vendor-class-id <value>
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> dhcpv6-options duid	interfaces bonding <text> vif-s <text> dhcpv6-options duid <value>
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> dhcpv6-options parameters-only	interfaces bonding <text> vif-s <text> dhcpv6-options parameters-only
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> dhcpv6-options pd <pd> interface <interface> address	interfaces bonding <text> vif-s <text> dhcpv6-options pd <text> interface <text> address <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> dhcpv6-options pd <pd> interface <interface> sla-id	interfaces bonding <text> vif-s <text> dhcpv6-options pd <text> interface <text> sla-id <value>
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> dhcpv6-options pd <pd> length	interfaces bonding <text> vif-s <text> dhcpv6-options pd <text> length <value>
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> dhcpv6-options rapid-commit	interfaces bonding <text> vif-s <text> dhcpv6-options rapid-commit
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> dhcpv6-options temporary	interfaces bonding <text> vif-s <text> dhcpv6-options temporary
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> disable	interfaces bonding <text> vif-s <text> disable
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> disable-link-detect	interfaces bonding <text> vif-s <text> disable-link-detect
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> firewall in ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> firewall in name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> firewall local ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> firewall local name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> firewall out ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> firewall out name <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> ip arp-cache-timeout	interfaces bonding <text> vif-s <text> ip arp-cache-timeout <value>
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> ip disable-arp-filter	interfaces bonding <text> vif-s <text> ip disable-arp-filter
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> ip disable-forwarding	interfaces bonding <text> vif-s <text> ip disable-forwarding
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> ip enable-arp-accept	interfaces bonding <text> vif-s <text> ip enable-arp-accept
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> ip enable-arp-announce	interfaces bonding <text> vif-s <text> ip enable-arp-announce
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> ip enable-arp-ignore	interfaces bonding <text> vif-s <text> ip enable-arp-ignore
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> ip enable-proxy-arp	interfaces bonding <text> vif-s <text> ip enable-proxy-arp
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> ip ospf authentication md5 key-id <text> md5-key <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> ip ospf authentication plaintext-password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> ip ospf bandwidth <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> ip ospf bfd

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> ip ospf cost <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> ip ospf dead-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> ip ospf hello-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> ip ospf mtu-ignore
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> ip ospf network <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> ip ospf priority <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> ip ospf retransmit-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> ip ospf transmit-delay <value>
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> ip proxy-arp-pvlan	interfaces bonding <text> vif-s <text> ip proxy-arp-pvlan
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> ip rip authentication md5 <text> password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> ip rip authentication plaintext-password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> ip rip split-horizon disable
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> ip rip split-horizon poison-reverse
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> ip source-validation	interfaces bonding <text> vif-s <text> ip source-validation <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> ipv6 address autoconf	interfaces bonding <text> vif-s <text> ipv6 address autoconf
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> ipv6 address eui64	interfaces bonding <text> vif-s <text> ipv6 address eui64 <value>
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> ipv6 address no-default-link-local	interfaces bonding <text> vif-s <text> ipv6 address no-default-link-local
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> ipv6 disable-forwarding	interfaces bonding <text> vif-s <text> ipv6 disable-forwarding
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> ipv6 dup-addr-detect-transmits	interfaces bonding <text> vif-s <text> ipv6 dup-addr-detect-transmits <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> ipv6 ospfv3 bfd
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> ipv6 ospfv3 cost <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> ipv6 ospfv3 dead-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> ipv6 ospfv3 hello-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> ipv6 ospfv3 ifmtu <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> ipv6 ospfv3 instance-id <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> ipv6 ospfv3 mtu-ignore
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> ipv6 ospfv3 network <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> ipv6 ospfv3 passive
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> ipv6 ospfv3 priority <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> ipv6 ospfv3 retransmit-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> ipv6 ospfv3 transmit-delay <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> ipv6 ripng split-horizon disable
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> ipv6 ripng split-horizon poison-reverse
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> mac	interfaces bonding <text> vif-s <text> mac <value>
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> mtu	interfaces bonding <text> vif-s <text> mtu <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> policy ipv6-route <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> policy route <value>
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> protocol	interfaces bonding <text> vif-s <text> protocol <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> redirect <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> traffic-policy in <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> traffic-policy out <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> vif-c <vif-c> address	interfaces bonding <text> vif-s <text> vif-c <text> address <value>
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> vif-c <vif-c> description	interfaces bonding <text> vif-s <text> vif-c <text> description <value>
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> vif-c <vif-c> dhcp-options client-id	interfaces bonding <text> vif-s <text> vif-c <text> dhcp-options client-id <value>
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> vif-c <vif-c> dhcp-options default-route-distance	interfaces bonding <text> vif-s <text> vif-c <text> dhcp-options default-route-distance <value>
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> vif-c <vif-c> dhcp-options host-name	interfaces bonding <text> vif-s <text> vif-c <text> dhcp-options host-name <value>
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> vif-c <vif-c> dhcp-options mtu	interfaces bonding <text> vif-s <text> vif-c <text> dhcp-options mtu
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> vif-c <vif-c> dhcp-options no-default-route	interfaces bonding <text> vif-s <text> vif-c <text> dhcp-options no-default-route
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> vif-c <vif-c> dhcp-options reject	interfaces bonding <text> vif-s <text> vif-c <text> dhcp-options reject <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> vif-c <vif-c> dhcp-options vendor-class-id	interfaces bonding <text> vif-s <text> vif-c <text> dhcp-options vendor-class-id <value>
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> vif-c <vif-c> dhcpv6-options duid	interfaces bonding <text> vif-s <text> vif-c <text> dhcpv6-options duid <value>
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> vif-c <vif-c> dhcpv6-options parameters-only	interfaces bonding <text> vif-s <text> vif-c <text> dhcpv6-options parameters-only
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> vif-c <vif-c> dhcpv6-options pd <pd> interface <interface> address	interfaces bonding <text> vif-s <text> vif-c <text> dhcpv6-options pd <text> interface <text> address <value>
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> vif-c <vif-c> dhcpv6-options pd <pd> interface <interface> sla-id	interfaces bonding <text> vif-s <text> vif-c <text> dhcpv6-options pd <text> interface <text> sla-id <value>
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> vif-c <vif-c> dhcpv6-options pd <pd> length	interfaces bonding <text> vif-s <text> vif-c <text> dhcpv6-options pd <text> length <value>
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> vif-c <vif-c> dhcpv6-options rapid-commit	interfaces bonding <text> vif-s <text> vif-c <text> dhcpv6-options rapid-commit
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> vif-c <vif-c> dhcpv6-options temporary	interfaces bonding <text> vif-s <text> vif-c <text> dhcpv6-options temporary

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> vif-c <vif-c> disable	interfaces bonding <text> vif-s <text> vif-c <text> disable
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> vif-c <vif-c> disable-link-detect	interfaces bonding <text> vif-s <text> vif-c <text> disable-link-detect
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> vif-c <text> firewall in ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> vif-c <text> firewall in name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> vif-c <text> firewall local ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> vif-c <text> firewall local name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> vif-c <text> firewall out ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> vif-c <text> firewall out name <value>
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> vif-c <vif-c> ip arp-cache-timeout	interfaces bonding <text> vif-s <text> vif-c <text> ip arp-cache-timeout <value>
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> vif-c <vif-c> ip disable-arp-filter	interfaces bonding <text> vif-s <text> vif-c <text> ip disable-arp-filter

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> vif-c <vif-c> ip disable-forwarding	interfaces bonding <text> vif-s <text> vif-c <text> ip disable-forwarding
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> vif-c <vif-c> ip enable-arp-accept	interfaces bonding <text> vif-s <text> vif-c <text> ip enable-arp-accept
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> vif-c <vif-c> ip enable-arp-announce	interfaces bonding <text> vif-s <text> vif-c <text> ip enable-arp-announce
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> vif-c <vif-c> ip enable-arp-ignore	interfaces bonding <text> vif-s <text> vif-c <text> ip enable-arp-ignore
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> vif-c <vif-c> ip enable-proxy-arp	interfaces bonding <text> vif-s <text> vif-c <text> ip enable-proxy-arp
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> vif-c <text> ip ospf authentication md5 key-id <text> md5-key <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> vif-c <text> ip ospf authentication plaintext-password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> vif-c <text> ip ospf bandwidth <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> vif-c <text> ip ospf bfd
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> vif-c <text> ip ospf cost <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> vif-c <text> ip ospf dead-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> vif-c <text> ip ospf hello-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> vif-c <text> ip ospf mtu-ignore
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> vif-c <text> ip ospf network <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> vif-c <text> ip ospf priority <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> vif-c <text> ip ospf retransmit-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> vif-c <text> ip ospf transmit-delay <value>
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> vif-c <vif-c> ip proxy-arp-pvlan	interfaces bonding <text> vif-s <text> vif-c <text> ip proxy-arp-pvlan
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> vif-c <text> ip rip authentication md5 <text> password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> vif-c <text> ip rip authentication plaintext-password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> vif-c <text> ip rip split-horizon disable
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> vif-c <text> ip rip split-horizon poison-reverse

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> vif-c <vif-c> ip source-validation	interfaces bonding <text> vif-s <text> vif-c <text> ip source-validation <value>
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> vif-c <vif-c> ipv6 address autoconf	interfaces bonding <text> vif-s <text> vif-c <text> ipv6 address autoconf
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> vif-c <vif-c> ipv6 address eui64	interfaces bonding <text> vif-s <text> vif-c <text> ipv6 address eui64 <value>
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> vif-c <vif-c> ipv6 address no-default-link-local	interfaces bonding <text> vif-s <text> vif-c <text> ipv6 address no-default-link-local
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> vif-c <vif-c> ipv6 disable-forwarding	interfaces bonding <text> vif-s <text> vif-c <text> ipv6 disable-forwarding
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> vif-c <vif-c> ipv6 dup-addr-detect-transmits	interfaces bonding <text> vif-s <text> vif-c <text> ipv6 dup-addr-detect-transmits <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> vif-c <text> ipv6 ospfv3 bfd
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> vif-c <text> ipv6 ospfv3 cost <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> vif-c <text> ipv6 ospfv3 dead-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> vif-c <text> ipv6 ospfv3 hello-interval <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> vif-c <text> ipv6 ospfv3 ifmtu <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> vif-c <text> ipv6 ospfv3 instance-id <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> vif-c <text> ipv6 ospfv3 mtu-ignore
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> vif-c <text> ipv6 ospfv3 network <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> vif-c <text> ipv6 ospfv3 passive
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> vif-c <text> ipv6 ospfv3 priority <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> vif-c <text> ipv6 ospfv3 retransmit-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> vif-c <text> ipv6 ospfv3 transmit-delay <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> vif-c <text> ipv6 ripng split-horizon disable
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> vif-c <text> ipv6 ripng split-horizon poison-reverse
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> vif-c <vif-c> mac	interfaces bonding <text> vif-s <text> vif-c <text> mac <value>
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> vif-c <vif-c> mtu	interfaces bonding <text> vif-s <text> vif-c <text> mtu <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> vif-c <text> policy ipv6-route <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> vif-c <text> policy route <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> vif-c <text> redirect <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> vif-c <text> traffic-policy in <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif-s <text> vif-c <text> traffic-policy out <value>
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> vif-c <vif-c> vrf	interfaces bonding <text> vif-s <text> vif-c <text> vrf <value>
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif-s <vif-s> vrf	interfaces bonding <text> vif-s <text> vrf <value>
✓	*set interfaces bonding <interface> vif <vlan-id> address <address | dhcp | dhcpv6>*	interfaces-bonding.xml.in: interfaces bonding <bonding> vif <vif> address	interfaces bonding <text> vif <text> address <value>
✓	*set interfaces bonding <interface> vif <vlan-id> description <description>*	interfaces-bonding.xml.in: interfaces bonding <bonding> vif <vif> description	interfaces bonding <text> vif <text> description <value>
✓	*set interfaces bonding <interface> vif <vlan-id> dhcp-options client-id <description>*	interfaces-bonding.xml.in: interfaces bonding <bonding> vif <vif> dhcp-options client-id	interfaces bonding <text> vif <text> dhcp-options client-id <value>
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif <vif> dhcp-options default-route-distance	interfaces bonding <text> vif <text> dhcp-options default-route-distance <value>
✓	*set interfaces bonding <interface> vif <vlan-id> dhcp-options host-name <hostname>*	interfaces-bonding.xml.in: interfaces bonding <bonding> vif <vif> dhcp-options host-name	interfaces bonding <text> vif <text> dhcp-options host-name <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif <vif> dhcp-options mtu	interfaces bonding <text> vif <text> dhcp-options mtu
✓	***set interfaces bonding <interface> vif <vlan-id> dhcp-options no-default-route***	interfaces-bonding.xml.in: interfaces bonding <bonding> vif <vif> dhcp-options no-default-route	interfaces bonding <text> vif <text> dhcp-options no-default-route
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif <vif> dhcp-options reject	interfaces bonding <text> vif <text> dhcp-options reject <value>
✓	***set interfaces bonding <interface> vif <vlan-id> dhcp-options vendor-class-id <vendor-id>***	interfaces-bonding.xml.in: interfaces bonding <bonding> vif <vif> dhcp-options vendor-class-id	interfaces bonding <text> vif <text> dhcp-options vendor-class-id <value>
✓	***set interfaces bonding <interface> vif <vlan-id> dhcpv6-options duid <duid>***	interfaces-bonding.xml.in: interfaces bonding <bonding> vif <vif> dhcpv6-options duid	interfaces bonding <text> vif <text> dhcpv6-options duid <value>
✓	***set interfaces bonding <interface> vif <vlan-id> dhcpv6-options parameters-only***	interfaces-bonding.xml.in: interfaces bonding <bonding> vif <vif> dhcpv6-options parameters-only	interfaces bonding <text> vif <text> dhcpv6-options parameters-only
✓	***set interfaces bonding <interface> vif <vlan-id> dhcpv6-options pd <id> interface <delegatee> address <address>***	interfaces-bonding.xml.in: interfaces bonding <bonding> vif <vif> dhcpv6-options pd <pd> interface <interface> address	interfaces bonding <text> vif <text> dhcpv6-options pd <text> interface <text> address <value>
✓	***set interfaces bonding <interface> vif <vlan-id> dhcpv6-options pd <id> interface <delegatee> sla-id <id>***	interfaces-bonding.xml.in: interfaces bonding <bonding> vif <vif> dhcpv6-options pd <pd> interface <interface> sla-id	interfaces bonding <text> vif <text> dhcpv6-options pd <text> interface <text> sla-id <value>

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	***set interfaces bonding <interface> vif <vlan-id> dhcpv6-options pd <id> length <length>***	interfaces-bonding.xml.in: interfaces bonding <bonding> vif <vif> dhcpv6-options pd <pd> length	interfaces bonding <text> vif <text> dhcpv6-options pd <text> length <value>
✓	***set interfaces bonding <interface> vif <vlan-id> dhcpv6-options rapid-commit***	interfaces-bonding.xml.in: interfaces bonding <bonding> vif <vif> dhcpv6-options rapid-commit	interfaces bonding <text> vif <text> dhcpv6-options rapid-commit
✓	***set interfaces bonding <interface> vif <vlan-id> dhcpv6-options temporary***	interfaces-bonding.xml.in: interfaces bonding <bonding> vif <vif> dhcpv6-options temporary	interfaces bonding <text> vif <text> dhcpv6-options temporary
✓	***set interfaces bonding <interface> vif <vlan-id> disable***	interfaces-bonding.xml.in: interfaces bonding <bonding> vif <vif> disable	interfaces bonding <text> vif <text> disable
✓	***set interfaces bonding <interface> vif <vlan-id> disable-link-detect***	interfaces-bonding.xml.in: interfaces bonding <bonding> vif <vif> disable-link-detect	interfaces bonding <text> vif <text> disable-link-detect
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif <vif> egress-qos	interfaces bonding <text> vif <text> egress-qos <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif <text> firewall in ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif <text> firewall in name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif <text> firewall local ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif <text> firewall local name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif <text> firewall out ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif <text> firewall out name <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif <vif> ingress-qos	interfaces bonding <text> vif <text> ingress-qos <value>
✓	***set interfaces bonding <interface> vif <vlan-id> ip arp-cache-timeout***	interfaces-bonding.xml.in: interfaces bonding <bonding> vif <vif> ip arp-cache-timeout	interfaces bonding <text> vif <text> ip arp-cache-timeout <value>
✓	***set interfaces bonding <interface> vif <vlan-id> ip disable-arp-filter***	interfaces-bonding.xml.in: interfaces bonding <bonding> vif <vif> ip disable-arp-filter	interfaces bonding <text> vif <text> ip disable-arp-filter
✓	***set interfaces bonding <interface> vif <vlan-id> ip disable-forwarding***	interfaces-bonding.xml.in: interfaces bonding <bonding> vif <vif> ip disable-forwarding	interfaces bonding <text> vif <text> ip disable-forwarding
✓	***set interfaces bonding <interface> vif <vlan-id> ip enable-arp-accept***	interfaces-bonding.xml.in: interfaces bonding <bonding> vif <vif> ip enable-arp-accept	interfaces bonding <text> vif <text> ip enable-arp-accept
✓	***set interfaces bonding <interface> vif <vlan-id> ip enable-arp-announce***	interfaces-bonding.xml.in: interfaces bonding <bonding> vif <vif> ip enable-arp-announce	interfaces bonding <text> vif <text> ip enable-arp-announce
✓	***set interfaces bonding <interface> vif <vlan-id> ip enable-arp-ignore***	interfaces-bonding.xml.in: interfaces bonding <bonding> vif <vif> ip enable-arp-ignore	interfaces bonding <text> vif <text> ip enable-arp-ignore
✓	***set interfaces bonding <interface> vif <vlan-id> ip enable-proxy-arp***	interfaces-bonding.xml.in: interfaces bonding <bonding> vif <vif> ip enable-proxy-arp	interfaces bonding <text> vif <text> ip enable-proxy-arp
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif <text> ip ospf authentication md5 key-id <text> md5-key <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif <text> ip ospf authentication plaintext-password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif <text> ip ospf bandwidth <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif <text> ip ospf bfd
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif <text> ip ospf cost <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif <text> ip ospf dead-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif <text> ip ospf hello-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif <text> ip ospf mtu-ignore
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif <text> ip ospf network <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif <text> ip ospf priority <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif <text> ip ospf retransmit-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif <text> ip ospf transmit-delay <value>
✓	***set interfaces bonding <interface> vif <vlan-id> ip proxy-arp-pvlan***	interfaces-bonding.xml.in: interfaces bonding <bonding> vif <vif> ip proxy-arp-pvlan	interfaces bonding <text> vif <text> ip proxy-arp-pvlan
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif <text> ip rip authentication md5 <text> password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif <text> ip rip authentication plaintext-password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif <text> ip rip split-horizon disable
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif <text> ip rip split-horizon poison-reverse

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	***set interfaces bonding <interface> vif <vlan-id> ip source-validation <strict | loose | disable>***	interfaces-bonding.xml.in: interfaces bonding <bonding> vif <vif> ip source-validation	interfaces bonding <text> vif <text> ip source-validation <value>
✓	***set interfaces bonding <interface> vif <vlan-id> ipv6 address autoconf***	interfaces-bonding.xml.in: interfaces bonding <bonding> vif <vif> ipv6 address autoconf	interfaces bonding <text> vif <text> ipv6 address autoconf
✓	***set interfaces bonding <interface> vif <vlan-id> ipv6 address eui64 <prefix>***	interfaces-bonding.xml.in: interfaces bonding <bonding> vif <vif> ipv6 address eui64	interfaces bonding <text> vif <text> ipv6 address eui64 <value>
✓	***set interfaces bonding <interface> vif <vlan-id> ipv6 address no-default-link-local***	interfaces-bonding.xml.in: interfaces bonding <bonding> vif <vif> ipv6 address no-default-link-local	interfaces bonding <text> vif <text> ipv6 address no-default-link-local
✓	***set interfaces bonding <interface> vif <vlan-id> ipv6 disable-forwarding***	interfaces-bonding.xml.in: interfaces bonding <bonding> vif <vif> ipv6 disable-forwarding	interfaces bonding <text> vif <text> ipv6 disable-forwarding
×	not yet documented	interfaces-bonding.xml.in: interfaces bonding <bonding> vif <vif> ipv6 dup-addr-detect-transmits	interfaces bonding <text> vif <text> ipv6 dup-addr-detect-transmits <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif <text> ipv6 ospfv3 bfd
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif <text> ipv6 ospfv3 cost <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif <text> ipv6 ospfv3 dead-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif <text> ipv6 ospfv3 hello-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif <text> ipv6 ospfv3 ifmtu <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif <text> ipv6 ospfv3 instance-id <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif <text> ipv6 ospfv3 mtu-ignore
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif <text> ipv6 ospfv3 network <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif <text> ipv6 ospfv3 passive
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif <text> ipv6 ospfv3 priority <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif <text> ipv6 ospfv3 retransmit-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif <text> ipv6 ospfv3 transmit-delay <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif <text> ipv6 ripng split-horizon disable
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif <text> ipv6 ripng split-horizon poison-reverse
✓	*set interfaces bonding <interface> vif <vlan-id> mac <xx:xx:xx:xx:xx:xx>*	interfaces-bonding.xml.in: interfaces bonding <bonding> vif <vif> mac	interfaces bonding <text> vif <text> mac <value>
✓	*set interfaces bonding <interface> vif <vlan-id> mtu <mtu>*	interfaces-bonding.xml.in: interfaces bonding <bonding> vif <vif> mtu	interfaces bonding <text> vif <text> mtu <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif <text> policy ipv6-route <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif <text> policy route <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif <text> redirect <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif <text> traffic-policy in <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bonding <text> vif <text> traffic-policy out <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set interfaces bonding <interface> vif <vlan-id> vrf <vrf>*	interfaces-bonding.xml.in: interfaces bonding <bonding> vif <vif> vrf	interfaces bonding <text> vif <text> vrf <value>
✓	*set interfaces bonding <interface> vrf <vrf>*	interfaces-bonding.xml.in: interfaces bonding <bonding> vrf	interfaces bonding <text> vrf <value>
✓	*set interfaces bridge <interface> address <address | dhcp | dhcpv6>*	interfaces-bridge.xml.in: interfaces bridge <bridge> address	interfaces bridge <text> address <value>
✓	*set interfaces bridge <interface> aging <time>*	interfaces-bridge.xml.in: interfaces bridge <bridge> aging	interfaces bridge <text> aging <value>
✓	*set interfaces bridge <interface> description <description>*	interfaces-bridge.xml.in: interfaces bridge <bridge> description	interfaces bridge <text> description <value>
✓	*set interfaces bridge <interface> dhcp-options client-id <description>*	interfaces-bridge.xml.in: interfaces bridge <bridge> dhcp-options client-id	interfaces bridge <text> dhcp-options client-id <value>
×	not yet documented	interfaces-bridge.xml.in: interfaces bridge <bridge> dhcp-options default-route-distance	interfaces bridge <text> dhcp-options default-route-distance <value>
✓	*set interfaces bridge <interface> dhcp-options host-name <hostname>*	interfaces-bridge.xml.in: interfaces bridge <bridge> dhcp-options host-name	interfaces bridge <text> dhcp-options host-name <value>
×	not yet documented	interfaces-bridge.xml.in: interfaces bridge <bridge> dhcp-options mtu	interfaces bridge <text> dhcp-options mtu
✓	*set interfaces bridge <interface> dhcp-options no-default-route*	interfaces-bridge.xml.in: interfaces bridge <bridge> dhcp-options no-default-route	interfaces bridge <text> dhcp-options no-default-route
×	not yet documented	interfaces-bridge.xml.in: interfaces bridge <bridge> dhcp-options reject	interfaces bridge <text> dhcp-options reject <value>
✓	*set interfaces bridge <interface> dhcp-options vendor-class-id <vendor-id>*	interfaces-bridge.xml.in: interfaces bridge <bridge> dhcp-options vendor-class-id	interfaces bridge <text> dhcp-options vendor-class-id <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set interfaces bridge <interface> dhcpv6-options duid <duid>*	interfaces-bridge.xml.in: interfaces bridge <bridge> dhcpv6-options duid	interfaces bridge <text> dhcpv6-options duid <value>
✓	*set interfaces bridge <interface> dhcpv6-options parameters-only*	interfaces-bridge.xml.in: interfaces bridge <bridge> dhcpv6-options parameters-only	interfaces bridge <text> dhcpv6-options parameters-only
✓	*set interfaces bridge <interface> dhcpv6-options pd <id> interface <delegatee> address <address>*	interfaces-bridge.xml.in: interfaces bridge <bridge> dhcpv6-options pd <pd> interface <interface> address	interfaces bridge <text> dhcpv6-options pd <text> interface <text> address <value>
✓	*set interfaces bridge <interface> dhcpv6-options pd <id> interface <delegatee> sla-id <id>*	interfaces-bridge.xml.in: interfaces bridge <bridge> dhcpv6-options pd <pd> interface <interface> sla-id	interfaces bridge <text> dhcpv6-options pd <text> interface <text> sla-id <value>
✓	*set interfaces bridge <interface> dhcpv6-options pd <id> length <length>*	interfaces-bridge.xml.in: interfaces bridge <bridge> dhcpv6-options pd <pd> length	interfaces bridge <text> dhcpv6-options pd <text> length <value>
✓	*set interfaces bridge <interface> dhcpv6-options rapid-commit*	interfaces-bridge.xml.in: interfaces bridge <bridge> dhcpv6-options rapid-commit	interfaces bridge <text> dhcpv6-options rapid-commit
✓	*set interfaces bridge <interface> dhcpv6-options temporary*	interfaces-bridge.xml.in: interfaces bridge <bridge> dhcpv6-options temporary	interfaces bridge <text> dhcpv6-options temporary
✓	*set interfaces bridge <interface> disable*	interfaces-bridge.xml.in: interfaces bridge <bridge> disable	interfaces bridge <text> disable
×	*set interfaces bridge <interface> disable-flow-control*	Nothing found in XML Definitions	Nothing found in VyOS
✓	*set interfaces bridge <interface> disable-link-detect*	interfaces-bridge.xml.in: interfaces bridge <bridge> disable-link-detect	interfaces bridge <text> disable-link-detect
✓	*set interfaces bridge <interface> enable-vlan*	interfaces-bridge.xml.in: interfaces bridge <bridge> enable-vlan	interfaces bridge <text> enable-vlan
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> firewall in ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> firewall in name <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> firewall local ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> firewall local name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> firewall out ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> firewall out name <value>
✓	*set interfaces bridge <interface> forwarding-delay <delay>*	interfaces-bridge.xml.in: interfaces bridge <bridge> forwarding-delay	interfaces bridge <text> forwarding-delay <value>
✓	*set interfaces bridge <interface> hello-time <interval>*	interfaces-bridge.xml.in: interfaces bridge <bridge> hello-time	interfaces bridge <text> hello-time <value>
✓	*set interfaces bridge <interface> igmp querier*	interfaces-bridge.xml.in: interfaces bridge <bridge> igmp querier	interfaces bridge <text> igmp querier
✓	*set interfaces bridge <interface> ip arp-cache-timeout*	interfaces-bridge.xml.in: interfaces bridge <bridge> ip arp-cache-timeout	interfaces bridge <text> ip arp-cache-timeout <value>
✓	*set interfaces bridge <interface> ip disable-arp-filter*	interfaces-bridge.xml.in: interfaces bridge <bridge> ip disable-arp-filter	interfaces bridge <text> ip disable-arp-filter
✓	*set interfaces bridge <interface> ip disable-forwarding*	interfaces-bridge.xml.in: interfaces bridge <bridge> ip disable-forwarding	interfaces bridge <text> ip disable-forwarding
✓	*set interfaces bridge <interface> ip enable-arp-accept*	interfaces-bridge.xml.in: interfaces bridge <bridge> ip enable-arp-accept	interfaces bridge <text> ip enable-arp-accept
✓	*set interfaces bridge <interface> ip enable-arp-announce*	interfaces-bridge.xml.in: interfaces bridge <bridge> ip enable-arp-announce	interfaces bridge <text> ip enable-arp-announce
✓	*set interfaces bridge <interface> ip enable-arp-ignore*	interfaces-bridge.xml.in: interfaces bridge <bridge> ip enable-arp-ignore	interfaces bridge <text> ip enable-arp-ignore
✓	*set interfaces bridge <interface> ip enable-proxy-arp*	interfaces-bridge.xml.in: interfaces bridge <bridge> ip enable-proxy-arp	interfaces bridge <text> ip enable-proxy-arp

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> ip ospf authentication md5 key-id <text> md5-key <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> ip ospf authentication plaintext-password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> ip ospf bandwidth <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> ip ospf bfd
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> ip ospf cost <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> ip ospf dead-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> ip ospf hello-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> ip ospf mtu-ignore
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> ip ospf network <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> ip ospf priority <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> ip ospf retransmit-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> ip ospf transmit-delay <value>
✓	***set interfaces bridge <interface> ip proxy-arp-pvlan***	interfaces-bridge.xml.in: interfaces bridge <bridge> ip proxy-arp-pvlan	interfaces bridge <text> ip proxy-arp-pvlan
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> ip rip authentication md5 <text> password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> ip rip authentication plaintext-password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> ip rip split-horizon disable
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> ip rip split-horizon poison-reverse

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set interfaces bridge <interface> ip source-validation <strict | loose | disable>*	interfaces-bridge.xml.in: interfaces bridge <bridge> ip source-validation	interfaces bridge <text> ip source-validation <value>
✓	*set interfaces bridge <interface> ipv6 address autoconf*	interfaces-bridge.xml.in: interfaces bridge <bridge> ipv6 address autoconf	interfaces bridge <text> ipv6 address autoconf
✓	*set interfaces bridge <interface> ipv6 address eui64 <prefix>*	interfaces-bridge.xml.in: interfaces bridge <bridge> ipv6 address eui64	interfaces bridge <text> ipv6 address eui64 <value>
✓	*set interfaces bridge <interface> ipv6 address no-default-link-local*	interfaces-bridge.xml.in: interfaces bridge <bridge> ipv6 address no-default-link-local	interfaces bridge <text> ipv6 address no-default-link-local
✓	*set interfaces bridge <interface> ipv6 disable-forwarding*	interfaces-bridge.xml.in: interfaces bridge <bridge> ipv6 disable-forwarding	interfaces bridge <text> ipv6 disable-forwarding
×	not yet documented	interfaces-bridge.xml.in: interfaces bridge <bridge> ipv6 dup-addr-detect-transmits	interfaces bridge <text> ipv6 dup-addr-detect-transmits <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> ipv6 ospfv3 bfd
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> ipv6 ospfv3 cost <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> ipv6 ospfv3 dead-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> ipv6 ospfv3 hello-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> ipv6 ospfv3 ifmtu <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> ipv6 ospfv3 instance-id <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> ipv6 ospfv3 mtu-ignore
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> ipv6 ospfv3 network <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> ipv6 ospfv3 passive
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> ipv6 ospfv3 priority <value>

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> ipv6 ospfv3 retransmit-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> ipv6 ospfv3 transmit-delay <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> ipv6 ripng split-horizon disable
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> ipv6 ripng split-horizon poison-reverse
✓	*set interfaces bridge <interface> mac <xx:xx:xx:xx:xx:xx>*	interfaces-bridge.xml.in: interfaces bridge <bridge> mac	interfaces bridge <text> mac <value>
✓	*set interfaces bridge <interface> max-age <time>*	interfaces-bridge.xml.in: interfaces bridge <bridge> max-age	interfaces bridge <text> max-age <value>
×	*set interfaces bridge <interface> member interface <member>*	Nothing found in XML Definitions	Nothing found in VyOS
✓	*set interfaces bridge <interface> member interface <member> allowed-vlan <vlan-id>*	interfaces-bridge.xml.in: interfaces bridge <bridge> member interface <interface> allowed-vlan	interfaces bridge <text> member interface <text> allowed-vlan <value>
✓	*set interfaces bridge <interface> member interface <member> cost <cost>*	interfaces-bridge.xml.in: interfaces bridge <bridge> member interface <interface> cost	interfaces bridge <text> member interface <text> cost <value>
×	not yet documented	interfaces-bridge.xml.in: interfaces bridge <bridge> member interface <interface> isolated	interfaces bridge <text> member interface <text> isolated
✓	*set interfaces bridge <interface> member interface <member> native-vlan <vlan-id>*	interfaces-bridge.xml.in: interfaces bridge <bridge> member interface <interface> native-vlan	interfaces bridge <text> member interface <text> native-vlan <value>
✓	*set interfaces bridge <interface> member interface <member> priority <priority>*	interfaces-bridge.xml.in: interfaces bridge <bridge> member interface <interface> priority	interfaces bridge <text> member interface <text> priority <value>

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	***set interfaces bridge <interface> mirror egress <monitor-interface>***	interfaces-bridge.xml.in: interfaces bridge <bridge> mirror egress	interfaces bridge <text> mirror egress <value>
✓	***set interfaces bridge <interface> mirror ingress <monitor-interface>***	interfaces-bridge.xml.in: interfaces bridge <bridge> mirror ingress	interfaces bridge <text> mirror ingress <value>
✓	***set interfaces bridge <interface> mtu <mtu>***	interfaces-bridge.xml.in: interfaces bridge <bridge> mtu	interfaces bridge <text> mtu <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> policy ipv6-route <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> policy route <value>
×	not yet documented	interfaces-bridge.xml.in: interfaces bridge <bridge> priority	interfaces bridge <text> priority <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> redirect <value>
✓	***set interfaces bridge <interface> stp***	interfaces-bridge.xml.in: interfaces bridge <bridge> stp	interfaces bridge <text> stp
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> traffic-policy in <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> traffic-policy out <value>
×	***set interfaces bridge <interface> vif <vlan-id>***	Nothing found in XML Definitions	Nothing found in VyOS
✓	***set interfaces bridge <interface> vif <vlan-id> address <address | dhcp | dhcpv6>***	interfaces-bridge.xml.in: interfaces bridge <bridge> vif <vif> address	interfaces bridge <text> vif <text> address <value>
✓	***set interfaces bridge <interface> vif <vlan-id> description <description>***	interfaces-bridge.xml.in: interfaces bridge <bridge> vif <vif> description	interfaces bridge <text> vif <text> description <value>
✓	***set interfaces bridge <interface> vif <vlan-id> dhcp-options client-id <description>***	interfaces-bridge.xml.in: interfaces bridge <bridge> vif <vif> dhcp-options client-id	interfaces bridge <text> vif <text> dhcp-options client-id <value>
×	not yet documented	interfaces-bridge.xml.in: interfaces bridge <bridge> vif <vif> dhcp-options default-route-distance	interfaces bridge <text> vif <text> dhcp-options default-route-distance <value>

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	***set interfaces bridge <interface> vif <vlan-id> dhcp-options host-name <hostname>***	interfaces-bridge.xml.in: interfaces bridge <bridge> vif <vif> dhcp-options host-name	interfaces bridge <text> vif <text> dhcp-options host-name <value>
×	not yet documented	interfaces-bridge.xml.in: interfaces bridge <bridge> vif <vif> dhcp-options mtu	interfaces bridge <text> vif <text> dhcp-options mtu
✓	***set interfaces bridge <interface> vif <vlan-id> dhcp-options no-default-route***	interfaces-bridge.xml.in: interfaces bridge <bridge> vif <vif> dhcp-options no-default-route	interfaces bridge <text> vif <text> dhcp-options no-default-route
×	not yet documented	interfaces-bridge.xml.in: interfaces bridge <bridge> vif <vif> dhcp-options reject	interfaces bridge <text> vif <text> dhcp-options reject <value>
✓	***set interfaces bridge <interface> vif <vlan-id> dhcp-options vendor-class-id <vendor-id>***	interfaces-bridge.xml.in: interfaces bridge <bridge> vif <vif> dhcp-options vendor-class-id	interfaces bridge <text> vif <text> dhcp-options vendor-class-id <value>
✓	***set interfaces bridge <interface> vif <vlan-id> dhcpv6-options duid <duid>***	interfaces-bridge.xml.in: interfaces bridge <bridge> vif <vif> dhcpv6-options duid	interfaces bridge <text> vif <text> dhcpv6-options duid <value>
✓	***set interfaces bridge <interface> vif <vlan-id> dhcpv6-options parameters-only***	interfaces-bridge.xml.in: interfaces bridge <bridge> vif <vif> dhcpv6-options parameters-only	interfaces bridge <text> vif <text> dhcpv6-options parameters-only
✓	***set interfaces bridge <interface> vif <vlan-id> dhcpv6-options pd <id> interface <delegatee> address <address>***	interfaces-bridge.xml.in: interfaces bridge <bridge> vif <vif> dhcpv6-options pd <pd> interface <interface> address	interfaces bridge <text> vif <text> dhcpv6-options pd <text> interface <text> address <value>
✓	***set interfaces bridge <interface> vif <vlan-id> dhcpv6-options pd <id> interface <delegatee> sla-id <id>***	interfaces-bridge.xml.in: interfaces bridge <bridge> vif <vif> dhcpv6-options pd <pd> interface <interface> sla-id	interfaces bridge <text> vif <text> dhcpv6-options pd <text> interface <text> sla-id <value>

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	***set interfaces bridge <interface> vif <vlan-id> dhcpv6-options pd <id> length <length>***	interfaces-bridge.xml.in: interfaces bridge <bridge> vif <vif> dhcpv6-options pd <pd> length	interfaces bridge <text> vif <text> dhcpv6-options pd <text> length <value>
✓	***set interfaces bridge <interface> vif <vlan-id> dhcpv6-options rapid-commit***	interfaces-bridge.xml.in: interfaces bridge <bridge> vif <vif> dhcpv6-options rapid-commit	interfaces bridge <text> vif <text> dhcpv6-options rapid-commit
✓	***set interfaces bridge <interface> vif <vlan-id> dhcpv6-options temporary***	interfaces-bridge.xml.in: interfaces bridge <bridge> vif <vif> dhcpv6-options temporary	interfaces bridge <text> vif <text> dhcpv6-options temporary
✓	***set interfaces bridge <interface> vif <vlan-id> disable***	interfaces-bridge.xml.in: interfaces bridge <bridge> vif <vif> disable	interfaces bridge <text> vif <text> disable
✓	***set interfaces bridge <interface> vif <vlan-id> disable-link-detect***	interfaces-bridge.xml.in: interfaces bridge <bridge> vif <vif> disable-link-detect	interfaces bridge <text> vif <text> disable-link-detect
×	not yet documented	interfaces-bridge.xml.in: interfaces bridge <bridge> vif <vif> egress-qos	interfaces bridge <text> vif <text> egress-qos <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> vif <text> firewall in ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> vif <text> firewall in name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> vif <text> firewall local ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> vif <text> firewall local name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> vif <text> firewall out ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> vif <text> firewall out name <value>
×	not yet documented	interfaces-bridge.xml.in: interfaces bridge <bridge> vif <vif> ingress-qos	interfaces bridge <text> vif <text> ingress-qos <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set interfaces bridge <interface> vif <vlan-id> ip arp-cache-timeout*	interfaces-bridge.xml.in: interfaces bridge <bridge> vif <vif> ip arp-cache-timeout	interfaces bridge <text> vif <text> ip arp-cache-timeout <value>
✓	*set interfaces bridge <interface> vif <vlan-id> ip disable-arp-filter*	interfaces-bridge.xml.in: interfaces bridge <bridge> vif <vif> ip disable-arp-filter	interfaces bridge <text> vif <text> ip disable-arp-filter
✓	*set interfaces bridge <interface> vif <vlan-id> ip disable-forwarding*	interfaces-bridge.xml.in: interfaces bridge <bridge> vif <vif> ip disable-forwarding	interfaces bridge <text> vif <text> ip disable-forwarding
✓	*set interfaces bridge <interface> vif <vlan-id> ip enable-arp-accept*	interfaces-bridge.xml.in: interfaces bridge <bridge> vif <vif> ip enable-arp-accept	interfaces bridge <text> vif <text> ip enable-arp-accept
✓	*set interfaces bridge <interface> vif <vlan-id> ip enable-arp-announce*	interfaces-bridge.xml.in: interfaces bridge <bridge> vif <vif> ip enable-arp-announce	interfaces bridge <text> vif <text> ip enable-arp-announce
✓	*set interfaces bridge <interface> vif <vlan-id> ip enable-arp-ignore*	interfaces-bridge.xml.in: interfaces bridge <bridge> vif <vif> ip enable-arp-ignore	interfaces bridge <text> vif <text> ip enable-arp-ignore
✓	*set interfaces bridge <interface> vif <vlan-id> ip enable-proxy-arp*	interfaces-bridge.xml.in: interfaces bridge <bridge> vif <vif> ip enable-proxy-arp	interfaces bridge <text> vif <text> ip enable-proxy-arp
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> vif <text> ip ospf authentication md5 key-id <text> md5-key <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> vif <text> ip ospf authentication plaintext-password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> vif <text> ip ospf bandwidth <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> vif <text> ip ospf bfd
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> vif <text> ip ospf cost <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> vif <text> ip ospf dead-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> vif <text> ip ospf hello-interval <value>

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> vif <text> ip ospf mtu-ignore
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> vif <text> ip ospf network <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> vif <text> ip ospf priority <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> vif <text> ip ospf retransmit-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> vif <text> ip ospf transmit-delay <value>
✓	*set interfaces bridge <interface> vif <vlan-id> ip proxy-arp-pvlan*	interfaces-bridge.xml.in: interfaces bridge <bridge> vif <vif> ip proxy-arp-pvlan	interfaces bridge <text> vif <text> ip proxy-arp-pvlan
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> vif <text> ip rip authentication md5 <text> password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> vif <text> ip rip authentication plaintext-password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> vif <text> ip rip split-horizon disable
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> vif <text> ip rip split-horizon poison-reverse
✓	*set interfaces bridge <interface> vif <vlan-id> ip source-validation <strict | loose | disable>*	interfaces-bridge.xml.in: interfaces bridge <bridge> vif <vif> ip source-validation	interfaces bridge <text> vif <text> ip source-validation <value>
✓	*set interfaces bridge <interface> vif <vlan-id> ipv6 address autoconf*	interfaces-bridge.xml.in: interfaces bridge <bridge> vif <vif> ipv6 address autoconf	interfaces bridge <text> vif <text> ipv6 address autoconf
✓	*set interfaces bridge <interface> vif <vlan-id> ipv6 address eui64 <prefix>*	interfaces-bridge.xml.in: interfaces bridge <bridge> vif <vif> ipv6 address eui64	interfaces bridge <text> vif <text> ipv6 address eui64 <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	***set interfaces bridge <interface> vif <vlan-id> ipv6 address no-default-link-local***	interfaces-bridge.xml.in: interfaces bridge <bridge> vif <vif> ipv6 address no-default-link-local	interfaces bridge <text> vif <text> ipv6 address no-default-link-local
✓	***set interfaces bridge <interface> vif <vlan-id> ipv6 disable-forwarding***	interfaces-bridge.xml.in: interfaces bridge <bridge> vif <vif> ipv6 disable-forwarding	interfaces bridge <text> vif <text> ipv6 disable-forwarding
×	not yet documented	interfaces-bridge.xml.in: interfaces bridge <bridge> vif <vif> ipv6 dup-addr-detect-transmits	interfaces bridge <text> vif <text> ipv6 dup-addr-detect-transmits <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> vif <text> ipv6 ospfv3 bfd
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> vif <text> ipv6 ospfv3 cost <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> vif <text> ipv6 ospfv3 dead-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> vif <text> ipv6 ospfv3 hello-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> vif <text> ipv6 ospfv3 ifmtu <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> vif <text> ipv6 ospfv3 instance-id <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> vif <text> ipv6 ospfv3 mtu-ignore
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> vif <text> ipv6 ospfv3 network <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> vif <text> ipv6 ospfv3 passive
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> vif <text> ipv6 ospfv3 priority <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> vif <text> ipv6 ospfv3 retransmit-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> vif <text> ipv6 ospfv3 transmit-delay <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> vif <text> ipv6 ripng split-horizon disable
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> vif <text> ipv6 ripng split-horizon poison-reverse
✓	***set interfaces bridge <interface> vif <vlan-id> mac <xx:xx:xx:xx:xx:xx>***	interfaces-bridge.xml.in: interfaces bridge <bridge> vif <vif> mac	interfaces bridge <text> vif <text> mac <value>
✓	***set interfaces bridge <interface> vif <vlan-id> mtu <mtu>***	interfaces-bridge.xml.in: interfaces bridge <bridge> vif <vif> mtu	interfaces bridge <text> vif <text> mtu <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> vif <text> policy ipv6-route <value>
×	not yet documented	Nothing found in XML Definitions	interfaces bridge <text> vif <text> policy route <value>
✓	***set interfaces bridge <interface> vif <vlan-id> vrf <vrf>***	interfaces-bridge.xml.in: interfaces bridge <bridge> vif <vif> vrf	interfaces bridge <text> vif <text> vrf <value>
✓	***set interfaces bridge <interface> vrf <vrf>***	interfaces-bridge.xml.in: interfaces bridge <bridge> vrf	interfaces bridge <text> vrf <value>
✓	***set interfaces dummy <interface> address <address>***	interfaces-dummy.xml.in: interfaces dummy <dummy> address	interfaces dummy <text> address <value>
✓	***set interfaces dummy <interface> description <description>***	interfaces-dummy.xml.in: interfaces dummy <dummy> description	interfaces dummy <text> description <value>
✓	***set interfaces dummy <interface> disable***	interfaces-dummy.xml.in: interfaces dummy <dummy> disable	interfaces dummy <text> disable
×	not yet documented	Nothing found in XML Definitions	interfaces dummy <text> firewall in ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces dummy <text> firewall in name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces dummy <text> firewall local ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces dummy <text> firewall local name <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces dummy <text> firewall out ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces dummy <text> firewall out name <value>
×	not yet documented	interfaces-dummy.xml.in: interfaces dummy <dummy> ip disable-forwarding	interfaces dummy <text> ip disable-forwarding
×	not yet documented	Nothing found in XML Definitions	interfaces dummy <text> ip ospf authentication md5 key-id <text> md5-key <value>
×	not yet documented	Nothing found in XML Definitions	interfaces dummy <text> ip ospf authentication plaintext-password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces dummy <text> ip ospf bandwidth <value>
×	not yet documented	Nothing found in XML Definitions	interfaces dummy <text> ip ospf bfd
×	not yet documented	Nothing found in XML Definitions	interfaces dummy <text> ip ospf cost <value>
×	not yet documented	Nothing found in XML Definitions	interfaces dummy <text> ip ospf dead-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces dummy <text> ip ospf hello-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces dummy <text> ip ospf mtu-ignore
×	not yet documented	Nothing found in XML Definitions	interfaces dummy <text> ip ospf network <value>
×	not yet documented	Nothing found in XML Definitions	interfaces dummy <text> ip ospf priority <value>
×	not yet documented	Nothing found in XML Definitions	interfaces dummy <text> ip ospf retransmit-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces dummy <text> ip ospf transmit-delay <value>
×	not yet documented	Nothing found in XML Definitions	interfaces dummy <text> ip rip authentication md5 <text> password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces dummy <text> ip rip authentication plaintext-password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces dummy <text> ip rip split-horizon disable

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces dummy <text> ip rip split-horizon poison-reverse
×	not yet documented	interfaces-dummy.xml.in: interfaces dummy <dummy> ip source-validation	interfaces dummy <text> ip source-validation <value>
×	not yet documented	interfaces-dummy.xml.in: interfaces dummy <dummy> ipv6 address eui64	interfaces dummy <text> ipv6 address eui64 <value>
×	not yet documented	interfaces-dummy.xml.in: interfaces dummy <dummy> ipv6 address no-default-link-local	interfaces dummy <text> ipv6 address no-default-link-local
×	not yet documented	interfaces-dummy.xml.in: interfaces dummy <dummy> ipv6 disable-forwarding	interfaces dummy <text> ipv6 disable-forwarding
×	not yet documented	Nothing found in XML Definitions	interfaces dummy <text> ipv6 ospfv3 bfd
×	not yet documented	Nothing found in XML Definitions	interfaces dummy <text> ipv6 ospfv3 cost <value>
×	not yet documented	Nothing found in XML Definitions	interfaces dummy <text> ipv6 ospfv3 dead-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces dummy <text> ipv6 ospfv3 hello-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces dummy <text> ipv6 ospfv3 ifmtu <value>
×	not yet documented	Nothing found in XML Definitions	interfaces dummy <text> ipv6 ospfv3 instance-id <value>
×	not yet documented	Nothing found in XML Definitions	interfaces dummy <text> ipv6 ospfv3 mtu-ignore
×	not yet documented	Nothing found in XML Definitions	interfaces dummy <text> ipv6 ospfv3 network <value>
×	not yet documented	Nothing found in XML Definitions	interfaces dummy <text> ipv6 ospfv3 passive
×	not yet documented	Nothing found in XML Definitions	interfaces dummy <text> ipv6 ospfv3 priority <value>
×	not yet documented	Nothing found in XML Definitions	interfaces dummy <text> ipv6 ospfv3 retransmit-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces dummy <text> ipv6 ospfv3 transmit-delay <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces dummy <text> ipv6 ripng split-horizon disable
×	not yet documented	Nothing found in XML Definitions	interfaces dummy <text> ipv6 ripng split-horizon poison-reverse
×	not yet documented	interfaces-dummy.xml.in: interfaces dummy <dummy> mtu	interfaces dummy <text> mtu <value>
×	not yet documented	Nothing found in XML Definitions	interfaces dummy <text> policy ipv6-route <value>
×	not yet documented	Nothing found in XML Definitions	interfaces dummy <text> policy route <value>
×	not yet documented	Nothing found in XML Definitions	interfaces dummy <text> redirect <value>
×	not yet documented	Nothing found in XML Definitions	interfaces dummy <text> traffic-policy in <value>
×	not yet documented	Nothing found in XML Definitions	interfaces dummy <text> traffic-policy out <value>
✓	*set interfaces dummy <interface> vrf <vrf>*	interfaces-dummy.xml.in: interfaces dummy <dummy> vrf	interfaces dummy <text> vrf <value>
✓	*set interfaces ethernet <interface> address <address | dhcp | dhcpv6>*	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> address	interfaces ethernet <text> address <value>
✓	*set interfaces ethernet <interface> description <description>*	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> description	interfaces ethernet <text> description <value>
✓	*set interfaces ethernet <interface> dhcp-options client-id <description>*	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> dhcp-options client-id	interfaces ethernet <text> dhcp-options client-id <value>
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> dhcp-options default-route-distance	interfaces ethernet <text> dhcp-options default-route-distance <value>
✓	*set interfaces ethernet <interface> dhcp-options host-name <hostname>*	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> dhcp-options host-name	interfaces ethernet <text> dhcp-options host-name <value>
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> dhcp-options mtu	interfaces ethernet <text> dhcp-options mtu

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set interfaces ethernet <interface> dhcp-options no-default-route*	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> dhcp-options no-default-route	interfaces ethernet <text> dhcp-options no-default-route
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> dhcp-options reject	interfaces ethernet <text> dhcp-options reject <value>
✓	*set interfaces ethernet <interface> dhcp-options vendor-class-id <vendor-id>*	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> dhcp-options vendor-class-id	interfaces ethernet <text> dhcp-options vendor-class-id <value>
✓	*set interfaces ethernet <interface> dhcpv6-options duid <duid>*	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> dhcpv6-options duid	interfaces ethernet <text> dhcpv6-options duid <value>
✓	*set interfaces ethernet <interface> dhcpv6-options parameters-only*	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> dhcpv6-options parameters-only	interfaces ethernet <text> dhcpv6-options parameters-only
✓	*set interfaces ethernet <interface> dhcpv6-options pd <id> interface <delegatee> address <address>*	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> dhcpv6-options pd <pd> interface <interface> address	interfaces ethernet <text> dhcpv6-options pd <text> interface <text> address <value>
✓	*set interfaces ethernet <interface> dhcpv6-options pd <id> interface <delegatee> sla-id <id>*	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> dhcpv6-options pd <pd> interface <interface> sla-id	interfaces ethernet <text> dhcpv6-options pd <text> interface <text> sla-id <value>
✓	*set interfaces ethernet <interface> dhcpv6-options pd <id> length <length>*	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> dhcpv6-options pd <pd> length	interfaces ethernet <text> dhcpv6-options pd <text> length <value>
✓	*set interfaces ethernet <interface> dhcpv6-options rapid-commit*	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> dhcpv6-options rapid-commit	interfaces ethernet <text> dhcpv6-options rapid-commit
✓	*set interfaces ethernet <interface> dhcpv6-options temporary*	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> dhcpv6-options temporary	interfaces ethernet <text> dhcpv6-options temporary

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set interfaces ethernet <interface> disable*	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> disable	interfaces ethernet <text> disable
✓	*set interfaces ethernet <interface> disable-flow-control*	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> disable-flow-control	interfaces ethernet <text> disable-flow-control
✓	*set interfaces ethernet <interface> disable-link-detect*	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> disable-link-detect	interfaces ethernet <text> disable-link-detect
✓	*set interfaces ethernet <interface> duplex <auto | full | half>*	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> duplex	interfaces ethernet <text> duplex <value>
✓	*set interfaces ethernet <interface> eapol ca-cert-file <file>*	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> eapol ca-cert-file	interfaces ethernet <text> eapol ca-cert-file <value>
✓	*set interfaces ethernet <interface> eapol cert-file <file>*	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> eapol cert-file	interfaces ethernet <text> eapol cert-file <value>
✓	*set interfaces ethernet <interface> eapol key-file <file>*	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> eapol key-file	interfaces ethernet <text> eapol key-file <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> firewall in ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> firewall in name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> firewall local ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> firewall local name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> firewall out ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> firewall out name <value>
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> hw-id	interfaces ethernet <text> hw-id <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	***set interfaces ethernet <interface> ip arp-cache-timeout***	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> ip arp-cache-timeout	interfaces ethernet <text> ip arp-cache-timeout <value>
✓	***set interfaces ethernet <interface> ip disable-arp-filter***	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> ip disable-arp-filter	interfaces ethernet <text> ip disable-arp-filter
✓	***set interfaces ethernet <interface> ip disable-forwarding***	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> ip disable-forwarding	interfaces ethernet <text> ip disable-forwarding
✓	***set interfaces ethernet <interface> ip enable-arp-accept***	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> ip enable-arp-accept	interfaces ethernet <text> ip enable-arp-accept
✓	***set interfaces ethernet <interface> ip enable-arp-announce***	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> ip enable-arp-announce	interfaces ethernet <text> ip enable-arp-announce
✓	***set interfaces ethernet <interface> ip enable-arp-ignore***	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> ip enable-arp-ignore	interfaces ethernet <text> ip enable-arp-ignore
✓	***set interfaces ethernet <interface> ip enable-proxy-arp***	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> ip enable-proxy-arp	interfaces ethernet <text> ip enable-proxy-arp
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> ip ospf authentication md5 key-id <text> md5-key <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> ip ospf authentication plaintext-password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> ip ospf bandwidth <value>
✓	***set interfaces ethernet <interface> ip ospf bfd***	Nothing found in XML Definitions	interfaces ethernet <text> ip ospf bfd
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> ip ospf cost <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> ip ospf dead-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> ip ospf hello-interval <value>

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> ip ospf mtu-ignore
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> ip ospf network <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> ip ospf priority <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> ip ospf retransmit-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> ip ospf transmit-delay <value>
✓	*set interfaces ethernet <interface> ip proxy-arp-pvlan*	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> ip proxy-arp-pvlan	interfaces ethernet <text> ip proxy-arp-pvlan
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> ip rip authentication md5 <text> password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> ip rip authentication plaintext-password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> ip rip split-horizon disable
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> ip rip split-horizon poison-reverse
✓	*set interfaces ethernet <interface> ip source-validation <strict | loose | disable>*	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> ip source-validation	interfaces ethernet <text> ip source-validation <value>
✓	*set interfaces ethernet <interface> ipv6 address autoconf*	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> ipv6 address autoconf	interfaces ethernet <text> ipv6 address autoconf
✓	*set interfaces ethernet <interface> ipv6 address eui64 <prefix>*	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> ipv6 address eui64	interfaces ethernet <text> ipv6 address eui64 <value>
✓	*set interfaces ethernet <interface> ipv6 address no-default-link-local*	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> ipv6 address no-default-link-local	interfaces ethernet <text> ipv6 address no-default-link-local

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	***set interfaces ethernet <interface> ipv6 disable-forwarding***	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> ipv6 disable-forwarding	interfaces ethernet <text> ipv6 disable-forwarding
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> ipv6 dup-addr-detect-transmits	interfaces ethernet <text> ipv6 dup-addr-detect-transmits <value>
✓	***set interfaces ethernet <interface> ipv6 ospfv3 bfd***	Nothing found in XML Definitions	interfaces ethernet <text> ipv6 ospfv3 bfd
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> ipv6 ospfv3 cost <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> ipv6 ospfv3 dead-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> ipv6 ospfv3 hello-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> ipv6 ospfv3 ifmtu <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> ipv6 ospfv3 instance-id <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> ipv6 ospfv3 mtu-ignore
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> ipv6 ospfv3 network <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> ipv6 ospfv3 passive
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> ipv6 ospfv3 priority <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> ipv6 ospfv3 retransmit-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> ipv6 ospfv3 transmit-delay <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> ipv6 ripng split-horizon disable
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> ipv6 ripng split-horizon poison-reverse

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set interfaces ethernet <interface> mac <xx:xx:xx:xx:xx:xx>*	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> mac	interfaces ethernet <text> mac <value>
✓	*set interfaces ethernet <interface> mirror egress <monitor-interface>*	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> mirror egress	interfaces ethernet <text> mirror egress <value>
✓	*set interfaces ethernet <interface> mirror ingress <monitor-interface>*	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> mirror ingress	interfaces ethernet <text> mirror ingress <value>
✓	*set interfaces ethernet <interface> mtu <mtu>*	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> mtu	interfaces ethernet <text> mtu <value>
×	*set interfaces ethernet <interface> offload <gro | gso | sg | tso | ufo | rps>*	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> offload gro	interfaces ethernet <text> offload gro
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> offload gso	interfaces ethernet <text> offload gso
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> offload lro	interfaces ethernet <text> offload lro
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> offload rps	interfaces ethernet <text> offload rps
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> offload sg	interfaces ethernet <text> offload sg
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> offload tso	interfaces ethernet <text> offload tso
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> policy ipv6-route <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> policy route <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> redirect <value>
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> ring-buffer rx	interfaces ethernet <text> ring-buffer rx <value>
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> ring-buffer tx	interfaces ethernet <text> ring-buffer tx <value>
✓	***set interfaces ethernet <interface> speed <auto | 10 | 100 | 1000 | 2500 | 5000 | 10000 | 25000 | 40000 | 50000 | 100000>***	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> speed	interfaces ethernet <text> speed <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> traffic-policy in <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> traffic-policy out <value>
×	***set interfaces ethernet <interface> vif <vlan-id>***	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> address	interfaces ethernet <text> vif-s <text> address <value>
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> description	interfaces ethernet <text> vif-s <text> description <value>
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> dhcp-options client-id	interfaces ethernet <text> vif-s <text> dhcp-options client-id <value>
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> dhcp-options default-route-distance	interfaces ethernet <text> vif-s <text> dhcp-options default-route-distance <value>
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> dhcp-options host-name	interfaces ethernet <text> vif-s <text> dhcp-options host-name <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> dhcp-options mtu	interfaces ethernet <text> vif-s <text> dhcp-options mtu
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> dhcp-options no-default-route	interfaces ethernet <text> vif-s <text> dhcp-options no-default-route
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> dhcp-options reject	interfaces ethernet <text> vif-s <text> dhcp-options reject <value>
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> dhcp-options vendor-class-id	interfaces ethernet <text> vif-s <text> dhcp-options vendor-class-id <value>
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> dhcpv6-options duid	interfaces ethernet <text> vif-s <text> dhcpv6-options duid <value>
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> dhcpv6-options parameters-only	interfaces ethernet <text> vif-s <text> dhcpv6-options parameters-only
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> dhcpv6-options pd <pd> interface <interface> address	interfaces ethernet <text> vif-s <text> dhcpv6-options pd <text> interface <text> address <value>
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> dhcpv6-options pd <pd> interface <interface> sla-id	interfaces ethernet <text> vif-s <text> dhcpv6-options pd <text> interface <text> sla-id <value>
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> dhcpv6-options pd <pd> length	interfaces ethernet <text> vif-s <text> dhcpv6-options pd <text> length <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> dhcpv6-options rapid-commit	interfaces ethernet <text> vif-s <text> dhcpv6-options rapid-commit
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> dhcpv6-options temporary	interfaces ethernet <text> vif-s <text> dhcpv6-options temporary
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> disable	interfaces ethernet <text> vif-s <text> disable
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> disable-link-detect	interfaces ethernet <text> vif-s <text> disable-link-detect
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> firewall in ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> firewall in name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> firewall local ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> firewall local name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> firewall out ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> firewall out name <value>
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> ip arp-cache-timeout	interfaces ethernet <text> vif-s <text> ip arp-cache-timeout <value>
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> ip disable-arp-filter	interfaces ethernet <text> vif-s <text> ip disable-arp-filter

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> ip disable-forwarding	interfaces ethernet <text> vif-s <text> ip disable-forwarding
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> ip enable-arp-accept	interfaces ethernet <text> vif-s <text> ip enable-arp-accept
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> ip enable-arp-announce	interfaces ethernet <text> vif-s <text> ip enable-arp-announce
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> ip enable-arp-ignore	interfaces ethernet <text> vif-s <text> ip enable-arp-ignore
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> ip enable-proxy-arp	interfaces ethernet <text> vif-s <text> ip enable-proxy-arp
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> ip ospf authentication md5 key-id <text> md5-key <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> ip ospf authentication plaintext-password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> ip ospf bandwidth <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> ip ospf bfd
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> ip ospf cost <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> ip ospf dead-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> ip ospf hello-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> ip ospf mtu-ignore

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> ip ospf network <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> ip ospf priority <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> ip ospf retransmit-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> ip ospf transmit-delay <value>
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> ip proxy-arp-pvlan	interfaces ethernet <text> vif-s <text> ip proxy-arp-pvlan
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> ip rip authentication md5 <text> password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> ip rip authentication plaintext-password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> ip rip split-horizon disable
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> ip rip split-horizon poison-reverse
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> ip source-validation	interfaces ethernet <text> vif-s <text> ip source-validation <value>
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> ipv6 address autoconf	interfaces ethernet <text> vif-s <text> ipv6 address autoconf
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> ipv6 address eui64	interfaces ethernet <text> vif-s <text> ipv6 address eui64 <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> ipv6 address no-default-link-local	interfaces ethernet <text> vif-s <text> ipv6 address no-default-link-local
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> ipv6 disable-forwarding	interfaces ethernet <text> vif-s <text> ipv6 disable-forwarding
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> ipv6 dup-addr-detect-transmits	interfaces ethernet <text> vif-s <text> ipv6 dup-addr-detect-transmits <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> ipv6 ospfv3 bfd
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> ipv6 ospfv3 cost <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> ipv6 ospfv3 dead-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> ipv6 ospfv3 hello-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> ipv6 ospfv3 ifmtu <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> ipv6 ospfv3 instance-id <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> ipv6 ospfv3 mtu-ignore
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> ipv6 ospfv3 network <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> ipv6 ospfv3 passive
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> ipv6 ospfv3 priority <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> ipv6 ospfv3 retransmit-interval <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> ipv6 ospfv3 transmit-delay <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> ipv6 ripng split-horizon disable
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> ipv6 ripng split-horizon poison-reverse
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> mac	interfaces ethernet <text> vif-s <text> mac <value>
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> mtu	interfaces ethernet <text> vif-s <text> mtu <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> policy ipv6-route <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> policy route <value>
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> protocol	interfaces ethernet <text> vif-s <text> protocol <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> redirect <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> traffic-policy in <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> traffic-policy out <value>
✓	*set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> address <address | dhcp | dhcpv6>*	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> vif-c <vif-c> address	interfaces ethernet <text> vif-s <text> vif-c <text> address <value>
✓	*set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> description <description>*	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> vif-c <vif-c> description	interfaces ethernet <text> vif-s <text> vif-c <text> description <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	***set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> dhcp-options client-id <description>***	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> vif-c <vif-c> dhcp-options client-id	interfaces ethernet <text> vif-s <text> vif-c <text> dhcp-options client-id <value>
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> vif-c <vif-c> dhcp-options default-route-distance	interfaces ethernet <text> vif-s <text> vif-c <text> dhcp-options default-route-distance <value>
✓	***set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> dhcp-options host-name <hostname>***	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> vif-c <vif-c> dhcp-options host-name	interfaces ethernet <text> vif-s <text> vif-c <text> dhcp-options host-name <value>
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> vif-c <vif-c> dhcp-options mtu	interfaces ethernet <text> vif-s <text> vif-c <text> dhcp-options mtu
✓	***set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> dhcp-options no-default-route***	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> vif-c <vif-c> dhcp-options no-default-route	interfaces ethernet <text> vif-s <text> vif-c <text> dhcp-options no-default-route
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> vif-c <vif-c> dhcp-options reject	interfaces ethernet <text> vif-s <text> vif-c <text> dhcp-options reject <value>
✓	***set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> dhcp-options vendor-class-id <vendor-id>***	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> vif-c <vif-c> dhcp-options vendor-class-id	interfaces ethernet <text> vif-s <text> vif-c <text> dhcp-options vendor-class-id <value>
✓	***set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> dhcpv6-options duid <duid>***	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> vif-c <vif-c> dhcpv6-options duid	interfaces ethernet <text> vif-s <text> vif-c <text> dhcpv6-options duid <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> dhcpv6-options parameters-only*	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> vif-c <vif-c> dhcpv6-options parameters-only	interfaces ethernet <text> vif-s <text> vif-c <text> dhcpv6-options parameters-only
✓	*set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> dhcpv6-options pd <id> interface <delegatee> address <address>*	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> vif-c <vif-c> dhcpv6-options pd <pd> interface <interface> address	interfaces ethernet <text> vif-s <text> vif-c <text> dhcpv6-options pd <text> interface <text> address <value>
✓	*set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> dhcpv6-options pd <id> interface <delegatee> sla-id <id>*	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> vif-c <vif-c> dhcpv6-options pd <pd> interface <interface> sla-id	interfaces ethernet <text> vif-s <text> vif-c <text> dhcpv6-options pd <text> interface <text> sla-id <value>
✓	*set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> dhcpv6-options pd <id> length <length>*	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> vif-c <vif-c> dhcpv6-options pd <pd> length	interfaces ethernet <text> vif-s <text> vif-c <text> dhcpv6-options pd <text> length <value>
✓	*set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> dhcpv6-options rapid-commit*	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> vif-c <vif-c> dhcpv6-options rapid-commit	interfaces ethernet <text> vif-s <text> vif-c <text> dhcpv6-options rapid-commit
✓	*set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> dhcpv6-options temporary*	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> vif-c <vif-c> dhcpv6-options temporary	interfaces ethernet <text> vif-s <text> vif-c <text> dhcpv6-options temporary
✓	*set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> disable*	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> vif-c <vif-c> disable	interfaces ethernet <text> vif-s <text> vif-c <text> disable

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	***set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> disable-link-detect***	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> vif-c <vif-c> disable-link-detect	interfaces ethernet <text> vif-s <text> vif-c <text> disable-link-detect
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> vif-c <text> firewall in ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> vif-c <text> firewall in name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> vif-c <text> firewall local ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> vif-c <text> firewall local name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> vif-c <text> firewall out ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> vif-c <text> firewall out name <value>
✓	***set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> ip arp-cache-timeout***	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> vif-c <vif-c> ip arp-cache-timeout	interfaces ethernet <text> vif-s <text> vif-c <text> ip arp-cache-timeout <value>
✓	***set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> ip disable-arp-filter***	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> vif-c <vif-c> ip disable-arp-filter	interfaces ethernet <text> vif-s <text> vif-c <text> ip disable-arp-filter
✓	***set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> ip disable-forwarding***	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> vif-c <vif-c> ip disable-forwarding	interfaces ethernet <text> vif-s <text> vif-c <text> ip disable-forwarding

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	***set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> ip enable-arp-accept***	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> vif-c <vif-c> ip enable-arp-accept	interfaces ethernet <text> vif-s <text> vif-c <text> ip enable-arp-accept
✓	***set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> ip enable-arp-announce***	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> vif-c <vif-c> ip enable-arp-announce	interfaces ethernet <text> vif-s <text> vif-c <text> ip enable-arp-announce
✓	***set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> ip enable-arp-ignore***	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> vif-c <vif-c> ip enable-arp-ignore	interfaces ethernet <text> vif-s <text> vif-c <text> ip enable-arp-ignore
✓	***set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> ip enable-proxy-arp***	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> vif-c <vif-c> ip enable-proxy-arp	interfaces ethernet <text> vif-s <text> vif-c <text> ip enable-proxy-arp
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> vif-c <text> ip ospf authentication md5 key-id <text> md5-key <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> vif-c <text> ip ospf authentication plaintext-password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> vif-c <text> ip ospf bandwidth <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> vif-c <text> ip ospf bfd
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> vif-c <text> ip ospf cost <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> vif-c <text> ip ospf dead-interval <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> vif-c <text> ip ospf hello-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> vif-c <text> ip ospf mtu-ignore
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> vif-c <text> ip ospf network <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> vif-c <text> ip ospf priority <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> vif-c <text> ip ospf retransmit-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> vif-c <text> ip ospf transmit-delay <value>
✓	***set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> ip proxy-arp-pvlan***	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> vif-c <vif-c> ip proxy-arp-pvlan	interfaces ethernet <text> vif-s <text> vif-c <text> ip proxy-arp-pvlan
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> vif-c <text> ip rip authentication md5 <text> password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> vif-c <text> ip rip authentication plaintext-password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> vif-c <text> ip rip split-horizon disable
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> vif-c <text> ip rip split-horizon poison-reverse
✓	***set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> ip source-validation <strict | loose | disable>***	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> vif-c <vif-c> ip source-validation	interfaces ethernet <text> vif-s <text> vif-c <text> ip source-validation <value>

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	***set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> ipv6 address autoconf***	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> vif-c <vif-c> ipv6 address autoconf	interfaces ethernet <text> vif-s <text> vif-c <text> ipv6 address autoconf
✓	***set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> ipv6 address eui64 <prefix>***	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> vif-c <vif-c> ipv6 address eui64	interfaces ethernet <text> vif-s <text> vif-c <text> ipv6 address eui64 <value>
✓	***set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> ipv6 address no-default-link-local***	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> vif-c <vif-c> ipv6 address no-default-link-local	interfaces ethernet <text> vif-s <text> vif-c <text> ipv6 address no-default-link-local
✓	***set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> ipv6 disable-forwarding***	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> vif-c <vif-c> ipv6 disable-forwarding	interfaces ethernet <text> vif-s <text> vif-c <text> ipv6 disable-forwarding
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> vif-c <vif-c> ipv6 dup-addr-detect-transmits	interfaces ethernet <text> vif-s <text> vif-c <text> ipv6 dup-addr-detect-transmits <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> vif-c <text> ipv6 ospfv3 bfd
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> vif-c <text> ipv6 ospfv3 cost <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> vif-c <text> ipv6 ospfv3 dead-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> vif-c <text> ipv6 ospfv3 hello-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> vif-c <text> ipv6 ospfv3 ifmtu <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> vif-c <text> ipv6 ospfv3 instance-id <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> vif-c <text> ipv6 ospfv3 mtu-ignore
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> vif-c <text> ipv6 ospfv3 network <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> vif-c <text> ipv6 ospfv3 passive
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> vif-c <text> ipv6 ospfv3 priority <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> vif-c <text> ipv6 ospfv3 retransmit-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> vif-c <text> ipv6 ospfv3 transmit-delay <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> vif-c <text> ipv6 ripng split-horizon disable
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> vif-c <text> ipv6 ripng split-horizon poison-reverse
✓	***set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> mac <xx:xx:xx:xx:xx:xx>***	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> vif-c <vif-c> mac	interfaces ethernet <text> vif-s <text> vif-c <text> mac <value>
✓	***set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> mtu <mtu>***	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> vif-c <vif-c> mtu	interfaces ethernet <text> vif-s <text> vif-c <text> mtu <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> vif-c <text> policy ipv6-route <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> vif-c <text> policy route <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> vif-c <text> redirect <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> vif-c <text> traffic-policy in <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif-s <text> vif-c <text> traffic-policy out <value>
✓	***set interfaces ethernet <interface> vif-s <vlan-id> vif-c <vlan-id> vrf <vrf>***	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> vif-c <vif-c> vrf	interfaces ethernet <text> vif-s <text> vif-c <text> vrf <value>
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif-s <vif-s> vrf	interfaces ethernet <text> vif-s <text> vrf <value>
✓	***set interfaces ethernet <interface> vif <vlan-id> address <address | dhcp | dhcpv6>***	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif <vif> address	interfaces ethernet <text> vif <text> address <value>
✓	***set interfaces ethernet <interface> vif <vlan-id> description <description>***	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif <vif> description	interfaces ethernet <text> vif <text> description <value>
✓	***set interfaces ethernet <interface> vif <vlan-id> dhcp-options client-id <description>***	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif <vif> dhcp-options client-id	interfaces ethernet <text> vif <text> dhcp-options client-id <value>
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif <vif> dhcp-options default-route-distance	interfaces ethernet <text> vif <text> dhcp-options default-route-distance <value>
✓	***set interfaces ethernet <interface> vif <vlan-id> dhcp-options host-name <hostname>***	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif <vif> dhcp-options host-name	interfaces ethernet <text> vif <text> dhcp-options host-name <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif <vif> dhcp-options mtu	interfaces ethernet <text> vif <text> dhcp-options mtu
✓	*set interfaces ethernet <interface> vif <vlan-id> dhcp-options no-default-route*	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif <vif> dhcp-options no-default-route	interfaces ethernet <text> vif <text> dhcp-options no-default-route
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif <vif> dhcp-options reject	interfaces ethernet <text> vif <text> dhcp-options reject <value>
✓	*set interfaces ethernet <interface> vif <vlan-id> dhcp-options vendor-class-id <vendor-id>*	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif <vif> dhcp-options vendor-class-id	interfaces ethernet <text> vif <text> dhcp-options vendor-class-id <value>
✓	*set interfaces ethernet <interface> vif <vlan-id> dhcpv6-options duid <duid>*	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif <vif> dhcpv6-options duid	interfaces ethernet <text> vif <text> dhcpv6-options duid <value>
✓	*set interfaces ethernet <interface> vif <vlan-id> dhcpv6-options parameters-only*	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif <vif> dhcpv6-options parameters-only	interfaces ethernet <text> vif <text> dhcpv6-options parameters-only
✓	*set interfaces ethernet <interface> vif <vlan-id> dhcpv6-options pd <id> interface <delegatee> address <address>*	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif <vif> dhcpv6-options pd <pd> interface <interface> address	interfaces ethernet <text> vif <text> dhcpv6-options pd <text> interface <text> address <value>
✓	*set interfaces ethernet <interface> vif <vlan-id> dhcpv6-options pd <id> interface <delegatee> sla-id <id>*	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif <vif> dhcpv6-options pd <pd> interface <interface> sla-id	interfaces ethernet <text> vif <text> dhcpv6-options pd <text> interface <text> sla-id <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	***set interfaces ethernet <interface> vif <vlan-id> dhcpv6-options pd <id> length <length>***	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif <vif> dhcpv6-options pd <pd> length	interfaces ethernet <text> vif <text> dhcpv6-options pd <text> length <value>
✓	***set interfaces ethernet <interface> vif <vlan-id> dhcpv6-options rapid-commit***	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif <vif> dhcpv6-options rapid-commit	interfaces ethernet <text> vif <text> dhcpv6-options rapid-commit
✓	***set interfaces ethernet <interface> vif <vlan-id> dhcpv6-options temporary***	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif <vif> dhcpv6-options temporary	interfaces ethernet <text> vif <text> dhcpv6-options temporary
✓	***set interfaces ethernet <interface> vif <vlan-id> disable***	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif <vif> disable	interfaces ethernet <text> vif <text> disable
✓	***set interfaces ethernet <interface> vif <vlan-id> disable-link-detect***	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif <vif> disable-link-detect	interfaces ethernet <text> vif <text> disable-link-detect
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif <vif> egress-qos	interfaces ethernet <text> vif <text> egress-qos <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif <text> firewall in ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif <text> firewall in name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif <text> firewall local ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif <text> firewall local name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif <text> firewall out ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif <text> firewall out name <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif <vif> ingress-qos	interfaces ethernet <text> vif <text> ingress-qos <value>
✓	***set interfaces ethernet <interface> vif <vlan-id> ip arp-cache-timeout***	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif <vif> ip arp-cache-timeout	interfaces ethernet <text> vif <text> ip arp-cache-timeout <value>
✓	***set interfaces ethernet <interface> vif <vlan-id> ip disable-arp-filter***	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif <vif> ip disable-arp-filter	interfaces ethernet <text> vif <text> ip disable-arp-filter
✓	***set interfaces ethernet <interface> vif <vlan-id> ip disable-forwarding***	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif <vif> ip disable-forwarding	interfaces ethernet <text> vif <text> ip disable-forwarding
✓	***set interfaces ethernet <interface> vif <vlan-id> ip enable-arp-accept***	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif <vif> ip enable-arp-accept	interfaces ethernet <text> vif <text> ip enable-arp-accept
✓	***set interfaces ethernet <interface> vif <vlan-id> ip enable-arp-announce***	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif <vif> ip enable-arp-announce	interfaces ethernet <text> vif <text> ip enable-arp-announce
✓	***set interfaces ethernet <interface> vif <vlan-id> ip enable-arp-ignore***	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif <vif> ip enable-arp-ignore	interfaces ethernet <text> vif <text> ip enable-arp-ignore
✓	***set interfaces ethernet <interface> vif <vlan-id> ip enable-proxy-arp***	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif <vif> ip enable-proxy-arp	interfaces ethernet <text> vif <text> ip enable-proxy-arp
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif <text> ip ospf authentication md5 key-id <text> md5-key <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif <text> ip ospf authentication plaintext-password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif <text> ip ospf bandwidth <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif <text> ip ospf bfd
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif <text> ip ospf cost <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif <text> ip ospf dead-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif <text> ip ospf hello-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif <text> ip ospf mtu-ignore
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif <text> ip ospf network <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif <text> ip ospf priority <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif <text> ip ospf retransmit-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif <text> ip ospf transmit-delay <value>
✓	***set interfaces ethernet <interface> vif <vlan-id> ip proxy-arp-pvlan***	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif <vif> ip proxy-arp-pvlan	interfaces ethernet <text> vif <text> ip proxy-arp-pvlan
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif <text> ip rip authentication md5 <text> password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif <text> ip rip authentication plaintext-password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif <text> ip rip split-horizon disable
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif <text> ip rip split-horizon poison-reverse

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set interfaces ethernet <interface> vif <vlan-id> ip source-validation <strict | loose | disable>*	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif <vif> ip source-validation	interfaces ethernet <text> vif <text> ip source-validation <value>
✓	*set interfaces ethernet <interface> vif <vlan-id> ipv6 address autoconf*	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif <vif> ipv6 address autoconf	interfaces ethernet <text> vif <text> ipv6 address autoconf
✓	*set interfaces ethernet <interface> vif <vlan-id> ipv6 address eui64 <prefix>*	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif <vif> ipv6 address eui64	interfaces ethernet <text> vif <text> ipv6 address eui64 <value>
✓	*set interfaces ethernet <interface> vif <vlan-id> ipv6 address no-default-link-local*	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif <vif> ipv6 address no-default-link-local	interfaces ethernet <text> vif <text> ipv6 address no-default-link-local
✓	*set interfaces ethernet <interface> vif <vlan-id> ipv6 disable-forwarding*	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif <vif> ipv6 disable-forwarding	interfaces ethernet <text> vif <text> ipv6 disable-forwarding
×	not yet documented	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif <vif> ipv6 dup-addr-detect-transmits	interfaces ethernet <text> vif <text> ipv6 dup-addr-detect-transmits <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif <text> ipv6 ospfv3 bfd
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif <text> ipv6 ospfv3 cost <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif <text> ipv6 ospfv3 dead-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif <text> ipv6 ospfv3 hello-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif <text> ipv6 ospfv3 ifmtu <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif <text> ipv6 ospfv3 instance-id <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif <text> ipv6 ospfv3 mtu-ignore
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif <text> ipv6 ospfv3 network <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif <text> ipv6 ospfv3 passive
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif <text> ipv6 ospfv3 priority <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif <text> ipv6 ospfv3 retransmit-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif <text> ipv6 ospfv3 transmit-delay <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif <text> ipv6 ripng split-horizon disable
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif <text> ipv6 ripng split-horizon poison-reverse
✓	*set interfaces ethernet <interface> vif <vlan-id> mac <xx:xx:xx:xx:xx:xx>*	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif <vif> mac	interfaces ethernet <text> vif <text> mac <value>
✓	*set interfaces ethernet <interface> vif <vlan-id> mtu <mtu>*	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif <vif> mtu	interfaces ethernet <text> vif <text> mtu <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif <text> policy ipv6-route <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif <text> policy route <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif <text> redirect <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif <text> traffic-policy in <value>
×	not yet documented	Nothing found in XML Definitions	interfaces ethernet <text> vif <text> traffic-policy out <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set interfaces ethernet <interface> vif <vlan-id> vrf <vrf>*	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vif <vif> vrf	interfaces ethernet <text> vif <text> vrf <value>
✓	*set interfaces ethernet <interface> vrf <vrf>*	interfaces-ethernet.xml.in: interfaces ethernet <ethernet> vrf	interfaces ethernet <text> vrf <value>
✓	*set interfaces geneve <interface> address <address>*	interfaces-geneve.xml.in: interfaces geneve <geneve> address	interfaces geneve <text> address <value>
✓	*set interfaces geneve <interface> description <description>*	interfaces-geneve.xml.in: interfaces geneve <geneve> description	interfaces geneve <text> description <value>
✓	*set interfaces geneve <interface> disable*	interfaces-geneve.xml.in: interfaces geneve <geneve> disable	interfaces geneve <text> disable
×	*set interfaces geneve <interface> disable-flow-control*	Nothing found in XML Definitions	Nothing found in VyOS
×	*set interfaces geneve <interface> disable-link-detect*	Nothing found in XML Definitions	Nothing found in VyOS
×	*set interfaces geneve gnv0 remote <address>*	Nothing found in XML Definitions	Nothing found in VyOS
×	*set interfaces geneve gnv0 vni <vni>*	Nothing found in XML Definitions	Nothing found in VyOS
✓	*set interfaces geneve <interface> ip arp-cache-timeout*	interfaces-geneve.xml.in: interfaces geneve <geneve> ip arp-cache-timeout	interfaces geneve <text> ip arp-cache-timeout <value>
✓	*set interfaces geneve <interface> ip disable-arp-filter*	interfaces-geneve.xml.in: interfaces geneve <geneve> ip disable-arp-filter	interfaces geneve <text> ip disable-arp-filter
✓	*set interfaces geneve <interface> ip disable-forwarding*	interfaces-geneve.xml.in: interfaces geneve <geneve> ip disable-forwarding	interfaces geneve <text> ip disable-forwarding
✓	*set interfaces geneve <interface> ip enable-arp-accept*	interfaces-geneve.xml.in: interfaces geneve <geneve> ip enable-arp-accept	interfaces geneve <text> ip enable-arp-accept
✓	*set interfaces geneve <interface> ip enable-arp-announce*	interfaces-geneve.xml.in: interfaces geneve <geneve> ip enable-arp-announce	interfaces geneve <text> ip enable-arp-announce

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set interfaces geneve <interface> ip enable-arp-ignore*	interfaces-geneve.xml.in: interfaces geneve <geneve> ip enable-arp-ignore	interfaces geneve <text> ip enable-arp-ignore
✓	*set interfaces geneve <interface> ip enable-proxy-arp*	interfaces-geneve.xml.in: interfaces geneve <geneve> ip enable-proxy-arp	interfaces geneve <text> ip enable-proxy-arp
✓	*set interfaces geneve <interface> ip proxy-arp-pvlan*	interfaces-geneve.xml.in: interfaces geneve <geneve> ip proxy-arp-pvlan	interfaces geneve <text> ip proxy-arp-pvlan
✓	*set interfaces geneve <interface> ip source-validation <strict | loose | disable>*	interfaces-geneve.xml.in: interfaces geneve <geneve> ip source-validation	interfaces geneve <text> ip source-validation <value>
✓	*set interfaces geneve <interface> ipv6 address autoconf*	interfaces-geneve.xml.in: interfaces geneve <geneve> ipv6 address autoconf	interfaces geneve <text> ipv6 address autoconf
✓	*set interfaces geneve <interface> ipv6 address eui64 <prefix>*	interfaces-geneve.xml.in: interfaces geneve <geneve> ipv6 address eui64	interfaces geneve <text> ipv6 address eui64 <value>
✓	*set interfaces geneve <interface> ipv6 address no-default-link-local*	interfaces-geneve.xml.in: interfaces geneve <geneve> ipv6 address no-default-link-local	interfaces geneve <text> ipv6 address no-default-link-local
✓	*set interfaces geneve <interface> ipv6 disable-forwarding*	interfaces-geneve.xml.in: interfaces geneve <geneve> ipv6 disable-forwarding	interfaces geneve <text> ipv6 disable-forwarding
×	not yet documented	interfaces-geneve.xml.in: interfaces geneve <geneve> ipv6 dup-addr-detect-transmits	interfaces geneve <text> ipv6 dup-addr-detect-transmits <value>
✓	*set interfaces geneve <interface> mac <xx:xx:xx:xx:xx:xx>*	interfaces-geneve.xml.in: interfaces geneve <geneve> mac	interfaces geneve <text> mac <value>
✓	*set interfaces geneve <interface> mtu <mtu>*	interfaces-geneve.xml.in: interfaces geneve <geneve> mtu	interfaces geneve <text> mtu <value>
×	not yet documented	interfaces-geneve.xml.in: interfaces geneve <geneve> remote	interfaces geneve <text> remote <value>
×	not yet documented	interfaces-geneve.xml.in: interfaces geneve <geneve> vni	interfaces geneve <text> vni <value>
×	*set interfaces geneve <interface> vrf <vrf>*	Nothing found in XML Definitions	Nothing found in VyOS

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces input <text> description <value>
×	not yet documented	Nothing found in XML Definitions	interfaces input <text> firewall in ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces input <text> firewall in name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces input <text> firewall local ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces input <text> firewall local name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces input <text> firewall out ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces input <text> firewall out name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces input <text> policy ipv6-route <value>
×	not yet documented	Nothing found in XML Definitions	interfaces input <text> policy route <value>
×	not yet documented	Nothing found in XML Definitions	interfaces input <text> redirect <value>
×	not yet documented	Nothing found in XML Definitions	interfaces input <text> traffic-policy in <value>
×	not yet documented	Nothing found in XML Definitions	interfaces input <text> traffic-policy out <value>
×	*set interfaces <inttype> <interface> ip ospf authentication md5 key-id <id> md5-key <text>*	Nothing found in XML Definitions	Nothing found in VyOS
×	*set interfaces <inttype> <interface> ip ospf authentication plaintext-password <text>*	Nothing found in XML Definitions	Nothing found in VyOS
×	*set interfaces <inttype> <interface> ip ospf bandwidth <number>*	Nothing found in XML Definitions	Nothing found in VyOS
×	*set interfaces <inttype> <interface> ip ospf cost <number>*	Nothing found in XML Definitions	Nothing found in VyOS

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	*set interfaces <inttype> <interface> ip ospf dead-interval <number>*	Nothing found in XML Definitions	Nothing found in VyOS
×	*set interfaces <inttype> <interface> ip ospf hello-interval <number>*	Nothing found in XML Definitions	Nothing found in VyOS
×	*set interfaces <inttype> <interface> ip ospf mtu-ignore*	Nothing found in XML Definitions	Nothing found in VyOS
×	*set interfaces <inttype> <interface> ip ospf network <type>*	Nothing found in XML Definitions	Nothing found in VyOS
×	*set interfaces <inttype> <interface> ip ospf priority <number>*	Nothing found in XML Definitions	Nothing found in VyOS
×	*set interfaces <inttype> <interface> ip ospf retransmit-interval <number>*	Nothing found in XML Definitions	Nothing found in VyOS
×	*set interfaces <inttype> <interface> ip ospf transmit-delay <number>*	Nothing found in XML Definitions	Nothing found in VyOS
×	*set interfaces <inttype> <intname> ip rip authentication md5 <id> password <text>*	Nothing found in XML Definitions	Nothing found in VyOS
×	*set interfaces <inttype> <intname> ip rip authentication plaintext-password <text>*	Nothing found in XML Definitions	Nothing found in VyOS
×	*set interfaces <inttype> <intname> ip rip split-horizon disable*	Nothing found in XML Definitions	Nothing found in VyOS

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	*set interfaces <inttype> <intname> ip rip split-horizon poison-reverse*	Nothing found in XML Definitions	Nothing found in VyOS
×	*set interfaces <inttype> <interface> ipv6 ospfv3 cost <number>*	Nothing found in XML Definitions	Nothing found in VyOS
×	*set interfaces <inttype> <interface> ipv6 ospfv3 dead-interval <number>*	Nothing found in XML Definitions	Nothing found in VyOS
×	*set interfaces <inttype> <interface> ipv6 ospfv3 hello-interval <number>*	Nothing found in XML Definitions	Nothing found in VyOS
×	*set interfaces <inttype> <interface> ipv6 ospfv3 mtu-ignore*	Nothing found in XML Definitions	Nothing found in VyOS
×	*set interfaces <inttype> <interface> ipv6 ospfv3 network <type>*	Nothing found in XML Definitions	Nothing found in VyOS
×	*set interfaces <inttype> <interface> ipv6 ospfv3 passive*	Nothing found in XML Definitions	Nothing found in VyOS
×	*set interfaces <inttype> <interface> ipv6 ospfv3 priority <number>*	Nothing found in XML Definitions	Nothing found in VyOS
×	*set interfaces <inttype> <interface> ipv6 ospfv3 retransmit-interval <number>*	Nothing found in XML Definitions	Nothing found in VyOS
×	*set interfaces <inttype> <interface> ipv6 ospfv3 transmit-delay <number>*	Nothing found in XML Definitions	Nothing found in VyOS

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set interfaces l2tpv3 <interface> address <address>*	interfaces-l2tpv3.xml.in: interfaces l2tpv3 <l2tpv3> address	interfaces l2tpv3 <text> address <value>
✓	*set interfaces l2tpv3 <interface> description <description>*	interfaces-l2tpv3.xml.in: interfaces l2tpv3 <l2tpv3> description	interfaces l2tpv3 <text> description <value>
×	not yet documented	interfaces-l2tpv3.xml.in: interfaces l2tpv3 <l2tpv3> destination-port	interfaces l2tpv3 <text> destination-port <value>
✓	*set interfaces l2tpv3 <interface> disable*	interfaces-l2tpv3.xml.in: interfaces l2tpv3 <l2tpv3> disable	interfaces l2tpv3 <text> disable
×	*set interfaces l2tpv3 <interface> disable-flow-control*	Nothing found in XML Definitions	Nothing found in VyOS
×	*set interfaces l2tpv3 <interface> disable-link-detect*	Nothing found in XML Definitions	Nothing found in VyOS
✓	*set interfaces l2tpv3 <interface> encapsulation <udp | ip>*	interfaces-l2tpv3.xml.in: interfaces l2tpv3 <l2tpv3> encapsulation	interfaces l2tpv3 <text> encapsulation <value>
×	not yet documented	Nothing found in XML Definitions	interfaces l2tpv3 <text> firewall in ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces l2tpv3 <text> firewall in name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces l2tpv3 <text> firewall local ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces l2tpv3 <text> firewall local name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces l2tpv3 <text> firewall out ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces l2tpv3 <text> firewall out name <value>
✓	*set interfaces l2tpv3 <interface> ip arp-cache-timeout*	interfaces-l2tpv3.xml.in: interfaces l2tpv3 <l2tpv3> ip arp-cache-timeout	interfaces l2tpv3 <text> ip arp-cache-timeout <value>
✓	*set interfaces l2tpv3 <interface> ip disable-arp-filter*	interfaces-l2tpv3.xml.in: interfaces l2tpv3 <l2tpv3> ip disable-arp-filter	interfaces l2tpv3 <text> ip disable-arp-filter

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	***set interfaces l2tpv3 <interface> ip disable-forwarding***	interfaces-l2tpv3.xml.in: interfaces l2tpv3 <l2tpv3> ip disable-forwarding	interfaces l2tpv3 <text> ip disable-forwarding
✓	***set interfaces l2tpv3 <interface> ip enable-arp-accept***	interfaces-l2tpv3.xml.in: interfaces l2tpv3 <l2tpv3> ip enable-arp-accept	interfaces l2tpv3 <text> ip enable-arp-accept
✓	***set interfaces l2tpv3 <interface> ip enable-arp-announce***	interfaces-l2tpv3.xml.in: interfaces l2tpv3 <l2tpv3> ip enable-arp-announce	interfaces l2tpv3 <text> ip enable-arp-announce
✓	***set interfaces l2tpv3 <interface> ip enable-arp-ignore***	interfaces-l2tpv3.xml.in: interfaces l2tpv3 <l2tpv3> ip enable-arp-ignore	interfaces l2tpv3 <text> ip enable-arp-ignore
✓	***set interfaces l2tpv3 <interface> ip enable-proxy-arp***	interfaces-l2tpv3.xml.in: interfaces l2tpv3 <l2tpv3> ip enable-proxy-arp	interfaces l2tpv3 <text> ip enable-proxy-arp
×	not yet documented	Nothing found in XML Definitions	interfaces l2tpv3 <text> ip ospf authentication md5 key-id <text> md5-key <value>
×	not yet documented	Nothing found in XML Definitions	interfaces l2tpv3 <text> ip ospf authentication plaintext-password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces l2tpv3 <text> ip ospf bandwidth <value>
×	not yet documented	Nothing found in XML Definitions	interfaces l2tpv3 <text> ip ospf bfd
×	not yet documented	Nothing found in XML Definitions	interfaces l2tpv3 <text> ip ospf cost <value>
×	not yet documented	Nothing found in XML Definitions	interfaces l2tpv3 <text> ip ospf dead-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces l2tpv3 <text> ip ospf hello-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces l2tpv3 <text> ip ospf mtu-ignore
×	not yet documented	Nothing found in XML Definitions	interfaces l2tpv3 <text> ip ospf network <value>
×	not yet documented	Nothing found in XML Definitions	interfaces l2tpv3 <text> ip ospf priority <value>
×	not yet documented	Nothing found in XML Definitions	interfaces l2tpv3 <text> ip ospf retransmit-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces l2tpv3 <text> ip ospf transmit-delay <value>

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	***set interfaces l2tpv3 <interface> ip proxy-arp-pvlan***	interfaces-l2tpv3.xml.in: interfaces l2tpv3 <l2tpv3> ip proxy-arp-pvlan	interfaces l2tpv3 <text> ip proxy-arp-pvlan
×	not yet documented	Nothing found in XML Definitions	interfaces l2tpv3 <text> ip rip authentication md5 <text> password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces l2tpv3 <text> ip rip authentication plaintext-password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces l2tpv3 <text> ip rip split-horizon disable
×	not yet documented	Nothing found in XML Definitions	interfaces l2tpv3 <text> ip rip split-horizon poison-reverse
✓	***set interfaces l2tpv3 <interface> ip source-validation <strict | loose | disable>***	interfaces-l2tpv3.xml.in: interfaces l2tpv3 <l2tpv3> ip source-validation	interfaces l2tpv3 <text> ip source-validation <value>
✓	***set interfaces l2tpv3 <interface> ipv6 address autoconf***	interfaces-l2tpv3.xml.in: interfaces l2tpv3 <l2tpv3> ipv6 address autoconf	interfaces l2tpv3 <text> ipv6 address autoconf
✓	***set interfaces l2tpv3 <interface> ipv6 address eui64 <prefix>***	interfaces-l2tpv3.xml.in: interfaces l2tpv3 <l2tpv3> ipv6 address eui64	interfaces l2tpv3 <text> ipv6 address eui64 <value>
✓	***set interfaces l2tpv3 <interface> ipv6 address no-default-link-local***	interfaces-l2tpv3.xml.in: interfaces l2tpv3 <l2tpv3> ipv6 address no-default-link-local	interfaces l2tpv3 <text> ipv6 address no-default-link-local
✓	***set interfaces l2tpv3 <interface> ipv6 disable-forwarding***	interfaces-l2tpv3.xml.in: interfaces l2tpv3 <l2tpv3> ipv6 disable-forwarding	interfaces l2tpv3 <text> ipv6 disable-forwarding
×	not yet documented	interfaces-l2tpv3.xml.in: interfaces l2tpv3 <l2tpv3> ipv6 dup-addr-detect-transmits	interfaces l2tpv3 <text> ipv6 dup-addr-detect-transmits <value>
×	not yet documented	Nothing found in XML Definitions	interfaces l2tpv3 <text> ipv6 ospfv3 bfd
×	not yet documented	Nothing found in XML Definitions	interfaces l2tpv3 <text> ipv6 ospfv3 cost <value>
×	not yet documented	Nothing found in XML Definitions	interfaces l2tpv3 <text> ipv6 ospfv3 dead-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces l2tpv3 <text> ipv6 ospfv3 hello-interval <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces l2tpv3 <text> ipv6 ospfv3 ifmtu <value>
×	not yet documented	Nothing found in XML Definitions	interfaces l2tpv3 <text> ipv6 ospfv3 instance-id <value>
×	not yet documented	Nothing found in XML Definitions	interfaces l2tpv3 <text> ipv6 ospfv3 mtu-ignore
×	not yet documented	Nothing found in XML Definitions	interfaces l2tpv3 <text> ipv6 ospfv3 network <value>
×	not yet documented	Nothing found in XML Definitions	interfaces l2tpv3 <text> ipv6 ospfv3 passive
×	not yet documented	Nothing found in XML Definitions	interfaces l2tpv3 <text> ipv6 ospfv3 priority <value>
×	not yet documented	Nothing found in XML Definitions	interfaces l2tpv3 <text> ipv6 ospfv3 retransmit-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces l2tpv3 <text> ipv6 ospfv3 transmit-delay <value>
×	not yet documented	Nothing found in XML Definitions	interfaces l2tpv3 <text> ipv6 ripng split-horizon disable
×	not yet documented	Nothing found in XML Definitions	interfaces l2tpv3 <text> ipv6 ripng split-horizon poison-reverse
×	*set interfaces l2tpv3 <interface> mac <xx:xx:xx:xx:xx:xx>*	Nothing found in XML Definitions	Nothing found in VyOS
✓	*set interfaces l2tpv3 <interface> mtu <mtu>*	interfaces-l2tpv3.xml.in: interfaces l2tpv3 <l2tpv3> mtu	interfaces l2tpv3 <text> mtu <value>
✓	*set interfaces l2tpv3 <interface> peer-session-id <id>*	interfaces-l2tpv3.xml.in: interfaces l2tpv3 <l2tpv3> peer-session-id	interfaces l2tpv3 <text> peer-session-id <value>
✓	*set interfaces l2tpv3 <interface> peer-tunnel-id <id>*	interfaces-l2tpv3.xml.in: interfaces l2tpv3 <l2tpv3> peer-tunnel-id	interfaces l2tpv3 <text> peer-tunnel-id <value>
×	not yet documented	Nothing found in XML Definitions	interfaces l2tpv3 <text> policy ipv6-route <value>
×	not yet documented	Nothing found in XML Definitions	interfaces l2tpv3 <text> policy route <value>
×	not yet documented	Nothing found in XML Definitions	interfaces l2tpv3 <text> redirect <value>
✓	*set interfaces l2tpv3 <interface> remote <address>*	interfaces-l2tpv3.xml.in: interfaces l2tpv3 <l2tpv3> remote	interfaces l2tpv3 <text> remote <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	***set interfaces l2tpv3 <interface> session-id <id>***	interfaces-l2tpv3.xml.in: interfaces l2tpv3 <l2tpv3> session-id	interfaces l2tpv3 <text> session-id <value>
✓	***set interfaces l2tpv3 <interface> source-address <address>***	interfaces-l2tpv3.xml.in: interfaces l2tpv3 <l2tpv3> source-address	interfaces l2tpv3 <text> source-address <value>
×	not yet documented	interfaces-l2tpv3.xml.in: interfaces l2tpv3 <l2tpv3> source-port	interfaces l2tpv3 <text> source-port <value>
×	not yet documented	Nothing found in XML Definitions	interfaces l2tpv3 <text> traffic-policy in <value>
×	not yet documented	Nothing found in XML Definitions	interfaces l2tpv3 <text> traffic-policy out <value>
✓	***set interfaces l2tpv3 <interface> tunnel-id <id>***	interfaces-l2tpv3.xml.in: interfaces l2tpv3 <l2tpv3> tunnel-id	interfaces l2tpv3 <text> tunnel-id <value>
✓	***set interfaces l2tpv3 <interface> vrf <vrf>***	interfaces-l2tpv3.xml.in: interfaces l2tpv3 <l2tpv3> vrf	interfaces l2tpv3 <text> vrf <value>
✓	***set interfaces loopback <interface> address <address>***	interfaces-loopback.xml.in: interfaces loopback <loopback> address	interfaces loopback <text> address <value>
✓	***set interfaces loopback <interface> description <description>***	interfaces-loopback.xml.in: interfaces loopback <loopback> description	interfaces loopback <text> description <value>
×	not yet documented	Nothing found in XML Definitions	interfaces loopback <text> ip ospf authentication md5 key-id <text> md5-key <value>
×	not yet documented	Nothing found in XML Definitions	interfaces loopback <text> ip ospf authentication plaintext-password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces loopback <text> ip ospf bandwidth <value>
×	not yet documented	Nothing found in XML Definitions	interfaces loopback <text> ip ospf bfd
×	not yet documented	Nothing found in XML Definitions	interfaces loopback <text> ip ospf cost <value>
×	not yet documented	Nothing found in XML Definitions	interfaces loopback <text> ip ospf dead-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces loopback <text> ip ospf hello-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces loopback <text> ip ospf mtu-ignore

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces loopback <text> ip ospf network <value>
×	not yet documented	Nothing found in XML Definitions	interfaces loopback <text> ip ospf priority <value>
×	not yet documented	Nothing found in XML Definitions	interfaces loopback <text> ip ospf retransmit-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces loopback <text> ip ospf transmit-delay <value>
×	not yet documented	Nothing found in XML Definitions	interfaces loopback <text> ip rip authentication md5 <text> password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces loopback <text> ip rip authentication plaintext-password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces loopback <text> ip rip split-horizon disable
×	not yet documented	Nothing found in XML Definitions	interfaces loopback <text> ip rip split-horizon poison-reverse
×	not yet documented	interfaces-loopback.xml.in: interfaces loopback <loopback> ip source-validation	interfaces loopback <text> ip source-validation <value>
×	not yet documented	Nothing found in XML Definitions	interfaces loopback <text> ipv6 ospfv3 bfd
×	not yet documented	Nothing found in XML Definitions	interfaces loopback <text> ipv6 ospfv3 cost <value>
×	not yet documented	Nothing found in XML Definitions	interfaces loopback <text> ipv6 ospfv3 dead-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces loopback <text> ipv6 ospfv3 hello-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces loopback <text> ipv6 ospfv3 ifmtu <value>
×	not yet documented	Nothing found in XML Definitions	interfaces loopback <text> ipv6 ospfv3 instance-id <value>
×	not yet documented	Nothing found in XML Definitions	interfaces loopback <text> ipv6 ospfv3 mtu-ignore
×	not yet documented	Nothing found in XML Definitions	interfaces loopback <text> ipv6 ospfv3 network <value>
×	not yet documented	Nothing found in XML Definitions	interfaces loopback <text> ipv6 ospfv3 passive

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces loopback <text> ipv6 ospfv3 priority <value>
×	not yet documented	Nothing found in XML Definitions	interfaces loopback <text> ipv6 ospfv3 retransmit-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces loopback <text> ipv6 ospfv3 transmit-delay <value>
×	not yet documented	Nothing found in XML Definitions	interfaces loopback <text> ipv6 ripng split-horizon disable
×	not yet documented	Nothing found in XML Definitions	interfaces loopback <text> ipv6 ripng split-horizon poison-reverse
×	not yet documented	Nothing found in XML Definitions	interfaces loopback <text> redirect <value>
×	not yet documented	Nothing found in XML Definitions	interfaces loopback <text> traffic-policy in <value>
×	not yet documented	Nothing found in XML Definitions	interfaces loopback <text> traffic-policy out <value>
✓	***set interfaces macsec <interface> address <address | dhcp | dhcpv6>***	interfaces-macsec.xml.in: interfaces macsec <macsec> address	interfaces macsec <text> address <value>
✓	***set interfaces macsec <interface> description <description>***	interfaces-macsec.xml.in: interfaces macsec <macsec> description	interfaces macsec <text> description <value>
✓	***set interfaces macsec <interface> dhcp-options client-id <description>***	interfaces-macsec.xml.in: interfaces macsec <macsec> dhcp-options client-id	interfaces macsec <text> dhcp-options client-id <value>
×	not yet documented	interfaces-macsec.xml.in: interfaces macsec <macsec> dhcp-options default-route-distance	interfaces macsec <text> dhcp-options default-route-distance <value>
✓	***set interfaces macsec <interface> dhcp-options host-name <hostname>***	interfaces-macsec.xml.in: interfaces macsec <macsec> dhcp-options host-name	interfaces macsec <text> dhcp-options host-name <value>
×	not yet documented	interfaces-macsec.xml.in: interfaces macsec <macsec> dhcp-options mtu	interfaces macsec <text> dhcp-options mtu
✓	***set interfaces macsec <interface> dhcp-options no-default-route***	interfaces-macsec.xml.in: interfaces macsec <macsec> dhcp-options no-default-route	interfaces macsec <text> dhcp-options no-default-route

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-macsec.xml.in: interfaces macsec <macsec> dhcp-options reject	interfaces macsec <text> dhcp-options reject <value>
✓	***set interfaces macsec <interface> dhcp-options vendor-class-id <vendor-id>***	interfaces-macsec.xml.in: interfaces macsec <macsec> dhcp-options vendor-class-id	interfaces macsec <text> dhcp-options vendor-class-id <value>
✓	***set interfaces macsec <interface> dhcpv6-options duid <duid>***	interfaces-macsec.xml.in: interfaces macsec <macsec> dhcpv6-options duid	interfaces macsec <text> dhcpv6-options duid <value>
✓	***set interfaces macsec <interface> dhcpv6-options parameters-only***	interfaces-macsec.xml.in: interfaces macsec <macsec> dhcpv6-options parameters-only	interfaces macsec <text> dhcpv6-options parameters-only
✓	***set interfaces macsec <interface> dhcpv6-options pd <id> interface <delegatee> address <address>***	interfaces-macsec.xml.in: interfaces macsec <macsec> dhcpv6-options pd <pd> interface <interface> address	interfaces macsec <text> dhcpv6-options pd <text> interface <text> address <value>
✓	***set interfaces macsec <interface> dhcpv6-options pd <id> interface <delegatee> sla-id <id>***	interfaces-macsec.xml.in: interfaces macsec <macsec> dhcpv6-options pd <pd> interface <interface> sla-id	interfaces macsec <text> dhcpv6-options pd <text> interface <text> sla-id <value>
✓	***set interfaces macsec <interface> dhcpv6-options pd <id> length <length>***	interfaces-macsec.xml.in: interfaces macsec <macsec> dhcpv6-options pd <pd> length	interfaces macsec <text> dhcpv6-options pd <text> length <value>
✓	***set interfaces macsec <interface> dhcpv6-options rapid-commit***	interfaces-macsec.xml.in: interfaces macsec <macsec> dhcpv6-options rapid-commit	interfaces macsec <text> dhcpv6-options rapid-commit
✓	***set interfaces macsec <interface> dhcpv6-options temporary***	interfaces-macsec.xml.in: interfaces macsec <macsec> dhcpv6-options temporary	interfaces macsec <text> dhcpv6-options temporary
✓	***set interfaces macsec <interface> disable***	interfaces-macsec.xml.in: interfaces macsec <macsec> disable	interfaces macsec <text> disable
×	***set interfaces macsec <interface> disable-flow-control***	Nothing found in XML Definitions	Nothing found in VyOS
×	***set interfaces macsec <interface> disable-link-detect***	Nothing found in XML Definitions	Nothing found in VyOS

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces macsec <text> firewall in ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces macsec <text> firewall in name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces macsec <text> firewall local ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces macsec <text> firewall local name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces macsec <text> firewall out ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces macsec <text> firewall out name <value>
✓	***set interfaces macsec <interface> ip arp-cache-timeout***	interfaces-macsec.xml.in: interfaces macsec <macsec> ip arp-cache-timeout	interfaces macsec <text> ip arp-cache-timeout <value>
✓	***set interfaces macsec <interface> ip disable-arp-filter***	interfaces-macsec.xml.in: interfaces macsec <macsec> ip disable-arp-filter	interfaces macsec <text> ip disable-arp-filter
✓	***set interfaces macsec <interface> ip disable-forwarding***	interfaces-macsec.xml.in: interfaces macsec <macsec> ip disable-forwarding	interfaces macsec <text> ip disable-forwarding
✓	***set interfaces macsec <interface> ip enable-arp-accept***	interfaces-macsec.xml.in: interfaces macsec <macsec> ip enable-arp-accept	interfaces macsec <text> ip enable-arp-accept
✓	***set interfaces macsec <interface> ip enable-arp-announce***	interfaces-macsec.xml.in: interfaces macsec <macsec> ip enable-arp-announce	interfaces macsec <text> ip enable-arp-announce
✓	***set interfaces macsec <interface> ip enable-arp-ignore***	interfaces-macsec.xml.in: interfaces macsec <macsec> ip enable-arp-ignore	interfaces macsec <text> ip enable-arp-ignore
✓	***set interfaces macsec <interface> ip enable-proxy-arp***	interfaces-macsec.xml.in: interfaces macsec <macsec> ip enable-proxy-arp	interfaces macsec <text> ip enable-proxy-arp
×	not yet documented	Nothing found in XML Definitions	interfaces macsec <text> ip ospf authentication md5 key-id <text> md5-key <value>
×	not yet documented	Nothing found in XML Definitions	interfaces macsec <text> ip ospf authentication plaintext-password <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces macsec <text> ip ospf bandwidth <value>
×	not yet documented	Nothing found in XML Definitions	interfaces macsec <text> ip ospf bfd
×	not yet documented	Nothing found in XML Definitions	interfaces macsec <text> ip ospf cost <value>
×	not yet documented	Nothing found in XML Definitions	interfaces macsec <text> ip ospf dead-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces macsec <text> ip ospf hello-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces macsec <text> ip ospf mtu-ignore
×	not yet documented	Nothing found in XML Definitions	interfaces macsec <text> ip ospf network <value>
×	not yet documented	Nothing found in XML Definitions	interfaces macsec <text> ip ospf priority <value>
×	not yet documented	Nothing found in XML Definitions	interfaces macsec <text> ip ospf retransmit-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces macsec <text> ip ospf transmit-delay <value>
✓	*set interfaces macsec <interface> ip proxy-arp-pvlan*	interfaces-macsec.xml.in: interfaces macsec <macsec> ip proxy-arp-pvlan	interfaces macsec <text> ip proxy-arp-pvlan
×	not yet documented	Nothing found in XML Definitions	interfaces macsec <text> ip rip authentication md5 <text> password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces macsec <text> ip rip authentication plaintext-password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces macsec <text> ip rip split-horizon disable
×	not yet documented	Nothing found in XML Definitions	interfaces macsec <text> ip rip split-horizon poison-reverse
✓	*set interfaces macsec <interface> ip source-validation <strict | loose | disable>*	interfaces-macsec.xml.in: interfaces macsec <macsec> ip source-validation	interfaces macsec <text> ip source-validation <value>
✓	*set interfaces macsec <interface> ipv6 address autoconf*	interfaces-macsec.xml.in: interfaces macsec <macsec> ipv6 address autoconf	interfaces macsec <text> ipv6 address autoconf

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	***set interfaces macsec <interface> ipv6 address eui64 <prefix>***	interfaces-macsec.xml.in: interfaces macsec <macsec> ipv6 address eui64	interfaces macsec <text> ipv6 address eui64 <value>
✓	***set interfaces macsec <interface> ipv6 address no-default-link-local***	interfaces-macsec.xml.in: interfaces macsec <macsec> ipv6 address no-default-link-local	interfaces macsec <text> ipv6 address no-default-link-local
✓	***set interfaces macsec <interface> ipv6 disable-forwarding***	interfaces-macsec.xml.in: interfaces macsec <macsec> ipv6 disable-forwarding	interfaces macsec <text> ipv6 disable-forwarding
×	not yet documented	interfaces-macsec.xml.in: interfaces macsec <macsec> ipv6 dup-addr-detect-transmits	interfaces macsec <text> ipv6 dup-addr-detect-transmits <value>
×	not yet documented	Nothing found in XML Definitions	interfaces macsec <text> ipv6 ospfv3 bfd
×	not yet documented	Nothing found in XML Definitions	interfaces macsec <text> ipv6 ospfv3 cost <value>
×	not yet documented	Nothing found in XML Definitions	interfaces macsec <text> ipv6 ospfv3 dead-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces macsec <text> ipv6 ospfv3 hello-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces macsec <text> ipv6 ospfv3 ifmtu <value>
×	not yet documented	Nothing found in XML Definitions	interfaces macsec <text> ipv6 ospfv3 instance-id <value>
×	not yet documented	Nothing found in XML Definitions	interfaces macsec <text> ipv6 ospfv3 mtu-ignore
×	not yet documented	Nothing found in XML Definitions	interfaces macsec <text> ipv6 ospfv3 network <value>
×	not yet documented	Nothing found in XML Definitions	interfaces macsec <text> ipv6 ospfv3 passive
×	not yet documented	Nothing found in XML Definitions	interfaces macsec <text> ipv6 ospfv3 priority <value>
×	not yet documented	Nothing found in XML Definitions	interfaces macsec <text> ipv6 ospfv3 retransmit-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces macsec <text> ipv6 ospfv3 transmit-delay <value>
×	not yet documented	Nothing found in XML Definitions	interfaces macsec <text> ipv6 ripng split-horizon disable

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces macsec <text> ipv6 ripng split-horizon poison-reverse
×	***set interfaces macsec <interface> mac <xx:xx:xx:xx:xx:xx>***	Nothing found in XML Definitions	Nothing found in VyOS
✓	***set interfaces macsec <interface> mtu <mtu>***	interfaces-macsec.xml.in: interfaces macsec <macsec> mtu	interfaces macsec <text> mtu <value>
×	not yet documented	Nothing found in XML Definitions	interfaces macsec <text> policy ipv6-route <value>
×	not yet documented	Nothing found in XML Definitions	interfaces macsec <text> policy route <value>
×	not yet documented	Nothing found in XML Definitions	interfaces macsec <text> redirect <value>
✓	***set interfaces macsec <interface> security cipher <gcm-aes-128|gcm-aes-***	interfaces-macsec.xml.in: interfaces macsec <macsec> security cipher	interfaces macsec <text> security cipher <value>
✓	***set interfaces macsec <interface> security encrypt***	interfaces-macsec.xml.in: interfaces macsec <macsec> security encrypt	interfaces macsec <text> security encrypt
✓	***set interfaces macsec <interface> security mka cak <key>***	interfaces-macsec.xml.in: interfaces macsec <macsec> security mka cak	interfaces macsec <text> security mka cak <value>
✓	***set interfaces macsec <interface> security mka ckn <key>***	interfaces-macsec.xml.in: interfaces macsec <macsec> security mka ckn	interfaces macsec <text> security mka ckn <value>
✓	***set interfaces macsec <interface> security mka priority <priority>***	interfaces-macsec.xml.in: interfaces macsec <macsec> security mka priority	interfaces macsec <text> security mka priority <value>
✓	***set interfaces macsec <interface> security replay-window <window>***	interfaces-macsec.xml.in: interfaces macsec <macsec> security replay-window	interfaces macsec <text> security replay-window <value>
✓	***set interfaces macsec <interface> source-interface <physical-source>***	interfaces-macsec.xml.in: interfaces macsec <macsec> source-interface	interfaces macsec <text> source-interface <value>
×	not yet documented	Nothing found in XML Definitions	interfaces macsec <text> traffic-policy in <value>
×	not yet documented	Nothing found in XML Definitions	interfaces macsec <text> traffic-policy out <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	***set interfaces macsec <interface> vrf <vrf>***	interfaces-macsec.xml.in: interfaces macsec <macsec> vrf	interfaces macsec <text> vrf <value>
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <openvpn> authentication password	interfaces openvpn <text> authentication password <value>
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <openvpn> authentication username	interfaces openvpn <text> authentication username <value>
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <openvpn> description	interfaces openvpn <text> description <value>
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <openvpn> device-type	interfaces openvpn <text> device-type <value>
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <openvpn> disable	interfaces openvpn <text> disable
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <openvpn> encryption cipher	interfaces openvpn <text> encryption cipher <value>
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <openvpn> encryption ncp-ciphers	interfaces openvpn <text> encryption ncp-ciphers <value>
×	not yet documented	Nothing found in XML Definitions	interfaces openvpn <text> firewall in ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces openvpn <text> firewall in name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces openvpn <text> firewall local ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces openvpn <text> firewall local name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces openvpn <text> firewall out ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces openvpn <text> firewall out name <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <openvpn> hash	interfaces openvpn <text> hash <value>
×	not yet documented	Nothing found in XML Definitions	interfaces openvpn <text> ip ospf authentication md5 key-id <text> md5-key <value>
×	not yet documented	Nothing found in XML Definitions	interfaces openvpn <text> ip ospf authentication plaintext-password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces openvpn <text> ip ospf bandwidth <value>
×	not yet documented	Nothing found in XML Definitions	interfaces openvpn <text> ip ospf bfd
×	not yet documented	Nothing found in XML Definitions	interfaces openvpn <text> ip ospf cost <value>
×	not yet documented	Nothing found in XML Definitions	interfaces openvpn <text> ip ospf dead-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces openvpn <text> ip ospf hello-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces openvpn <text> ip ospf mtu-ignore
×	not yet documented	Nothing found in XML Definitions	interfaces openvpn <text> ip ospf network <value>
×	not yet documented	Nothing found in XML Definitions	interfaces openvpn <text> ip ospf priority <value>
×	not yet documented	Nothing found in XML Definitions	interfaces openvpn <text> ip ospf retransmit-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces openvpn <text> ip ospf transmit-delay <value>
×	not yet documented	Nothing found in XML Definitions	interfaces openvpn <text> ip rip authentication md5 <text> password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces openvpn <text> ip rip authentication plaintext-password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces openvpn <text> ip rip split-horizon disable
×	not yet documented	Nothing found in XML Definitions	interfaces openvpn <text> ip rip split-horizon poison-reverse

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <openvpn> ipv6 address autoconf	interfaces openvpn <text> ipv6 address autoconf
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <openvpn> ipv6 address eui64	interfaces openvpn <text> ipv6 address eui64 <value>
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <openvpn> ipv6 address no-default-link-local	interfaces openvpn <text> ipv6 address no-default-link-local
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <openvpn> ipv6 disable-forwarding	interfaces openvpn <text> ipv6 disable-forwarding
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <openvpn> ipv6 dup-addr-detect-transmits	interfaces openvpn <text> ipv6 dup-addr-detect-transmits <value>
×	not yet documented	Nothing found in XML Definitions	interfaces openvpn <text> ipv6 ospfv3 bfd
×	not yet documented	Nothing found in XML Definitions	interfaces openvpn <text> ipv6 ospfv3 cost <value>
×	not yet documented	Nothing found in XML Definitions	interfaces openvpn <text> ipv6 ospfv3 dead-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces openvpn <text> ipv6 ospfv3 hello-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces openvpn <text> ipv6 ospfv3 ifmtu <value>
×	not yet documented	Nothing found in XML Definitions	interfaces openvpn <text> ipv6 ospfv3 instance-id <value>
×	not yet documented	Nothing found in XML Definitions	interfaces openvpn <text> ipv6 ospfv3 mtu-ignore
×	not yet documented	Nothing found in XML Definitions	interfaces openvpn <text> ipv6 ospfv3 network <value>
×	not yet documented	Nothing found in XML Definitions	interfaces openvpn <text> ipv6 ospfv3 passive
×	not yet documented	Nothing found in XML Definitions	interfaces openvpn <text> ipv6 ospfv3 priority <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces openvpn <text> ipv6 ospfv3 retransmit-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces openvpn <text> ipv6 ospfv3 transmit-delay <value>
×	not yet documented	Nothing found in XML Definitions	interfaces openvpn <text> ipv6 ripng split-horizon disable
×	not yet documented	Nothing found in XML Definitions	interfaces openvpn <text> ipv6 ripng split-horizon poison-reverse
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <open-vpn> keep-alive failure-count	interfaces openvpn <text> keep-alive failure-count <value>
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <open-vpn> keep-alive interval	interfaces openvpn <text> keep-alive interval <value>
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <open-vpn> local-address <local-address> subnet-mask	interfaces openvpn <text> local-address <text> subnet-mask <value>
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <open-vpn> local-host	interfaces openvpn <text> local-host <value>
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <open-vpn> local-port	interfaces openvpn <text> local-port <value>
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <open-vpn> mode	interfaces openvpn <text> mode <value>
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <open-vpn> openvpn-option	interfaces openvpn <text> openvpn-option <value>
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <open-vpn> persistent-tunnel	interfaces openvpn <text> persistent-tunnel
×	not yet documented	Nothing found in XML Definitions	interfaces openvpn <text> policy ipv6-route <value>
×	not yet documented	Nothing found in XML Definitions	interfaces openvpn <text> policy route <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <openvpn> protocol	interfaces openvpn <text> protocol <value>
×	not yet documented	Nothing found in XML Definitions	interfaces openvpn <text> redirect <value>
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <openvpn> remote-address	interfaces openvpn <text> remote-address <value>
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <openvpn> remote-host	interfaces openvpn <text> remote-host <value>
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <openvpn> remote-port	interfaces openvpn <text> remote-port <value>
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <openvpn> replace-default-route local	interfaces openvpn <text> replace-default-route local <value>
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <openvpn> server client-ip-pool disable	interfaces openvpn <text> server client-ip-pool disable
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <openvpn> server client-ip-pool start	interfaces openvpn <text> server client-ip-pool start <value>
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <openvpn> server client-ip-pool stop	interfaces openvpn <text> server client-ip-pool stop <value>
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <openvpn> server client-ip-pool subnet-mask	interfaces openvpn <text> server client-ip-pool subnet-mask <value>
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <openvpn> server client-ipv6-pool base	interfaces openvpn <text> server client-ipv6-pool base <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <openvpn> server client-ipv6-pool disable	interfaces openvpn <text> server client-ipv6-pool disable
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <openvpn> server client <client> disable	interfaces openvpn <text> server client <text> disable
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <openvpn> server client <client> ip	interfaces openvpn <text> server client <text> ip <value>
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <openvpn> server client <client> push-route	interfaces openvpn <text> server client <text> push-route <value>
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <openvpn> server client <client> subnet	interfaces openvpn <text> server client <text> subnet <value>
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <openvpn> server domain-name	interfaces openvpn <text> server domain-name <value>
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <openvpn> server max-connections	interfaces openvpn <text> server max-connections <value>
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <openvpn> server name-server	interfaces openvpn <text> server name-server <value>
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <openvpn> server push-route <push-route> metric	interfaces openvpn <text> server push-route <text> metric <value>
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <openvpn> server reject-unconfigured-clients	interfaces openvpn <text> server reject-unconfigured-clients

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <openvpn> server subnet	interfaces openvpn <text> server subnet <value>
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <openvpn> server topology	interfaces openvpn <text> server topology <value>
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <openvpn> shared-secret-key-file	interfaces openvpn <text> shared-secret-key-file <value>
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <openvpn> tls auth-file	interfaces openvpn <text> tls auth-file <value>
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <openvpn> tls ca-cert-file	interfaces openvpn <text> tls ca-cert-file <value>
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <openvpn> tls cert-file	interfaces openvpn <text> tls cert-file <value>
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <openvpn> tls crl-file	interfaces openvpn <text> tls crl-file <value>
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <openvpn> tls crypt-file	interfaces openvpn <text> tls crypt-file <value>
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <openvpn> tls dh-file	interfaces openvpn <text> tls dh-file <value>
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <openvpn> tls key-file	interfaces openvpn <text> tls key-file <value>
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <openvpn> tls role	interfaces openvpn <text> tls role <value>
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <openvpn> tls tls-version-min	interfaces openvpn <text> tls tls-version-min <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces openvpn <text> traffic-policy in <value>
×	not yet documented	Nothing found in XML Definitions	interfaces openvpn <text> traffic-policy out <value>
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <openvpn> use-lzo-compression	interfaces openvpn <text> use-lzo-compression
×	not yet documented	interfaces-openvpn.xml.in: interfaces openvpn <openvpn> vrf	interfaces openvpn <text> vrf <value>
×	*set interfaces openvpn vtun10 openvpn-option 'persistent-key'*	Nothing found in XML Definitions	Nothing found in VyOS
×	*set interfaces openvpn vtun10 openvpn-option 'push "keepalive 1 10"'*	Nothing found in XML Definitions	Nothing found in VyOS
✓	*set interfaces pppoe <interface> access-concentrator <name>*	interfaces-pppoe.xml.in: interfaces pppoe <pppoe> access-concentrator	interfaces pppoe <text> access-concentrator <value>
✓	*set interfaces pppoe <interface> authentication password <password>*	interfaces-pppoe.xml.in: interfaces pppoe <pppoe> authentication password	interfaces pppoe <text> authentication password <value>
✓	*set interfaces pppoe <interface> authentication user <username>*	interfaces-pppoe.xml.in: interfaces pppoe <pppoe> authentication user	interfaces pppoe <text> authentication user <value>
✓	*set interfaces pppoe <interface> connect-on-demand*	interfaces-pppoe.xml.in: interfaces pppoe <pppoe> connect-on-demand	interfaces pppoe <text> connect-on-demand
✓	*set interfaces pppoe <interface> default-route [auto | force | none]*	interfaces-pppoe.xml.in: interfaces pppoe <pppoe> default-route	interfaces pppoe <text> default-route <value>
✓	*set interfaces pppoe <interface> description <description>*	interfaces-pppoe.xml.in: interfaces pppoe <pppoe> description	interfaces pppoe <text> description <value>
×	not yet documented	interfaces-pppoe.xml.in: interfaces pppoe <pppoe> dhcpv6-options duid	interfaces pppoe <text> dhcpv6-options duid <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-pppoe.xml.in: interfaces pppoe <pppoe> dhcpv6-options parameters-only	interfaces pppoe <text> dhcpv6-options parameters-only
✓	***set interfaces pppoe <interface> dhcpv6-options pd <id> interface <delegatee> address <address>***	interfaces-pppoe.xml.in: interfaces pppoe <pppoe> dhcpv6-options pd <pd> interface <interface> address	interfaces pppoe <text> dhcpv6-options pd <text> interface <text> address <value>
✓	***set interfaces pppoe <interface> dhcpv6-options pd <id> interface <delegatee> sla-id <id>***	interfaces-pppoe.xml.in: interfaces pppoe <pppoe> dhcpv6-options pd <pd> interface <interface> sla-id	interfaces pppoe <text> dhcpv6-options pd <text> interface <text> sla-id <value>
✓	***set interfaces pppoe <interface> dhcpv6-options pd <id> length <length>***	interfaces-pppoe.xml.in: interfaces pppoe <pppoe> dhcpv6-options pd <pd> length	interfaces pppoe <text> dhcpv6-options pd <text> length <value>
×	not yet documented	interfaces-pppoe.xml.in: interfaces pppoe <pppoe> dhcpv6-options rapid-commit	interfaces pppoe <text> dhcpv6-options rapid-commit
×	not yet documented	interfaces-pppoe.xml.in: interfaces pppoe <pppoe> dhcpv6-options temporary	interfaces pppoe <text> dhcpv6-options temporary
✓	***set interfaces pppoe <interface> disable***	interfaces-pppoe.xml.in: interfaces pppoe <pppoe> disable	interfaces pppoe <text> disable
×	not yet documented	Nothing found in XML Definitions	interfaces pppoe <text> firewall in ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pppoe <text> firewall in name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pppoe <text> firewall local ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pppoe <text> firewall local name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pppoe <text> firewall out ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pppoe <text> firewall out name <value>
×	not yet documented	interfaces-pppoe.xml.in: interfaces pppoe <pppoe> host-uniq	interfaces pppoe <text> host-uniq <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	***set interfaces pppoe <interface> idle-timeout <time>***	interfaces-pppoe.xml.in: interfaces pppoe <pppoe> idle-timeout	interfaces pppoe <text> idle-timeout <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pppoe <text> ip ospf authentication md5 key-id <text> md5-key <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pppoe <text> ip ospf authentication plaintext-password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pppoe <text> ip ospf bandwidth <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pppoe <text> ip ospf bfd
×	not yet documented	Nothing found in XML Definitions	interfaces pppoe <text> ip ospf cost <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pppoe <text> ip ospf dead-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pppoe <text> ip ospf hello-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pppoe <text> ip ospf mtu-ignore
×	not yet documented	Nothing found in XML Definitions	interfaces pppoe <text> ip ospf network <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pppoe <text> ip ospf priority <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pppoe <text> ip ospf retransmit-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pppoe <text> ip ospf transmit-delay <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pppoe <text> ip rip authentication md5 <text> password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pppoe <text> ip rip authentication plaintext-password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pppoe <text> ip rip split-horizon disable
×	not yet documented	Nothing found in XML Definitions	interfaces pppoe <text> ip rip split-horizon poison-reverse
×	not yet documented	interfaces-pppoe.xml.in: interfaces pppoe <pppoe> ip source-validation	interfaces pppoe <text> ip source-validation <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	***set interfaces pppoe <interface> ipv6 address autoconf***	interfaces-pppoe.xml.in: interfaces pppoe <pppoe> ipv6 address autoconf	interfaces pppoe <text> ipv6 address autoconf
×	not yet documented	Nothing found in XML Definitions	interfaces pppoe <text> ipv6 ospfv3 bfd
×	not yet documented	Nothing found in XML Definitions	interfaces pppoe <text> ipv6 ospfv3 cost <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pppoe <text> ipv6 ospfv3 dead-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pppoe <text> ipv6 ospfv3 hello-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pppoe <text> ipv6 ospfv3 ifmtu <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pppoe <text> ipv6 ospfv3 instance-id <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pppoe <text> ipv6 ospfv3 mtu-ignore
×	not yet documented	Nothing found in XML Definitions	interfaces pppoe <text> ipv6 ospfv3 network <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pppoe <text> ipv6 ospfv3 passive
×	not yet documented	Nothing found in XML Definitions	interfaces pppoe <text> ipv6 ospfv3 priority <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pppoe <text> ipv6 ospfv3 retransmit-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pppoe <text> ipv6 ospfv3 transmit-delay <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pppoe <text> ipv6 ripng split-horizon disable
×	not yet documented	Nothing found in XML Definitions	interfaces pppoe <text> ipv6 ripng split-horizon poison-reverse
✓	***set interfaces pppoe <interface> local-address <address>***	interfaces-pppoe.xml.in: interfaces pppoe <pppoe> local-address	interfaces pppoe <text> local-address <value>
×	***set interfaces pppoe <interface> mru <mru>***	interfaces-pppoe.xml.in: interfaces pppoe <pppoe> mru	Nothing found in VyOS
✓	***set interfaces pppoe <interface> mtu <mtu>***	interfaces-pppoe.xml.in: interfaces pppoe <pppoe> mtu	interfaces pppoe <text> mtu <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set interfaces pppoe <interface> no-peer-dns*	interfaces-pppoe.xml.in: interfaces pppoe <pppoe> no-peer-dns	interfaces pppoe <text> no-peer-dns
×	not yet documented	Nothing found in XML Definitions	interfaces pppoe <text> policy ipv6-route <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pppoe <text> policy route <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pppoe <text> redirect <value>
✓	*set interfaces pppoe <interface> remote-address <address>*	interfaces-pppoe.xml.in: interfaces pppoe <pppoe> remote-address	interfaces pppoe <text> remote-address <value>
✓	*set interfaces pppoe <interface> service-name <name>*	interfaces-pppoe.xml.in: interfaces pppoe <pppoe> service-name	interfaces pppoe <text> service-name <value>
✓	*set interfaces pppoe <interface> source-interface <source-interface>*	interfaces-pppoe.xml.in: interfaces pppoe <pppoe> source-interface	interfaces pppoe <text> source-interface <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pppoe <text> traffic-policy in <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pppoe <text> traffic-policy out <value>
✓	*set interfaces pppoe <interface> vrf <vrf>*	interfaces-pppoe.xml.in: interfaces pppoe <pppoe> vrf	interfaces pppoe <text> vrf <value>
✓	*set interfaces pseudo-ethernet <interface> address <address | dhcp | dhcpv6>*	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> address	interfaces pseudo-ethernet <text> address <value>
✓	*set interfaces pseudo-ethernet <interface> description <description>*	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> description	interfaces pseudo-ethernet <text> description <value>
✓	*set interfaces pseudo-ethernet <interface> dhcp-options client-id <description>*	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> dhcp-options client-id	interfaces pseudo-ethernet <text> dhcp-options client-id <value>
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> dhcp-options default-route-distance	interfaces pseudo-ethernet <text> dhcp-options default-route-distance <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set interfaces pseudo-ethernet <interface> dhcp-options host-name <hostname>*	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> dhcp-options host-name	interfaces pseudo-ethernet <text> dhcp-options host-name <value>
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> dhcp-options mtu	interfaces pseudo-ethernet <text> dhcp-options mtu
✓	*set interfaces pseudo-ethernet <interface> dhcp-options no-default-route*	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> dhcp-options no-default-route	interfaces pseudo-ethernet <text> dhcp-options no-default-route
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> dhcp-options reject	interfaces pseudo-ethernet <text> dhcp-options reject <value>
✓	*set interfaces pseudo-ethernet <interface> dhcp-options vendor-class-id <vendor-id>*	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> dhcp-options vendor-class-id	interfaces pseudo-ethernet <text> dhcp-options vendor-class-id <value>
✓	*set interfaces pseudo-ethernet <interface> dhcpv6-options duid <duid>*	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> dhcpv6-options duid	interfaces pseudo-ethernet <text> dhcpv6-options duid <value>
✓	*set interfaces pseudo-ethernet <interface> dhcpv6-options parameters-only*	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> dhcpv6-options parameters-only	interfaces pseudo-ethernet <text> dhcpv6-options parameters-only
✓	*set interfaces pseudo-ethernet <interface> dhcpv6-options pd <id> interface <delegatee> address <address>*	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> dhcpv6-options pd <pd> interface <interface> address	interfaces pseudo-ethernet <text> dhcpv6-options pd <text> interface <text> address <value>

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set interfaces pseudo-ethernet <interface> dhcpv6-options pd <id> interface <delegatee> sla-id <id>*	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> dhcpv6-options pd <pd> interface <interface> sla-id	interfaces pseudo-ethernet <text> dhcpv6-options pd <text> interface <text> sla-id <value>
✓	*set interfaces pseudo-ethernet <interface> dhcpv6-options pd <id> length <length>*	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> dhcpv6-options pd <pd> length	interfaces pseudo-ethernet <text> dhcpv6-options pd <text> length <value>
✓	*set interfaces pseudo-ethernet <interface> dhcpv6-options rapid-commit*	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> dhcpv6-options rapid-commit	interfaces pseudo-ethernet <text> dhcpv6-options rapid-commit
✓	*set interfaces pseudo-ethernet <interface> dhcpv6-options temporary*	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> dhcpv6-options temporary	interfaces pseudo-ethernet <text> dhcpv6-options temporary
✓	*set interfaces pseudo-ethernet <interface> disable*	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> disable	interfaces pseudo-ethernet <text> disable
×	*set interfaces pseudo-ethernet <interface> disable-flow-control*	Nothing found in XML Definitions	Nothing found in VyOS
✓	*set interfaces pseudo-ethernet <interface> disable-link-detect*	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> disable-link-detect	interfaces pseudo-ethernet <text> disable-link-detect
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> firewall in ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> firewall in name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> firewall local ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> firewall local name <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> firewall out ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> firewall out name <value>
✓	*set interfaces pseudo-ethernet <interface> ip arp-cache-timeout*	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> ip arp-cache-timeout	interfaces pseudo-ethernet <text> ip arp-cache-timeout <value>
✓	*set interfaces pseudo-ethernet <interface> ip disable-arp-filter*	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> ip disable-arp-filter	interfaces pseudo-ethernet <text> ip disable-arp-filter
✓	*set interfaces pseudo-ethernet <interface> ip disable-forwarding*	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> ip disable-forwarding	interfaces pseudo-ethernet <text> ip disable-forwarding
✓	*set interfaces pseudo-ethernet <interface> ip enable-arp-accept*	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> ip enable-arp-accept	interfaces pseudo-ethernet <text> ip enable-arp-accept
✓	*set interfaces pseudo-ethernet <interface> ip enable-arp-announce*	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> ip enable-arp-announce	interfaces pseudo-ethernet <text> ip enable-arp-announce
✓	*set interfaces pseudo-ethernet <interface> ip enable-arp-ignore*	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> ip enable-arp-ignore	interfaces pseudo-ethernet <text> ip enable-arp-ignore
✓	*set interfaces pseudo-ethernet <interface> ip enable-proxy-arp*	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> ip enable-proxy-arp	interfaces pseudo-ethernet <text> ip enable-proxy-arp
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> ip ospf authentication md5 key-id <text> md5-key <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> ip ospf authentication plaintext-password <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> ip ospf bandwidth <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> ip ospf bfd
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> ip ospf cost <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> ip ospf dead-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> ip ospf hello-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> ip ospf mtu-ignore
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> ip ospf network <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> ip ospf priority <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> ip ospf retransmit-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> ip ospf transmit-delay <value>
✓	*set interfaces pseudo-ethernet <interface> ip proxy-arp-pvlan*	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> ip proxy-arp-pvlan	interfaces pseudo-ethernet <text> ip proxy-arp-pvlan
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> ip rip authentication md5 <text> password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> ip rip authentication plaintext-password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> ip rip split-horizon disable
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> ip rip split-horizon poison-reverse

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set interfaces pseudo-ethernet <interface> ip source-validation <strict | loose | disable>*	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> ip source-validation	interfaces pseudo-ethernet <text> ip source-validation <value>
✓	*set interfaces pseudo-ethernet <interface> ipv6 address autoconf*	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> ipv6 address autoconf	interfaces pseudo-ethernet <text> ipv6 address auto-conf
✓	*set interfaces pseudo-ethernet <interface> ipv6 address eui64 <prefix>*	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> ipv6 address eui64	interfaces pseudo-ethernet <text> ipv6 address eui64 <value>
✓	*set interfaces pseudo-ethernet <interface> ipv6 address no-default-link-local*	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> ipv6 address no-default-link-local	interfaces pseudo-ethernet <text> ipv6 address no-default-link-local
✓	*set interfaces pseudo-ethernet <interface> ipv6 disable-forwarding*	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> ipv6 disable-forwarding	interfaces pseudo-ethernet <text> ipv6 disable-forwarding
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> ipv6 dup-addr-detect-transmits	interfaces pseudo-ethernet <text> ipv6 dup-addr-detect-transmits <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> ipv6 ospfv3 bfd
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> ipv6 ospfv3 cost <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> ipv6 ospfv3 dead-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> ipv6 ospfv3 hello-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> ipv6 ospfv3 ifmtu <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> ipv6 ospfv3 instance-id <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> ipv6 ospfv3 mtu-ignore
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> ipv6 ospfv3 network <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> ipv6 ospfv3 passive
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> ipv6 ospfv3 priority <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> ipv6 ospfv3 retransmit-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> ipv6 ospfv3 transmit-delay <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> ipv6 ripng split-horizon disable
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> ipv6 ripng split-horizon poison-reverse
✓	*set interfaces pseudo-ethernet <interface> mac <xx:xx:xx:xx:xx:xx>*	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> mac	interfaces pseudo-ethernet <text> mac <value>
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> mode	interfaces pseudo-ethernet <text> mode <value>
✓	*set interfaces pseudo-ethernet <interface> mtu <mtu>*	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> mtu	interfaces pseudo-ethernet <text> mtu <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> policy ipv6-route <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> policy route <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> redirect <value>
✓	*set interfaces pseudo-ethernet <interface> source-interface <ethX>*	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> source-interface	interfaces pseudo-ethernet <text> source-interface <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> traffic-policy in <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> traffic-policy out <value>
×	*set interfaces pseudo-ethernet <interface> vif <vlan-id>*	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> address	interfaces pseudo-ethernet <text> vif-s <text> address <value>
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> description	interfaces pseudo-ethernet <text> vif-s <text> description <value>
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> dhcp-options client-id	interfaces pseudo-ethernet <text> vif-s <text> dhcp-options client-id <value>
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> dhcp-options default-route-distance	interfaces pseudo-ethernet <text> vif-s <text> dhcp-options default-route-distance <value>
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> dhcp-options host-name	interfaces pseudo-ethernet <text> vif-s <text> dhcp-options host-name <value>
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> dhcp-options mtu	interfaces pseudo-ethernet <text> vif-s <text> dhcp-options mtu
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> dhcp-options no-default-route	interfaces pseudo-ethernet <text> vif-s <text> dhcp-options no-default-route

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> dhcp-options reject	interfaces pseudo-ethernet <text> vif-s <text> dhcp-options reject <value>
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> dhcp-options vendor-class-id	interfaces pseudo-ethernet <text> vif-s <text> dhcp-options vendor-class-id <value>
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> dhcpv6-options duid	interfaces pseudo-ethernet <text> vif-s <text> dhcpv6-options duid <value>
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> dhcpv6-options parameters-only	interfaces pseudo-ethernet <text> vif-s <text> dhcpv6-options parameters-only
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> dhcpv6-options pd <pd> interface <interface> address	interfaces pseudo-ethernet <text> vif-s <text> dhcpv6-options pd <text> interface <text> address <value>
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> dhcpv6-options pd <pd> interface <interface> sla-id	interfaces pseudo-ethernet <text> vif-s <text> dhcpv6-options pd <text> interface <text> sla-id <value>
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> dhcpv6-options pd <pd> length	interfaces pseudo-ethernet <text> vif-s <text> dhcpv6-options pd <text> length <value>
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> dhcpv6-options rapid-commit	interfaces pseudo-ethernet <text> vif-s <text> dhcpv6-options rapid-commit

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> dhcpv6-options temporary	interfaces pseudo-ethernet <text> vif-s <text> dhcpv6-options temporary
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> disable	interfaces pseudo-ethernet <text> vif-s <text> disable
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> disable-link-detect	interfaces pseudo-ethernet <text> vif-s <text> disable-link-detect
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> firewall in ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> firewall in name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> firewall local ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> firewall local name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> firewall out ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> firewall out name <value>
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> ip arp-cache-timeout	interfaces pseudo-ethernet <text> vif-s <text> ip arp-cache-timeout <value>
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> ip disable-arp-filter	interfaces pseudo-ethernet <text> vif-s <text> ip disable-arp-filter

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> ip disable-forwarding	interfaces pseudo-ethernet <text> vif-s <text> ip disable-forwarding
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> ip enable-arp-accept	interfaces pseudo-ethernet <text> vif-s <text> ip enable-arp-accept
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> ip enable-arp-announce	interfaces pseudo-ethernet <text> vif-s <text> ip enable-arp-announce
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> ip enable-arp-ignore	interfaces pseudo-ethernet <text> vif-s <text> ip enable-arp-ignore
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> ip enable-proxy-arp	interfaces pseudo-ethernet <text> vif-s <text> ip enable-proxy-arp
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> ip ospf authentication md5 key-id <text> md5-key <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> ip ospf authentication plaintext-password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> ip ospf bandwidth <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> ip ospf bfd
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> ip ospf cost <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> ip ospf dead-interval <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> ip ospf hello-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> ip ospf mtu-ignore
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> ip ospf network <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> ip ospf priority <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> ip ospf retransmit-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> ip ospf transmit-delay <value>
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> ip proxy-arp-pvlan	interfaces pseudo-ethernet <text> vif-s <text> ip proxy-arp-pvlan
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> ip rip authentication md5 <text> password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> ip rip authentication plaintext-password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> ip rip split-horizon disable
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> ip rip split-horizon poison-reverse
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> ip source-validation	interfaces pseudo-ethernet <text> vif-s <text> ip source-validation <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> ipv6 address autoconf	interfaces pseudo-ethernet <text> vif-s <text> ipv6 address autoconf
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> ipv6 address eui64	interfaces pseudo-ethernet <text> vif-s <text> ipv6 address eui64 <value>
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> ipv6 address no-default-link-local	interfaces pseudo-ethernet <text> vif-s <text> ipv6 address no-default-link-local
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> ipv6 disable-forwarding	interfaces pseudo-ethernet <text> vif-s <text> ipv6 disable-forwarding
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> ipv6 dup-addr-detect-transmits	interfaces pseudo-ethernet <text> vif-s <text> ipv6 dup-addr-detect-transmits <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> ipv6 ospfv3 bfd
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> ipv6 ospfv3 cost <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> ipv6 ospfv3 dead-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> ipv6 ospfv3 hello-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> ipv6 ospfv3 ifmtu <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> ipv6 ospfv3 instance-id <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> ipv6 ospfv3 mtu-ignore
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> ipv6 ospfv3 network <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> ipv6 ospfv3 passive
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> ipv6 ospfv3 priority <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> ipv6 ospfv3 retransmit-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> ipv6 ospfv3 transmit-delay <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> ipv6 ripng split-horizon disable
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> ipv6 ripng split-horizon poison-reverse
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> mac	interfaces pseudo-ethernet <text> vif-s <text> mac <value>
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> mtu	interfaces pseudo-ethernet <text> vif-s <text> mtu <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> policy ipv6-route <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> policy route <value>
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> protocol	interfaces pseudo-ethernet <text> vif-s <text> protocol <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> vif-c <vif-c> address	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> address <value>
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> vif-c <vif-c> description	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> description <value>
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> vif-c <vif-c> dhcp-options client-id	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> dhcp-options client-id <value>
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> vif-c <vif-c> dhcp-options default-route-distance	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> dhcp-options default-route-distance <value>
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> vif-c <vif-c> dhcp-options host-name	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> dhcp-options host-name <value>
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> vif-c <vif-c> dhcp-options mtu	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> dhcp-options mtu
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> vif-c <vif-c> dhcp-options no-default-route	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> dhcp-options no-default-route
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> vif-c <vif-c> dhcp-options reject	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> dhcp-options reject <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> vif-c <vif-c> dhcp-options vendor-class-id	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> dhcp-options vendor-class-id <value>
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> vif-c <vif-c> dhcpv6-options duid	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> dhcpv6-options duid <value>
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> vif-c <vif-c> dhcpv6-options parameters-only	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> dhcpv6-options parameters-only
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> vif-c <vif-c> dhcpv6-options pd <pd> interface <interface> address	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> dhcpv6-options pd <text> interface <text> address <value>
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> vif-c <vif-c> dhcpv6-options pd <pd> interface <interface> sla-id	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> dhcpv6-options pd <text> interface <text> sla-id <value>
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> vif-c <vif-c> dhcpv6-options pd <pd> length	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> dhcpv6-options pd <text> length <value>
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> vif-c <vif-c> dhcpv6-options rapid-commit	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> dhcpv6-options rapid-commit

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> vif-c <vif-c> dhcpv6-options temporary	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> dhcpv6-options temporary
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> vif-c <vif-c> disable	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> disable
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> vif-c <vif-c> disable-link-detect	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> disable-link-detect
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> firewall in ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> firewall in name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> firewall local ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> firewall local name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> firewall out ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> firewall out name <value>
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> vif-c <vif-c> ip arp-cache-timeout	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> ip arp-cache-timeout <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> vif-c <vif-c> ip disable-arp-filter	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> ip disable-arp-filter
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> vif-c <vif-c> ip disable-forwarding	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> ip disable-forwarding
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> vif-c <vif-c> ip enable-arp-accept	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> ip enable-arp-accept
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> vif-c <vif-c> ip enable-arp-announce	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> ip enable-arp-announce
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> vif-c <vif-c> ip enable-arp-ignore	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> ip enable-arp-ignore
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> vif-c <vif-c> ip enable-proxy-arp	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> ip enable-proxy-arp
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> ip ospf authentication md5 key-id <text> md5-key <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> ip ospf authentication plaintext-password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> ip ospf bandwidth <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> ip ospf bfd
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> ip ospf cost <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> ip ospf dead-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> ip ospf hello-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> ip ospf mtu-ignore
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> ip ospf network <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> ip ospf priority <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> ip ospf retransmit-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> ip ospf transmit-delay <value>
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> vif-c <vif-c> ip proxy-arp-pvlan	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> ip proxy-arp-pvlan
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> ip rip authentication md5 <text> password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> ip rip authentication plaintext-password <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> ip rip split-horizon disable
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> ip rip split-horizon poison-reverse
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> vif-c <vif-c> ip source-validation	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> ip source-validation <value>
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> vif-c <vif-c> ipv6 address autoconf	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> ipv6 address auto-conf
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> vif-c <vif-c> ipv6 address eui64	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> ipv6 address eui64 <value>
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> vif-c <vif-c> ipv6 address no-default-link-local	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> ipv6 address no-default-link-local
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> vif-c <vif-c> ipv6 disable-forwarding	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> ipv6 disable-forwarding
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> vif-c <vif-c> ipv6 dup-addr-detect-transmits	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> ipv6 dup-addr-detect-transmits <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> ipv6 ospfv3 bfd

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> ipv6 ospfv3 cost <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> ipv6 ospfv3 dead-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> ipv6 ospfv3 hello-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> ipv6 ospfv3 ifmtu <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> ipv6 ospfv3 instance-id <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> ipv6 ospfv3 mtu-ignore
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> ipv6 ospfv3 network <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> ipv6 ospfv3 passive
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> ipv6 ospfv3 priority <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> ipv6 ospfv3 retransmit-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> ipv6 ospfv3 transmit-delay <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> ipv6 ripng split-horizon disable

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> ipv6 ripng split-horizon poison-reverse
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> vif-c <vif-c> mac	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> mac <value>
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> vif-c <vif-c> mtu	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> mtu <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> policy ipv6-route <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> policy route <value>
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> vif-c <vif-c> vrf	interfaces pseudo-ethernet <text> vif-s <text> vif-c <text> vrf <value>
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif-s <vif-s> vrf	interfaces pseudo-ethernet <text> vif-s <text> vrf <value>
✓	*set interfaces pseudo-ethernet <interface> vif <vlan-id> address <address | dhcp | dhcpv6>*	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif <vif> address	interfaces pseudo-ethernet <text> vif <text> address <value>
✓	*set interfaces pseudo-ethernet <interface> vif <vlan-id> description <description>*	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif <vif> description	interfaces pseudo-ethernet <text> vif <text> description <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set interfaces pseudo-ethernet <interface> vif <vlan-id> dhcp-options client-id <description>*	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif <vif> dhcp-options client-id	interfaces pseudo-ethernet <text> vif <text> dhcp-options client-id <value>
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif <vif> dhcp-options default-route-distance	interfaces pseudo-ethernet <text> vif <text> dhcp-options default-route-distance <value>
✓	*set interfaces pseudo-ethernet <interface> vif <vlan-id> dhcp-options host-name <hostname>*	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif <vif> dhcp-options host-name	interfaces pseudo-ethernet <text> vif <text> dhcp-options host-name <value>
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif <vif> dhcp-options mtu	interfaces pseudo-ethernet <text> vif <text> dhcp-options mtu
✓	*set interfaces pseudo-ethernet <interface> vif <vlan-id> dhcp-options no-default-route*	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif <vif> dhcp-options no-default-route	interfaces pseudo-ethernet <text> vif <text> dhcp-options no-default-route
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif <vif> dhcp-options reject	interfaces pseudo-ethernet <text> vif <text> dhcp-options reject <value>
✓	*set interfaces pseudo-ethernet <interface> vif <vlan-id> dhcp-options vendor-class-id <vendor-id>*	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif <vif> dhcp-options vendor-class-id	interfaces pseudo-ethernet <text> vif <text> dhcp-options vendor-class-id <value>
✓	*set interfaces pseudo-ethernet <interface> vif <vlan-id> dhcpv6-options duid <duid>*	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif <vif> dhcpv6-options duid	interfaces pseudo-ethernet <text> vif <text> dhcpv6-options duid <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set interfaces pseudo-ethernet <interface> vif <vlan-id> dhcpv6-options parameters-only*	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif <vif> dhcpv6-options parameters-only	interfaces pseudo-ethernet <text> vif <text> dhcpv6-options parameters-only
✓	*set interfaces pseudo-ethernet <interface> vif <vlan-id> dhcpv6-options pd <id> interface <delegatee> address <address>*	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif <vif> dhcpv6-options pd <pd> interface <interface> address	interfaces pseudo-ethernet <text> vif <text> dhcpv6-options pd <text> interface <text> address <value>
✓	*set interfaces pseudo-ethernet <interface> vif <vlan-id> dhcpv6-options pd <id> interface <delegatee> sla-id <id>*	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif <vif> dhcpv6-options pd <pd> interface <interface> sla-id	interfaces pseudo-ethernet <text> vif <text> dhcpv6-options pd <text> interface <text> sla-id <value>
✓	*set interfaces pseudo-ethernet <interface> vif <vlan-id> dhcpv6-options pd <id> length <length>*	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif <vif> dhcpv6-options pd <pd> length	interfaces pseudo-ethernet <text> vif <text> dhcpv6-options pd <text> length <value>
✓	*set interfaces pseudo-ethernet <interface> vif <vlan-id> dhcpv6-options rapid-commit*	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif <vif> dhcpv6-options rapid-commit	interfaces pseudo-ethernet <text> vif <text> dhcpv6-options rapid-commit
✓	*set interfaces pseudo-ethernet <interface> vif <vlan-id> dhcpv6-options temporary*	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif <vif> dhcpv6-options temporary	interfaces pseudo-ethernet <text> vif <text> dhcpv6-options temporary
✓	*set interfaces pseudo-ethernet <interface> vif <vlan-id> disable*	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif <vif> disable	interfaces pseudo-ethernet <text> vif <text> disable

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	***set interfaces pseudo-ethernet <interface> vif <vlan-id> disable-link-detect***	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif <vif> disable-link-detect	interfaces pseudo-ethernet <text> vif <text> disable-link-detect
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif <vif> egress-qos	interfaces pseudo-ethernet <text> vif <text> egress-qos <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif <text> firewall in ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif <text> firewall in name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif <text> firewall local ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif <text> firewall local name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif <text> firewall out ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif <text> firewall out name <value>
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif <vif> ingress-qos	interfaces pseudo-ethernet <text> vif <text> ingress-qos <value>
✓	***set interfaces pseudo-ethernet <interface> vif <vlan-id> ip arp-cache-timeout***	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif <vif> ip arp-cache-timeout	interfaces pseudo-ethernet <text> vif <text> ip arp-cache-timeout <value>
✓	***set interfaces pseudo-ethernet <interface> vif <vlan-id> ip disable-arp-filter***	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif <vif> ip disable-arp-filter	interfaces pseudo-ethernet <text> vif <text> ip disable-arp-filter
✓	***set interfaces pseudo-ethernet <interface> vif <vlan-id> ip disable-forwarding***	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif <vif> ip disable-forwarding	interfaces pseudo-ethernet <text> vif <text> ip disable-forwarding

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	***set interfaces pseudo-ethernet <interface> vif <vlan-id> ip enable-arp-accept***	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif <vif> ip enable-arp-accept	interfaces pseudo-ethernet <text> vif <text> ip enable-arp-accept
✓	***set interfaces pseudo-ethernet <interface> vif <vlan-id> ip enable-arp-announce***	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif <vif> ip enable-arp-announce	interfaces pseudo-ethernet <text> vif <text> ip enable-arp-announce
✓	***set interfaces pseudo-ethernet <interface> vif <vlan-id> ip enable-arp-ignore***	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif <vif> ip enable-arp-ignore	interfaces pseudo-ethernet <text> vif <text> ip enable-arp-ignore
✓	***set interfaces pseudo-ethernet <interface> vif <vlan-id> ip enable-proxy-arp***	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif <vif> ip enable-proxy-arp	interfaces pseudo-ethernet <text> vif <text> ip enable-proxy-arp
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif <text> ip ospf authentication md5 key-id <text> md5-key <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif <text> ip ospf authentication plaintext-password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif <text> ip ospf bandwidth <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif <text> ip ospf bfd
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif <text> ip ospf cost <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif <text> ip ospf dead-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif <text> ip ospf hello-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif <text> ip ospf mtu-ignore

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif <text> ip ospf network <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif <text> ip ospf priority <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif <text> ip ospf retransmit-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif <text> ip ospf transmit-delay <value>
✓	***set interfaces pseudo-ethernet <interface> vif <vlan-id> ip proxy-arp-pvlan***	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif <vif> ip proxy-arp-pvlan	interfaces pseudo-ethernet <text> vif <text> ip proxy-arp-pvlan
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif <text> ip rip authentication md5 <text> password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif <text> ip rip authentication plaintext-password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif <text> ip rip split-horizon disable
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif <text> ip rip split-horizon poison-reverse
✓	***set interfaces pseudo-ethernet <interface> vif <vlan-id> ip source-validation <strict | loose | disable>***	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif <vif> ip source-validation	interfaces pseudo-ethernet <text> vif <text> ip source-validation <value>
✓	***set interfaces pseudo-ethernet <interface> vif <vlan-id> ipv6 address autoconf***	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif <vif> ipv6 address auto-conf	interfaces pseudo-ethernet <text> vif <text> ipv6 address autoconf

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	***set interfaces pseudo-ethernet <interface> vif <vlan-id> ipv6 address eui64 <prefix>***	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif <vif> ipv6 address eui64	interfaces pseudo-ethernet <text> vif <text> ipv6 address eui64 <value>
✓	***set interfaces pseudo-ethernet <interface> vif <vlan-id> ipv6 address no-default-link-local***	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif <vif> ipv6 address no-default-link-local	interfaces pseudo-ethernet <text> vif <text> ipv6 address no-default-link-local
✓	***set interfaces pseudo-ethernet <interface> vif <vlan-id> ipv6 disable-forwarding***	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif <vif> ipv6 disable-forwarding	interfaces pseudo-ethernet <text> vif <text> ipv6 disable-forwarding
×	not yet documented	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif <vif> ipv6 dup-addr-detect-transmits	interfaces pseudo-ethernet <text> vif <text> ipv6 dup-addr-detect-transmits <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif <text> ipv6 ospfv3 bfd
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif <text> ipv6 ospfv3 cost <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif <text> ipv6 ospfv3 dead-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif <text> ipv6 ospfv3 hello-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif <text> ipv6 ospfv3 ifmtu <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif <text> ipv6 ospfv3 instance-id <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif <text> ipv6 ospfv3 mtu-ignore

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif <text> ipv6 ospfv3 network <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif <text> ipv6 ospfv3 passive
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif <text> ipv6 ospfv3 priority <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif <text> ipv6 ospfv3 retransmit-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif <text> ipv6 ospfv3 transmit-delay <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif <text> ipv6 ripng split-horizon disable
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif <text> ipv6 ripng split-horizon poison-reverse
✓	***set interfaces pseudo-ethernet <interface> vif <vlan-id> mac <xx:xx:xx:xx:xx:xx>***	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif <vif> mac	interfaces pseudo-ethernet <text> vif <text> mac <value>
✓	***set interfaces pseudo-ethernet <interface> vif <vlan-id> mtu <mtu>***	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif <vif> mtu	interfaces pseudo-ethernet <text> vif <text> mtu <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif <text> policy ipv6-route <value>
×	not yet documented	Nothing found in XML Definitions	interfaces pseudo-ethernet <text> vif <text> policy route <value>
✓	***set interfaces pseudo-ethernet <interface> vif <vlan-id> vrf <vrf>***	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vif <vif> vrf	interfaces pseudo-ethernet <text> vif <text> vrf <value>
✓	***set interfaces pseudo-ethernet <interface> vrf <vrf>***	interfaces-pseudo-ethernet.xml.in: interfaces pseudo-ethernet <pseudo-ethernet> vrf	interfaces pseudo-ethernet <text> vrf <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-tunnel.xml.in: interfaces tunnel <tunnel> 6rd-prefix	interfaces tunnel <text> 6rd-prefix <value>
×	not yet documented	interfaces-tunnel.xml.in: interfaces tunnel <tunnel> 6rd-relay-prefix	interfaces tunnel <text> 6rd-relay-prefix <value>
✓	*set interfaces tunnel <interface> address <address>*	interfaces-tunnel.xml.in: interfaces tunnel <tunnel> address	interfaces tunnel <text> address <value>
✓	*set interfaces tunnel <interface> description <description>*	interfaces-tunnel.xml.in: interfaces tunnel <tunnel> description	interfaces tunnel <text> description <value>
✓	*set interfaces tunnel <interface> disable*	interfaces-tunnel.xml.in: interfaces tunnel <tunnel> disable	interfaces tunnel <text> disable
×	*set interfaces tunnel <interface> disable-flow-control*	Nothing found in XML Definitions	Nothing found in VyOS
✓	*set interfaces tunnel <interface> disable-link-detect*	interfaces-tunnel.xml.in: interfaces tunnel <tunnel> disable-link-detect	interfaces tunnel <text> disable-link-detect
×	not yet documented	interfaces-tunnel.xml.in: interfaces tunnel <tunnel> encapsulation	interfaces tunnel <text> encapsulation <value>
×	not yet documented	Nothing found in XML Definitions	interfaces tunnel <text> firewall in ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces tunnel <text> firewall in name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces tunnel <text> firewall local ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces tunnel <text> firewall local name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces tunnel <text> firewall out ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces tunnel <text> firewall out name <value>
✓	*set interfaces tunnel <interface> ip arp-cache-timeout*	interfaces-tunnel.xml.in: interfaces tunnel <tunnel> ip arp-cache-timeout	interfaces tunnel <text> ip arp-cache-timeout <value>
✓	*set interfaces tunnel <interface> ip disable-arp-filter*	interfaces-tunnel.xml.in: interfaces tunnel <tunnel> ip disable-arp-filter	interfaces tunnel <text> ip disable-arp-filter

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	***set interfaces tunnel <interface> ip disable-forwarding***	interfaces-tunnel.xml.in: interfaces tunnel <tunnel> ip disable-forwarding	interfaces tunnel <text> ip disable-forwarding
✓	***set interfaces tunnel <interface> ip enable-arp-accept***	interfaces-tunnel.xml.in: interfaces tunnel <tunnel> ip enable-arp-accept	interfaces tunnel <text> ip enable-arp-accept
✓	***set interfaces tunnel <interface> ip enable-arp-announce***	interfaces-tunnel.xml.in: interfaces tunnel <tunnel> ip enable-arp-announce	interfaces tunnel <text> ip enable-arp-announce
✓	***set interfaces tunnel <interface> ip enable-arp-ignore***	interfaces-tunnel.xml.in: interfaces tunnel <tunnel> ip enable-arp-ignore	interfaces tunnel <text> ip enable-arp-ignore
✓	***set interfaces tunnel <interface> ip enable-proxy-arp***	interfaces-tunnel.xml.in: interfaces tunnel <tunnel> ip enable-proxy-arp	interfaces tunnel <text> ip enable-proxy-arp
×	not yet documented	Nothing found in XML Definitions	interfaces tunnel <text> ip ospf authentication md5 key-id <text> md5-key <value>
×	not yet documented	Nothing found in XML Definitions	interfaces tunnel <text> ip ospf authentication plaintext-password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces tunnel <text> ip ospf bandwidth <value>
×	not yet documented	Nothing found in XML Definitions	interfaces tunnel <text> ip ospf bfd
×	not yet documented	Nothing found in XML Definitions	interfaces tunnel <text> ip ospf cost <value>
×	not yet documented	Nothing found in XML Definitions	interfaces tunnel <text> ip ospf dead-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces tunnel <text> ip ospf hello-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces tunnel <text> ip ospf mtu-ignore
×	not yet documented	Nothing found in XML Definitions	interfaces tunnel <text> ip ospf network <value>
×	not yet documented	Nothing found in XML Definitions	interfaces tunnel <text> ip ospf priority <value>
×	not yet documented	Nothing found in XML Definitions	interfaces tunnel <text> ip ospf retransmit-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces tunnel <text> ip ospf transmit-delay <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	***set interfaces tunnel <interface> ip proxy-arp-pvlan***	interfaces-tunnel.xml.in: interfaces tunnel <tunnel> ip proxy-arp-pvlan	interfaces tunnel <text> ip proxy-arp-pvlan
×	not yet documented	Nothing found in XML Definitions	interfaces tunnel <text> ip rip authentication md5 <text> password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces tunnel <text> ip rip authentication plaintext-password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces tunnel <text> ip rip split-horizon disable
×	not yet documented	Nothing found in XML Definitions	interfaces tunnel <text> ip rip split-horizon poison-reverse
✓	***set interfaces tunnel <interface> ip source-validation <strict | loose | disable>***	interfaces-tunnel.xml.in: interfaces tunnel <tunnel> ip source-validation	interfaces tunnel <text> ip source-validation <value>
✓	***set interfaces tunnel <interface> ipv6 address autoconf***	interfaces-tunnel.xml.in: interfaces tunnel <tunnel> ipv6 address autoconf	interfaces tunnel <text> ipv6 address autoconf
✓	***set interfaces tunnel <interface> ipv6 address eui64 <prefix>***	interfaces-tunnel.xml.in: interfaces tunnel <tunnel> ipv6 address eui64	interfaces tunnel <text> ipv6 address eui64 <value>
✓	***set interfaces tunnel <interface> ipv6 address no-default-link-local***	interfaces-tunnel.xml.in: interfaces tunnel <tunnel> ipv6 address no-default-link-local	interfaces tunnel <text> ipv6 address no-default-link-local
✓	***set interfaces tunnel <interface> ipv6 disable-forwarding***	interfaces-tunnel.xml.in: interfaces tunnel <tunnel> ipv6 disable-forwarding	interfaces tunnel <text> ipv6 disable-forwarding
×	not yet documented	interfaces-tunnel.xml.in: interfaces tunnel <tunnel> ipv6 dup-addr-detect-transmits	interfaces tunnel <text> ipv6 dup-addr-detect-transmits <value>
×	not yet documented	Nothing found in XML Definitions	interfaces tunnel <text> ipv6 ospfv3 bfd
×	not yet documented	Nothing found in XML Definitions	interfaces tunnel <text> ipv6 ospfv3 cost <value>
×	not yet documented	Nothing found in XML Definitions	interfaces tunnel <text> ipv6 ospfv3 dead-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces tunnel <text> ipv6 ospfv3 hello-interval <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces tunnel <text> ipv6 ospfv3 ifmtu <value>
×	not yet documented	Nothing found in XML Definitions	interfaces tunnel <text> ipv6 ospfv3 instance-id <value>
×	not yet documented	Nothing found in XML Definitions	interfaces tunnel <text> ipv6 ospfv3 mtu-ignore
×	not yet documented	Nothing found in XML Definitions	interfaces tunnel <text> ipv6 ospfv3 network <value>
×	not yet documented	Nothing found in XML Definitions	interfaces tunnel <text> ipv6 ospfv3 passive
×	not yet documented	Nothing found in XML Definitions	interfaces tunnel <text> ipv6 ospfv3 priority <value>
×	not yet documented	Nothing found in XML Definitions	interfaces tunnel <text> ipv6 ospfv3 retransmit-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces tunnel <text> ipv6 ospfv3 transmit-delay <value>
×	not yet documented	Nothing found in XML Definitions	interfaces tunnel <text> ipv6 ripng split-horizon disable
×	not yet documented	Nothing found in XML Definitions	interfaces tunnel <text> ipv6 ripng split-horizon poison-reverse
✓	*set interfaces tunnel <interface> mtu <mtu>*	interfaces-tunnel.xml.in: interfaces tunnel <tunnel> mtu	interfaces tunnel <text> mtu <value>
×	not yet documented	interfaces-tunnel.xml.in: interfaces tunnel <tunnel> multicast	interfaces tunnel <text> multicast <value>
×	not yet documented	interfaces-tunnel.xml.in: interfaces tunnel <tunnel> parameters ip ignore-df	interfaces tunnel <text> parameters ip ignore-df
×	not yet documented	interfaces-tunnel.xml.in: interfaces tunnel <tunnel> parameters ip key	interfaces tunnel <text> parameters ip key <value>
×	not yet documented	interfaces-tunnel.xml.in: interfaces tunnel <tunnel> parameters ip no-pmtu-discovery	interfaces tunnel <text> parameters ip no-pmtu-discovery
×	not yet documented	interfaces-tunnel.xml.in: interfaces tunnel <tunnel> parameters ip tos	interfaces tunnel <text> parameters ip tos <value>
×	not yet documented	interfaces-tunnel.xml.in: interfaces tunnel <tunnel> parameters ip ttl	interfaces tunnel <text> parameters ip ttl <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-tunnel.xml.in: interfaces tunnel <tunnel> parameters ipv6 encaplimit	interfaces tunnel <text> parameters ipv6 encaplimit <value>
×	not yet documented	interfaces-tunnel.xml.in: interfaces tunnel <tunnel> parameters ipv6 flowlabel	interfaces tunnel <text> parameters ipv6 flowlabel <value>
×	not yet documented	interfaces-tunnel.xml.in: interfaces tunnel <tunnel> parameters ipv6 hoplimit	interfaces tunnel <text> parameters ipv6 hoplimit <value>
×	not yet documented	interfaces-tunnel.xml.in: interfaces tunnel <tunnel> parameters ipv6 tclass	interfaces tunnel <text> parameters ipv6 tclass <value>
×	not yet documented	Nothing found in XML Definitions	interfaces tunnel <text> policy ipv6-route <value>
×	not yet documented	Nothing found in XML Definitions	interfaces tunnel <text> policy route <value>
×	not yet documented	Nothing found in XML Definitions	interfaces tunnel <text> redirect <value>
×	not yet documented	interfaces-tunnel.xml.in: interfaces tunnel <tunnel> remote	interfaces tunnel <text> remote <value>
×	not yet documented	interfaces-tunnel.xml.in: interfaces tunnel <tunnel> source-address	interfaces tunnel <text> source-address <value>
×	not yet documented	interfaces-tunnel.xml.in: interfaces tunnel <tunnel> source-interface	interfaces tunnel <text> source-interface <value>
×	not yet documented	Nothing found in XML Definitions	interfaces tunnel <text> traffic-policy in <value>
×	not yet documented	Nothing found in XML Definitions	interfaces tunnel <text> traffic-policy out <value>
✓	***set interfaces tunnel <interface> vrf <vrf>***	interfaces-tunnel.xml.in: interfaces tunnel <tunnel> vrf	interfaces tunnel <text> vrf <value>
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> address	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> description	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> dhcp-options client-id	Nothing found in VyOS

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> dhcp-options default-route-distance	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> dhcp-options host-name	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> dhcp-options mtu	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> dhcp-options no-default-route	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> dhcp-options reject	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> dhcp-options vendor-class-id	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> dhcpv6-options duid	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> dhcpv6-options parameters-only	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> dhcpv6-options pd <pd> interface <interface> address	Nothing found in VyOS

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> dhcpv6-options pd <pd> interface <interface> sla-id	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> dhcpv6-options pd <pd> length	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> dhcpv6-options rapid-commit	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> dhcpv6-options temporary	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> disable	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> peer-name	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> address	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> description	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> dhcp-options client-id	Nothing found in VyOS

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> dhcp-options default-route-distance	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> dhcp-options host-name	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> dhcp-options mtu	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> dhcp-options no-default-route	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> dhcp-options reject	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> dhcp-options vendor-class-id	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> dhcpv6-options duid	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> dhcpv6-options parameters-only	Nothing found in VyOS

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> dhcpv6-options pd <pd> interface <interface> address	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> dhcpv6-options pd <pd> interface <interface> sla-id	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> dhcpv6-options pd <pd> length	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> dhcpv6-options rapid-commit	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> dhcpv6-options temporary	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> disable	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> disable-link-detect	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> ip arp-cache-timeout	Nothing found in VyOS

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> ip disable-arp-filter	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> ip disable-forwarding	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> ip enable-arp-accept	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> ip enable-arp-announce	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> ip enable-arp-ignore	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> ip enable-proxy-arp	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> ip proxy-arp-pvlan	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> ip source-validation	Nothing found in VyOS

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> ipv6 address autoconf	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> ipv6 address eui64	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> ipv6 address no-default-link-local	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> ipv6 disable-forwarding	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> ipv6 dup-addr-detect-transmits	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> mac	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> mtu	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> protocol	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> vif-c <vif-c> address	Nothing found in VyOS

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> vif-c <vif-c> description	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> vif-c <vif-c> dhcp-options client-id	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> vif-c <vif-c> dhcp-options default-route-distance	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> vif-c <vif-c> dhcp-options host-name	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> vif-c <vif-c> dhcp-options mtu	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> vif-c <vif-c> dhcp-options no-default-route	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> vif-c <vif-c> dhcp-options reject	Nothing found in VyOS

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> vif-c <vif-c> dhcp-options vendor-class-id	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> vif-c <vif-c> dhcpv6-options duid	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> vif-c <vif-c> dhcpv6-options parameters-only	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> vif-c <vif-c> dhcpv6-options pd <pd> interface <interface> address	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> vif-c <vif-c> dhcpv6-options pd <pd> interface <interface> sla-id	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> vif-c <vif-c> dhcpv6-options pd <pd> length	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> vif-c <vif-c> dhcpv6-options rapid-commit	Nothing found in VyOS

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> vif-c <vif-c> dhcpv6-options temporary	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> vif-c <vif-c> disable	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> vif-c <vif-c> disable-link-detect	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> vif-c <vif-c> ip arp-cache-timeout	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> vif-c <vif-c> ip disable-arp-filter	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> vif-c <vif-c> ip disable-forwarding	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> vif-c <vif-c> ip enable-arp-accept	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> vif-c <vif-c> ip enable-arp-announce	Nothing found in VyOS

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> vif-c <vif-c> ip enable-arp-ignore	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> vif-c <vif-c> ip enable-proxy-arp	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> vif-c <vif-c> ip proxy-arp-pvlan	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> vif-c <vif-c> ip source-validation	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> vif-c <vif-c> ipv6 address autoconf	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> vif-c <vif-c> ipv6 address eui64	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> vif-c <vif-c> ipv6 address no-default-link-local	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> vif-c <vif-c> ipv6 disable-forwarding	Nothing found in VyOS

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> vif-c <vif-c> ipv6 dup-addr-detect-transmits	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> vif-c <vif-c> mac	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> vif-c <vif-c> mtu	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> vif-c <vif-c> vrf	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif-s <vif-s> vrf	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif <vif> address	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif <vif> description	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif <vif> dhcp-options client-id	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif <vif> dhcp-options default-route-distance	Nothing found in VyOS

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif <vif> dhcp-options host-name	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif <vif> dhcp-options mtu	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif <vif> dhcp-options no-default-route	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif <vif> dhcp-options reject	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif <vif> dhcp-options vendor-class-id	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif <vif> dhcpv6-options duid	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif <vif> dhcpv6-options parameters-only	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif <vif> dhcpv6-options pd <pd> interface <interface> address	Nothing found in VyOS

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif <vif> dhcpv6-options pd <pd> interface <interface> sla-id	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif <vif> dhcpv6-options pd <pd> length	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif <vif> dhcpv6-options rapid-commit	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif <vif> dhcpv6-options temporary	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif <vif> disable	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif <vif> disable-link-detect	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif <vif> egress-qos	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif <vif> ingress-qos	Nothing found in VyOS

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif <vif> ip arp-cache-timeout	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif <vif> ip disable-arp-filter	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif <vif> ip disable-forwarding	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif <vif> ip enable-arp-accept	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif <vif> ip enable-arp-announce	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif <vif> ip enable-arp-ignore	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif <vif> ip enable-proxy-arp	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif <vif> ip proxy-arp-pvlan	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif <vif> ip source-validation	Nothing found in VyOS

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif <vif> ipv6 address auto-conf	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif <vif> ipv6 address eui64	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif <vif> ipv6 address no-default-link-local	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif <vif> ipv6 disable-forwarding	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif <vif> ipv6 dup-addr-detect-transmits	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif <vif> mac	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif <vif> mtu	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vif <vif> vrf	Nothing found in VyOS
×	not yet documented	interfaces-virtaul-ethernet.xml.in: interfaces virtual-ethernet <virtual-ethernet> vrf	Nothing found in VyOS

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	*set interfaces <dummy | ethernet | bonding | bridge | pppoe> <interface> vrf <name>*	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	Nothing found in XML Definitions	interfaces vti <text> address <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vti <text> description <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vti <text> disable
×	not yet documented	Nothing found in XML Definitions	interfaces vti <text> firewall in ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vti <text> firewall in name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vti <text> firewall local ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vti <text> firewall local name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vti <text> firewall out ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vti <text> firewall out name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vti <text> ip ospf authentication md5 key-id <text> md5-key <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vti <text> ip ospf authentication plaintext-password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vti <text> ip ospf bandwidth <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vti <text> ip ospf bfd
×	not yet documented	Nothing found in XML Definitions	interfaces vti <text> ip ospf cost <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vti <text> ip ospf dead-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vti <text> ip ospf hello-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vti <text> ip ospf mtu-ignore
×	not yet documented	Nothing found in XML Definitions	interfaces vti <text> ip ospf network <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces vti <text> ip ospf priority <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vti <text> ip ospf retransmit-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vti <text> ip ospf transmit-delay <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vti <text> ip rip authentication md5 <text> password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vti <text> ip rip authentication plaintext-password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vti <text> ip rip split-horizon disable
×	not yet documented	Nothing found in XML Definitions	interfaces vti <text> ip rip split-horizon poison-reverse
×	not yet documented	Nothing found in XML Definitions	interfaces vti <text> ipv6 ospfv3 bfd
×	not yet documented	Nothing found in XML Definitions	interfaces vti <text> ipv6 ospfv3 cost <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vti <text> ipv6 ospfv3 dead-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vti <text> ipv6 ospfv3 hello-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vti <text> ipv6 ospfv3 ifmtu <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vti <text> ipv6 ospfv3 instance-id <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vti <text> ipv6 ospfv3 mtu-ignore
×	not yet documented	Nothing found in XML Definitions	interfaces vti <text> ipv6 ospfv3 network <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vti <text> ipv6 ospfv3 passive
×	not yet documented	Nothing found in XML Definitions	interfaces vti <text> ipv6 ospfv3 priority <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vti <text> ipv6 ospfv3 retransmit-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vti <text> ipv6 ospfv3 transmit-delay <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vti <text> ipv6 ripng split-horizon disable

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces vti <text> ipv6 ripng split-horizon poison-reverse
×	not yet documented	Nothing found in XML Definitions	interfaces vti <text> mtu <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vti <text> policy ipv6-route <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vti <text> policy route <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vti <text> redirect <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vti <text> traffic-policy in <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vti <text> traffic-policy out <value>
✓	***set interfaces vxlan <interface> address <address>***	interfaces-vxlan.xml.in: interfaces vxlan <vxlan> address	interfaces vxlan <text> address <value>
✓	***set interfaces vxlan <interface> description <description>***	interfaces-vxlan.xml.in: interfaces vxlan <vxlan> description	interfaces vxlan <text> description <value>
✓	***set interfaces vxlan <interface> disable***	interfaces-vxlan.xml.in: interfaces vxlan <vxlan> disable	interfaces vxlan <text> disable
×	***set interfaces vxlan <interface> disable-flow-control***	Nothing found in XML Definitions	Nothing found in VyOS
×	***set interfaces vxlan <interface> disable-link-detect***	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	Nothing found in XML Definitions	interfaces vxlan <text> firewall in ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vxlan <text> firewall in name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vxlan <text> firewall local ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vxlan <text> firewall local name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vxlan <text> firewall out ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vxlan <text> firewall out name <value>
✓	***set interfaces vxlan <interface> group <address>***	interfaces-vxlan.xml.in: interfaces vxlan <vxlan> group	interfaces vxlan <text> group <value>

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	***set interfaces vxlan <interface> ip arp-cache-timeout***	interfaces-vxlan.xml.in: interfaces vxlan <vxlan> ip arp-cache-timeout	interfaces vxlan <text> ip arp-cache-timeout <value>
✓	***set interfaces vxlan <interface> ip disable-arp-filter***	interfaces-vxlan.xml.in: interfaces vxlan <vxlan> ip disable-arp-filter	interfaces vxlan <text> ip disable-arp-filter
✓	***set interfaces vxlan <interface> ip disable-forwarding***	interfaces-vxlan.xml.in: interfaces vxlan <vxlan> ip disable-forwarding	interfaces vxlan <text> ip disable-forwarding
✓	***set interfaces vxlan <interface> ip enable-arp-accept***	interfaces-vxlan.xml.in: interfaces vxlan <vxlan> ip enable-arp-accept	interfaces vxlan <text> ip enable-arp-accept
✓	***set interfaces vxlan <interface> ip enable-arp-announce***	interfaces-vxlan.xml.in: interfaces vxlan <vxlan> ip enable-arp-announce	interfaces vxlan <text> ip enable-arp-announce
✓	***set interfaces vxlan <interface> ip enable-arp-ignore***	interfaces-vxlan.xml.in: interfaces vxlan <vxlan> ip enable-arp-ignore	interfaces vxlan <text> ip enable-arp-ignore
✓	***set interfaces vxlan <interface> ip enable-proxy-arp***	interfaces-vxlan.xml.in: interfaces vxlan <vxlan> ip enable-proxy-arp	interfaces vxlan <text> ip enable-proxy-arp
×	not yet documented	Nothing found in XML Definitions	interfaces vxlan <text> ip ospf authentication md5 key-id <text> md5-key <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vxlan <text> ip ospf authentication plaintext-password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vxlan <text> ip ospf bandwidth <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vxlan <text> ip ospf bfd
×	not yet documented	Nothing found in XML Definitions	interfaces vxlan <text> ip ospf cost <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vxlan <text> ip ospf dead-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vxlan <text> ip ospf hello-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vxlan <text> ip ospf mtu-ignore
×	not yet documented	Nothing found in XML Definitions	interfaces vxlan <text> ip ospf network <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vxlan <text> ip ospf priority <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vxlan <text> ip ospf retransmit-interval <value>

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces vxlan <text> ip ospf transmit-delay <value>
✓	***set interfaces vxlan <interface> ip proxy-arp-pvlan***	interfaces-vxlan.xml.in: interfaces vxlan <vxlan> ip proxy-arp-pvlan	interfaces vxlan <text> ip proxy-arp-pvlan
×	not yet documented	Nothing found in XML Definitions	interfaces vxlan <text> ip rip authentication md5 <text> password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vxlan <text> ip rip authentication plaintext-password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vxlan <text> ip rip split-horizon disable
×	not yet documented	Nothing found in XML Definitions	interfaces vxlan <text> ip rip split-horizon poison-reverse
✓	***set interfaces vxlan <interface> ip source-validation <strict | loose | disable>***	interfaces-vxlan.xml.in: interfaces vxlan <vxlan> ip source-validation	interfaces vxlan <text> ip source-validation <value>
✓	***set interfaces vxlan <interface> ipv6 address autoconf***	interfaces-vxlan.xml.in: interfaces vxlan <vxlan> ipv6 address autoconf	interfaces vxlan <text> ipv6 address autoconf
✓	***set interfaces vxlan <interface> ipv6 address eui64 <prefix>***	interfaces-vxlan.xml.in: interfaces vxlan <vxlan> ipv6 address eui64	interfaces vxlan <text> ipv6 address eui64 <value>
✓	***set interfaces vxlan <interface> ipv6 address no-default-link-local***	interfaces-vxlan.xml.in: interfaces vxlan <vxlan> ipv6 address no-default-link-local	interfaces vxlan <text> ipv6 address no-default-link-local
✓	***set interfaces vxlan <interface> ipv6 disable-forwarding***	interfaces-vxlan.xml.in: interfaces vxlan <vxlan> ipv6 disable-forwarding	interfaces vxlan <text> ipv6 disable-forwarding
×	not yet documented	interfaces-vxlan.xml.in: interfaces vxlan <vxlan> ipv6 dup-addr-detect-transmits	interfaces vxlan <text> ipv6 dup-addr-detect-transmits <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vxlan <text> ipv6 ospfv3 bfd
×	not yet documented	Nothing found in XML Definitions	interfaces vxlan <text> ipv6 ospfv3 cost <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vxlan <text> ipv6 ospfv3 dead-interval <value>

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces vxlan <text> ipv6 ospfv3 hello-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vxlan <text> ipv6 ospfv3 ifmtu <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vxlan <text> ipv6 ospfv3 instance-id <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vxlan <text> ipv6 ospfv3 mtu-ignore
×	not yet documented	Nothing found in XML Definitions	interfaces vxlan <text> ipv6 ospfv3 network <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vxlan <text> ipv6 ospfv3 passive
×	not yet documented	Nothing found in XML Definitions	interfaces vxlan <text> ipv6 ospfv3 priority <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vxlan <text> ipv6 ospfv3 retransmit-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vxlan <text> ipv6 ospfv3 transmit-delay <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vxlan <text> ipv6 ripng split-horizon disable
×	not yet documented	Nothing found in XML Definitions	interfaces vxlan <text> ipv6 ripng split-horizon poison-reverse
✓	*set interfaces vxlan <interface> mac <xx:xx:xx:xx:xx:xx>*	interfaces-vxlan.xml.in: interfaces vxlan <vxlan> mac	interfaces vxlan <text> mac <value>
✓	*set interfaces vxlan <interface> mtu <mtu>*	interfaces-vxlan.xml.in: interfaces vxlan <vxlan> mtu	interfaces vxlan <text> mtu <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vxlan <text> policy ipv6-route <value>
×	not yet documented	Nothing found in XML Definitions	interfaces vxlan <text> policy route <value>
✓	*set interfaces vxlan <interface> port <port>*	interfaces-vxlan.xml.in: interfaces vxlan <vxlan> port	interfaces vxlan <text> port <value>
✓	*set interfaces vxlan <interface> remote <address>*	interfaces-vxlan.xml.in: interfaces vxlan <vxlan> remote	interfaces vxlan <text> remote <value>
✓	*set interfaces vxlan <interface> source-address <interface>*	interfaces-vxlan.xml.in: interfaces vxlan <vxlan> source-address	interfaces vxlan <text> source-address <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	***set interfaces vxlan <interface> source-interface <interface>***	interfaces-vxlan.xml.in: interfaces vxlan <vxlan> source-interface	interfaces vxlan <text> source-interface <value>
✓	***set interfaces vxlan <interface> vni <number>***	interfaces-vxlan.xml.in: interfaces vxlan <vxlan> vni	interfaces vxlan <text> vni <value>
✓	***set interfaces vxlan <interface> vrf <vrf>***	interfaces-vxlan.xml.in: interfaces vxlan <vxlan> vrf	interfaces vxlan <text> vrf <value>
×	not yet documented	interfaces-wireguard.xml.in: interfaces wireguard <wireguard> address	interfaces wireguard <text> address <value>
×	not yet documented	interfaces-wireguard.xml.in: interfaces wireguard <wireguard> description	interfaces wireguard <text> description <value>
×	not yet documented	interfaces-wireguard.xml.in: interfaces wireguard <wireguard> disable	interfaces wireguard <text> disable
×	not yet documented	Nothing found in XML Definitions	interfaces wireguard <text> firewall in ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireguard <text> firewall in name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireguard <text> firewall local ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireguard <text> firewall local name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireguard <text> firewall out ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireguard <text> firewall out name <value>
×	not yet documented	interfaces-wireguard.xml.in: interfaces wireguard <wireguard> fwmark	interfaces wireguard <text> fwmark <value>
×	not yet documented	interfaces-wireguard.xml.in: interfaces wireguard <wireguard> ip arp-cache-timeout	interfaces wireguard <text> ip arp-cache-timeout <value>

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-wireguard.xml.in: interfaces wireguard <wireguard> ip disable-arp-filter	interfaces wireguard <text> ip disable-arp-filter
×	not yet documented	interfaces-wireguard.xml.in: interfaces wireguard <wireguard> ip disable-forwarding	interfaces wireguard <text> ip disable-forwarding
×	not yet documented	interfaces-wireguard.xml.in: interfaces wireguard <wireguard> ip enable-arp-accept	interfaces wireguard <text> ip enable-arp-accept
×	not yet documented	interfaces-wireguard.xml.in: interfaces wireguard <wireguard> ip enable-arp-announce	interfaces wireguard <text> ip enable-arp-announce
×	not yet documented	interfaces-wireguard.xml.in: interfaces wireguard <wireguard> ip enable-arp-ignore	interfaces wireguard <text> ip enable-arp-ignore
×	not yet documented	interfaces-wireguard.xml.in: interfaces wireguard <wireguard> ip enable-proxy-arp	interfaces wireguard <text> ip enable-proxy-arp
×	not yet documented	Nothing found in XML Definitions	interfaces wireguard <text> ip ospf authentication md5 key-id <text> md5-key <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireguard <text> ip ospf authentication plaintext-password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireguard <text> ip ospf bandwidth <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireguard <text> ip ospf bfd
×	not yet documented	Nothing found in XML Definitions	interfaces wireguard <text> ip ospf cost <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireguard <text> ip ospf dead-interval <value>

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces wireguard <text> ip ospf hello-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireguard <text> ip ospf mtu-ignore
×	not yet documented	Nothing found in XML Definitions	interfaces wireguard <text> ip ospf network <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireguard <text> ip ospf priority <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireguard <text> ip ospf retransmit-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireguard <text> ip ospf transmit-delay <value>
×	not yet documented	interfaces-wireguard.xml.in: interfaces wireguard <wireguard> ip proxy-arp-pvlan	interfaces wireguard <text> ip proxy-arp-pvlan
×	not yet documented	Nothing found in XML Definitions	interfaces wireguard <text> ip rip authentication md5 <text> password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireguard <text> ip rip authentication plaintext-password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireguard <text> ip rip split-horizon disable
×	not yet documented	Nothing found in XML Definitions	interfaces wireguard <text> ip rip split-horizon poison-reverse
×	not yet documented	interfaces-wireguard.xml.in: interfaces wireguard <wireguard> ip source-validation	interfaces wireguard <text> ip source-validation <value>
×	not yet documented	interfaces-wireguard.xml.in: interfaces wireguard <wireguard> ipv6 address autoconf	interfaces wireguard <text> ipv6 address autoconf

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-wireguard.xml.in: interfaces wireguard <wireguard> ipv6 address eui64	interfaces wireguard <text> ipv6 address eui64 <value>
×	not yet documented	interfaces-wireguard.xml.in: interfaces wireguard <wireguard> ipv6 address no-default-link-local	interfaces wireguard <text> ipv6 address no-default-link-local
×	not yet documented	interfaces-wireguard.xml.in: interfaces wireguard <wireguard> ipv6 disable-forwarding	interfaces wireguard <text> ipv6 disable-forwarding
×	not yet documented	interfaces-wireguard.xml.in: interfaces wireguard <wireguard> ipv6 dup-addr-detect-transmits	interfaces wireguard <text> ipv6 dup-addr-detect-transmits <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireguard <text> ipv6 ospfv3 bfd
×	not yet documented	Nothing found in XML Definitions	interfaces wireguard <text> ipv6 ospfv3 cost <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireguard <text> ipv6 ospfv3 dead-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireguard <text> ipv6 ospfv3 hello-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireguard <text> ipv6 ospfv3 ifmtu <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireguard <text> ipv6 ospfv3 instance-id <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireguard <text> ipv6 ospfv3 mtu-ignore
×	not yet documented	Nothing found in XML Definitions	interfaces wireguard <text> ipv6 ospfv3 network <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireguard <text> ipv6 ospfv3 passive
×	not yet documented	Nothing found in XML Definitions	interfaces wireguard <text> ipv6 ospfv3 priority <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces wireguard <text> ipv6 ospfv3 retransmit-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireguard <text> ipv6 ospfv3 transmit-delay <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireguard <text> ipv6 ripng split-horizon disable
×	not yet documented	Nothing found in XML Definitions	interfaces wireguard <text> ipv6 ripng split-horizon poison-reverse
×	not yet documented	interfaces-wireguard.xml.in: interfaces wireguard <wireguard> mtu	interfaces wireguard <text> mtu <value>
×	not yet documented	interfaces-wireguard.xml.in: interfaces wireguard <wireguard> peer <peer> address	interfaces wireguard <text> peer <text> address <value>
×	not yet documented	interfaces-wireguard.xml.in: interfaces wireguard <wireguard> peer <peer> allowed-ips	interfaces wireguard <text> peer <text> allowed-ips <value>
×	not yet documented	interfaces-wireguard.xml.in: interfaces wireguard <wireguard> peer <peer> disable	interfaces wireguard <text> peer <text> disable
×	not yet documented	interfaces-wireguard.xml.in: interfaces wireguard <wireguard> peer <peer> persistent-keepalive	interfaces wireguard <text> peer <text> persistent-keepalive <value>
×	not yet documented	interfaces-wireguard.xml.in: interfaces wireguard <wireguard> peer <peer> port	interfaces wireguard <text> peer <text> port <value>
×	not yet documented	interfaces-wireguard.xml.in: interfaces wireguard <wireguard> peer <peer> preshared-key	interfaces wireguard <text> peer <text> preshared-key <value>

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-wireguard.xml.in: interfaces wireguard <wireguard> peer <peer> pubkey	interfaces wireguard <text> peer <text> pubkey <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireguard <text> policy ipv6-route <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireguard <text> policy route <value>
×	not yet documented	interfaces-wireguard.xml.in: interfaces wireguard <wireguard> port	interfaces wireguard <text> port <value>
✓	*set interfaces wireguard <interface> private-key <name>*	interfaces-wireguard.xml.in: interfaces wireguard <wireguard> private-key	interfaces wireguard <text> private-key <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireguard <text> redirect <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireguard <text> traffic-policy in <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireguard <text> traffic-policy out <value>
×	not yet documented	interfaces-wireguard.xml.in: interfaces wireguard <wireguard> vrf	interfaces wireguard <text> vrf <value>
✓	*set interfaces wireless <interface> address <address | dhcp | dhcpv6>*	interfaces-wireless.xml.in: interfaces wireless <wireless> address	interfaces wireless <text> address <value>
✓	*set interfaces wireless <interface> capabilities ht 40mhz-incapable*	interfaces-wireless.xml.in: interfaces wireless <wireless> capabilities ht 40mhz-incapable	interfaces wireless <text> capabilities ht 40mhz-incapable
✓	*set interfaces wireless <interface> capabilities ht auto-powersave*	interfaces-wireless.xml.in: interfaces wireless <wireless> capabilities ht auto-powersave	interfaces wireless <text> capabilities ht auto-powersave

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set interfaces wireless <interface> capabilities ht channel-set-width <ht20 | ht40+ | ht40->*	interfaces-wireless.xml.in: interfaces wireless <wireless> capabilities ht channel-set-width	interfaces wireless <text> capabilities ht channel-set-width <value>
✓	*set interfaces wireless <interface> capabilities ht delayed-block-ack*	interfaces-wireless.xml.in: interfaces wireless <wireless> capabilities ht delayed-block-ack	interfaces wireless <text> capabilities ht delayed-block-ack
✓	*set interfaces wireless <interface> capabilities ht dsss-cck-40*	interfaces-wireless.xml.in: interfaces wireless <wireless> capabilities ht dsss-cck-40	interfaces wireless <text> capabilities ht dsss-cck-40
✓	*set interfaces wireless <interface> capabilities ht greenfield*	interfaces-wireless.xml.in: interfaces wireless <wireless> capabilities ht greenfield	interfaces wireless <text> capabilities ht greenfield
✓	*set interfaces wireless <interface> capabilities ht ldpc*	interfaces-wireless.xml.in: interfaces wireless <wireless> capabilities ht ldpc	interfaces wireless <text> capabilities ht ldpc
✓	*set interfaces wireless <interface> capabilities ht lsig-protection*	interfaces-wireless.xml.in: interfaces wireless <wireless> capabilities ht lsig-protection	interfaces wireless <text> capabilities ht lsig-protection
✓	*set interfaces wireless <interface> capabilities ht max-amsdu <3839 | 7935>*	interfaces-wireless.xml.in: interfaces wireless <wireless> capabilities ht max-amsdu	interfaces wireless <text> capabilities ht max-amsdu <value>
✓	*set interfaces wireless <interface> capabilities ht short-gi <20 | 40>*	interfaces-wireless.xml.in: interfaces wireless <wireless> capabilities ht short-gi	interfaces wireless <text> capabilities ht short-gi <value>
✓	*set interfaces wireless <interface> capabilities ht smps <static | dynamic>*	interfaces-wireless.xml.in: interfaces wireless <wireless> capabilities ht smps	interfaces wireless <text> capabilities ht smps <value>
✓	*set interfaces wireless <interface> capabilities ht stbc rx <num>*	interfaces-wireless.xml.in: interfaces wireless <wireless> capabilities ht stbc rx	interfaces wireless <text> capabilities ht stbc rx <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set interfaces wireless <interface> capabilities ht stbc tx*	interfaces-wireless.xml.in: interfaces wireless <wireless> capabilities ht stbc tx	interfaces wireless <text> capabilities ht stbc tx
✓	*set interfaces wireless <interface> capabilities require-ht*	interfaces-wireless.xml.in: interfaces wireless <wireless> capabilities require-ht	interfaces wireless <text> capabilities require-ht
×	*set interfaces wireless <interface> capabilities require-hvt*	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> capabilities require-vht	interfaces wireless <text> capabilities require-vht
✓	*set interfaces wireless <interface> capabilities vht antenna-count*	interfaces-wireless.xml.in: interfaces wireless <wireless> capabilities vht antenna-count	interfaces wireless <text> capabilities vht antenna-count <value>
✓	*set interfaces wireless <interface> capabilities vht antenna-pattern-fixed*	interfaces-wireless.xml.in: interfaces wireless <wireless> capabilities vht antenna-pattern-fixed	interfaces wireless <text> capabilities vht antenna-pattern-fixed
✓	*set interfaces wireless <interface> capabilities vht beamform <single-user-beamform | single-user-beamforme | multi-user-beamformer | multi-user-beamformee*	interfaces-wireless.xml.in: interfaces wireless <wireless> capabilities vht beamform	interfaces wireless <text> capabilities vht beamform <value>
×	*set interfaces wireless <interface> capabilities vht center-channel-freq <freq-1 | freq-2> <number>*	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> capabilities vht center-channel-freq freq-1	interfaces wireless <text> capabilities vht center-channel-freq freq-1 <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> capabilities vht center-channel-freq freq-2	interfaces wireless <text> capabilities vht center-channel-freq freq-2 <value>
✓	*set interfaces wireless <interface> capabilities vht channel-set-width <0 | 1 | 2 | 3>*	interfaces-wireless.xml.in: interfaces wireless <wireless> capabilities vht channel-set-width	interfaces wireless <text> capabilities vht channel-set-width <value>
✓	*set interfaces wireless <interface> capabilities vht ldpc*	interfaces-wireless.xml.in: interfaces wireless <wireless> capabilities vht ldpc	interfaces wireless <text> capabilities vht ldpc
✓	*set interfaces wireless <interface> capabilities vht link-adaptation*	interfaces-wireless.xml.in: interfaces wireless <wireless> capabilities vht link-adaptation	interfaces wireless <text> capabilities vht link-adaptation <value>
✓	*set interfaces wireless <interface> capabilities vht max-mpdu <value>*	interfaces-wireless.xml.in: interfaces wireless <wireless> capabilities vht max-mpdu	interfaces wireless <text> capabilities vht max-mpdu <value>
✓	*set interfaces wireless <interface> capabilities vht max-mpdu-exp <value>*	interfaces-wireless.xml.in: interfaces wireless <wireless> capabilities vht max-mpdu-exp	interfaces wireless <text> capabilities vht max-mpdu-exp <value>
✓	*set interfaces wireless <interface> capabilities vht short-gi <80 | 160>*	interfaces-wireless.xml.in: interfaces wireless <wireless> capabilities vht short-gi	interfaces wireless <text> capabilities vht short-gi <value>
✓	*set interfaces wireless <interface> capabilities vht stbc rx <num>*	interfaces-wireless.xml.in: interfaces wireless <wireless> capabilities vht stbc rx	interfaces wireless <text> capabilities vht stbc rx <value>
✓	*set interfaces wireless <interface> capabilities vht stbc tx*	interfaces-wireless.xml.in: interfaces wireless <wireless> capabilities vht stbc tx	interfaces wireless <text> capabilities vht stbc tx
✓	*set interfaces wireless <interface> capabilities vht tx-powersave*	interfaces-wireless.xml.in: interfaces wireless <wireless> capabilities vht tx-powersave	interfaces wireless <text> capabilities vht tx-powersave

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	***set interfaces wireless <interface> capabilities vht vht-cf***	interfaces-wireless.xml.in: interfaces wireless <wireless> capabilities vht vht-cf	interfaces wireless <text> capabilities vht vht-cf
✓	***set interfaces wireless <interface> channel <number>***	interfaces-wireless.xml.in: interfaces wireless <wireless> channel	interfaces wireless <text> channel <value>
✓	***set interfaces wireless <interface> country-code <cc>***	interfaces-wireless.xml.in: interfaces wireless <wireless> country-code	interfaces wireless <text> country-code <value>
✓	***set interfaces wireless <interface> description <description>***	interfaces-wireless.xml.in: interfaces wireless <wireless> description	interfaces wireless <text> description <value>
✓	***set interfaces wireless <interface> dhcp-options client-id <description>***	interfaces-wireless.xml.in: interfaces wireless <wireless> dhcp-options client-id	interfaces wireless <text> dhcp-options client-id <value>
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> dhcp-options default-route-distance	interfaces wireless <text> dhcp-options default-route-distance <value>
✓	***set interfaces wireless <interface> dhcp-options host-name <hostname>***	interfaces-wireless.xml.in: interfaces wireless <wireless> dhcp-options host-name	interfaces wireless <text> dhcp-options host-name <value>
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> dhcp-options mtu	interfaces wireless <text> dhcp-options mtu
✓	***set interfaces wireless <interface> dhcp-options no-default-route***	interfaces-wireless.xml.in: interfaces wireless <wireless> dhcp-options no-default-route	interfaces wireless <text> dhcp-options no-default-route
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> dhcp-options reject	interfaces wireless <text> dhcp-options reject <value>
✓	***set interfaces wireless <interface> dhcp-options vendor-class-id <vendor-id>***	interfaces-wireless.xml.in: interfaces wireless <wireless> dhcp-options vendor-class-id	interfaces wireless <text> dhcp-options vendor-class-id <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set interfaces wireless <interface> dhcpv6-options duid <duid>*	interfaces-wireless.xml.in: interfaces wireless <wireless> dhcpv6-options duid	interfaces wireless <text> dhcpv6-options duid <value>
✓	*set interfaces wireless <interface> dhcpv6-options parameters-only*	interfaces-wireless.xml.in: interfaces wireless <wireless> dhcpv6-options parameters-only	interfaces wireless <text> dhcpv6-options parameters-only
✓	*set interfaces wireless <interface> dhcpv6-options pd <id> interface <delegatee> address <address>*	interfaces-wireless.xml.in: interfaces wireless <wireless> dhcpv6-options pd <pd> interface <interface> address	interfaces wireless <text> dhcpv6-options pd <text> interface <text> address <value>
✓	*set interfaces wireless <interface> dhcpv6-options pd <id> interface <delegatee> sla-id <id>*	interfaces-wireless.xml.in: interfaces wireless <wireless> dhcpv6-options pd <pd> interface <interface> sla-id	interfaces wireless <text> dhcpv6-options pd <text> interface <text> sla-id <value>
✓	*set interfaces wireless <interface> dhcpv6-options pd <id> length <length>*	interfaces-wireless.xml.in: interfaces wireless <wireless> dhcpv6-options pd <pd> length	interfaces wireless <text> dhcpv6-options pd <text> length <value>
✓	*set interfaces wireless <interface> dhcpv6-options rapid-commit*	interfaces-wireless.xml.in: interfaces wireless <wireless> dhcpv6-options rapid-commit	interfaces wireless <text> dhcpv6-options rapid-commit
✓	*set interfaces wireless <interface> dhcpv6-options temporary*	interfaces-wireless.xml.in: interfaces wireless <wireless> dhcpv6-options temporary	interfaces wireless <text> dhcpv6-options temporary
✓	*set interfaces wireless <interface> disable*	interfaces-wireless.xml.in: interfaces wireless <wireless> disable	interfaces wireless <text> disable
✓	*set interfaces wireless <interface> disable-broadcast-ssi*	interfaces-wireless.xml.in: interfaces wireless <wireless> disable-broadcast-ssid	interfaces wireless <text> disable-broadcast-ssid
×	*set interfaces wireless <interface> disable-flow-control*	Nothing found in XML Definitions	Nothing found in VyOS

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set interfaces wireless <interface> disable-link-detect*	interfaces-wireless.xml.in: interfaces wireless <wireless> disable-link-detect	interfaces wireless <text> disable-link-detect
✓	*set interfaces wireless <interface> expunge-failing-stati*	interfaces-wireless.xml.in: interfaces wireless <wireless> expunge-failing-stations	interfaces wireless <text> expunge-failing-stations
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> firewall in ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> firewall in name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> firewall local ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> firewall local name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> firewall out ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> firewall out name <value>
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> hw-id	interfaces wireless <text> hw-id <value>
✓	*set interfaces wireless <interface> ip arp-cache-timeout*	interfaces-wireless.xml.in: interfaces wireless <wireless> ip arp-cache-timeout	interfaces wireless <text> ip arp-cache-timeout <value>
✓	*set interfaces wireless <interface> ip disable-arp-filter*	interfaces-wireless.xml.in: interfaces wireless <wireless> ip disable-arp-filter	interfaces wireless <text> ip disable-arp-filter
✓	*set interfaces wireless <interface> ip disable-forwarding*	interfaces-wireless.xml.in: interfaces wireless <wireless> ip disable-forwarding	interfaces wireless <text> ip disable-forwarding
✓	*set interfaces wireless <interface> ip enable-arp-accept*	interfaces-wireless.xml.in: interfaces wireless <wireless> ip enable-arp-accept	interfaces wireless <text> ip enable-arp-accept

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	***set interfaces wireless <interface> ip enable-arp-announce***	interfaces-wireless.xml.in: interfaces wireless <wireless> ip enable-arp-announce	interfaces wireless <text> ip enable-arp-announce
✓	***set interfaces wireless <interface> ip enable-arp-ignore***	interfaces-wireless.xml.in: interfaces wireless <wireless> ip enable-arp-ignore	interfaces wireless <text> ip enable-arp-ignore
✓	***set interfaces wireless <interface> ip enable-proxy-arp***	interfaces-wireless.xml.in: interfaces wireless <wireless> ip enable-proxy-arp	interfaces wireless <text> ip enable-proxy-arp
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> ip ospf authentication md5 key-id <text> md5-key <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> ip ospf authentication plaintext-password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> ip ospf bandwidth <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> ip ospf bfd
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> ip ospf cost <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> ip ospf dead-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> ip ospf hello-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> ip ospf mtu-ignore
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> ip ospf network <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> ip ospf priority <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> ip ospf retransmit-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> ip ospf transmit-delay <value>
✓	***set interfaces wireless <interface> ip proxy-arp-pvlan***	interfaces-wireless.xml.in: interfaces wireless <wireless> ip proxy-arp-pvlan	interfaces wireless <text> ip proxy-arp-pvlan

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> ip rip authentication md5 <text> password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> ip rip authentication plaintext-password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> ip rip split-horizon disable
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> ip rip split-horizon poison-reverse
✓	*set interfaces wireless <interface> ip source-validation <strict | loose | disable>*	interfaces-wireless.xml.in: interfaces wireless <wireless> ip source-validation	interfaces wireless <text> ip source-validation <value>
✓	*set interfaces wireless <interface> ipv6 address autoconf*	interfaces-wireless.xml.in: interfaces wireless <wireless> ipv6 address autoconf	interfaces wireless <text> ipv6 address autoconf
✓	*set interfaces wireless <interface> ipv6 address eui64 <prefix>*	interfaces-wireless.xml.in: interfaces wireless <wireless> ipv6 address eui64	interfaces wireless <text> ipv6 address eui64 <value>
✓	*set interfaces wireless <interface> ipv6 address no-default-link-local*	interfaces-wireless.xml.in: interfaces wireless <wireless> ipv6 address no-default-link-local	interfaces wireless <text> ipv6 address no-default-link-local
✓	*set interfaces wireless <interface> ipv6 disable-forwarding*	interfaces-wireless.xml.in: interfaces wireless <wireless> ipv6 disable-forwarding	interfaces wireless <text> ipv6 disable-forwarding
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> ipv6 dup-addr-detect-transmits	interfaces wireless <text> ipv6 dup-addr-detect-transmits <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> ipv6 ospfv3 bfd
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> ipv6 ospfv3 cost <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> ipv6 ospfv3 dead-interval <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> ipv6 ospfv3 hello-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> ipv6 ospfv3 ifmtu <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> ipv6 ospfv3 instance-id <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> ipv6 ospfv3 mtu-ignore
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> ipv6 ospfv3 network <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> ipv6 ospfv3 passive
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> ipv6 ospfv3 priority <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> ipv6 ospfv3 retransmit-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> ipv6 ospfv3 transmit-delay <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> ipv6 ripng split-horizon disable
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> ipv6 ripng split-horizon poison-reverse
✓	*set interfaces wireless <interface> isolate-stations*	interfaces-wireless.xml.in: interfaces wireless <wireless> isolate-stations	interfaces wireless <text> isolate-stations
✓	*set interfaces wireless <interface> mac <xx:xx:xx:xx:xx:xx>*	interfaces-wireless.xml.in: interfaces wireless <wireless> mac	interfaces wireless <text> mac <value>
✓	*set interfaces wireless <interface> max-stations*	interfaces-wireless.xml.in: interfaces wireless <wireless> max-stations	interfaces wireless <text> max-stations <value>
✓	*set interfaces wireless <interface> mgmt-frame-protection*	interfaces-wireless.xml.in: interfaces wireless <wireless> mgmt-frame-protection	interfaces wireless <text> mgmt-frame-protection <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set interfaces wireless <interface> mode <a | b | g | n | ac>*	interfaces-wireless.xml.in: interfaces wireless <wireless> mode	interfaces wireless <text> mode <value>
×	*set interfaces wireless <interface> mtu <mtu>*	Nothing found in XML Definitions	Nothing found in VyOS
✓	*set interfaces wireless <interface> physical-device <device>*	interfaces-wireless.xml.in: interfaces wireless <wireless> physical-device	interfaces wireless <text> physical-device <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> policy ipv6-route <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> policy route <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> redirect <value>
✓	*set interfaces wireless <interface> reduce-transmit-power <number>*	interfaces-wireless.xml.in: interfaces wireless <wireless> reduce-transmit-power	interfaces wireless <text> reduce-transmit-power <value>
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> security wep key	interfaces wireless <text> security wep key <value>
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> security wpa cipher	interfaces wireless <text> security wpa cipher <value>
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> security wpa group-cipher	interfaces wireless <text> security wpa group-cipher <value>
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> security wpa mode	interfaces wireless <text> security wpa mode <value>
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> security wpa passphrase	interfaces wireless <text> security wpa passphrase <value>
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> security wpa radius server <server> accounting	interfaces wireless <text> security wpa radius server <text> accounting

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> security wpa radius server <server> disable	interfaces wireless <text> security wpa radius server <text> disable
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> security wpa radius server <server> key	interfaces wireless <text> security wpa radius server <text> key <value>
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> security wpa radius server <server> port	interfaces wireless <text> security wpa radius server <text> port <value>
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> security wpa radius source-address	interfaces wireless <text> security wpa radius source-address <value>
✓	*set interfaces wireless <interface> ssid <ssid>*	interfaces-wireless.xml.in: interfaces wireless <wireless> ssid	interfaces wireless <text> ssid <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> traffic-policy in <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> traffic-policy out <value>
✓	*set interfaces wireless <interface> type <access-point | station | monitor>*	interfaces-wireless.xml.in: interfaces wireless <wireless> type	interfaces wireless <text> type <value>
×	*set interfaces wireless <interface> vif <vlan-id>*	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> address	interfaces wireless <text> vif-s <text> address <value>
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> description	interfaces wireless <text> vif-s <text> description <value>
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> dhcp-options client-id	interfaces wireless <text> vif-s <text> dhcp-options client-id <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> dhcp-options default-route-distance	interfaces wireless <text> vif-s <text> dhcp-options default-route-distance <value>
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> dhcp-options host-name	interfaces wireless <text> vif-s <text> dhcp-options host-name <value>
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> dhcp-options mtu	interfaces wireless <text> vif-s <text> dhcp-options mtu
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> dhcp-options no-default-route	interfaces wireless <text> vif-s <text> dhcp-options no-default-route
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> dhcp-options reject	interfaces wireless <text> vif-s <text> dhcp-options reject <value>
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> dhcp-options vendor-class-id	interfaces wireless <text> vif-s <text> dhcp-options vendor-class-id <value>
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> dhcpv6-options duid	interfaces wireless <text> vif-s <text> dhcpv6-options duid <value>
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> dhcpv6-options parameters-only	interfaces wireless <text> vif-s <text> dhcpv6-options parameters-only
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> dhcpv6-options pd <pd> interface <interface> address	interfaces wireless <text> vif-s <text> dhcpv6-options pd <text> interface <text> address <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> dhcpv6-options pd <pd> interface <interface> sla-id	interfaces wireless <text> vif-s <text> dhcpv6-options pd <text> interface <text> sla-id <value>
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> dhcpv6-options pd <pd> length	interfaces wireless <text> vif-s <text> dhcpv6-options pd <text> length <value>
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> dhcpv6-options rapid-commit	interfaces wireless <text> vif-s <text> dhcpv6-options rapid-commit
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> dhcpv6-options temporary	interfaces wireless <text> vif-s <text> dhcpv6-options temporary
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> disable	interfaces wireless <text> vif-s <text> disable
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> disable-link-detect	interfaces wireless <text> vif-s <text> disable-link-detect
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> ip arp-cache-timeout	interfaces wireless <text> vif-s <text> ip arp-cache-timeout <value>
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> ip disable-arp-filter	interfaces wireless <text> vif-s <text> ip disable-arp-filter
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> ip disable-forwarding	interfaces wireless <text> vif-s <text> ip disable-forwarding

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> ip enable-arp-accept	interfaces wireless <text> vif-s <text> ip enable-arp-accept
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> ip enable-arp-announce	interfaces wireless <text> vif-s <text> ip enable-arp-announce
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> ip enable-arp-ignore	interfaces wireless <text> vif-s <text> ip enable-arp-ignore
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> ip enable-proxy-arp	interfaces wireless <text> vif-s <text> ip enable-proxy-arp
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> ip proxy-arp-pvlan	interfaces wireless <text> vif-s <text> ip proxy-arp-pvlan
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> ip source-validation	interfaces wireless <text> vif-s <text> ip source-validation <value>
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> ipv6 address autoconf	interfaces wireless <text> vif-s <text> ipv6 address autoconf
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> ipv6 address eui64	interfaces wireless <text> vif-s <text> ipv6 address eui64 <value>
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> ipv6 address no-default-link-local	interfaces wireless <text> vif-s <text> ipv6 address no-default-link-local

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> ipv6 disable-forwarding	interfaces wireless <text> vif-s <text> ipv6 disable-forwarding
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> ipv6 dup-addr-detect-transmits	interfaces wireless <text> vif-s <text> ipv6 dup-addr-detect-transmits <value>
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> mac	interfaces wireless <text> vif-s <text> mac <value>
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> mtu	interfaces wireless <text> vif-s <text> mtu <value>
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> protocol	interfaces wireless <text> vif-s <text> protocol <value>
✓	*set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> address <address | dhcp | dhcpv6>*	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> vif-c <vif-c> address	interfaces wireless <text> vif-s <text> vif-c <text> address <value>
✓	*set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> description <description>*	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> vif-c <vif-c> description	interfaces wireless <text> vif-s <text> vif-c <text> description <value>
✓	*set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> dhcp-options client-id <description>*	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> vif-c <vif-c> dhcp-options client-id	interfaces wireless <text> vif-s <text> vif-c <text> dhcp-options client-id <value>
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> vif-c <vif-c> dhcp-options default-route-distance	interfaces wireless <text> vif-s <text> vif-c <text> dhcp-options default-route-distance <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> dhcp-options host-name <hostname>*	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> vif-c <vif-c> dhcp-options host-name	interfaces wireless <text> vif-s <text> vif-c <text> dhcp-options host-name <value>
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> vif-c <vif-c> dhcp-options mtu	interfaces wireless <text> vif-s <text> vif-c <text> dhcp-options mtu
✓	*set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> dhcp-options no-default-route*	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> vif-c <vif-c> dhcp-options no-default-route	interfaces wireless <text> vif-s <text> vif-c <text> dhcp-options no-default-route
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> vif-c <vif-c> dhcp-options reject	interfaces wireless <text> vif-s <text> vif-c <text> dhcp-options reject <value>
✓	*set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> dhcp-options vendor-class-id <vendor-id>*	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> vif-c <vif-c> dhcp-options vendor-class-id	interfaces wireless <text> vif-s <text> vif-c <text> dhcp-options vendor-class-id <value>
✓	*set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> dhcpv6-options duid <duid>*	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> vif-c <vif-c> dhcpv6-options duid	interfaces wireless <text> vif-s <text> vif-c <text> dhcpv6-options duid <value>
✓	*set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> dhcpv6-options parameters-only*	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> vif-c <vif-c> dhcpv6-options parameters-only	interfaces wireless <text> vif-s <text> vif-c <text> dhcpv6-options parameters-only

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> dhcpv6-options pd <id> interface <delegatee> address <address>*	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> vif-c <vif-c> dhcpv6-options pd <pd> interface <interface> address	interfaces wireless <text> vif-s <text> vif-c <text> dhcpv6-options pd <text> interface <text> address <value>
✓	*set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> dhcpv6-options pd <id> interface <delegatee> sla-id <id>*	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> vif-c <vif-c> dhcpv6-options pd <pd> interface <interface> sla-id	interfaces wireless <text> vif-s <text> vif-c <text> dhcpv6-options pd <text> interface <text> sla-id <value>
✓	*set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> dhcpv6-options pd <id> length <length>*	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> vif-c <vif-c> dhcpv6-options pd <pd> length	interfaces wireless <text> vif-s <text> vif-c <text> dhcpv6-options pd <text> length <value>
✓	*set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> dhcpv6-options rapid-commit*	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> vif-c <vif-c> dhcpv6-options rapid-commit	interfaces wireless <text> vif-s <text> vif-c <text> dhcpv6-options rapid-commit
✓	*set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> dhcpv6-options temporary*	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> vif-c <vif-c> dhcpv6-options temporary	interfaces wireless <text> vif-s <text> vif-c <text> dhcpv6-options temporary
✓	*set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> disable*	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> vif-c <vif-c> disable	interfaces wireless <text> vif-s <text> vif-c <text> disable
✓	*set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> disable-link-detect*	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> vif-c <vif-c> disable-link-detect	interfaces wireless <text> vif-s <text> vif-c <text> disable-link-detect

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> ip arp-cache-timeout*	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> vif-c <vif-c> ip arp-cache-timeout	interfaces wireless <text> vif-s <text> vif-c <text> ip arp-cache-timeout <value>
✓	*set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> ip disable-arp-filter*	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> vif-c <vif-c> ip disable-arp-filter	interfaces wireless <text> vif-s <text> vif-c <text> ip disable-arp-filter
✓	*set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> ip disable-forwarding*	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> vif-c <vif-c> ip disable-forwarding	interfaces wireless <text> vif-s <text> vif-c <text> ip disable-forwarding
✓	*set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> ip enable-arp-accept*	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> vif-c <vif-c> ip enable-arp-accept	interfaces wireless <text> vif-s <text> vif-c <text> ip enable-arp-accept
✓	*set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> ip enable-arp-announce*	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> vif-c <vif-c> ip enable-arp-announce	interfaces wireless <text> vif-s <text> vif-c <text> ip enable-arp-announce
✓	*set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> ip enable-arp-ignore*	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> vif-c <vif-c> ip enable-arp-ignore	interfaces wireless <text> vif-s <text> vif-c <text> ip enable-arp-ignore
✓	*set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> ip enable-proxy-arp*	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> vif-c <vif-c> ip enable-proxy-arp	interfaces wireless <text> vif-s <text> vif-c <text> ip enable-proxy-arp
✓	*set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> ip proxy-arp-pvlan*	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> vif-c <vif-c> ip proxy-arp-pvlan	interfaces wireless <text> vif-s <text> vif-c <text> ip proxy-arp-pvlan

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> ip source-validation <strict | loose | disable>*	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> vif-c <vif-c> ip source-validation	interfaces wireless <text> vif-s <text> vif-c <text> ip source-validation <value>
✓	*set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> ipv6 address autoconf*	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> vif-c <vif-c> ipv6 address autoconf	interfaces wireless <text> vif-s <text> vif-c <text> ipv6 address autoconf
✓	*set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> ipv6 address eui64 <prefix>*	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> vif-c <vif-c> ipv6 address eui64	interfaces wireless <text> vif-s <text> vif-c <text> ipv6 address eui64 <value>
✓	*set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> ipv6 address no-default-link-local*	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> vif-c <vif-c> ipv6 address no-default-link-local	interfaces wireless <text> vif-s <text> vif-c <text> ipv6 address no-default-link-local
✓	*set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> ipv6 disable-forwarding*	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> vif-c <vif-c> ipv6 disable-forwarding	interfaces wireless <text> vif-s <text> vif-c <text> ipv6 disable-forwarding
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> vif-c <vif-c> ipv6 dup-addr-detect-transmits	interfaces wireless <text> vif-s <text> vif-c <text> ipv6 dup-addr-detect-transmits <value>
✓	*set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> mac <xx:xx:xx:xx:xx:xx>*	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> vif-c <vif-c> mac	interfaces wireless <text> vif-s <text> vif-c <text> mac <value>
✓	*set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> mtu <mtu>*	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> vif-c <vif-c> mtu	interfaces wireless <text> vif-s <text> vif-c <text> mtu <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	***set interfaces wireless <interface> vif-s <vlan-id> vif-c <vlan-id> vrf <vrf>***	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> vif-c <vif-c> vrf	interfaces wireless <text> vif-s <text> vif-c <text> vrf <value>
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> vif-s <vif-s> vrf	interfaces wireless <text> vif-s <text> vrf <value>
✓	***set interfaces wireless <interface> vif <vlan-id> address <address | dhcp | dhcpv6>***	interfaces-wireless.xml.in: interfaces wireless <wireless> vif <vif> address	interfaces wireless <text> vif <text> address <value>
✓	***set interfaces wireless <interface> vif <vlan-id> description <description>***	interfaces-wireless.xml.in: interfaces wireless <wireless> vif <vif> description	interfaces wireless <text> vif <text> description <value>
✓	***set interfaces wireless <interface> vif <vlan-id> dhcp-options client-id <description>***	interfaces-wireless.xml.in: interfaces wireless <wireless> vif <vif> dhcp-options client-id	interfaces wireless <text> vif <text> dhcp-options client-id <value>
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> vif <vif> dhcp-options default-route-distance	interfaces wireless <text> vif <text> dhcp-options default-route-distance <value>
✓	***set interfaces wireless <interface> vif <vlan-id> dhcp-options host-name <hostname>***	interfaces-wireless.xml.in: interfaces wireless <wireless> vif <vif> dhcp-options host-name	interfaces wireless <text> vif <text> dhcp-options host-name <value>
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> vif <vif> dhcp-options mtu	interfaces wireless <text> vif <text> dhcp-options mtu
✓	***set interfaces wireless <interface> vif <vlan-id> dhcp-options no-default-route***	interfaces-wireless.xml.in: interfaces wireless <wireless> vif <vif> dhcp-options no-default-route	interfaces wireless <text> vif <text> dhcp-options no-default-route

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> vif <vif> dhcp-options reject	interfaces wireless <text> vif <text> dhcp-options reject <value>
✓	***set interfaces wireless <interface> vif <vlan-id> dhcp-options vendor-class-id <vendor-id>***	interfaces-wireless.xml.in: interfaces wireless <wireless> vif <vif> dhcp-options vendor-class-id	interfaces wireless <text> vif <text> dhcp-options vendor-class-id <value>
✓	***set interfaces wireless <interface> vif <vlan-id> dhcpv6-options duid <duid>***	interfaces-wireless.xml.in: interfaces wireless <wireless> vif <vif> dhcpv6-options duid	interfaces wireless <text> vif <text> dhcpv6-options duid <value>
✓	***set interfaces wireless <interface> vif <vlan-id> dhcpv6-options parameters-only***	interfaces-wireless.xml.in: interfaces wireless <wireless> vif <vif> dhcpv6-options parameters-only	interfaces wireless <text> vif <text> dhcpv6-options parameters-only
✓	***set interfaces wireless <interface> vif <vlan-id> dhcpv6-options pd <id> interface <delegatee> address <address>***	interfaces-wireless.xml.in: interfaces wireless <wireless> vif <vif> dhcpv6-options pd <pd> interface <interface> address	interfaces wireless <text> vif <text> dhcpv6-options pd <text> interface <text> address <value>
✓	***set interfaces wireless <interface> vif <vlan-id> dhcpv6-options pd <id> interface <delegatee> sla-id <id>***	interfaces-wireless.xml.in: interfaces wireless <wireless> vif <vif> dhcpv6-options pd <pd> interface <interface> sla-id	interfaces wireless <text> vif <text> dhcpv6-options pd <text> interface <text> sla-id <value>
✓	***set interfaces wireless <interface> vif <vlan-id> dhcpv6-options pd <id> length <length>***	interfaces-wireless.xml.in: interfaces wireless <wireless> vif <vif> dhcpv6-options pd <pd> length	interfaces wireless <text> vif <text> dhcpv6-options pd <text> length <value>
✓	***set interfaces wireless <interface> vif <vlan-id> dhcpv6-options rapid-commit***	interfaces-wireless.xml.in: interfaces wireless <wireless> vif <vif> dhcpv6-options rapid-commit	interfaces wireless <text> vif <text> dhcpv6-options rapid-commit

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	***set interfaces wireless <interface> vif <vlan-id> dhcpv6-options temporary***	interfaces-wireless.xml.in: interfaces wireless <wireless> vif <vif> dhcpv6-options temporary	interfaces wireless <text> vif <text> dhcpv6-options temporary
✓	***set interfaces wireless <interface> vif <vlan-id> disable***	interfaces-wireless.xml.in: interfaces wireless <wireless> vif <vif> disable	interfaces wireless <text> vif <text> disable
✓	***set interfaces wireless <interface> vif <vlan-id> disable-link-detect***	interfaces-wireless.xml.in: interfaces wireless <wireless> vif <vif> disable-link-detect	interfaces wireless <text> vif <text> disable-link-detect
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> vif <vif> egress-qos	interfaces wireless <text> vif <text> egress-qos <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> vif <text> firewall in ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> vif <text> firewall in name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> vif <text> firewall local ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> vif <text> firewall local name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> vif <text> firewall out ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> vif <text> firewall out name <value>
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> vif <vif> ingress-qos	interfaces wireless <text> vif <text> ingress-qos <value>
✓	***set interfaces wireless <interface> vif <vlan-id> ip arp-cache-timeout***	interfaces-wireless.xml.in: interfaces wireless <wireless> vif <vif> ip arp-cache-timeout	interfaces wireless <text> vif <text> ip arp-cache-timeout <value>
✓	***set interfaces wireless <interface> vif <vlan-id> ip disable-arp-filter***	interfaces-wireless.xml.in: interfaces wireless <wireless> vif <vif> ip disable-arp-filter	interfaces wireless <text> vif <text> ip disable-arp-filter

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	***set interfaces wireless <interface> vif <vlan-id> ip disable-forwarding***	interfaces-wireless.xml.in: interfaces wireless <wireless> vif <vif> ip disable-forwarding	interfaces wireless <text> vif <text> ip disable-forwarding
✓	***set interfaces wireless <interface> vif <vlan-id> ip enable-arp-accept***	interfaces-wireless.xml.in: interfaces wireless <wireless> vif <vif> ip enable-arp-accept	interfaces wireless <text> vif <text> ip enable-arp-accept
✓	***set interfaces wireless <interface> vif <vlan-id> ip enable-arp-announce***	interfaces-wireless.xml.in: interfaces wireless <wireless> vif <vif> ip enable-arp-announce	interfaces wireless <text> vif <text> ip enable-arp-announce
✓	***set interfaces wireless <interface> vif <vlan-id> ip enable-arp-ignore***	interfaces-wireless.xml.in: interfaces wireless <wireless> vif <vif> ip enable-arp-ignore	interfaces wireless <text> vif <text> ip enable-arp-ignore
✓	***set interfaces wireless <interface> vif <vlan-id> ip enable-proxy-arp***	interfaces-wireless.xml.in: interfaces wireless <wireless> vif <vif> ip enable-proxy-arp	interfaces wireless <text> vif <text> ip enable-proxy-arp
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> vif <text> ip ospf authentication md5 key-id <text> md5-key <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> vif <text> ip ospf authentication plaintext-password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> vif <text> ip ospf bandwidth <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> vif <text> ip ospf bfd
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> vif <text> ip ospf cost <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> vif <text> ip ospf dead-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> vif <text> ip ospf hello-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> vif <text> ip ospf mtu-ignore

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> vif <text> ip ospf network <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> vif <text> ip ospf priority <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> vif <text> ip ospf retransmit-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> vif <text> ip ospf transmit-delay <value>
✓	***set interfaces wireless <interface> vif <vlan-id> ip proxy-arp-pvlan***	interfaces-wireless.xml.in: interfaces wireless <wireless> vif <vif> ip proxy-arp-pvlan	interfaces wireless <text> vif <text> ip proxy-arp-pvlan
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> vif <text> ip rip authentication md5 <text> password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> vif <text> ip rip authentication plaintext-password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> vif <text> ip rip split-horizon disable
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> vif <text> ip rip split-horizon poison-reverse
✓	***set interfaces wireless <interface> vif <vlan-id> ip source-validation <strict | loose | disable>***	interfaces-wireless.xml.in: interfaces wireless <wireless> vif <vif> ip source-validation	interfaces wireless <text> vif <text> ip source-validation <value>
✓	***set interfaces wireless <interface> vif <vlan-id> ipv6 address autoconf***	interfaces-wireless.xml.in: interfaces wireless <wireless> vif <vif> ipv6 address autoconf	interfaces wireless <text> vif <text> ipv6 address autoconf
✓	***set interfaces wireless <interface> vif <vlan-id> ipv6 address eui64 <prefix>***	interfaces-wireless.xml.in: interfaces wireless <wireless> vif <vif> ipv6 address eui64	interfaces wireless <text> vif <text> ipv6 address eui64 <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	***set interfaces wireless <interface> vif <vlan-id> ipv6 address no-default-link-local***	interfaces-wireless.xml.in: interfaces wireless <wireless> vif <vif> ipv6 address no-default-link-local	interfaces wireless <text> vif <text> ipv6 address no-default-link-local
✓	***set interfaces wireless <interface> vif <vlan-id> ipv6 disable-forwarding***	interfaces-wireless.xml.in: interfaces wireless <wireless> vif <vif> ipv6 disable-forwarding	interfaces wireless <text> vif <text> ipv6 disable-forwarding
×	not yet documented	interfaces-wireless.xml.in: interfaces wireless <wireless> vif <vif> ipv6 dup-addr-detect-transmits	interfaces wireless <text> vif <text> ipv6 dup-addr-detect-transmits <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> vif <text> ipv6 ospfv3 bfd
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> vif <text> ipv6 ospfv3 cost <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> vif <text> ipv6 ospfv3 dead-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> vif <text> ipv6 ospfv3 hello-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> vif <text> ipv6 ospfv3 ifmtu <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> vif <text> ipv6 ospfv3 instance-id <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> vif <text> ipv6 ospfv3 mtu-ignore
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> vif <text> ipv6 ospfv3 network <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> vif <text> ipv6 ospfv3 passive
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> vif <text> ipv6 ospfv3 priority <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> vif <text> ipv6 ospfv3 retransmit-interval <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> vif <text> ipv6 ospfv3 transmit-delay <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> vif <text> ipv6 ripng split-horizon disable
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> vif <text> ipv6 ripng split-horizon poison-reverse
✓	***set interfaces wireless <interface> vif <vlan-id> mac <xx:xx:xx:xx:xx:xx>***	interfaces-wireless.xml.in: interfaces wireless <wireless> vif <vif> mac	interfaces wireless <text> vif <text> mac <value>
✓	***set interfaces wireless <interface> vif <vlan-id> mtu <mtu>***	interfaces-wireless.xml.in: interfaces wireless <wireless> vif <vif> mtu	interfaces wireless <text> vif <text> mtu <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> vif <text> policy ipv6-route <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> vif <text> policy route <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> vif <text> redirect <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> vif <text> traffic-policy in <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wireless <text> vif <text> traffic-policy out <value>
✓	***set interfaces wireless <interface> vif <vlan-id> vrf <vrf>***	interfaces-wireless.xml.in: interfaces wireless <wireless> vif <vif> vrf	interfaces wireless <text> vif <text> vrf <value>
✓	***set interfaces wireless <interface> vrf <vrf>***	interfaces-wireless.xml.in: interfaces wireless <wireless> vrf	interfaces wireless <text> vrf <value>
✓	***set interfaces wwan <interface> address <address | dhcp | dhcpv6>***	interfaces-wwan.xml.in: interfaces wwan <wwan> address	interfaces wwan <text> address <value>
✓	***set interfaces wwan <interface> apn <apn>***	interfaces-wwan.xml.in: interfaces wwan <wwan> apn	interfaces wwan <text> apn <value>
×	not yet documented	interfaces-wwan.xml.in: interfaces wwan <wwan> authentication password	interfaces wwan <text> authentication password <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	interfaces-wwan.xml.in: interfaces wwan <wwan> authentication user	interfaces wwan <text> authentication user <value>
×	not yet documented	interfaces-wwan.xml.in: interfaces wwan <wwan> connect-on-demand	interfaces wwan <text> connect-on-demand
✓	*set interfaces wwan <interface> description <description>*	interfaces-wwan.xml.in: interfaces wwan <wwan> description	interfaces wwan <text> description <value>
✓	*set interfaces wwan <interface> dhcp-options client-id <description>*	interfaces-wwan.xml.in: interfaces wwan <wwan> dhcp-options client-id	interfaces wwan <text> dhcp-options client-id <value>
×	not yet documented	interfaces-wwan.xml.in: interfaces wwan <wwan> dhcp-options default-route-distance	interfaces wwan <text> dhcp-options default-route-distance <value>
✓	*set interfaces wwan <interface> dhcp-options host-name <hostname>*	interfaces-wwan.xml.in: interfaces wwan <wwan> dhcp-options host-name	interfaces wwan <text> dhcp-options host-name <value>
×	not yet documented	interfaces-wwan.xml.in: interfaces wwan <wwan> dhcp-options mtu	interfaces wwan <text> dhcp-options mtu
✓	*set interfaces wwan <interface> dhcp-options no-default-route*	interfaces-wwan.xml.in: interfaces wwan <wwan> dhcp-options no-default-route	interfaces wwan <text> dhcp-options no-default-route
×	not yet documented	interfaces-wwan.xml.in: interfaces wwan <wwan> dhcp-options reject	interfaces wwan <text> dhcp-options reject <value>
✓	*set interfaces wwan <interface> dhcp-options vendor-class-id <vendor-id>*	interfaces-wwan.xml.in: interfaces wwan <wwan> dhcp-options vendor-class-id	interfaces wwan <text> dhcp-options vendor-class-id <value>
✓	*set interfaces wwan <interface> dhcpv6-options duid <duid>*	interfaces-wwan.xml.in: interfaces wwan <wwan> dhcpv6-options duid	interfaces wwan <text> dhcpv6-options duid <value>
✓	*set interfaces wwan <interface> dhcpv6-options parameters-only*	interfaces-wwan.xml.in: interfaces wwan <wwan> dhcpv6-options parameters-only	interfaces wwan <text> dhcpv6-options parameters-only

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set interfaces wwan <interface> dhcpv6-options pd <id> interface <delegatee> address <address>*	interfaces-wwan.xml.in: interfaces wwan <wwan> dhcpv6-options pd <pd> interface <interface> address	interfaces wwan <text> dhcpv6-options pd <text> interface <text> address <value>
✓	*set interfaces wwan <interface> dhcpv6-options pd <id> interface <delegatee> sla-id <id>*	interfaces-wwan.xml.in: interfaces wwan <wwan> dhcpv6-options pd <pd> interface <interface> sla-id	interfaces wwan <text> dhcpv6-options pd <text> interface <text> sla-id <value>
✓	*set interfaces wwan <interface> dhcpv6-options pd <id> length <length>*	interfaces-wwan.xml.in: interfaces wwan <wwan> dhcpv6-options pd <pd> length	interfaces wwan <text> dhcpv6-options pd <text> length <value>
✓	*set interfaces wwan <interface> dhcpv6-options rapid-commit*	interfaces-wwan.xml.in: interfaces wwan <wwan> dhcpv6-options rapid-commit	interfaces wwan <text> dhcpv6-options rapid-commit
✓	*set interfaces wwan <interface> dhcpv6-options temporary*	interfaces-wwan.xml.in: interfaces wwan <wwan> dhcpv6-options temporary	interfaces wwan <text> dhcpv6-options temporary
✓	*set interfaces wwan <interface> disable*	interfaces-wwan.xml.in: interfaces wwan <wwan> disable	interfaces wwan <text> disable
✓	*set interfaces wwan <interface> disable-link-detect*	interfaces-wwan.xml.in: interfaces wwan <wwan> disable-link-detect	interfaces wwan <text> disable-link-detect
×	not yet documented	Nothing found in XML Definitions	interfaces wwan <text> firewall in ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wwan <text> firewall in name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wwan <text> firewall local ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wwan <text> firewall local name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wwan <text> firewall out ipv6-name <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wwan <text> firewall out name <value>
✓	*set interfaces wwan <interface> ip arp-cache-timeout*	interfaces-wwan.xml.in: interfaces wwan <wwan> ip arp-cache-timeout	interfaces wwan <text> ip arp-cache-timeout <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	***set interfaces wwan <interface> ip disable-arp-filter***	interfaces-wwan.xml.in: interfaces wwan <wwan> ip disable-arp-filter	interfaces wwan <text> ip disable-arp-filter
✓	***set interfaces wwan <interface> ip disable-forwarding***	interfaces-wwan.xml.in: interfaces wwan <wwan> ip disable-forwarding	interfaces wwan <text> ip disable-forwarding
✓	***set interfaces wwan <interface> ip enable-arp-accept***	interfaces-wwan.xml.in: interfaces wwan <wwan> ip enable-arp-accept	interfaces wwan <text> ip enable-arp-accept
✓	***set interfaces wwan <interface> ip enable-arp-announce***	interfaces-wwan.xml.in: interfaces wwan <wwan> ip enable-arp-announce	interfaces wwan <text> ip enable-arp-announce
✓	***set interfaces wwan <interface> ip enable-arp-ignore***	interfaces-wwan.xml.in: interfaces wwan <wwan> ip enable-arp-ignore	interfaces wwan <text> ip enable-arp-ignore
✓	***set interfaces wwan <interface> ip enable-proxy-arp***	interfaces-wwan.xml.in: interfaces wwan <wwan> ip enable-proxy-arp	interfaces wwan <text> ip enable-proxy-arp
×	not yet documented	Nothing found in XML Definitions	interfaces wwan <text> ip ospf authentication md5 key-id <text> md5-key <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wwan <text> ip ospf authentication plaintext-password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wwan <text> ip ospf bandwidth <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wwan <text> ip ospf bfd
×	not yet documented	Nothing found in XML Definitions	interfaces wwan <text> ip ospf cost <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wwan <text> ip ospf dead-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wwan <text> ip ospf hello-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wwan <text> ip ospf mtu-ignore
×	not yet documented	Nothing found in XML Definitions	interfaces wwan <text> ip ospf network <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wwan <text> ip ospf priority <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wwan <text> ip ospf retransmit-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wwan <text> ip ospf transmit-delay <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	***set interfaces wwan <interface> ip proxy-arp-pvlan***	interfaces-wwan.xml.in: interfaces wwan <wwan> ip proxy-arp-pvlan	interfaces wwan <text> ip proxy-arp-pvlan
×	not yet documented	Nothing found in XML Definitions	interfaces wwan <text> ip rip authentication md5 <text> password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wwan <text> ip rip authentication plaintext-password <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wwan <text> ip rip split-horizon disable
×	not yet documented	Nothing found in XML Definitions	interfaces wwan <text> ip rip split-horizon poison-reverse
✓	***set interfaces wwan <interface> ip source-validation <strict | loose | disable>***	interfaces-wwan.xml.in: interfaces wwan <wwan> ip source-validation	interfaces wwan <text> ip source-validation <value>
✓	***set interfaces wwan <interface> ipv6 address autoconf***	interfaces-wwan.xml.in: interfaces wwan <wwan> ipv6 address autoconf	interfaces wwan <text> ipv6 address autoconf
✓	***set interfaces wwan <interface> ipv6 address eui64 <prefix>***	interfaces-wwan.xml.in: interfaces wwan <wwan> ipv6 address eui64	interfaces wwan <text> ipv6 address eui64 <value>
✓	***set interfaces wwan <interface> ipv6 address no-default-link-local***	interfaces-wwan.xml.in: interfaces wwan <wwan> ipv6 address no-default-link-local	interfaces wwan <text> ipv6 address no-default-link-local
✓	***set interfaces wwan <interface> ipv6 disable-forwarding***	interfaces-wwan.xml.in: interfaces wwan <wwan> ipv6 disable-forwarding	interfaces wwan <text> ipv6 disable-forwarding
×	not yet documented	interfaces-wwan.xml.in: interfaces wwan <wwan> ipv6 dup-addr-detect-transmits	interfaces wwan <text> ipv6 dup-addr-detect-transmits <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wwan <text> ipv6 ospfv3 bfd
×	not yet documented	Nothing found in XML Definitions	interfaces wwan <text> ipv6 ospfv3 cost <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wwan <text> ipv6 ospfv3 dead-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wwan <text> ipv6 ospfv3 hello-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wwan <text> ipv6 ospfv3 ifmtu <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	interfaces wwan <text> ipv6 ospfv3 instance-id <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wwan <text> ipv6 ospfv3 mtu-ignore
×	not yet documented	Nothing found in XML Definitions	interfaces wwan <text> ipv6 ospfv3 network <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wwan <text> ipv6 ospfv3 passive
×	not yet documented	Nothing found in XML Definitions	interfaces wwan <text> ipv6 ospfv3 priority <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wwan <text> ipv6 ospfv3 retransmit-interval <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wwan <text> ipv6 ospfv3 transmit-delay <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wwan <text> ipv6 ripng split-horizon disable
×	not yet documented	Nothing found in XML Definitions	interfaces wwan <text> ipv6 ripng split-horizon poison-reverse
✓	***set interfaces wwan <interface> mtu <mtu>***	interfaces-wwan.xml.in: interfaces wwan <wwan> mtu	interfaces wwan <text> mtu <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wwan <text> policy ipv6-route <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wwan <text> policy route <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wwan <text> redirect <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wwan <text> traffic-policy in <value>
×	not yet documented	Nothing found in XML Definitions	interfaces wwan <text> traffic-policy out <value>
✓	***set interfaces wwan <interface> vrf <vrf>***	interfaces-wwan.xml.in: interfaces wwan <wwan> vrf	interfaces wwan <text> vrf <value>
×	***load <URI>***	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	Nothing found in XML Definitions	load-balancing wan disable-source-nat
×	not yet documented	Nothing found in XML Definitions	load-balancing wan enable-local-traffic
×	not yet documented	Nothing found in XML Definitions	load-balancing wan flush-connections

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	load-balancing wan hook <value>
×	not yet documented	Nothing found in XML Definitions	load-balancing wan interface-health <text> failure-count <value>
×	not yet documented	Nothing found in XML Definitions	load-balancing wan interface-health <text> nexthop <value>
×	not yet documented	Nothing found in XML Definitions	load-balancing wan interface-health <text> success-count <value>
×	not yet documented	Nothing found in XML Definitions	load-balancing wan interface-health <text> test <text> resp-time <value>
×	not yet documented	Nothing found in XML Definitions	load-balancing wan interface-health <text> test <text> target <value>
×	not yet documented	Nothing found in XML Definitions	load-balancing wan interface-health <text> test <text> test-script <value>
×	not yet documented	Nothing found in XML Definitions	load-balancing wan interface-health <text> test <text> ttl-limit <value>
×	not yet documented	Nothing found in XML Definitions	load-balancing wan interface-health <text> test <text> type <value>
×	not yet documented	Nothing found in XML Definitions	load-balancing wan rule <text> description <value>
×	not yet documented	Nothing found in XML Definitions	load-balancing wan rule <text> destination address <value>
×	not yet documented	Nothing found in XML Definitions	load-balancing wan rule <text> destination port <value>
×	not yet documented	Nothing found in XML Definitions	load-balancing wan rule <text> exclude
×	not yet documented	Nothing found in XML Definitions	load-balancing wan rule <text> failover
×	not yet documented	Nothing found in XML Definitions	load-balancing wan rule <text> inbound-interface <value>
×	not yet documented	Nothing found in XML Definitions	load-balancing wan rule <text> interface <text> weight <value>
×	not yet documented	Nothing found in XML Definitions	load-balancing wan rule <text> limit burst <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	load-balancing wan rule <text> limit period <value>
×	not yet documented	Nothing found in XML Definitions	load-balancing wan rule <text> limit rate <value>
×	not yet documented	Nothing found in XML Definitions	load-balancing wan rule <text> limit threshold <value>
×	not yet documented	Nothing found in XML Definitions	load-balancing wan rule <text> per-packet-balancing
×	not yet documented	Nothing found in XML Definitions	load-balancing wan rule <text> protocol <value>
×	not yet documented	Nothing found in XML Definitions	load-balancing wan rule <text> source address <value>
×	not yet documented	Nothing found in XML Definitions	load-balancing wan rule <text> source port <value>
×	not yet documented	Nothing found in XML Definitions	load-balancing wan sticky-connections inbound
×	*loadkey <username> <location>*	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	nat.xml.in: nat destination rule <rule> description	nat destination rule <text> description <value>
×	not yet documented	nat.xml.in: nat destination rule <rule> destination address	nat destination rule <text> destination address <value>
×	not yet documented	nat.xml.in: nat destination rule <rule> destination port	nat destination rule <text> destination port <value>
×	not yet documented	nat.xml.in: nat destination rule <rule> disable	nat destination rule <text> disable
×	not yet documented	nat.xml.in: nat destination rule <rule> exclude	nat destination rule <text> exclude
×	not yet documented	nat.xml.in: nat destination rule <rule> inbound-interface	nat destination rule <text> inbound-interface <value>
×	not yet documented	nat.xml.in: nat destination rule <rule> log	nat destination rule <text> log <value>
×	not yet documented	nat.xml.in: nat destination rule <rule> protocol	nat destination rule <text> protocol <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	nat.xml.in: nat destination rule <rule> source address	nat destination rule <text> source address <value>
×	not yet documented	nat.xml.in: nat destination rule <rule> source port	nat destination rule <text> source port <value>
×	not yet documented	nat.xml.in: nat destination rule <rule> translation address	nat destination rule <text> translation address <value>
×	not yet documented	nat.xml.in: nat destination rule <rule> translation options address-mapping	nat destination rule <text> translation options address-mapping <value>
×	not yet documented	nat.xml.in: nat destination rule <rule> translation options port-mapping	Nothing found in VyOS
×	not yet documented	nat.xml.in: nat destination rule <rule> translation port	nat destination rule <text> translation port <value>
×	not yet documented	nat.xml.in: nat nptv6 rule <rule> description	nat nptv6 rule <text> description <value>
×	not yet documented	nat.xml.in: nat nptv6 rule <rule> disable	nat nptv6 rule <text> disable
×	not yet documented	nat.xml.in: nat nptv6 rule <rule> outbound-interface	nat nptv6 rule <text> outbound-interface <value>
×	not yet documented	nat.xml.in: nat nptv6 rule <rule> source prefix	nat nptv6 rule <text> source prefix <value>
×	not yet documented	nat.xml.in: nat nptv6 rule <rule> translation prefix	nat nptv6 rule <text> translation prefix <value>
×	not yet documented	nat.xml.in: nat source rule <rule> description	nat source rule <text> description <value>
×	not yet documented	nat.xml.in: nat source rule <rule> destination address	nat source rule <text> destination address <value>
×	not yet documented	nat.xml.in: nat source rule <rule> destination port	nat source rule <text> destination port <value>
×	not yet documented	nat.xml.in: nat source rule <rule> disable	nat source rule <text> disable
×	not yet documented	nat.xml.in: nat source rule <rule> exclude	nat source rule <text> exclude

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	nat.xml.in: nat source rule <rule> log	nat source rule <text> log <value>
×	not yet documented	nat.xml.in: nat source rule <rule> outbound-interface	nat source rule <text> outbound-interface <value>
×	not yet documented	nat.xml.in: nat source rule <rule> protocol	nat source rule <text> protocol <value>
×	not yet documented	nat.xml.in: nat source rule <rule> source address	nat source rule <text> source address <value>
×	not yet documented	nat.xml.in: nat source rule <rule> source port	nat source rule <text> source port <value>
×	not yet documented	nat.xml.in: nat source rule <rule> translation address	nat source rule <text> translation address <value>
×	not yet documented	nat.xml.in: nat source rule <rule> translation options address-mapping	nat source rule <text> translation options address-mapping <value>
×	not yet documented	nat.xml.in: nat source rule <rule> translation options port-mapping	nat source rule <text> translation options port-mapping <value>
×	not yet documented	nat.xml.in: nat source rule <rule> translation port	nat source rule <text> translation port <value>
×	not yet documented	Nothing found in XML Definitions	policy access-list6 <text> description <value>
×	not yet documented	Nothing found in XML Definitions	policy access-list6 <text> rule <text> action <value>
×	not yet documented	Nothing found in XML Definitions	policy access-list6 <text> rule <text> description <value>
×	not yet documented	Nothing found in XML Definitions	policy access-list6 <text> rule <text> source any
×	not yet documented	Nothing found in XML Definitions	policy access-list6 <text> rule <text> source exact-match
×	not yet documented	Nothing found in XML Definitions	policy access-list6 <text> rule <text> source network <value>
×	not yet documented	Nothing found in XML Definitions	policy access-list <text> description <value>
×	not yet documented	Nothing found in XML Definitions	policy access-list <text> rule <text> action <value>
×	not yet documented	Nothing found in XML Definitions	policy access-list <text> rule <text> description <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	policy access-list <text> rule <text> destination any
×	not yet documented	Nothing found in XML Definitions	policy access-list <text> rule <text> destination host <value>
×	not yet documented	Nothing found in XML Definitions	policy access-list <text> rule <text> destination inverse-mask <value>
×	not yet documented	Nothing found in XML Definitions	policy access-list <text> rule <text> destination network <value>
×	not yet documented	Nothing found in XML Definitions	policy access-list <text> rule <text> source any
×	not yet documented	Nothing found in XML Definitions	policy access-list <text> rule <text> source host <value>
×	not yet documented	Nothing found in XML Definitions	policy access-list <text> rule <text> source inverse-mask <value>
×	not yet documented	Nothing found in XML Definitions	policy access-list <text> rule <text> source network <value>
×	not yet documented	Nothing found in XML Definitions	policy as-path-list <text> description <value>
×	not yet documented	Nothing found in XML Definitions	policy as-path-list <text> rule <text> action <value>
×	not yet documented	Nothing found in XML Definitions	policy as-path-list <text> rule <text> description <value>
×	not yet documented	Nothing found in XML Definitions	policy as-path-list <text> rule <text> regex <value>
×	not yet documented	Nothing found in XML Definitions	policy community-list <text> description <value>
×	not yet documented	Nothing found in XML Definitions	policy community-list <text> rule <text> action <value>
×	not yet documented	Nothing found in XML Definitions	policy community-list <text> rule <text> description <value>
×	not yet documented	Nothing found in XML Definitions	policy community-list <text> rule <text> regex <value>
×	not yet documented	Nothing found in XML Definitions	policy extcommunity-list <text> description <value>
×	not yet documented	Nothing found in XML Definitions	policy extcommunity-list <text> rule <text> action <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	policy extcommunity-list <text> rule <text> description <value>
×	not yet documented	Nothing found in XML Definitions	policy extcommunity-list <text> rule <text> regex <value>
×	not yet documented	Nothing found in XML Definitions	policy ipv6-route <text> description <value>
×	not yet documented	Nothing found in XML Definitions	policy ipv6-route <text> enable-default-log
×	not yet documented	Nothing found in XML Definitions	policy ipv6-route <text> rule <text> action <value>
×	not yet documented	Nothing found in XML Definitions	policy ipv6-route <text> rule <text> description <value>
×	not yet documented	Nothing found in XML Definitions	policy ipv6-route <text> rule <text> destination address <value>
×	not yet documented	Nothing found in XML Definitions	policy ipv6-route <text> rule <text> destination port <value>
×	not yet documented	Nothing found in XML Definitions	policy ipv6-route <text> rule <text> disable
×	not yet documented	Nothing found in XML Definitions	policy ipv6-route <text> rule <text> icmpv6 type <value>
×	not yet documented	Nothing found in XML Definitions	policy ipv6-route <text> rule <text> ipsec match-ipsec
×	not yet documented	Nothing found in XML Definitions	policy ipv6-route <text> rule <text> ipsec match-none
×	not yet documented	Nothing found in XML Definitions	policy ipv6-route <text> rule <text> limit burst <value>
×	not yet documented	Nothing found in XML Definitions	policy ipv6-route <text> rule <text> limit rate <value>
×	not yet documented	Nothing found in XML Definitions	policy ipv6-route <text> rule <text> log <value>
×	not yet documented	Nothing found in XML Definitions	policy ipv6-route <text> rule <text> protocol <value>
×	not yet documented	Nothing found in XML Definitions	policy ipv6-route <text> rule <text> recent count <value>
×	not yet documented	Nothing found in XML Definitions	policy ipv6-route <text> rule <text> recent time <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	policy ipv6-route <text> rule <text> set dscp <value>
×	not yet documented	Nothing found in XML Definitions	policy ipv6-route <text> rule <text> set mark <value>
×	not yet documented	Nothing found in XML Definitions	policy ipv6-route <text> rule <text> set table <value>
×	not yet documented	Nothing found in XML Definitions	policy ipv6-route <text> rule <text> set tcp-mss <value>
×	not yet documented	Nothing found in XML Definitions	policy ipv6-route <text> rule <text> source address <value>
×	not yet documented	Nothing found in XML Definitions	policy ipv6-route <text> rule <text> source mac-address <value>
×	not yet documented	Nothing found in XML Definitions	policy ipv6-route <text> rule <text> source port <value>
×	not yet documented	Nothing found in XML Definitions	policy ipv6-route <text> rule <text> state established <value>
×	not yet documented	Nothing found in XML Definitions	policy ipv6-route <text> rule <text> state invalid <value>
×	not yet documented	Nothing found in XML Definitions	policy ipv6-route <text> rule <text> state new <value>
×	not yet documented	Nothing found in XML Definitions	policy ipv6-route <text> rule <text> state related <value>
×	not yet documented	Nothing found in XML Definitions	policy ipv6-route <text> rule <text> tcp flags <value>
×	not yet documented	Nothing found in XML Definitions	policy ipv6-route <text> rule <text> time monthdays <value>
×	not yet documented	Nothing found in XML Definitions	policy ipv6-route <text> rule <text> time startdate <value>
×	not yet documented	Nothing found in XML Definitions	policy ipv6-route <text> rule <text> time starttime <value>
×	not yet documented	Nothing found in XML Definitions	policy ipv6-route <text> rule <text> time stopdate <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	policy ipv6-route <text> rule <text> time stoptime <value>
×	not yet documented	Nothing found in XML Definitions	policy ipv6-route <text> rule <text> time utc
×	not yet documented	Nothing found in XML Definitions	policy ipv6-route <text> rule <text> time weekdays <value>
×	not yet documented	Nothing found in XML Definitions	policy large-community-list <text> description <value>
×	not yet documented	Nothing found in XML Definitions	policy large-community-list <text> rule <text> action <value>
×	not yet documented	Nothing found in XML Definitions	policy large-community-list <text> rule <text> description <value>
×	not yet documented	Nothing found in XML Definitions	policy large-community-list <text> rule <text> regex <value>
×	not yet documented	policy-local-route.xml.in: policy local-route6 rule <rule> destination	policy local-route6 rule <text> destination <value>
×	not yet documented	policy-local-route.xml.in: policy local-route6 rule <rule> fwmark	policy local-route6 rule <text> fwmark <value>
×	not yet documented	policy-local-route.xml.in: policy local-route6 rule <rule> inbound-interface	policy local-route6 rule <text> inbound-interface <value>
×	not yet documented	policy-local-route.xml.in: policy local-route6 rule <rule> set table	policy local-route6 rule <text> set table <value>
×	not yet documented	policy-local-route.xml.in: policy local-route6 rule <rule> source	policy local-route6 rule <text> source <value>
×	not yet documented	policy-local-route.xml.in: policy local-route rule <rule> destination	policy local-route rule <text> destination <value>
×	not yet documented	policy-local-route.xml.in: policy local-route rule <rule> fwmark	policy local-route rule <text> fwmark <value>
×	not yet documented	policy-local-route.xml.in: policy local-route rule <rule> inbound-interface	policy local-route rule <text> inbound-interface <value>
×	not yet documented	policy-local-route.xml.in: policy local-route rule <rule> set table	policy local-route rule <text> set table <value>
×	not yet documented	policy-local-route.xml.in: policy local-route rule <rule> source	policy local-route rule <text> source <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	policy prefix-list6 <text> description <value>
×	not yet documented	Nothing found in XML Definitions	policy prefix-list6 <text> rule <text> action <value>
×	not yet documented	Nothing found in XML Definitions	policy prefix-list6 <text> rule <text> description <value>
×	not yet documented	Nothing found in XML Definitions	policy prefix-list6 <text> rule <text> ge <value>
×	not yet documented	Nothing found in XML Definitions	policy prefix-list6 <text> rule <text> le <value>
×	not yet documented	Nothing found in XML Definitions	policy prefix-list6 <text> rule <text> prefix <value>
×	not yet documented	Nothing found in XML Definitions	policy prefix-list <text> description <value>
×	not yet documented	Nothing found in XML Definitions	policy prefix-list <text> rule <text> action <value>
×	not yet documented	Nothing found in XML Definitions	policy prefix-list <text> rule <text> description <value>
×	not yet documented	Nothing found in XML Definitions	policy prefix-list <text> rule <text> ge <value>
×	not yet documented	Nothing found in XML Definitions	policy prefix-list <text> rule <text> le <value>
×	not yet documented	Nothing found in XML Definitions	policy prefix-list <text> rule <text> prefix <value>
×	not yet documented	Nothing found in XML Definitions	policy route-map <text> description <value>
×	not yet documented	Nothing found in XML Definitions	policy route-map <text> rule <text> action <value>
×	not yet documented	Nothing found in XML Definitions	policy route-map <text> rule <text> call <value>
×	not yet documented	Nothing found in XML Definitions	policy route-map <text> rule <text> continue <value>
×	not yet documented	Nothing found in XML Definitions	policy route-map <text> rule <text> description <value>
×	not yet documented	Nothing found in XML Definitions	policy route-map <text> rule <text> match as-path <value>
×	not yet documented	Nothing found in XML Definitions	policy route-map <text> rule <text> match community community-list <value>
×	not yet documented	Nothing found in XML Definitions	policy route-map <text> rule <text> match community exact-match

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	policy route-map <text> rule <text> match extcommunity <value>
×	not yet documented	Nothing found in XML Definitions	policy route-map <text> rule <text> match interface <value>
×	not yet documented	Nothing found in XML Definitions	policy route-map <text> rule <text> match ip address access-list <value>
×	not yet documented	Nothing found in XML Definitions	policy route-map <text> rule <text> match ip address prefix-list <value>
×	not yet documented	Nothing found in XML Definitions	policy route-map <text> rule <text> match ip nexthop access-list <value>
×	not yet documented	Nothing found in XML Definitions	policy route-map <text> rule <text> match ip nexthop prefix-list <value>
×	not yet documented	Nothing found in XML Definitions	policy route-map <text> rule <text> match ip routesource access-list <value>
×	not yet documented	Nothing found in XML Definitions	policy route-map <text> rule <text> match ip routesource prefix-list <value>
×	not yet documented	Nothing found in XML Definitions	policy route-map <text> rule <text> match ipv6 address access-list <value>
×	not yet documented	Nothing found in XML Definitions	policy route-map <text> rule <text> match ipv6 address prefix-list <value>
×	not yet documented	Nothing found in XML Definitions	policy route-map <text> rule <text> match ipv6 nexthop <value>
×	not yet documented	Nothing found in XML Definitions	policy route-map <text> rule <text> match large-community large-community-list <value>
×	not yet documented	Nothing found in XML Definitions	policy route-map <text> rule <text> match local-preference <value>
×	not yet documented	Nothing found in XML Definitions	policy route-map <text> rule <text> match metric <value>
×	not yet documented	Nothing found in XML Definitions	policy route-map <text> rule <text> match origin <value>
×	not yet documented	Nothing found in XML Definitions	policy route-map <text> rule <text> match peer <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	policy route-map <text> rule <text> match rpki <value>
×	not yet documented	Nothing found in XML Definitions	policy route-map <text> rule <text> match tag <value>
×	not yet documented	Nothing found in XML Definitions	policy route-map <text> rule <text> on-match goto <value>
×	not yet documented	Nothing found in XML Definitions	policy route-map <text> rule <text> on-match next
×	not yet documented	Nothing found in XML Definitions	policy route-map <text> rule <text> set aggregator as <value>
×	not yet documented	Nothing found in XML Definitions	policy route-map <text> rule <text> set aggregator ip <value>
×	not yet documented	Nothing found in XML Definitions	policy route-map <text> rule <text> set as-path-exclude <value>
×	not yet documented	Nothing found in XML Definitions	policy route-map <text> rule <text> set as-path-prepend <value>
×	not yet documented	Nothing found in XML Definitions	policy route-map <text> rule <text> set atomic-aggregate
×	not yet documented	Nothing found in XML Definitions	policy route-map <text> rule <text> set bgp-extcommunity-rt <value>
×	not yet documented	Nothing found in XML Definitions	policy route-map <text> rule <text> set comm-list comm-list <value>
×	not yet documented	Nothing found in XML Definitions	policy route-map <text> rule <text> set comm-list delete
×	not yet documented	Nothing found in XML Definitions	policy route-map <text> rule <text> set community <value>
×	not yet documented	Nothing found in XML Definitions	policy route-map <text> rule <text> set distance <value>
×	not yet documented	Nothing found in XML Definitions	policy route-map <text> rule <text> set extcommunity-rt <value>
×	not yet documented	Nothing found in XML Definitions	policy route-map <text> rule <text> set extcommunity-soo <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	policy route-map <text> rule <text> set ip-next-hop <value>
×	not yet documented	Nothing found in XML Definitions	policy route-map <text> rule <text> set ipv6-next-hop global <value>
×	not yet documented	Nothing found in XML Definitions	policy route-map <text> rule <text> set ipv6-next-hop local <value>
×	not yet documented	Nothing found in XML Definitions	policy route-map <text> rule <text> set ipv6-next-hop prefer-global
×	not yet documented	Nothing found in XML Definitions	policy route-map <text> rule <text> set large-community <value>
×	not yet documented	Nothing found in XML Definitions	policy route-map <text> rule <text> set local-preference <value>
×	not yet documented	Nothing found in XML Definitions	policy route-map <text> rule <text> set metric <value>
×	not yet documented	Nothing found in XML Definitions	policy route-map <text> rule <text> set metric-type <value>
×	not yet documented	Nothing found in XML Definitions	policy route-map <text> rule <text> set origin <value>
×	not yet documented	Nothing found in XML Definitions	policy route-map <text> rule <text> set originator-id <value>
×	not yet documented	Nothing found in XML Definitions	policy route-map <text> rule <text> set src <value>
×	not yet documented	Nothing found in XML Definitions	policy route-map <text> rule <text> set table <value>
×	not yet documented	Nothing found in XML Definitions	policy route-map <text> rule <text> set tag <value>
×	not yet documented	Nothing found in XML Definitions	policy route-map <text> rule <text> set weight <value>
×	not yet documented	Nothing found in XML Definitions	policy route <text> description <value>
×	not yet documented	Nothing found in XML Definitions	policy route <text> enable-default-log
×	not yet documented	Nothing found in XML Definitions	policy route <text> rule <text> action <value>
×	not yet documented	Nothing found in XML Definitions	policy route <text> rule <text> description <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	policy route <text> rule <text> destination address <value>
×	not yet documented	Nothing found in XML Definitions	policy route <text> rule <text> destination group address-group <value>
×	not yet documented	Nothing found in XML Definitions	policy route <text> rule <text> destination group network-group <value>
×	not yet documented	Nothing found in XML Definitions	policy route <text> rule <text> destination group port-group <value>
×	not yet documented	Nothing found in XML Definitions	policy route <text> rule <text> destination port <value>
×	not yet documented	Nothing found in XML Definitions	policy route <text> rule <text> disable
×	not yet documented	Nothing found in XML Definitions	policy route <text> rule <text> fragment match-frag
×	not yet documented	Nothing found in XML Definitions	policy route <text> rule <text> fragment match-non-frag
×	not yet documented	Nothing found in XML Definitions	policy route <text> rule <text> icmp code <value>
×	not yet documented	Nothing found in XML Definitions	policy route <text> rule <text> icmp type <value>
×	not yet documented	Nothing found in XML Definitions	policy route <text> rule <text> icmp type-name <value>
×	not yet documented	Nothing found in XML Definitions	policy route <text> rule <text> ipsec match-ipsec
×	not yet documented	Nothing found in XML Definitions	policy route <text> rule <text> ipsec match-none
×	not yet documented	Nothing found in XML Definitions	policy route <text> rule <text> limit burst <value>
×	not yet documented	Nothing found in XML Definitions	policy route <text> rule <text> limit rate <value>
×	not yet documented	Nothing found in XML Definitions	policy route <text> rule <text> log <value>
×	not yet documented	Nothing found in XML Definitions	policy route <text> rule <text> protocol <value>
×	not yet documented	Nothing found in XML Definitions	policy route <text> rule <text> recent count <value>
×	not yet documented	Nothing found in XML Definitions	policy route <text> rule <text> recent time <value>
×	not yet documented	Nothing found in XML Definitions	policy route <text> rule <text> set dscp <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	policy route <text> rule <text> set mark <value>
×	not yet documented	Nothing found in XML Definitions	policy route <text> rule <text> set table <value>
×	not yet documented	Nothing found in XML Definitions	policy route <text> rule <text> set tcp-mss <value>
×	not yet documented	Nothing found in XML Definitions	policy route <text> rule <text> source address <value>
×	not yet documented	Nothing found in XML Definitions	policy route <text> rule <text> source group address-group <value>
×	not yet documented	Nothing found in XML Definitions	policy route <text> rule <text> source group network-group <value>
×	not yet documented	Nothing found in XML Definitions	policy route <text> rule <text> source group port-group <value>
×	not yet documented	Nothing found in XML Definitions	policy route <text> rule <text> source mac-address <value>
×	not yet documented	Nothing found in XML Definitions	policy route <text> rule <text> source port <value>
×	not yet documented	Nothing found in XML Definitions	policy route <text> rule <text> state established <value>
×	not yet documented	Nothing found in XML Definitions	policy route <text> rule <text> state invalid <value>
×	not yet documented	Nothing found in XML Definitions	policy route <text> rule <text> state new <value>
×	not yet documented	Nothing found in XML Definitions	policy route <text> rule <text> state related <value>
×	not yet documented	Nothing found in XML Definitions	policy route <text> rule <text> tcp flags <value>
×	not yet documented	Nothing found in XML Definitions	policy route <text> rule <text> time monthdays <value>
×	not yet documented	Nothing found in XML Definitions	policy route <text> rule <text> time startdate <value>
×	not yet documented	Nothing found in XML Definitions	policy route <text> rule <text> time starttime <value>
×	not yet documented	Nothing found in XML Definitions	policy route <text> rule <text> time stopdate <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	policy route <text> rule <text> time stoptime <value>
×	not yet documented	Nothing found in XML Definitions	policy route <text> rule <text> time utc
×	not yet documented	Nothing found in XML Definitions	policy route <text> rule <text> time weekdays <value>
×	*set protocols bfd peer <address>*	Nothing found in XML Definitions	Nothing found in VyOS
✓	*set protocols bfd peer <address> echo-mode*	protocols-bfd.xml.in: protocols bfd peer <peer> echo-mode	protocols bfd peer <text> echo-mode
×	*set protocols bfd peer <address> interval [receive | transmit] <10-60000>*	Nothing found in XML Definitions	Nothing found in VyOS
✓	*set protocols bfd peer <address> interval echo-interval <10-60000>*	protocols-bfd.xml.in: protocols bfd peer <peer> interval echo-interval	protocols bfd peer <text> interval echo-interval <value>
✓	*set protocols bfd peer <address> interval multiplier <2-255>*	protocols-bfd.xml.in: protocols bfd peer <peer> interval multiplier	protocols bfd peer <text> interval multiplier <value>
×	not yet documented	protocols-bfd.xml.in: protocols bfd peer <peer> interval receive	protocols bfd peer <text> interval receive <value>
×	not yet documented	protocols-bfd.xml.in: protocols bfd peer <peer> interval transmit	protocols bfd peer <text> interval transmit <value>
×	not yet documented	protocols-bfd.xml.in: protocols bfd peer <peer> minimum-ttl	Nothing found in VyOS
✓	*set protocols bfd peer <address> multihop*	protocols-bfd.xml.in: protocols bfd peer <peer> multihop	protocols bfd peer <text> multihop
✓	*set protocols bfd peer <address> shutdown*	protocols-bfd.xml.in: protocols bfd peer <peer> shutdown	protocols bfd peer <text> shutdown
×	*set protocols bfd peer <address> source [address <address> | interface <interface>]*	Nothing found in XML Definitions	Nothing found in VyOS

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	protocols-bfd.xml.in: protocols bfd peer <peer> source address	protocols bfd peer <text> source address <value>
×	not yet documented	protocols-bfd.xml.in: protocols bfd peer <peer> source interface	protocols bfd peer <text> source interface <value>
×	*set protocols bgp <asn> address-family <ipv4-unicast|ipv6-un aggregate-address <prefix>*	Nothing found in XML Definitions	Nothing found in VyOS
×	*set protocols bgp <asn> address-family <ipv4-unicast|ipv6-un aggregate-address <prefix> as-set*	Nothing found in XML Definitions	Nothing found in VyOS
×	*set protocols bgp <asn> address-family <ipv4-unicast|ipv6-un aggregate-address <prefix> summary-only*	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> address-family ipv4-unicast aggregate-address <text> as-set
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> address-family ipv4-unicast aggregate-address <text> route-map <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> address-family ipv4-unicast aggregate-address <text> summary-only
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> address-family ipv4-unicast maximum-paths ebgp <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> address-family ipv4-unicast maximum-paths ibgp <value>
✓	*set protocols bgp <asn> address-family ipv4-unicast network <prefix> backdoor*	Nothing found in XML Definitions	protocols bgp <text> address-family ipv4-unicast network <text> backdoor
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> address-family ipv4-unicast network <text> route-map <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> address-family ipv4-unicast redistribute connected metric <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> address-family ipv4-unicast redistribute connected route-map <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> address-family ipv4-unicast redistribute isis metric <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> address-family ipv4-unicast redistribute isis route-map <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> address-family ipv4-unicast redistribute kernel metric <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> address-family ipv4-unicast redistribute kernel route-map <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> address-family ipv4-unicast redistribute ospf metric <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> address-family ipv4-unicast redistribute ospf route-map <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> address-family ipv4-unicast redistribute rip metric <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> address-family ipv4-unicast redistribute rip route-map <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> address-family ipv4-unicast redistribute static metric <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> address-family ipv4-unicast redistribute static route-map <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> address-family ipv4-unicast redistribute table <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> address-family ipv6-unicast aggregate-address <text> route-map <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> address-family ipv6-unicast aggregate-address <text> summary-only
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> address-family ipv6-unicast maximum-paths ebgp <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> address-family ipv6-unicast maximum-paths ibgp <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> address-family ipv6-unicast network <text> path-limit <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> address-family ipv6-unicast network <text> route-map <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> address-family ipv6-unicast redistribute connected metric <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> address-family ipv6-unicast redistribute connected route-map <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> address-family ipv6-unicast redistribute kernel metric <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> address-family ipv6-unicast redistribute kernel route-map <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> address-family ipv6-unicast redistribute ospfv3 metric <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> address-family ipv6-unicast redistribute ospfv3 route-map <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> address-family ipv6-unicast redistribute ripng metric <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> address-family ipv6-unicast redistribute ripng route-map <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> address-family ipv6-unicast redistribute static metric <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> address-family ipv6-unicast redistribute static route-map <value>
×	*set protocols bgp <asn> address-family <ipv4-unicast|ipv6-un maximum-paths <ebgp|ibgp> <number>*	Nothing found in XML Definitions	Nothing found in VyOS
×	*set protocols bgp <asn> address-family <ipv4-unicast|ipv6-un network <prefix>*	Nothing found in XML Definitions	Nothing found in VyOS
×	*set protocols bgp <asn> address-family <ipv4-unicast|ipv6-un redistribute <route source>*	Nothing found in XML Definitions	Nothing found in VyOS
×	*set protocols bgp <asn> address-family <ipv4-unicast|ipv6-un redistribute <route source> metric <number>*	Nothing found in XML Definitions	Nothing found in VyOS
×	*set protocols bgp <asn> address-family <ipv4-unicast|ipv6-un redistribute <route source> route-map <name>*	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> listen limit <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> listen range <text> peer-group <value>
×	*set protocols bgp <asn> neighbor <address|interface> address-family <ipv4-unicast|ipv6-un allowas-in number <number>*	Nothing found in XML Definitions	Nothing found in VyOS
×	*set protocols bgp <asn> neighbor <address|interface> address-family <ipv4-unicast|ipv6-un as-override*	Nothing found in XML Definitions	Nothing found in VyOS
×	*set protocols bgp <asn> neighbor <address|interface> address-family <ipv4-unicast|ipv6-un attribute-unchanged <as-path|med|next-hop*	Nothing found in XML Definitions	Nothing found in VyOS
×	*set protocols bgp <asn> neighbor <address|interface> address-family <ipv4-unicast|ipv6-un capability orf <receive|send>*	Nothing found in XML Definitions	Nothing found in VyOS
×	*set protocols bgp <asn> neighbor <address|interface> address-family <ipv4-unicast|ipv6-un default-originate [route-map <name>]*	Nothing found in XML Definitions	Nothing found in VyOS
×	*set protocols bgp <asn> neighbor <address|interface> address-family <ipv4-unicast|ipv6-un distribute-list <export|import> <number>*	Nothing found in XML Definitions	Nothing found in VyOS

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	*set protocols bgp <asn> neighbor <address|interface> address-family <ipv4-unicast|ipv6-un filter-list <export|import> <name>*	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> address-family ipv4-unicast allowas-in number <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> address-family ipv4-unicast as-override
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> address-family ipv4-unicast attribute-unchanged as-path
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> address-family ipv4-unicast attribute-unchanged med
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> address-family ipv4-unicast attribute-unchanged next-hop
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> address-family ipv4-unicast capability orf prefix-list receive
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> address-family ipv4-unicast capability orf prefix-list send
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> address-family ipv4-unicast default-originate route-map <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> address-family ipv4-unicast distribute-list export <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> address-family ipv4-unicast distribute-list import <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> address-family ipv4-unicast filter-list export <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> address-family ipv4-unicast filter-list import <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> address-family ipv4-unicast maximum-prefix <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> address-family ipv4-unicast nexthop-self force
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> address-family ipv4-unicast prefix-list export <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> address-family ipv4-unicast prefix-list import <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> address-family ipv4-unicast remove-private-as
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> address-family ipv4-unicast route-map export <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> address-family ipv4-unicast route-map import <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> address-family ipv4-unicast route-reflector-client

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> address-family ipv4-unicast route-server-client
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> address-family ipv4-unicast soft-reconfiguration inbound
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> address-family ipv4-unicast unsuppress-map <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> address-family ipv4-unicast weight <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> address-family ipv6-unicast allowas-in number <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> address-family ipv6-unicast attribute-unchanged as-path
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> address-family ipv6-unicast attribute-unchanged med
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> address-family ipv6-unicast attribute-unchanged next-hop
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> address-family ipv6-unicast capability orf prefix-list receive
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> address-family ipv6-unicast capability orf prefix-list send

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> address-family ipv6-unicast default-originate route-map <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> address-family ipv6-unicast disable-send-community extended
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> address-family ipv6-unicast disable-send-community standard
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> address-family ipv6-unicast distribute-list export <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> address-family ipv6-unicast distribute-list import <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> address-family ipv6-unicast filter-list export <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> address-family ipv6-unicast filter-list import <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> address-family ipv6-unicast maximum-prefix <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> address-family ipv6-unicast nexthop-local unchanged
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> address-family ipv6-unicast nexthop-self force
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> address-family ipv6-unicast peer-group <value>

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> address-family ipv6-unicast prefix-list export <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> address-family ipv6-unicast prefix-list import <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> address-family ipv6-unicast remove-private-as
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> address-family ipv6-unicast route-map export <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> address-family ipv6-unicast route-map import <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> address-family ipv6-unicast route-reflector-client
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> address-family ipv6-unicast route-server-client
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> address-family ipv6-unicast soft-reconfiguration inbound
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> address-family ipv6-unicast unsuppress-map <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> address-family ipv6-unicast weight <value>
×	*set protocols bgp <asn> neighbor <address|interface> address-family <ipv4-unicast|ipv6-un maximum-prefix <number>*	Nothing found in XML Definitions	Nothing found in VyOS

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	*set protocols bgp <asn> neighbor <address|interface> address-family <ipv4-unicast|ipv6-un nexthop-self*	Nothing found in XML Definitions	Nothing found in VyOS
×	*set protocols bgp <asn> neighbor <address|interface> address-family <ipv4-unicast|ipv6-un prefix-list <export|import> <name>*	Nothing found in XML Definitions	Nothing found in VyOS
×	*set protocols bgp <asn> neighbor <address|interface> address-family <ipv4-unicast|ipv6-un remove-private-as*	Nothing found in XML Definitions	Nothing found in VyOS
×	*set protocols bgp <asn> neighbor <address|interface> address-family <ipv4-unicast|ipv6-un route-map <export|import> <name>*	Nothing found in XML Definitions	Nothing found in VyOS
×	*set protocols bgp <asn> neighbor <address> address-family <ipv4-unicast|ipv6-un route-reflector-clien*	Nothing found in XML Definitions	Nothing found in VyOS
×	*set protocols bgp <asn> neighbor <address|interface> address-family <ipv4-unicast|ipv6-un soft-reconfiguration inbound*	Nothing found in XML Definitions	Nothing found in VyOS
×	*set protocols bgp <asn> neighbor <address|interface> address-family <ipv4-unicast|ipv6-un unsuppress-map <name>*	Nothing found in XML Definitions	Nothing found in VyOS

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	*set protocols bgp <asn> neighbor <address|interface> address-family <ipv4-unicast|ipv6-un weight <number>*	Nothing found in XML Definitions	Nothing found in VyOS
✓	*set protocols bgp <asn> neighbor <address|interface> advertisement-interva <seconds>*	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> advertisement-interval <value>
×	*set protocols bgp <asn> neighbor <address> bfd*	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> bfd check-control-plane-failure
✓	*set protocols bgp <asn> neighbor <address|interface> capability dynamic*	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> capability dynamic
✓	*set protocols bgp <asn> neighbor <address|interface> capability extended-nexthop*	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> capability extended-nexthop
✓	*set protocols bgp <asn> neighbor <address|interface> description <text>*	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> description <value>
✓	*set protocols bgp <asn> neighbor <address|interface> disable-capability-ne*	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> disable-capability-negotiation
✓	*set protocols bgp <asn> neighbor <address|interface> disable-connected-che*	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> disable-connected-check
×	*set protocols bgp <asn> neighbor <address|interface> disable-send-communit <extended|standard>*	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> disable-send-community extended
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> disable-send-community standard

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set protocols bgp <asn> neighbor <address|interface> ebgp-multihop <number>*	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> ebgp-multihop <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> interface peer-group <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> interface remote-as <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> interface v6only peer-group <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> interface v6only remote-as <value>
×	*set protocols bgp <asn> neighbor <address|interface> local-as <asn> [no-prepend] [replace-as]*	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> local-as <text> no-prepend replace-as
✓	*set protocols bgp <asn> neighbor <address|interface> override-capability*	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> override-capability
✓	*set protocols bgp <asn> neighbor <address|interface> passive*	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> passive
✓	*set protocols bgp <asn> neighbor <address|interface> password <text>*	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> password <value>
✓	*set protocols bgp <asn> neighbor <address|interface> peer-group <name>*	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> peer-group <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> port <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set protocols bgp <asn> neighbor <address|interface> remote-as <nasn>*	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> remote-as <value>
×	*set protocols bgp <asn> neighbor <address|interface> remote-as external*	Nothing found in XML Definitions	Nothing found in VyOS
×	*set protocols bgp <asn> neighbor <address|interface> remote-as internal*	Nothing found in XML Definitions	Nothing found in VyOS
✓	*set protocols bgp <asn> neighbor <address|interface> shutdown*	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> shutdown
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> solo
✓	*set protocols bgp <asn> neighbor <address|interface> strict-capability-mat*	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> strict-capability-match
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> timers connect <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> timers holdtime <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> timers keepalive <value>
✓	*set protocols bgp <asn> neighbor <address|interface> ttl-security hops <number>*	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> ttl-security hops <value>
✓	*set protocols bgp <asn> neighbor <address|interface> update-source <address|interface>*	Nothing found in XML Definitions	protocols bgp <text> neighbor <text> update-source <value>
✓	*set protocols bgp <asn> parameters always-compare-med*	Nothing found in XML Definitions	protocols bgp <text> parameters always-compare-med
✓	*set protocols bgp <asn> parameters bestpath as-path confed*	Nothing found in XML Definitions	protocols bgp <text> parameters bestpath as-path confed

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set protocols bgp <asn> parameters bestpath as-path ignore*	Nothing found in XML Definitions	protocols bgp <text> parameters bestpath as-path ignore
✓	*set protocols bgp <asn> parameters bestpath as-path multipath-relax*	Nothing found in XML Definitions	protocols bgp <text> parameters bestpath as-path multipath-relax
✓	*set protocols bgp <asn> parameters bestpath compare-routerid*	Nothing found in XML Definitions	protocols bgp <text> parameters bestpath compare-routerid
✓	*set protocols bgp <asn> parameters bestpath med confed*	Nothing found in XML Definitions	protocols bgp <text> parameters bestpath med confed
✓	*set protocols bgp <asn> parameters bestpath med missing-as-worst*	Nothing found in XML Definitions	protocols bgp <text> parameters bestpath med missing-as-worst
✓	*set protocols bgp <asn> parameters cluster-id <id>*	Nothing found in XML Definitions	protocols bgp <text> parameters cluster-id <value>
×	*set protocols bgp <subasn> parameters confederation confederation peers <nsubasn>*	Nothing found in XML Definitions	Nothing found in VyOS
✓	*set protocols bgp <subasn> parameters confederation identifier <asn>*	Nothing found in XML Definitions	protocols bgp <text> parameters confederation identifier <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> parameters confederation peers <value>
✓	*set protocols bgp <asn> parameters dampening half-life <minutes>*	Nothing found in XML Definitions	protocols bgp <text> parameters dampening half-life <value>
✓	*set protocols bgp <asn> parameters dampening max-suppress-time <seconds>*	Nothing found in XML Definitions	protocols bgp <text> parameters dampening max-suppress-time <value>
✓	*set protocols bgp <asn> parameters dampening re-use <seconds>*	Nothing found in XML Definitions	protocols bgp <text> parameters dampening re-use <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set protocols bgp <asn> parameters dampening start-suppress-time <seconds>*	Nothing found in XML Definitions	protocols bgp <text> parameters dampening start-suppress-time <value>
✓	*set protocols bgp <asn> parameters default local-pref <local-pref value>*	Nothing found in XML Definitions	protocols bgp <text> parameters default local-pref <value>
✓	*set protocols bgp <asn> parameters default no-ipv4-unicast*	Nothing found in XML Definitions	protocols bgp <text> parameters default no-ipv4-unicast
✓	*set protocols bgp <asn> parameters deterministic-med*	Nothing found in XML Definitions	protocols bgp <text> parameters deterministic-med
×	*set protocols bgp <asn> parameters distance global <external|internal|lo <distance>*	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> parameters distance global external <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> parameters distance global internal <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> parameters distance global local <value>
✓	*set protocols bgp <asn> parameters distance prefix <subnet> distance <distance>*	Nothing found in XML Definitions	protocols bgp <text> parameters distance prefix <text> distance <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> parameters graceful-restart stalepath-time <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> parameters graceful-shutdown
✓	*set protocols bgp <asn> parameters log-neighbor-changes*	Nothing found in XML Definitions	protocols bgp <text> parameters log-neighbor-changes
✓	*set protocols bgp <asn> parameters network-import-check*	Nothing found in XML Definitions	protocols bgp <text> parameters network-import-check
✓	*set protocols bgp <asn> parameters no-client-to-client-r*	Nothing found in XML Definitions	protocols bgp <text> parameters no-client-to-client-reflection

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set protocols bgp <asn> parameters no-fast-external-fail*	Nothing found in XML Definitions	protocols bgp <text> parameters no-fast-external-failover
✓	*set protocols bgp <asn> parameters router-id <id>*	Nothing found in XML Definitions	protocols bgp <text> parameters router-id <value>
×	*set protocols bgp <asn> peer-group <name>*	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> address-family ipv4-unicast allowas-in number <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> address-family ipv4-unicast attribute-unchanged as-path
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> address-family ipv4-unicast attribute-unchanged med
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> address-family ipv4-unicast attribute-unchanged next-hop
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> address-family ipv4-unicast capability orf prefix-list receive
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> address-family ipv4-unicast capability orf prefix-list send
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> address-family ipv4-unicast default-originate route-map <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> address-family ipv4-unicast disable-send-community extended

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> address-family ipv4-unicast disable-send-community standard
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> address-family ipv4-unicast distribute-list export <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> address-family ipv4-unicast distribute-list import <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> address-family ipv4-unicast filter-list export <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> address-family ipv4-unicast filter-list import <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> address-family ipv4-unicast maximum-prefix <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> address-family ipv4-unicast nexthop-self force
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> address-family ipv4-unicast prefix-list export <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> address-family ipv4-unicast prefix-list import <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> address-family ipv4-unicast remove-private-as
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> address-family ipv4-unicast route-map export <value>

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> address-family ipv4-unicast route-map import <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> address-family ipv4-unicast route-reflector-client
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> address-family ipv4-unicast route-server-client
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> address-family ipv4-unicast soft-reconfiguration inbound
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> address-family ipv4-unicast unsuppress-map <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> address-family ipv4-unicast weight <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> address-family ipv6-unicast allowas-in number <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> address-family ipv6-unicast attribute-unchanged as-path
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> address-family ipv6-unicast attribute-unchanged med
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> address-family ipv6-unicast attribute-unchanged next-hop
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> address-family ipv6-unicast capability orf prefix-list receive

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> address-family ipv6-unicast capability orf prefix-list send
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> address-family ipv6-unicast default-originate route-map <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> address-family ipv6-unicast disable-send-community extended
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> address-family ipv6-unicast disable-send-community standard
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> address-family ipv6-unicast distribute-list export <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> address-family ipv6-unicast distribute-list import <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> address-family ipv6-unicast filter-list export <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> address-family ipv6-unicast filter-list import <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> address-family ipv6-unicast maximum-prefix <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> address-family ipv6-unicast nexthop-local unchanged
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> address-family ipv6-unicast nexthop-self force

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> address-family ipv6-unicast prefix-list export <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> address-family ipv6-unicast prefix-list import <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> address-family ipv6-unicast remove-private-as
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> address-family ipv6-unicast route-map export <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> address-family ipv6-unicast route-map import <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> address-family ipv6-unicast route-reflector-client
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> address-family ipv6-unicast route-server-client
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> address-family ipv6-unicast soft-reconfiguration inbound
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> address-family ipv6-unicast unsuppress-map <value>
✓	*set protocols bgp <asn> peer-group <group> bfd*	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> bfd
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> capability dynamic
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> capability extended-nexthop
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> description <value>

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> disable-capability-negotiation
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> disable-connected-check
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> ebgp-multihop <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> local-as <text> no-prepend
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> override-capability
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> passive
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> password <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> remote-as <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> shutdown
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> ttl-security hops <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> peer-group <text> update-source <value>
×	not yet documented	Nothing found in XML Definitions	protocols bgp <text> route-map <value>
✓	*set protocols bgp <asn> timers holdtime <seconds>*	Nothing found in XML Definitions	protocols bgp <text> timers holdtime <value>
✓	*set protocols bgp <asn> timers keepalive <seconds>*	Nothing found in XML Definitions	protocols bgp <text> timers keepalive <value>
✓	*set protocols igmp-proxy disable*	igmp-proxy.xml.in: protocols igmp-proxy disable	protocols igmp-proxy disable
✓	*set protocols igmp-proxy disable-quickleave*	igmp-proxy.xml.in: protocols igmp-proxy disable-quickleave	protocols igmp-proxy disable-quickleave
✓	*set protocols igmp-proxy interface <interface> alt-subnet <network>*	igmp-proxy.xml.in: protocols igmp-proxy interface <interface> alt-subnet	protocols igmp-proxy interface <text> alt-subnet <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	***set protocols igmp-proxy interface <interface> role <upstream | downstream>***	igmp-proxy.xml.in: protocols igmp-proxy interface <interface> role	protocols igmp-proxy interface <text> role <value>
×	not yet documented	igmp-proxy.xml.in: protocols igmp-proxy interface <interface> threshold	protocols igmp-proxy interface <text> threshold <value>
×	not yet documented	igmp-proxy.xml.in: protocols igmp-proxy interface <interface> whitelist	protocols igmp-proxy interface <text> whitelist <value>
×	***set protocols igmp interface eth1***	Nothing found in XML Definitions	Nothing found in VyOS
✓	***set protocols igmp interface <interface> join <multicast-address> source <IP-address>***	protocols-igmp.xml.in: protocols igmp interface <interface> join <join> source	protocols igmp interface <text> join <text> source <value>
✓	***set protocols igmp interface <interface> query-interval <seconds>***	protocols-igmp.xml.in: protocols igmp interface <interface> query-interval	protocols igmp interface <text> query-interval <value>
✓	***set protocols igmp interface <interface> query-max-response-ti <deciseconds>***	protocols-igmp.xml.in: protocols igmp interface <interface> query-max-response-time	protocols igmp interface <text> query-max-response-time <value>
✓	***set protocols igmp interface <interface> version <version-number>***	protocols-igmp.xml.in: protocols igmp interface <interface> version	protocols igmp interface <text> version <value>
×	not yet documented	protocols-isis.xml.in: protocols isis area-password md5	protocols isis area-password md5 <value>
×	not yet documented	protocols-isis.xml.in: protocols isis area-password plaintext-password	protocols isis area-password plaintext-password <value>
×	not yet documented	protocols-isis.xml.in: protocols isis default-information originate ipv4 level-1 always	protocols isis default-information originate ipv4 level-1 always
×	not yet documented	protocols-isis.xml.in: protocols isis default-information originate ipv4 level-1 metric	protocols isis default-information originate ipv4 level-1 metric <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	protocols-isis.xml.in: protocols isis default-information originate ipv4 level-1 route-map	protocols isis default-information originate ipv4 level-1 route-map <value>
×	not yet documented	protocols-isis.xml.in: protocols isis default-information originate ipv4 level-2 always	protocols isis default-information originate ipv4 level-2 always
×	not yet documented	protocols-isis.xml.in: protocols isis default-information originate ipv4 level-2 metric	protocols isis default-information originate ipv4 level-2 metric <value>
×	not yet documented	protocols-isis.xml.in: protocols isis default-information originate ipv4 level-2 route-map	protocols isis default-information originate ipv4 level-2 route-map <value>
×	not yet documented	protocols-isis.xml.in: protocols isis default-information originate ipv6 level-1 always	protocols isis default-information originate ipv6 level-1 always
×	not yet documented	protocols-isis.xml.in: protocols isis default-information originate ipv6 level-1 metric	protocols isis default-information originate ipv6 level-1 metric <value>
×	not yet documented	protocols-isis.xml.in: protocols isis default-information originate ipv6 level-1 route-map	protocols isis default-information originate ipv6 level-1 route-map <value>
×	not yet documented	protocols-isis.xml.in: protocols isis default-information originate ipv6 level-2 always	protocols isis default-information originate ipv6 level-2 always
×	not yet documented	protocols-isis.xml.in: protocols isis default-information originate ipv6 level-2 metric	protocols isis default-information originate ipv6 level-2 metric <value>
×	not yet documented	protocols-isis.xml.in: protocols isis default-information originate ipv6 level-2 route-map	protocols isis default-information originate ipv6 level-2 route-map <value>
×	not yet documented	protocols-isis.xml.in: protocols isis domain-password md5	protocols isis domain-password md5 <value>
×	not yet documented	protocols-isis.xml.in: protocols isis domain-password plaintext-password	protocols isis domain-password plaintext-password <value>
✓	*set protocols isis dynamic-hostname*	protocols-isis.xml.in: protocols isis dynamic-hostname	protocols isis dynamic-hostname

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	*set protocols isis interface <interface>*	Nothing found in XML Definitions	Nothing found in VyOS
✓	*set protocols isis <name> interface <interface> bfd*	protocols-isis.xml.in: protocols isis interface <interface> bfd	protocols isis interface <text> bfd
✓	*set protocols isis interface <interface> circuit-type <level-1|level-1-2|le*	protocols-isis.xml.in: protocols isis interface <interface> circuit-type	protocols isis interface <text> circuit-type <value>
✓	*set protocols isis interface <interface> hello-interval <seconds>*	protocols-isis.xml.in: protocols isis interface <interface> hello-interval	protocols isis interface <text> hello-interval <value>
✓	*set protocols isis interface <interface> hello-multiplier <seconds>*	protocols-isis.xml.in: protocols isis interface <interface> hello-multiplier	protocols isis interface <text> hello-multiplier <value>
✓	*set protocols isis interface <interface> hello-padding*	protocols-isis.xml.in: protocols isis interface <interface> hello-padding	protocols isis interface <text> hello-padding
✓	*set protocols isis interface <interface> metric <metric>*	protocols-isis.xml.in: protocols isis interface <interface> metric	protocols isis interface <text> metric <value>
✓	*set protocols isis interface <interface> network point-to-point*	protocols-isis.xml.in: protocols isis interface <interface> network point-to-point	protocols isis interface <text> network point-to-point
✓	*set protocols isis interface <interface> no-three-way-handshak*	protocols-isis.xml.in: protocols isis interface <interface> no-three-way-handshake	protocols isis interface <text> no-three-way-handshake
✓	*set protocols isis interface <interface> passive*	protocols-isis.xml.in: protocols isis interface <interface> passive	protocols isis interface <text> passive
×	not yet documented	protocols-isis.xml.in: protocols isis interface <interface> password md5	protocols isis interface <text> password md5 <value>
✓	*set protocols isis interface <interface> password plaintext-password <text>*	protocols-isis.xml.in: protocols isis interface <interface> password plaintext-password	protocols isis interface <text> password plaintext-password <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set protocols isis interface <interface> priority <number>*	protocols-isis.xml.in: protocols isis interface <interface> priority	protocols isis interface <text> priority <value>
✓	*set protocols isis interface <interface> psnp-interval <number>*	protocols-isis.xml.in: protocols isis interface <interface> psnp-interval	protocols isis interface <text> psnp-interval <value>
✓	*set protocols isis level <level-1|level-1-2|le*	protocols-isis.xml.in: protocols isis level	protocols isis level <value>
×	not yet documented	protocols-isis.xml.in: protocols isis log-adjacency-changes	protocols isis log-adjacency-changes
✓	*set protocols isis lsp-gen-interval <seconds>*	protocols-isis.xml.in: protocols isis lsp-gen-interval	protocols isis lsp-gen-interval <value>
✓	*set protocols isis lsp-mtu <size>*	protocols-isis.xml.in: protocols isis lsp-mtu	protocols isis lsp-mtu <value>
✓	*set protocols isis lsp-refresh-interval <seconds>*	protocols-isis.xml.in: protocols isis lsp-refresh-interval	protocols isis lsp-refresh-interval <value>
✓	*set protocols isis max-lsp-lifetime <seconds>*	protocols-isis.xml.in: protocols isis max-lsp-lifetime	protocols isis max-lsp-lifetime <value>
✓	*set protocols isis metric-style <narrow|transition|wi*	protocols-isis.xml.in: protocols isis metric-style	protocols isis metric-style <value>
×	*set protocols isis name default-information originate <ipv4|ipv6> level-1*	Nothing found in XML Definitions	Nothing found in VyOS
×	*set protocols isis name default-information originate <ipv4|ipv6> level-2*	Nothing found in XML Definitions	Nothing found in VyOS
✓	*set protocols isis net <network-entity-title*	protocols-isis.xml.in: protocols isis net	protocols isis net <value>
✓	*set protocols isis purge-originator*	protocols-isis.xml.in: protocols isis purge-originator	protocols isis purge-originator
×	not yet documented	protocols-isis.xml.in: protocols isis redistribute ipv4 bgp level-1 metric	protocols isis redistribute ipv4 bgp level-1 metric <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	protocols-isis.xml.in: protocols isis redistribute ipv4 bgp level-1 route-map	protocols isis redistribute ipv4 bgp level-1 route-map <value>
×	not yet documented	protocols-isis.xml.in: protocols isis redistribute ipv4 bgp level-2 metric	protocols isis redistribute ipv4 bgp level-2 metric <value>
×	not yet documented	protocols-isis.xml.in: protocols isis redistribute ipv4 bgp level-2 route-map	protocols isis redistribute ipv4 bgp level-2 route-map <value>
×	not yet documented	protocols-isis.xml.in: protocols isis redistribute ipv4 connected level-1 metric	protocols isis redistribute ipv4 connected level-1 metric <value>
×	not yet documented	protocols-isis.xml.in: protocols isis redistribute ipv4 connected level-1 route-map	protocols isis redistribute ipv4 connected level-1 route-map <value>
×	not yet documented	protocols-isis.xml.in: protocols isis redistribute ipv4 connected level-2 metric	protocols isis redistribute ipv4 connected level-2 metric <value>
×	not yet documented	protocols-isis.xml.in: protocols isis redistribute ipv4 connected level-2 route-map	protocols isis redistribute ipv4 connected level-2 route-map <value>
×	not yet documented	protocols-isis.xml.in: protocols isis redistribute ipv4 kernel level-1 metric	protocols isis redistribute ipv4 kernel level-1 metric <value>
×	not yet documented	protocols-isis.xml.in: protocols isis redistribute ipv4 kernel level-1 route-map	protocols isis redistribute ipv4 kernel level-1 route-map <value>
×	not yet documented	protocols-isis.xml.in: protocols isis redistribute ipv4 kernel level-2 metric	protocols isis redistribute ipv4 kernel level-2 metric <value>
×	not yet documented	protocols-isis.xml.in: protocols isis redistribute ipv4 kernel level-2 route-map	protocols isis redistribute ipv4 kernel level-2 route-map <value>
×	***set protocols isis redistribute ipv4 <route source> level-1***	Nothing found in XML Definitions	Nothing found in VyOS
×	***set protocols isis redistribute ipv4 <route source> level-2***	Nothing found in XML Definitions	Nothing found in VyOS

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	***set protocols isis redistribute ipv4 <route source> <level-1|level-2> metric <number>***	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	protocols-isis.xml.in: protocols isis redistribute ipv4 ospf level-1 metric	protocols isis redistribute ipv4 ospf level-1 metric <value>
×	not yet documented	protocols-isis.xml.in: protocols isis redistribute ipv4 ospf level-1 route-map	protocols isis redistribute ipv4 ospf level-1 route-map <value>
×	not yet documented	protocols-isis.xml.in: protocols isis redistribute ipv4 ospf level-2 metric	protocols isis redistribute ipv4 ospf level-2 metric <value>
×	not yet documented	protocols-isis.xml.in: protocols isis redistribute ipv4 ospf level-2 route-map	protocols isis redistribute ipv4 ospf level-2 route-map <value>
×	not yet documented	protocols-isis.xml.in: protocols isis redistribute ipv4 rip level-1 metric	protocols isis redistribute ipv4 rip level-1 metric <value>
×	not yet documented	protocols-isis.xml.in: protocols isis redistribute ipv4 rip level-1 route-map	protocols isis redistribute ipv4 rip level-1 route-map <value>
×	not yet documented	protocols-isis.xml.in: protocols isis redistribute ipv4 rip level-2 metric	protocols isis redistribute ipv4 rip level-2 metric <value>
×	not yet documented	protocols-isis.xml.in: protocols isis redistribute ipv4 rip level-2 route-map	protocols isis redistribute ipv4 rip level-2 route-map <value>
×	***set protocols isis redistribute ipv4 <route source> <level-1|level-2> route-map <name>***	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	protocols-isis.xml.in: protocols isis redistribute ipv4 static level-1 metric	protocols isis redistribute ipv4 static level-1 metric <value>
×	not yet documented	protocols-isis.xml.in: protocols isis redistribute ipv4 static level-1 route-map	protocols isis redistribute ipv4 static level-1 route-map <value>
×	not yet documented	protocols-isis.xml.in: protocols isis redistribute ipv4 static level-2 metric	protocols isis redistribute ipv4 static level-2 metric <value>
×	not yet documented	protocols-isis.xml.in: protocols isis redistribute ipv4 static level-2 route-map	protocols isis redistribute ipv4 static level-2 route-map <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	protocols-isis.xml.in: protocols isis redistribute ipv6 bgp level-1 metric	protocols isis redistribute ipv6 bgp level-1 metric <value>
×	not yet documented	protocols-isis.xml.in: protocols isis redistribute ipv6 bgp level-1 route-map	protocols isis redistribute ipv6 bgp level-1 route-map <value>
×	not yet documented	protocols-isis.xml.in: protocols isis redistribute ipv6 bgp level-2 metric	protocols isis redistribute ipv6 bgp level-2 metric <value>
×	not yet documented	protocols-isis.xml.in: protocols isis redistribute ipv6 bgp level-2 route-map	protocols isis redistribute ipv6 bgp level-2 route-map <value>
×	not yet documented	protocols-isis.xml.in: protocols isis redistribute ipv6 connected level-1 metric	protocols isis redistribute ipv6 connected level-1 metric <value>
×	not yet documented	protocols-isis.xml.in: protocols isis redistribute ipv6 connected level-1 route-map	protocols isis redistribute ipv6 connected level-1 route-map <value>
×	not yet documented	protocols-isis.xml.in: protocols isis redistribute ipv6 connected level-2 metric	protocols isis redistribute ipv6 connected level-2 metric <value>
×	not yet documented	protocols-isis.xml.in: protocols isis redistribute ipv6 connected level-2 route-map	protocols isis redistribute ipv6 connected level-2 route-map <value>
×	not yet documented	protocols-isis.xml.in: protocols isis redistribute ipv6 kernel level-1 metric	protocols isis redistribute ipv6 kernel level-1 metric <value>
×	not yet documented	protocols-isis.xml.in: protocols isis redistribute ipv6 kernel level-1 route-map	protocols isis redistribute ipv6 kernel level-1 route-map <value>
×	not yet documented	protocols-isis.xml.in: protocols isis redistribute ipv6 kernel level-2 metric	protocols isis redistribute ipv6 kernel level-2 metric <value>
×	not yet documented	protocols-isis.xml.in: protocols isis redistribute ipv6 kernel level-2 route-map	protocols isis redistribute ipv6 kernel level-2 route-map <value>
×	not yet documented	protocols-isis.xml.in: protocols isis redistribute ipv6 ospf6 level-1 metric	protocols isis redistribute ipv6 ospf6 level-1 metric <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	protocols-isis.xml.in: protocols isis redistribute ipv6 ospf6 level-1 route-map	protocols isis redistribute ipv6 ospf6 level-1 route-map <value>
×	not yet documented	protocols-isis.xml.in: protocols isis redistribute ipv6 ospf6 level-2 metric	protocols isis redistribute ipv6 ospf6 level-2 metric <value>
×	not yet documented	protocols-isis.xml.in: protocols isis redistribute ipv6 ospf6 level-2 route-map	protocols isis redistribute ipv6 ospf6 level-2 route-map <value>
×	not yet documented	protocols-isis.xml.in: protocols isis redistribute ipv6 ripng level-1 metric	protocols isis redistribute ipv6 ripng level-1 metric <value>
×	not yet documented	protocols-isis.xml.in: protocols isis redistribute ipv6 ripng level-1 route-map	protocols isis redistribute ipv6 ripng level-1 route-map <value>
×	not yet documented	protocols-isis.xml.in: protocols isis redistribute ipv6 ripng level-2 metric	protocols isis redistribute ipv6 ripng level-2 metric <value>
×	not yet documented	protocols-isis.xml.in: protocols isis redistribute ipv6 ripng level-2 route-map	protocols isis redistribute ipv6 ripng level-2 route-map <value>
×	not yet documented	protocols-isis.xml.in: protocols isis redistribute ipv6 static level-1 metric	protocols isis redistribute ipv6 static level-1 metric <value>
×	not yet documented	protocols-isis.xml.in: protocols isis redistribute ipv6 static level-1 route-map	protocols isis redistribute ipv6 static level-1 route-map <value>
×	not yet documented	protocols-isis.xml.in: protocols isis redistribute ipv6 static level-2 metric	protocols isis redistribute ipv6 static level-2 metric <value>
×	not yet documented	protocols-isis.xml.in: protocols isis redistribute ipv6 static level-2 route-map	protocols isis redistribute ipv6 static level-2 route-map <value>
×	not yet documented	protocols-isis.xml.in: protocols isis route-map	protocols isis route-map <value>
×	not yet documented	protocols-isis.xml.in: protocols isis segment-routing enable	protocols isis segment-routing enable
×	not yet documented	protocols-isis.xml.in: protocols isis segment-routing global-block high-label-value	protocols isis segment-routing global-block high-label-value <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	protocols-isis.xml.in: protocols isis segment-routing global-block low-label-value	protocols isis segment-routing global-block low-label-value <value>
×	not yet documented	protocols-isis.xml.in: protocols isis segment-routing maximum-label-depth	protocols isis segment-routing maximum-label-depth <value>
×	not yet documented	protocols-isis.xml.in: protocols isis segment-routing prefix <prefix> absolute explicit-null	protocols isis segment-routing prefix <text> absolute explicit-null
×	not yet documented	protocols-isis.xml.in: protocols isis segment-routing prefix <prefix> absolute no-php-flag	protocols isis segment-routing prefix <text> absolute no-php-flag
×	not yet documented	protocols-isis.xml.in: protocols isis segment-routing prefix <prefix> absolute value	protocols isis segment-routing prefix <text> absolute value <value>
×	not yet documented	protocols-isis.xml.in: protocols isis segment-routing prefix <prefix> index explicit-null	protocols isis segment-routing prefix <text> index explicit-null
×	not yet documented	protocols-isis.xml.in: protocols isis segment-routing prefix <prefix> index no-php-flag	protocols isis segment-routing prefix <text> index no-php-flag
×	not yet documented	protocols-isis.xml.in: protocols isis segment-routing prefix <prefix> index value	protocols isis segment-routing prefix <text> index value <value>
✓	*set protocols isis set-attached-bit*	protocols-isis.xml.in: protocols isis set-attached-bit	protocols isis set-attached-bit
✓	*set protocols isis set-overload-bit*	protocols-isis.xml.in: protocols isis set-overload-bit	protocols isis set-overload-bit
✓	*set protocols isis spf-delay-ietf holddown <milliseconds>*	protocols-isis.xml.in: protocols isis spf-delay-ietf holddown	protocols isis spf-delay-ietf holddown <value>
✓	*set protocols isis spf-delay-ietf init-delay <milliseconds>*	protocols-isis.xml.in: protocols isis spf-delay-ietf init-delay	protocols isis spf-delay-ietf init-delay <value>
✓	*set protocols isis spf-delay-ietf long-delay <milliseconds>*	protocols-isis.xml.in: protocols isis spf-delay-ietf long-delay	protocols isis spf-delay-ietf long-delay <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set protocols isis spf-delay-ietf short-delay <milliseconds>*	protocols-isis.xml.in: protocols isis spf-delay-ietf short-delay	protocols isis spf-delay-ietf short-delay <value>
✓	*set protocols isis spf-delay-ietf time-to-learn <milliseconds>*	protocols-isis.xml.in: protocols isis spf-delay-ietf time-to-learn	protocols isis spf-delay-ietf time-to-learn <value>
✓	*set protocols isis spf-interval <seconds>*	protocols-isis.xml.in: protocols isis spf-interval	protocols isis spf-interval <value>
×	not yet documented	protocols-isis.xml.in: protocols isis traffic-engineering address	protocols isis traffic-engineering address <value>
×	not yet documented	protocols-isis.xml.in: protocols isis traffic-engineering enable	protocols isis traffic-engineering enable
✓	*set protocols mpls interface <interface>*	protocols-mpls.xml.in: protocols mpls interface	protocols mpls interface <value>
✓	*set protocols mpls ldp allocation ipv4 access-list <access list number>*	protocols-mpls.xml.in: protocols mpls ldp allocation ipv4 access-list	protocols mpls ldp allocation ipv4 access-list <value>
✓	*set protocols mpls ldp allocation ipv6 access-list6 <access list number>*	protocols-mpls.xml.in: protocols mpls ldp allocation ipv6 access-list6	protocols mpls ldp allocation ipv6 access-list6 <value>
✓	*set protocols mpls ldp discovery hello-ipv4-holdtime <seconds>*	protocols-mpls.xml.in: protocols mpls ldp discovery hello-ipv4-holdtime	protocols mpls ldp discovery hello-ipv4-holdtime <value>
✓	*set protocols mpls ldp discovery hello-ipv4-interval <seconds>*	protocols-mpls.xml.in: protocols mpls ldp discovery hello-ipv4-interval	protocols mpls ldp discovery hello-ipv4-interval <value>
✓	*set protocols mpls ldp discovery hello-ipv6-holdtime <seconds>*	protocols-mpls.xml.in: protocols mpls ldp discovery hello-ipv6-holdtime	protocols mpls ldp discovery hello-ipv6-holdtime <value>
✓	*set protocols mpls ldp discovery hello-ipv6-interval <seconds>*	protocols-mpls.xml.in: protocols mpls ldp discovery hello-ipv6-interval	protocols mpls ldp discovery hello-ipv6-interval <value>
✓	*set protocols mpls ldp discovery session-ipv4-holdtime <seconds>*	protocols-mpls.xml.in: protocols mpls ldp discovery session-ipv4-holdtime	protocols mpls ldp discovery session-ipv4-holdtime <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set protocols mpls ldp discovery session-ipv6-holdtime <seconds>*	protocols-mpls.xml.in: protocols mpls ldp discovery session-ipv6-holdtime	protocols mpls ldp discovery session-ipv6-holdtime <value>
✓	*set protocols mpls ldp discovery transport-ipv4-addres <address>*	protocols-mpls.xml.in: protocols mpls ldp discovery transport-ipv4-address	protocols mpls ldp discovery transport-ipv4-address <value>
✓	*set protocols mpls ldp discovery transport-ipv6-addres <address>*	protocols-mpls.xml.in: protocols mpls ldp discovery transport-ipv6-address	protocols mpls ldp discovery transport-ipv6-address <value>
✓	*set protocols mpls ldp export ipv4 explicit-null*	protocols-mpls.xml.in: protocols mpls ldp export ipv4 explicit-null	protocols mpls ldp export ipv4 explicit-null
✓	*set protocols mpls ldp export ipv4 export-filter filter-access-list <access list number>*	protocols-mpls.xml.in: protocols mpls ldp export ipv4 export-filter filter-access-list	protocols mpls ldp export ipv4 export-filter filter-access-list <value>
×	not yet documented	protocols-mpls.xml.in: protocols mpls ldp export ipv4 export-filter neighbor-access-list	protocols mpls ldp export ipv4 export-filter neighbor-access-list <value>
✓	*set protocols mpls ldp export ipv6 explicit-null*	protocols-mpls.xml.in: protocols mpls ldp export ipv6 explicit-null	protocols mpls ldp export ipv6 explicit-null
✓	*set protocols mpls ldp export ipv6 export-filter filter-access-list6 <access list number>*	protocols-mpls.xml.in: protocols mpls ldp export ipv6 export-filter filter-access-list6	protocols mpls ldp export ipv6 export-filter filter-access-list6 <value>
×	not yet documented	protocols-mpls.xml.in: protocols mpls ldp export ipv6 export-filter neighbor-access-list6	protocols mpls ldp export ipv6 export-filter neighbor-access-list6 <value>
✓	*set protocols mpls ldp import ipv4 import-filter filter-access-list <access list number>*	protocols-mpls.xml.in: protocols mpls ldp import ipv4 import-filter filter-access-list	protocols mpls ldp import ipv4 import-filter filter-access-list <value>
×	not yet documented	protocols-mpls.xml.in: protocols mpls ldp import ipv4 import-filter neighbor-access-list	protocols mpls ldp import ipv4 import-filter neighbor-access-list <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set protocols mpls ldp import ipv6 import-filter filter-access-list6 <access list number>*	protocols-mpls.xml.in: protocols mpls ldp import ipv6 import-filter filter-access-list6	protocols mpls ldp import ipv6 import-filter filter-access-list6 <value>
×	not yet documented	protocols-mpls.xml.in: protocols mpls ldp import ipv6 import-filter neighbor-access-list6	protocols mpls ldp import ipv6 import-filter neighbor-access-list6 <value>
✓	*set protocols mpls ldp interface <interface>*	protocols-mpls.xml.in: protocols mpls ldp interface	protocols mpls ldp interface <value>
✓	*set protocols mpls ldp neighbor <address> password <password>*	protocols-mpls.xml.in: protocols mpls ldp neighbor <neighbor> password	protocols mpls ldp neighbor <text> password <value>
✓	*set protocols mpls ldp neighbor <address> session-holdtime <seconds>*	protocols-mpls.xml.in: protocols mpls ldp neighbor <neighbor> session-holdtime	protocols mpls ldp neighbor <text> session-holdtime <value>
✓	*set protocols mpls ldp neighbor <address> ttl-security <disable | hop count>*	protocols-mpls.xml.in: protocols mpls ldp neighbor <neighbor> ttl-security	protocols mpls ldp neighbor <text> ttl-security <value>
✓	*set protocols mpls ldp parameters cisco-interop-tlv*	protocols-mpls.xml.in: protocols mpls ldp parameters cisco-interop-tlv	protocols mpls ldp parameters cisco-interop-tlv
✓	*set protocols mpls ldp parameters ordered-control*	protocols-mpls.xml.in: protocols mpls ldp parameters ordered-control	protocols mpls ldp parameters ordered-control
✓	*set protocols mpls ldp parameters transport-prefer-ipv4*	protocols-mpls.xml.in: protocols mpls ldp parameters transport-prefer-ipv4	protocols mpls ldp parameters transport-prefer-ipv4
✓	*set protocols mpls ldp router-id <address>*	protocols-mpls.xml.in: protocols mpls ldp router-id	protocols mpls ldp router-id <value>
✓	*set protocols mpls ldp targeted-neighbor ipv4 address <address>*	protocols-mpls.xml.in: protocols mpls ldp targeted-neighbor ipv4 address	protocols mpls ldp targeted-neighbor ipv4 address <value>
✓	*set protocols mpls ldp targeted-neighbor ipv4 enable*	protocols-mpls.xml.in: protocols mpls ldp targeted-neighbor ipv4 enable	protocols mpls ldp targeted-neighbor ipv4 enable

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set protocols mpls ldp targeted-neighbor ipv4 hello-holdtime <seconds>*	protocols-mpls.xml.in: protocols mpls ldp targeted-neighbor ipv4 hello-holdtime	protocols mpls ldp targeted-neighbor ipv4 hello-holdtime <value>
✓	*set protocols mpls ldp targeted-neighbor ipv4 hello-interval <seconds>*	protocols-mpls.xml.in: protocols mpls ldp targeted-neighbor ipv4 hello-interval	protocols mpls ldp targeted-neighbor ipv4 hello-interval <value>
✓	*set protocols mpls ldp targeted-neighbor ipv6 address <address>*	protocols-mpls.xml.in: protocols mpls ldp targeted-neighbor ipv6 address	protocols mpls ldp targeted-neighbor ipv6 address <value>
✓	*set protocols mpls ldp targeted-neighbor ipv6 enable*	protocols-mpls.xml.in: protocols mpls ldp targeted-neighbor ipv6 enable	protocols mpls ldp targeted-neighbor ipv6 enable
✓	*set protocols mpls ldp targeted-neighbor ipv6 hello-holdtime <seconds>*	protocols-mpls.xml.in: protocols mpls ldp targeted-neighbor ipv6 hello-holdtime	protocols mpls ldp targeted-neighbor ipv6 hello-holdtime <value>
✓	*set protocols mpls ldp targeted-neighbor ipv6 hello-interval <seconds>*	protocols-mpls.xml.in: protocols mpls ldp targeted-neighbor ipv6 hello-interval	protocols mpls ldp targeted-neighbor ipv6 hello-interval <value>
×	not yet documented	protocols-mpls.xml.in: protocols mpls parameters maximum-ttl	protocols mpls parameters maximum-ttl <value>
×	not yet documented	protocols-mpls.xml.in: protocols mpls parameters no-propagate-ttl	protocols mpls parameters no-propagate-ttl
✓	*set protocols nhrp tunnel <tunnel> cisco-authentication <secret>*	Nothing found in XML Definitions	protocols nhrp tunnel <text> cisco-authentication <value>
✓	*set protocols nhrp tunnel <tunnel> dynamic-map <address> nbma-domain-name <fqdn>*	Nothing found in XML Definitions	protocols nhrp tunnel <text> dynamic-map <text> nbma-domain-name <value>
✓	*set protocols nhrp tunnel <tunnel> holding-time <timeout>*	Nothing found in XML Definitions	protocols nhrp tunnel <text> holding-time <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set protocols nhrp tunnel <tunnel> map cisco*	Nothing found in XML Definitions	protocols nhrp tunnel <text> map <text> cisco
✓	*set protocols nhrp tunnel <tunnel> map nbma-address <address>*	Nothing found in XML Definitions	protocols nhrp tunnel <text> map <text> nbma-address <value>
✓	*set protocols nhrp tunnel <tunnel> map register*	Nothing found in XML Definitions	protocols nhrp tunnel <text> map <text> register
✓	*set protocols nhrp tunnel <tunnel> multicast <dynamic | nhs>*	Nothing found in XML Definitions	protocols nhrp tunnel <text> multicast <value>
✓	*set protocols nhrp tunnel <tunnel> non-caching*	Nothing found in XML Definitions	protocols nhrp tunnel <text> non-caching
✓	*set protocols nhrp tunnel <tunnel> redirect*	Nothing found in XML Definitions	protocols nhrp tunnel <text> redirect
✓	*set protocols nhrp tunnel <tunnel> shortcut*	Nothing found in XML Definitions	protocols nhrp tunnel <text> shortcut
✓	*set protocols nhrp tunnel <tunnel> shortcut-destination*	Nothing found in XML Definitions	protocols nhrp tunnel <text> shortcut-destination
×	*set protocols nhrp tunnel <tunnel> shortcut-target <address>*	Nothing found in XML Definitions	Nothing found in VyOS
✓	*set protocols nhrp tunnel <tunnel> shortcut-target <address> holding-time <timeout>*	Nothing found in XML Definitions	protocols nhrp tunnel <text> shortcut-target <text> holding-time <value>
×	not yet documented	Nothing found in XML Definitions	protocols ospf access-list <text> export <value>
×	not yet documented	Nothing found in XML Definitions	protocols ospf area <text> area-type normal
×	*set protocols ospf area <number> area-type nssa*	Nothing found in XML Definitions	Nothing found in VyOS
✓	*set protocols ospf area <number> area-type nssa default-cost <number>*	Nothing found in XML Definitions	protocols ospf area <text> area-type nssa default-cost <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set protocols ospf area <number> area-type nssa no-summary*	Nothing found in XML Definitions	protocols ospf area <text> area-type nssa no-summary
✓	*set protocols ospf area <number> area-type nssa translate <always|candidate|nev*	Nothing found in XML Definitions	protocols ospf area <text> area-type nssa translate <value>
×	*set protocols ospf area <number> area-type stub*	Nothing found in XML Definitions	Nothing found in VyOS
✓	*set protocols ospf area <number> area-type stub default-cost <number>*	Nothing found in XML Definitions	protocols ospf area <text> area-type stub default-cost <value>
✓	*set protocols ospf area <number> area-type stub no-summary*	Nothing found in XML Definitions	protocols ospf area <text> area-type stub no-summary
×	not yet documented	Nothing found in XML Definitions	protocols ospf area <text> authentication <value>
×	*set protocols ospf area <number> authentication md5*	Nothing found in XML Definitions	Nothing found in VyOS
×	*set protocols ospf area <number> authentication plaintext-password*	Nothing found in XML Definitions	Nothing found in VyOS
✓	*set protocols ospf area <number> network <A.B.C.D/M>*	Nothing found in XML Definitions	protocols ospf area <text> network <value>
×	*set protocols ospf area <number> range <A.B.C.D/M> [cost <number>]*	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	Nothing found in XML Definitions	protocols ospf area <text> range <text> cost <value>
✓	*set protocols ospf area <number> range <A.B.C.D/M> not-advertise*	Nothing found in XML Definitions	protocols ospf area <text> range <text> not-advertise
✓	*set protocols ospf area <number> range <A.B.C.D/M> substitute <E.F.G.H/M>*	Nothing found in XML Definitions	protocols ospf area <text> range <text> substitute <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set protocols ospf area <number> shortcut <default|disable|enab*	Nothing found in XML Definitions	protocols ospf area <text> shortcut <value>
×	*set protocols ospf area <number> virtual-link <A.B.C.D>*	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	Nothing found in XML Definitions	protocols ospf area <text> virtual-link <text> authentication md5 key-id <text> md5-key <value>
×	not yet documented	Nothing found in XML Definitions	protocols ospf area <text> virtual-link <text> authentication plaintext-password <value>
×	not yet documented	Nothing found in XML Definitions	protocols ospf area <text> virtual-link <text> dead-interval <value>
×	not yet documented	Nothing found in XML Definitions	protocols ospf area <text> virtual-link <text> hello-interval <value>
×	not yet documented	Nothing found in XML Definitions	protocols ospf area <text> virtual-link <text> retransmit-interval <value>
×	not yet documented	Nothing found in XML Definitions	protocols ospf area <text> virtual-link <text> transmit-delay <value>
✓	*set protocols ospf auto-cost reference-bandwidth <number>*	Nothing found in XML Definitions	protocols ospf auto-cost reference-bandwidth <value>
×	*set protocols ospf default-information originate [always] [metric <number>] [metric-type <1|2>] [route-map <name>]*	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	Nothing found in XML Definitions	protocols ospf default-information originate always
×	not yet documented	Nothing found in XML Definitions	protocols ospf default-information originate metric <value>
×	not yet documented	Nothing found in XML Definitions	protocols ospf default-information originate metric-type <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	protocols ospf default-information originate route-map <value>
✓	*set protocols ospf default-metric <number>*	Nothing found in XML Definitions	protocols ospf default-metric <value>
✓	*set protocols ospf distance global <distance>*	Nothing found in XML Definitions	protocols ospf distance global <value>
×	*set protocols ospf distance ospf <external|inter-area| <distance>*	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	Nothing found in XML Definitions	protocols ospf distance ospf external <value>
×	not yet documented	Nothing found in XML Definitions	protocols ospf distance ospf inter-area <value>
×	not yet documented	Nothing found in XML Definitions	protocols ospf distance ospf intra-area <value>
×	*set protocols ospf log-adjacency-changes [detail]*	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	Nothing found in XML Definitions	protocols ospf log-adjacency-changes detail
×	*set protocols ospf max-metric router-lsa <administrative|on-sh <seconds>|on-startup <seconds>>*	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	Nothing found in XML Definitions	protocols ospf max-metric router-lsa administrative
×	not yet documented	Nothing found in XML Definitions	protocols ospf max-metric router-lsa on-shutdown <value>
×	not yet documented	Nothing found in XML Definitions	protocols ospf max-metric router-lsa on-startup <value>
×	not yet documented	Nothing found in XML Definitions	protocols ospf mpls-te enable
×	not yet documented	Nothing found in XML Definitions	protocols ospf mpls-te router-address <value>
×	*set protocols ospf neighbor <A.B.C.D>*	Nothing found in XML Definitions	Nothing found in VyOS
✓	*set protocols ospf neighbor <A.B.C.D> poll-interval <seconds>*	Nothing found in XML Definitions	protocols ospf neighbor <text> poll-interval <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set protocols ospf neighbor <A.B.C.D> priority <number>*	Nothing found in XML Definitions	protocols ospf neighbor <text> priority <value>
✓	*set protocols ospf parameters abr-type <cisco|ibm|shortcut|s*	Nothing found in XML Definitions	protocols ospf parameters abr-type <value>
×	not yet documented	Nothing found in XML Definitions	protocols ospf parameters opaque-lsa
✓	*set protocols ospf parameters rfc1583-compatibility*	Nothing found in XML Definitions	protocols ospf parameters rfc1583-compatibility
✓	*set protocols ospf parameters router-id <rid>*	Nothing found in XML Definitions	protocols ospf parameters router-id <value>
✓	*set protocols ospf passive-interface <interface>*	Nothing found in XML Definitions	protocols ospf passive-interface <value>
✓	*set protocols ospf passive-interface-exc <interface>*	Nothing found in XML Definitions	protocols ospf passive-interface-exclude <value>
×	*set protocols ospf passive-interface default*	Nothing found in XML Definitions	Nothing found in VyOS
×	*set protocols ospf redistribute <route source>*	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	Nothing found in XML Definitions	protocols ospf redistribute bgp metric <value>
×	not yet documented	Nothing found in XML Definitions	protocols ospf redistribute bgp metric-type <value>
×	not yet documented	Nothing found in XML Definitions	protocols ospf redistribute bgp route-map <value>
×	not yet documented	Nothing found in XML Definitions	protocols ospf redistribute connected metric <value>
×	not yet documented	Nothing found in XML Definitions	protocols ospf redistribute connected metric-type <value>
×	not yet documented	Nothing found in XML Definitions	protocols ospf redistribute connected route-map <value>
×	not yet documented	Nothing found in XML Definitions	protocols ospf redistribute isis metric <value>
×	not yet documented	Nothing found in XML Definitions	protocols ospf redistribute isis metric-type <value>
×	not yet documented	Nothing found in XML Definitions	protocols ospf redistribute isis route-map <value>
×	not yet documented	Nothing found in XML Definitions	protocols ospf redistribute kernel metric <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	protocols ospf redistribute kernel metric-type <value>
×	not yet documented	Nothing found in XML Definitions	protocols ospf redistribute kernel route-map <value>
×	*set protocols ospf redistribute <route source> metric <number>*	Nothing found in XML Definitions	Nothing found in VyOS
×	*set protocols ospf redistribute <route source> metric-type <1|2>*	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	Nothing found in XML Definitions	protocols ospf redistribute rip metric <value>
×	not yet documented	Nothing found in XML Definitions	protocols ospf redistribute rip metric-type <value>
×	not yet documented	Nothing found in XML Definitions	protocols ospf redistribute rip route-map <value>
×	*set protocols ospf redistribute <route source> route-map <name>*	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	Nothing found in XML Definitions	protocols ospf redistribute static metric <value>
×	not yet documented	Nothing found in XML Definitions	protocols ospf redistribute static metric-type <value>
×	not yet documented	Nothing found in XML Definitions	protocols ospf redistribute static route-map <value>
✓	*set protocols ospf refresh timers <seconds>*	Nothing found in XML Definitions	protocols ospf refresh timers <value>
×	not yet documented	Nothing found in XML Definitions	protocols ospf route-map <value>
×	*set protocols ospf timers throttle spf <delay|initial-holdti <seconds>*	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	Nothing found in XML Definitions	protocols ospf timers throttle spf delay <value>
×	not yet documented	Nothing found in XML Definitions	protocols ospf timers throttle spf initial-holdtime <value>
×	not yet documented	Nothing found in XML Definitions	protocols ospf timers throttle spf max-holdtime <value>
×	not yet documented	Nothing found in XML Definitions	protocols ospfv3 area <text> area-type stub no-summary

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	protocols ospfv3 area <text> export-list <value>
×	not yet documented	Nothing found in XML Definitions	protocols ospfv3 area <text> import-list <value>
✓	*set protocols ospfv3 area <number> interface <interface>*	Nothing found in XML Definitions	protocols ospfv3 area <text> interface <value>
×	*set protocols ospfv3 area <number> range <prefix>*	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	Nothing found in XML Definitions	protocols ospfv3 area <text> range <text> advertise
✓	*set protocols ospfv3 area <number> range <prefix> not-advertise*	Nothing found in XML Definitions	protocols ospfv3 area <text> range <text> not-advertise
✓	*set protocols ospfv3 distance global <distance>*	Nothing found in XML Definitions	protocols ospfv3 distance global <value>
×	*set protocols ospfv3 distance ospfv3 <external|inter-area| <distance>*	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	Nothing found in XML Definitions	protocols ospfv3 distance ospfv3 external <value>
×	not yet documented	Nothing found in XML Definitions	protocols ospfv3 distance ospfv3 inter-area <value>
×	not yet documented	Nothing found in XML Definitions	protocols ospfv3 distance ospfv3 intra-area <value>
×	not yet documented	Nothing found in XML Definitions	protocols ospfv3 log-adjacency-changes detail
✓	*set protocols ospfv3 parameters router-id <rid>*	Nothing found in XML Definitions	protocols ospfv3 parameters router-id <value>
×	*set protocols ospfv3 redistribute <route source>*	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	Nothing found in XML Definitions	protocols ospfv3 redistribute bgp route-map <value>
×	not yet documented	Nothing found in XML Definitions	protocols ospfv3 redistribute connected route-map <value>
×	not yet documented	Nothing found in XML Definitions	protocols ospfv3 redistribute kernel route-map <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	protocols ospfv3 redistribute ripng route-map <value>
×	not yet documented	Nothing found in XML Definitions	protocols ospfv3 redistribute static route-map <value>
×	not yet documented	Nothing found in XML Definitions	protocols ospfv3 route-map <value>
×	***set protocols pim interface <interface-name>***	Nothing found in XML Definitions	Nothing found in VyOS
✓	***set protocols pim interface <interface> dr-priority <value>***	protocols-pim.xml.in: protocols pim interface <interface> dr-priority	protocols pim interface <text> dr-priority <value>
×	not yet documented	protocols-pim.xml.in: protocols pim interface <interface> hello	protocols pim interface <text> hello <value>
×	***set protocols pim int <interface> hello <seconds>***	Nothing found in XML Definitions	Nothing found in VyOS
✓	***set protocols pim rp address <address> group <multicast-address/mask-bits>***	protocols-pim.xml.in: protocols pim rp address <address> group	protocols pim rp address <text> group <value>
✓	***set protocols pim rp keep-alive-timer <seconds>***	protocols-pim.xml.in: protocols pim rp keep-alive-timer	protocols pim rp keep-alive-timer <value>
✓	***set protocols rip default-distance <distance>***	protocols-rip.xml.in: protocols rip default-distance	protocols rip default-distance <value>
✓	***set protocols rip default-information originate***	protocols-rip.xml.in: protocols rip default-information originate	protocols rip default-information originate
✓	***set protocols rip default-metric <metric>***	protocols-rip.xml.in: protocols rip default-metric	protocols rip default-metric <value>
×	***set protocols rip distribute-list access-list <in|out> <number>***	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	protocols-rip.xml.in: protocols rip distribute-list access-list in	protocols rip distribute-list access-list in <value>
×	not yet documented	protocols-rip.xml.in: protocols rip distribute-list access-list out	protocols rip distribute-list access-list out <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	***set protocols rip distribute-list interface <interface> access-list <in|out> <number>***	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	protocols-rip.xml.in: protocols rip distribute-list interface <interface> access-list in	protocols rip distribute-list interface <text> access-list in <value>
×	not yet documented	protocols-rip.xml.in: protocols rip distribute-list interface <interface> access-list out	protocols rip distribute-list interface <text> access-list out <value>
×	***set protocols rip distribute-list interface <interface> prefix-list <in|out> <name>***	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	protocols-rip.xml.in: protocols rip distribute-list interface <interface> prefix-list in	protocols rip distribute-list interface <text> prefix-list in <value>
×	not yet documented	protocols-rip.xml.in: protocols rip distribute-list interface <interface> prefix-list out	protocols rip distribute-list interface <text> prefix-list out <value>
×	***set protocols rip distribute-list prefix-list <in|out> <name>***	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	protocols-rip.xml.in: protocols rip distribute-list prefix-list in	protocols rip distribute-list prefix-list in <value>
×	not yet documented	protocols-rip.xml.in: protocols rip distribute-list prefix-list out	protocols rip distribute-list prefix-list out <value>
✓	***set protocols rip interface <interface>***	protocols-rip.xml.in: protocols rip interface	protocols rip interface <value>
✓	***set protocols rip neighbor <A.B.C.D>***	protocols-rip.xml.in: protocols rip neighbor	protocols rip neighbor <value>
✓	***set protocols rip network <A.B.C.D/M>***	protocols-rip.xml.in: protocols rip network	protocols rip network <value>
✓	***set protocols rip network-distance <A.B.C.D/M> access-list <name>***	protocols-rip.xml.in: protocols rip network-distance <network-distance> access-list	protocols rip network-distance <text> access-list <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	***set protocols rip network-distance <A.B.C.D/M> distance <distance>***	protocols-rip.xml.in: protocols rip network-distance <network-distance> distance	protocols rip network-distance <text> distance <value>
×	not yet documented	Nothing found in XML Definitions	protocols ripng aggregate-address <value>
×	not yet documented	Nothing found in XML Definitions	protocols ripng default-information originate
×	not yet documented	Nothing found in XML Definitions	protocols ripng default-metric <value>
×	not yet documented	Nothing found in XML Definitions	protocols ripng distribute-list access-list in <value>
×	not yet documented	Nothing found in XML Definitions	protocols ripng distribute-list access-list out <value>
×	not yet documented	Nothing found in XML Definitions	protocols ripng distribute-list interface <text> access-list in <value>
×	not yet documented	Nothing found in XML Definitions	protocols ripng distribute-list interface <text> access-list out <value>
×	not yet documented	Nothing found in XML Definitions	protocols ripng distribute-list interface <text> prefix-list in <value>
×	not yet documented	Nothing found in XML Definitions	protocols ripng distribute-list interface <text> prefix-list out <value>
×	not yet documented	Nothing found in XML Definitions	protocols ripng distribute-list prefix-list in <value>
×	not yet documented	Nothing found in XML Definitions	protocols ripng distribute-list prefix-list out <value>
×	not yet documented	Nothing found in XML Definitions	protocols ripng interface <value>
×	not yet documented	Nothing found in XML Definitions	protocols ripng network <value>
×	not yet documented	Nothing found in XML Definitions	protocols ripng passive-interface <value>
×	not yet documented	Nothing found in XML Definitions	protocols ripng re-distribute bgp metric <value>
×	not yet documented	Nothing found in XML Definitions	protocols ripng redis-tribute bgp route-map <value>
×	not yet documented	Nothing found in XML Definitions	protocols ripng redis-tribute connected metric <value>
×	not yet documented	Nothing found in XML Definitions	protocols ripng re-distribute connected route-map <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	protocols ripng redistribute kernel metric <value>
×	not yet documented	Nothing found in XML Definitions	protocols ripng redistribute kernel route-map <value>
×	not yet documented	Nothing found in XML Definitions	protocols ripng redistribute ospfv3 metric <value>
×	not yet documented	Nothing found in XML Definitions	protocols ripng redistribute ospfv3 route-map <value>
×	not yet documented	Nothing found in XML Definitions	protocols ripng redistribute static metric <value>
×	not yet documented	Nothing found in XML Definitions	protocols ripng redistribute static route-map <value>
×	not yet documented	Nothing found in XML Definitions	protocols ripng route <value>
×	not yet documented	Nothing found in XML Definitions	protocols ripng route-map <value>
×	not yet documented	Nothing found in XML Definitions	protocols ripng timers garbage-collection <value>
×	not yet documented	Nothing found in XML Definitions	protocols ripng timers timeout <value>
×	not yet documented	Nothing found in XML Definitions	protocols ripng timers update <value>
×	not yet documented	protocols-rip.xml.in: protocols rip passive-interface	protocols rip passive-interface <value>
×	***set protocols rip passive-interface interface <interface>***	Nothing found in XML Definitions	Nothing found in VyOS
×	***set protocols rip passive-interface interface default***	Nothing found in XML Definitions	Nothing found in VyOS
×	***set protocols rip redistribute <route source>***	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	protocols-rip.xml.in: protocols rip redistribute bgp metric	protocols rip redistribute bgp metric <value>
×	not yet documented	protocols-rip.xml.in: protocols rip redistribute bgp route-map	protocols rip redistribute bgp route-map <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	protocols-rip.xml.in: protocols rip redistribute connected metric	protocols rip redistribute connected metric <value>
×	not yet documented	protocols-rip.xml.in: protocols rip redistribute connected route-map	protocols rip redistribute connected route-map <value>
×	not yet documented	protocols-rip.xml.in: protocols rip redistribute isis metric	protocols rip redistribute isis metric <value>
×	not yet documented	protocols-rip.xml.in: protocols rip redistribute isis route-map	protocols rip redistribute isis route-map <value>
×	not yet documented	protocols-rip.xml.in: protocols rip redistribute kernel metric	protocols rip redistribute kernel metric <value>
×	not yet documented	protocols-rip.xml.in: protocols rip redistribute kernel route-map	protocols rip redistribute kernel route-map <value>
×	*set protocols rip redistribute <route source> metric <metric>*	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	protocols-rip.xml.in: protocols rip redistribute ospf metric	protocols rip redistribute ospf metric <value>
×	not yet documented	protocols-rip.xml.in: protocols rip redistribute ospf route-map	protocols rip redistribute ospf route-map <value>
×	*set protocols rip redistribute <route source> route-map <name>*	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	protocols-rip.xml.in: protocols rip redistribute static metric	protocols rip redistribute static metric <value>
×	not yet documented	protocols-rip.xml.in: protocols rip redistribute static route-map	protocols rip redistribute static route-map <value>
✓	*set protocols rip route <A.B.C.D/M>*	protocols-rip.xml.in: protocols rip route	protocols rip route <value>
✓	*set protocols rip timers garbage-collection <seconds>*	protocols-rip.xml.in: protocols rip timers garbage-collection	protocols rip timers garbage-collection <value>
✓	*set protocols rip timers timeout <seconds>*	protocols-rip.xml.in: protocols rip timers timeout	protocols rip timers timeout <value>
✓	*set protocols rip timers update <seconds>*	protocols-rip.xml.in: protocols rip timers update	protocols rip timers update <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set protocols rpki cache <address> port <port>*	protocols-rpki.xml.in: protocols rpki cache <cache> port	protocols rpki cache <text> port <value>
✓	*set protocols rpki cache <address> preference <preference>*	protocols-rpki.xml.in: protocols rpki cache <cache> preference	protocols rpki cache <text> preference <value>
✓	*set protocols rpki cache <address> ssh known-hosts-file <filepath>*	protocols-rpki.xml.in: protocols rpki cache <cache> ssh known-hosts-file	protocols rpki cache <text> ssh known-hosts-file <value>
✓	*set protocols rpki cache <address> ssh private-key-file <filepath>*	protocols-rpki.xml.in: protocols rpki cache <cache> ssh private-key-file	protocols rpki cache <text> ssh private-key-file <value>
✓	*set protocols rpki cache <address> ssh public-key-file <filepath>*	protocols-rpki.xml.in: protocols rpki cache <cache> ssh public-key-file	protocols rpki cache <text> ssh public-key-file <value>
✓	*set protocols rpki cache <address> ssh username <user>*	protocols-rpki.xml.in: protocols rpki cache <cache> ssh username	protocols rpki cache <text> ssh username <value>
✓	*set protocols rpki polling-period <1-86400>*	protocols-rpki.xml.in: protocols rpki polling-period	protocols rpki polling-period <value>
✓	*set protocols static arp <address> hwaddr <mac>*	arp.xml.in: protocols static arp <arp> hwaddr	protocols static arp <text> hwaddr <value>
×	*set protocols static interface-route6 <subnet> next-hop-interface <interface>*	Nothing found in XML Definitions	Nothing found in VyOS
✓	*set protocols static interface-route6 <subnet> next-hop-interface <interface> disable*	Nothing found in XML Definitions	protocols static interface-route6 <text> next-hop-interface <text> disable
✓	*set protocols static interface-route6 <subnet> next-hop-interface <interface> distance <distance>*	Nothing found in XML Definitions	protocols static interface-route6 <text> next-hop-interface <text> distance <value>
×	*set protocols static interface-route <subnet> next-hop-interface <interface>*	Nothing found in XML Definitions	Nothing found in VyOS

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set protocols static interface-route <subnet> next-hop-interface <interface> disable*	Nothing found in XML Definitions	protocols static interface-route <text> next-hop-interface <text> disable
✓	*set protocols static interface-route <subnet> next-hop-interface <interface> distance <distance>*	Nothing found in XML Definitions	protocols static interface-route <text> next-hop-interface <text> distance <value>
×	not yet documented	Nothing found in XML Definitions	protocols static interface-route <text> next-hop-interface <text> next-hop-vrf <value>
×	not yet documented	protocols-multicast.xml.in: protocols static multicast interface-route <interface-route> next-hop-interface <next-hop-interface> distance	protocols static multicast interface-route <text> next-hop-interface <text> distance <value>
×	not yet documented	protocols-multicast.xml.in: protocols static multicast route <route> next-hop <next-hop> distance	protocols static multicast route <text> next-hop <text> distance <value>
×	not yet documented	Nothing found in XML Definitions	protocols static route-map <value>
×	*set protocols static route 0.0.0.0/0 next-hop <address>*	Nothing found in XML Definitions	Nothing found in VyOS
×	*set protocols static route6 <subnet> blackhole*	Nothing found in XML Definitions	Nothing found in VyOS
✓	*set protocols static route6 <subnet> blackhole distance <distance>*	Nothing found in XML Definitions	protocols static route6 <text> blackhole distance <value>
×	*set protocols static route6 <subnet> next-hop <address>*	Nothing found in XML Definitions	Nothing found in VyOS
✓	*set protocols static route6 <subnet> next-hop <address> disable*	Nothing found in XML Definitions	protocols static route6 <text> next-hop <text> disable
✓	*set protocols static route6 <subnet> next-hop <address> distance <distance>*	Nothing found in XML Definitions	protocols static route6 <text> next-hop <text> distance <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	protocols static route6 <text> next-hop <text> interface <value>
×	not yet documented	Nothing found in XML Definitions	protocols static route6 <text> next-hop <text> next-hop-vrf <value>
×	*set protocols static route <subnet> blackhole*	Nothing found in XML Definitions	Nothing found in VyOS
✓	*set protocols static route <subnet> blackhole distance <distance>*	Nothing found in XML Definitions	protocols static route <text> blackhole distance <value>
×	not yet documented	Nothing found in XML Definitions	protocols static route <text> blackhole tag <value>
×	not yet documented	Nothing found in XML Definitions	protocols static route <text> dhcp-interface <value>
×	*set protocols static route <subnet> next-hop <address>*	Nothing found in XML Definitions	Nothing found in VyOS
✓	*set protocols static route <subnet> next-hop <address> disable*	Nothing found in XML Definitions	protocols static route <text> next-hop <text> disable
✓	*set protocols static route <subnet> next-hop <address> distance <distance>*	Nothing found in XML Definitions	protocols static route <text> next-hop <text> distance <value>
×	not yet documented	Nothing found in XML Definitions	protocols static route <text> next-hop <text> next-hop-interface <value>
×	not yet documented	Nothing found in XML Definitions	protocols static route <text> next-hop <text> next-hop-vrf <value>
×	not yet documented	Nothing found in XML Definitions	protocols static table <text> interface-route6 <text> next-hop-interface <text> disable
×	not yet documented	Nothing found in XML Definitions	protocols static table <text> interface-route6 <text> next-hop-interface <text> distance <value>
×	not yet documented	Nothing found in XML Definitions	protocols static table <text> interface-route <text> next-hop-interface <text> disable

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	protocols static table <text> interface-route <text> next-hop-interface <text> distance <value>
×	not yet documented	Nothing found in XML Definitions	protocols static table <text> route6 <text> blackhole distance <value>
×	not yet documented	Nothing found in XML Definitions	protocols static table <text> route6 <text> next-hop <text> disable
×	not yet documented	Nothing found in XML Definitions	protocols static table <text> route6 <text> next-hop <text> distance <value>
×	not yet documented	Nothing found in XML Definitions	protocols static table <text> route6 <text> next-hop <text> interface <value>
×	not yet documented	Nothing found in XML Definitions	protocols static table <text> route <text> blackhole distance <value>
×	not yet documented	Nothing found in XML Definitions	protocols static table <text> route <text> dhcp-interface <value>
×	not yet documented	Nothing found in XML Definitions	protocols static table <text> route <text> next-hop <text> disable
×	not yet documented	Nothing found in XML Definitions	protocols static table <text> route <text> next-hop <text> distance <value>
×	not yet documented	Nothing found in XML Definitions	protocols static table <text> route <text> next-hop <text> next-hop-interface <value>
×	*set protocols vrf <name> static interface-route6 <subnet> next-hop-interface <interface>*	Nothing found in XML Definitions	Nothing found in VyOS
✓	*set protocols vrf <name> static interface-route6 <subnet> next-hop-interface <interface> disable*	Nothing found in XML Definitions	protocols vrf <text> static interface-route6 <text> next-hop-interface <text> disable

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set protocols vrf <name> static interface-route6 <subnet> next-hop-interface <interface> distance <distance>*	Nothing found in XML Definitions	protocols vrf <text> static interface-route6 <text> next-hop-interface <text> distance <value>
×	not yet documented	Nothing found in XML Definitions	protocols vrf <text> static interface-route6 <text> next-hop-interface <text> next-hop-vrf <value>
×	*set protocols vrf <name> static interface-route <subnet> next-hop-interface <interface>*	Nothing found in XML Definitions	Nothing found in VyOS
✓	*set protocols vrf <name> static interface-route <subnet> next-hop-interface <interface> disable*	Nothing found in XML Definitions	protocols vrf <text> static interface-route <text> next-hop-interface <text> disable
✓	*set protocols vrf <name> static interface-route <subnet> next-hop-interface <interface> distance <distance>*	Nothing found in XML Definitions	protocols vrf <text> static interface-route <text> next-hop-interface <text> distance <value>
×	not yet documented	Nothing found in XML Definitions	protocols vrf <text> static interface-route <text> next-hop-interface <text> next-hop-vrf <value>
×	*set protocols vrf <name> static route6 <subnet> blackhole*	Nothing found in XML Definitions	Nothing found in VyOS
✓	*set protocols vrf <name> static route6 <subnet> blackhole distance <distance>*	Nothing found in XML Definitions	protocols vrf <text> static route6 <text> blackhole distance <value>
×	*set protocols vrf <name> static route6 <subnet> next-hop <address>*	Nothing found in XML Definitions	Nothing found in VyOS
✓	*set protocols vrf <name> static route6 <subnet> next-hop <address> disable*	Nothing found in XML Definitions	protocols vrf <text> static route6 <text> next-hop <text> disable

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set protocols vrf <name> static route6 <subnet> next-hop <address> distance <distance>*	Nothing found in XML Definitions	protocols vrf <text> static route6 <text> next-hop <text> distance <value>
×	not yet documented	Nothing found in XML Definitions	protocols vrf <text> static route6 <text> next-hop <text> interface <value>
✓	*set protocols vrf <name> static route6 <subnet> next-hop <address> next-hop-vrf <default | vrf-name>*	Nothing found in XML Definitions	protocols vrf <text> static route6 <text> next-hop <text> next-hop-vrf <value>
×	*set protocols vrf <name> static route <subnet> blackhole*	Nothing found in XML Definitions	Nothing found in VyOS
✓	*set protocols vrf <name> static route <subnet> blackhole distance <distance>*	Nothing found in XML Definitions	protocols vrf <text> static route <text> blackhole distance <value>
×	not yet documented	Nothing found in XML Definitions	protocols vrf <text> static route <text> dhcp-interface <value>
×	*set protocols vrf <name> static route <subnet> next-hop <address>*	Nothing found in XML Definitions	Nothing found in VyOS
✓	*set protocols vrf <name> static route <subnet> next-hop <address> disable*	Nothing found in XML Definitions	protocols vrf <text> static route <text> next-hop <text> disable
✓	*set protocols vrf <name> static route <subnet> next-hop <address> distance <distance>*	Nothing found in XML Definitions	protocols vrf <text> static route <text> next-hop <text> distance <value>
×	not yet documented	Nothing found in XML Definitions	protocols vrf <text> static route <text> next-hop <text> next-hop-interface <value>
✓	*set protocols vrf <name> static route <subnet> next-hop <address> next-hop-vrf <default | vrf-name>*	Nothing found in XML Definitions	protocols vrf <text> static route <text> next-hop <text> next-hop-vrf <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	*rename*	Nothing found in XML Definitions	Nothing found in VyOS
×	*rollback <N>*	Nothing found in XML Definitions	Nothing found in VyOS
×	*run*	Nothing found in XML Definitions	Nothing found in VyOS
×	*save*	Nothing found in XML Definitions	Nothing found in VyOS
✓	*set service broadcast-relay disable*	bcast-relay.xml.in: service broadcast-relay disable	service broadcast-relay disable
✓	*set service broadcast-relay id <n> address <ipv4-address>*	bcast-relay.xml.in: service broadcast-relay id <id> address	service broadcast-relay id <text> address <value>
✓	*set service broadcast-relay id <n> description <description>*	bcast-relay.xml.in: service broadcast-relay id <id> description	service broadcast-relay id <text> description <value>
✓	*set service broadcast-relay id <n> disable*	bcast-relay.xml.in: service broadcast-relay id <id> disable	service broadcast-relay id <text> disable
✓	*set service broadcast-relay id <n> interface <interface>*	bcast-relay.xml.in: service broadcast-relay id <id> interface	service broadcast-relay id <text> interface <value>
✓	*set service broadcast-relay id <n> port <port>*	bcast-relay.xml.in: service broadcast-relay id <id> port	service broadcast-relay id <text> port <value>
✓	*set service conntrack-sync accept-protocol*	service_conntrack-sync.xml.in: service conntrack-sync accept-protocol	service conntrack-sync accept-protocol <value>
✓	*set service conntrack-sync disable-external-cach*	service_conntrack-sync.xml.in: service conntrack-sync disable-external-cache	service conntrack-sync disable-external-cache
×	not yet documented	service_conntrack-sync.xml.in: service conntrack-sync disable-syslog	Nothing found in VyOS
✓	*set service conntrack-sync event-listen-queue-si <size>*	service_conntrack-sync.xml.in: service conntrack-sync event-listen-queue-size	service conntrack-sync event-listen-queue-size <value>
✓	*set service conntrack-sync expect-sync <all|ftp|h323|nfs|sip*	service_conntrack-sync.xml.in: service conntrack-sync expect-sync	service conntrack-sync expect-sync <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set service conntrack-sync failover-mechanism vrrp sync-group <group>*	service_conntrack-sync.xml.in: service conntrack-sync failover-mechanism vrrp sync-group	service conntrack-sync failover-mechanism vrrp sync-group <value>
✓	*set service conntrack-sync ignore-address <x.x.x.x>*	service_conntrack-sync.xml.in: service conntrack-sync ignore-address	service conntrack-sync ignore-address <value>
×	*set service conntrack-sync interface <name>*	Nothing found in XML Definitions	Nothing found in VyOS
✓	*set service conntrack-sync interface <name> peer <address>*	service_conntrack-sync.xml.in: service conntrack-sync interface <interface> peer	service conntrack-sync interface <text> peer <value>
✓	*set service conntrack-sync interface <name> port <port>*	service_conntrack-sync.xml.in: service conntrack-sync interface <interface> port	service conntrack-sync interface <text> port <value>
✓	*set service conntrack-sync listen-address <ipv4address>*	service_conntrack-sync.xml.in: service conntrack-sync listen-address	service conntrack-sync listen-address <value>
✓	*set service conntrack-sync mcast-group <x.x.x.x>*	service_conntrack-sync.xml.in: service conntrack-sync mcast-group	service conntrack-sync mcast-group <value>
×	*set service conntrack-sync startup-resync*	service_conntrack-sync.xml.in: service conntrack-sync startup-resync	Nothing found in VyOS
✓	*set service conntrack-sync sync-queue-size <size>*	service_conntrack-sync.xml.in: service conntrack-sync sync-queue-size	service conntrack-sync sync-queue-size <value>
✓	*set service console-server device <device> data-bits [7 | 8]*	service_console-server.xml.in: service console-server device <device> data-bits	service console-server device <text> data-bits <value>
✓	*set service console-server device <device> description <string>*	service_console-server.xml.in: service console-server device <device> description	service console-server device <text> description <value>
✓	*set service console-server device <device> parity [even | odd | none]*	service_console-server.xml.in: service console-server device <device> parity	service console-server device <text> parity <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	***set service console-server device <device> speed [300 | 1200 | 2400 | 4800 | 9600 | 19200 | 38400 | 57600 | 115200]***	service_console-server.xml.in: service console-server device <device> speed	service console-server device <text> speed <value>
✓	***set service console-server device <device> ssh port <port>***	service_console-server.xml.in: service console-server device <device> ssh port	service console-server device <text> ssh port <value>
✓	***set service console-server device <device> stop-bits [1 | 2]***	service_console-server.xml.in: service console-server device <device> stop-bits	service console-server device <text> stop-bits <value>
✓	***set service dhcp-relay interface <interface>***	dhcp-relay.xml.in: service dhcp-relay interface	service dhcp-relay interface <value>
✓	***set service dhcp-relay relay-options hop-count <count>***	dhcp-relay.xml.in: service dhcp-relay relay-options hop-count	service dhcp-relay relay-options hop-count <value>
✓	***set service dhcp-relay relay-options max-size <size>***	dhcp-relay.xml.in: service dhcp-relay relay-options max-size	service dhcp-relay relay-options max-size <value>
✓	***set service dhcp-relay relay-options relay-agents-packets <append | discard | forward | replace>***	dhcp-relay.xml.in: service dhcp-relay relay-options relay-agents-packets	service dhcp-relay relay-options relay-agents-packets <value>
✓	***set service dhcp-relay server <server>***	dhcp-relay.xml.in: service dhcp-relay server	service dhcp-relay server <value>
×	not yet documented	dhcp-server.xml.in: service dhcp-server disable	service dhcp-server disable
×	not yet documented	dhcp-server.xml.in: service dhcp-server dynamic-dns-update	service dhcp-server dynamic-dns-update
✓	***set service dhcp-server failover name <name>***	dhcp-server.xml.in: service dhcp-server failover name	service dhcp-server failover name <value>
✓	***set service dhcp-server failover remote <address>***	dhcp-server.xml.in: service dhcp-server failover remote	service dhcp-server failover remote <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set service dhcp-server failover source-address <address>*	dhcp-server.xml.in: service dhcp-server failover source-address	service dhcp-server failover source-address <value>
✓	*set service dhcp-server failover status <primary | secondary>*	dhcp-server.xml.in: service dhcp-server failover status	service dhcp-server failover status <value>
×	not yet documented	dhcp-server.xml.in: service dhcp-server global-parameters	service dhcp-server global-parameters <value>
✓	*set service dhcp-server host-decl-name*	dhcp-server.xml.in: service dhcp-server host-decl-name	service dhcp-server host-decl-name
✓	*set service dhcp-server hostfile-update*	dhcp-server.xml.in: service dhcp-server hostfile-update	service dhcp-server hostfile-update
✓	*set service dhcp-server listen-address <address>*	dhcp-server.xml.in: service dhcp-server listen-address	service dhcp-server listen-address <value>
✓	*set service dhcp-server shared-network-name <name> authoritative*	dhcp-server.xml.in: service dhcp-server shared-network-name <shared-network-name> authoritative	service dhcp-server shared-network-name <text> authoritative
×	not yet documented	dhcp-server.xml.in: service dhcp-server shared-network-name <shared-network-name> description	service dhcp-server shared-network-name <text> description <value>
×	not yet documented	dhcp-server.xml.in: service dhcp-server shared-network-name <shared-network-name> disable	service dhcp-server shared-network-name <text> disable
✓	*set service dhcp-server shared-network-name <name> domain-name <domain-name>*	dhcp-server.xml.in: service dhcp-server shared-network-name <shared-network-name> domain-name	service dhcp-server shared-network-name <text> domain-name <value>
✓	*set service dhcp-server shared-network-name <name> domain-search <domain-name>*	dhcp-server.xml.in: service dhcp-server shared-network-name <shared-network-name> domain-search	service dhcp-server shared-network-name <text> domain-search <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	***set service dhcp-server shared-network-name <name> name-server <address>***	dhcp-server.xml.in: service dhcp-server shared-network-name <shared-network-name> name-server	service dhcp-server shared-network-name <text> name-server <value>
×	not yet documented	dhcp-server.xml.in: service dhcp-server shared-network-name <shared-network-name> ntp-server	service dhcp-server shared-network-name <text> ntp-server <value>
✓	***set service dhcp-server shared-network-name <name> ping-check***	dhcp-server.xml.in: service dhcp-server shared-network-name <shared-network-name> ping-check	service dhcp-server shared-network-name <text> ping-check
×	not yet documented	dhcp-server.xml.in: service dhcp-server shared-network-name <shared-network-name> shared-network-parameters	service dhcp-server shared-network-name <text> shared-network-parameters <value>
×	not yet documented	dhcp-server.xml.in: service dhcp-server shared-network-name <shared-network-name> subnet <subnet> bootfile-name	service dhcp-server shared-network-name <text> subnet <text> bootfile-name <value>
×	not yet documented	dhcp-server.xml.in: service dhcp-server shared-network-name <shared-network-name> subnet <subnet> bootfile-server	service dhcp-server shared-network-name <text> subnet <text> bootfile-server <value>
×	not yet documented	dhcp-server.xml.in: service dhcp-server shared-network-name <shared-network-name> subnet <subnet> client-prefix-length	service dhcp-server shared-network-name <text> subnet <text> client-prefix-length <value>
✓	***set service dhcp-server shared-network-name <name> subnet <subnet> default-router <address>***	dhcp-server.xml.in: service dhcp-server shared-network-name <shared-network-name> subnet <subnet> default-router	service dhcp-server shared-network-name <text> subnet <text> default-router <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	dhcp-server.xml.in: service dhcp-server shared-network-name <shared-network-name> subnet <subnet> description	service dhcp-server shared-network-name <text> subnet <text> description <value>
✓	*set service dhcp-server shared-network-name <name> subnet <subnet> domain-name <domain-name>*	dhcp-server.xml.in: service dhcp-server shared-network-name <shared-network-name> subnet <subnet> domain-name	service dhcp-server shared-network-name <text> subnet <text> domain-name <value>
✓	*set service dhcp-server shared-network-name <name> subnet <subnet> domain-search <domain-name>*	dhcp-server.xml.in: service dhcp-server shared-network-name <shared-network-name> subnet <subnet> domain-search	service dhcp-server shared-network-name <text> subnet <text> domain-search <value>
✓	*set service dhcp-server shared-network-name <name> subnet <subnet> enable-failover*	dhcp-server.xml.in: service dhcp-server shared-network-name <shared-network-name> subnet <subnet> enable-failover	service dhcp-server shared-network-name <text> subnet <text> enable-failover
✓	*set service dhcp-server shared-network-name <name> subnet <subnet> exclude <address>*	dhcp-server.xml.in: service dhcp-server shared-network-name <shared-network-name> subnet <subnet> exclude	service dhcp-server shared-network-name <text> subnet <text> exclude <value>
×	not yet documented	dhcp-server.xml.in: service dhcp-server shared-network-name <shared-network-name> subnet <subnet> ip-forwarding	service dhcp-server shared-network-name <text> subnet <text> ip-forwarding
×	not yet documented	dhcp-server.xml.in: service dhcp-server shared-network-name <shared-network-name> subnet <subnet> ipv6-only-preferred	service dhcp-server shared-network-name <text> subnet <text> ipv6-only-preferred <value>
✓	*set service dhcp-server shared-network-name <name> subnet <subnet> lease <time>*	dhcp-server.xml.in: service dhcp-server shared-network-name <shared-network-name> subnet <subnet> lease	service dhcp-server shared-network-name <text> subnet <text> lease <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	***set service dhcp-server shared-network-name <name> subnet <subnet> name-server <address>***	dhcp-server.xml.in: service dhcp-server shared-network-name <shared-network-name> subnet <subnet> name-server	service dhcp-server shared-network-name <text> subnet <text> name-server <value>
×	not yet documented	dhcp-server.xml.in: service dhcp-server shared-network-name <shared-network-name> subnet <subnet> ntp-server	service dhcp-server shared-network-name <text> subnet <text> ntp-server <value>
✓	***set service dhcp-server shared-network-name <name> subnet <subnet> ping-check***	dhcp-server.xml.in: service dhcp-server shared-network-name <shared-network-name> subnet <subnet> ping-check	service dhcp-server shared-network-name <text> subnet <text> ping-check
×	not yet documented	dhcp-server.xml.in: service dhcp-server shared-network-name <shared-network-name> subnet <subnet> pop-server	service dhcp-server shared-network-name <text> subnet <text> pop-server <value>
✓	***set service dhcp-server shared-network-name <name> subnet <subnet> range <n> start <address>***	dhcp-server.xml.in: service dhcp-server shared-network-name <shared-network-name> subnet <subnet> range <range> start	service dhcp-server shared-network-name <text> subnet <text> range <text> start <value>
✓	***set service dhcp-server shared-network-name <name> subnet <subnet> range <n> stop <address>***	dhcp-server.xml.in: service dhcp-server shared-network-name <shared-network-name> subnet <subnet> range <range> stop	service dhcp-server shared-network-name <text> subnet <text> range <text> stop <value>
×	not yet documented	dhcp-server.xml.in: service dhcp-server shared-network-name <shared-network-name> subnet <subnet> server-identifier	service dhcp-server shared-network-name <text> subnet <text> server-identifier <value>
×	not yet documented	dhcp-server.xml.in: service dhcp-server shared-network-name <shared-network-name> subnet <subnet> smtp-server	service dhcp-server shared-network-name <text> subnet <text> smtp-server <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	dhcp-server.xml.in: service dhcp-server shared-network-name <shared-network-name> subnet <subnet> static-mapping <static-mapping> disable	service dhcp-server shared-network-name <text> subnet <text> static-mapping <text> disable
✓	*set service dhcp-server shared-network-name <name> subnet <subnet> static-mapping <description> ip-address <address>*	dhcp-server.xml.in: service dhcp-server shared-network-name <shared-network-name> subnet <subnet> static-mapping <static-mapping> ip-address	service dhcp-server shared-network-name <text> subnet <text> static-mapping <text> ip-address <value>
✓	*set service dhcp-server shared-network-name <name> subnet <subnet> static-mapping <description> mac-address <address>*	dhcp-server.xml.in: service dhcp-server shared-network-name <shared-network-name> subnet <subnet> static-mapping <static-mapping> mac-address	service dhcp-server shared-network-name <text> subnet <text> static-mapping <text> mac-address <value>
×	not yet documented	dhcp-server.xml.in: service dhcp-server shared-network-name <shared-network-name> subnet <subnet> static-mapping <static-mapping> static-mapping-parameters	service dhcp-server shared-network-name <text> subnet <text> static-mapping <text> static-mapping-parameters <value>
×	not yet documented	dhcp-server.xml.in: service dhcp-server shared-network-name <shared-network-name> subnet <subnet> static-route <static-route> next-hop	service dhcp-server shared-network-name <text> subnet <text> static-route <text> next-hop <value>
×	not yet documented	dhcp-server.xml.in: service dhcp-server shared-network-name <shared-network-name> subnet <subnet> subnet-parameters	service dhcp-server shared-network-name <text> subnet <text> subnet-parameters <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	dhcp-server.xml.in: service dhcp-server shared-network-name <shared-network-name> subnet <subnet> tftp-server-name	service dhcp-server shared-network-name <text> subnet <text> tftp-server-name <value>
×	not yet documented	dhcp-server.xml.in: service dhcp-server shared-network-name <shared-network-name> subnet <subnet> time-offset	service dhcp-server shared-network-name <text> subnet <text> time-offset <value>
×	not yet documented	dhcp-server.xml.in: service dhcp-server shared-network-name <shared-network-name> subnet <subnet> time-server	service dhcp-server shared-network-name <text> subnet <text> time-server <value>
×	not yet documented	dhcp-server.xml.in: service dhcp-server shared-network-name <shared-network-name> subnet <subnet> wins-server	service dhcp-server shared-network-name <text> subnet <text> wins-server <value>
×	not yet documented	dhcp-server.xml.in: service dhcp-server shared-network-name <shared-network-name> subnet <subnet> wpad-url	service dhcp-server shared-network-name <text> subnet <text> wpad-url <value>
×	*set service dhcpv6-relay listen-interface <interface>*	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	dhcpv6-relay.xml.in: service dhcpv6-relay listen-interface <listen-interface> address	service dhcpv6-relay listen-interface <text> address <value>
✓	*set service dhcpv6-relay max-hop-count <count>*	dhcpv6-relay.xml.in: service dhcpv6-relay max-hop-count	service dhcpv6-relay max-hop-count <value>
✓	*set service dhcpv6-relay upstream-interface <interface> address <server>*	dhcpv6-relay.xml.in: service dhcpv6-relay upstream-interface <upstream-interface> address	service dhcpv6-relay upstream-interface <text> address <value>
✓	*set service dhcpv6-relay use-interface-id-opti*	dhcpv6-relay.xml.in: service dhcpv6-relay use-interface-id-option	service dhcpv6-relay use-interface-id-option

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	dhcpv6-server.xml.in: service dhcpv6-server disable	service dhcpv6-server disable
×	not yet documented	dhcpv6-server.xml.in: service dhcpv6-server global-parameters name-server	service dhcpv6-server global-parameters name-server <value>
✓	***set service dhcpv6-server preference <preference value>***	dhcpv6-server.xml.in: service dhcpv6-server preference	service dhcpv6-server preference <value>
×	not yet documented	dhcpv6-server.xml.in: service dhcpv6-server shared-network-name <shared-network-name> common-options domain-search	service dhcpv6-server shared-network-name <text> common-options domain-search <value>
×	not yet documented	dhcpv6-server.xml.in: service dhcpv6-server shared-network-name <shared-network-name> common-options info-refresh-time	service dhcpv6-server shared-network-name <text> common-options info-refresh-time <value>
×	not yet documented	dhcpv6-server.xml.in: service dhcpv6-server shared-network-name <shared-network-name> common-options name-server	service dhcpv6-server shared-network-name <text> common-options name-server <value>
×	not yet documented	dhcpv6-server.xml.in: service dhcpv6-server shared-network-name <shared-network-name> description	service dhcpv6-server shared-network-name <text> description <value>
×	not yet documented	dhcpv6-server.xml.in: service dhcpv6-server shared-network-name <shared-network-name> disable	service dhcpv6-server shared-network-name <text> disable
×	not yet documented	dhcpv6-server.xml.in: service dhcpv6-server shared-network-name <shared-network-name> subnet <subnet> address-range prefix <prefix> temporary	service dhcpv6-server shared-network-name <text> subnet <text> address-range prefix <text> temporary

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	dhcpv6-server.xml.in: service dhcpv6-server shared-network-name <shared-network-name> subnet <subnet> address-range start <start> stop	service dhcpv6-server shared-network-name <text> subnet <text> address-range start <text> stop <value>
×	not yet documented	dhcpv6-server.xml.in: service dhcpv6-server shared-network-name <shared-network-name> subnet <subnet> domain-search	service dhcpv6-server shared-network-name <text> subnet <text> domain-search <value>
×	not yet documented	dhcpv6-server.xml.in: service dhcpv6-server shared-network-name <shared-network-name> subnet <subnet> lease-time default	service dhcpv6-server shared-network-name <text> subnet <text> lease-time default <value>
×	not yet documented	dhcpv6-server.xml.in: service dhcpv6-server shared-network-name <shared-network-name> subnet <subnet> lease-time maximum	service dhcpv6-server shared-network-name <text> subnet <text> lease-time maximum <value>
×	not yet documented	dhcpv6-server.xml.in: service dhcpv6-server shared-network-name <shared-network-name> subnet <subnet> lease-time minimum	service dhcpv6-server shared-network-name <text> subnet <text> lease-time minimum <value>
×	*set service dhcpv6-server shared-network-name <name> subnet <prefix> lease-time {default | maximum | minimum}*	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	dhcpv6-server.xml.in: service dhcpv6-server shared-network-name <shared-network-name> subnet <subnet> name-server	service dhcpv6-server shared-network-name <text> subnet <text> name-server <value>
✓	*set service dhcpv6-server shared-network-name <name> subnet <prefix> nis-domain <domain-name>*	dhcpv6-server.xml.in: service dhcpv6-server shared-network-name <shared-network-name> subnet <subnet> nis-domain	service dhcpv6-server shared-network-name <text> subnet <text> nis-domain <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set service dhcpv6-server shared-network-name <name> subnet <prefix> nis-server <address>*	dhcpv6-server.xml.in: service dhcpv6-server shared-network-name <shared-network-name> subnet <subnet> nis-server	service dhcpv6-server shared-network-name <text> subnet <text> nis-server <value>
✓	*set service dhcpv6-server shared-network-name <name> subnet <prefix> nisplus-domain <domain-name>*	dhcpv6-server.xml.in: service dhcpv6-server shared-network-name <shared-network-name> subnet <subnet> nisplus-domain	service dhcpv6-server shared-network-name <text> subnet <text> nisplus-domain <value>
✓	*set service dhcpv6-server shared-network-name <name> subnet <prefix> nisplus-server <address>*	dhcpv6-server.xml.in: service dhcpv6-server shared-network-name <shared-network-name> subnet <subnet> nisplus-server	service dhcpv6-server shared-network-name <text> subnet <text> nisplus-server <value>
✓	*set service dhcpv6-server shared-network-name <name> subnet <prefix> prefix-delegation start <address> prefix-length <length>*	dhcpv6-server.xml.in: service dhcpv6-server shared-network-name <shared-network-name> subnet <subnet> prefix-delegation start <start> prefix-length	service dhcpv6-server shared-network-name <text> subnet <text> prefix-delegation start <text> prefix-length <value>
✓	*set service dhcpv6-server shared-network-name <name> subnet <prefix> prefix-delegation start <address> stop <address>*	dhcpv6-server.xml.in: service dhcpv6-server shared-network-name <shared-network-name> subnet <subnet> prefix-delegation start <start> stop	service dhcpv6-server shared-network-name <text> subnet <text> prefix-delegation start <text> stop <value>
✓	*set service dhcpv6-server shared-network-name <name> subnet <prefix> sip-server <address | fqdn>*	dhcpv6-server.xml.in: service dhcpv6-server shared-network-name <shared-network-name> subnet <subnet> sip-server	service dhcpv6-server shared-network-name <text> subnet <text> sip-server <value>
×	not yet documented	dhcpv6-server.xml.in: service dhcpv6-server shared-network-name <shared-network-name> subnet <subnet> sntp-server	service dhcpv6-server shared-network-name <text> subnet <text> sntp-server <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	***set service dhcpv6-server shared-network-name <name> subnet <prefix> sntp-server-address <address>***	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	dhcpv6-server.xml.in: service dhcpv6-server shared-network-name <shared-network-name> subnet <subnet> static-mapping <static-mapping> disable	service dhcpv6-server shared-network-name <text> subnet <text> static-mapping <text> disable
×	not yet documented	dhcpv6-server.xml.in: service dhcpv6-server shared-network-name <shared-network-name> subnet <subnet> static-mapping <static-mapping> identifier	service dhcpv6-server shared-network-name <text> subnet <text> static-mapping <text> identifier <value>
×	not yet documented	dhcpv6-server.xml.in: service dhcpv6-server shared-network-name <shared-network-name> subnet <subnet> static-mapping <static-mapping> ipv6-address	service dhcpv6-server shared-network-name <text> subnet <text> static-mapping <text> ipv6-address <value>
×	not yet documented	dhcpv6-server.xml.in: service dhcpv6-server shared-network-name <shared-network-name> subnet <subnet> static-mapping <static-mapping> ipv6-prefix	service dhcpv6-server shared-network-name <text> subnet <text> static-mapping <text> ipv6-prefix <value>
×	not yet documented	dns-dynamic.xml.in: service dns dynamic interface <interface> ipv6-enable	service dns dynamic interface <text> ipv6-enable
×	***set service dns dynamic interface <interface> rfc2136 <service-name>***	Nothing found in XML Definitions	Nothing found in VyOS
✓	***set service dns dynamic interface <interface> rfc2136 <service-name> key <keyfile>***	dns-dynamic.xml.in: service dns dynamic interface <interface> rfc2136 <rfc2136> key	service dns dynamic interface <text> rfc2136 <text> key <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set service dns dynamic interface <interface> rfc2136 <service-name> record <record>*	dns-dynamic.xml.in: service dns dynamic interface <interface> rfc2136 <rfc2136> record	service dns dynamic interface <text> rfc2136 <text> record <value>
✓	*set service dns dynamic interface <interface> rfc2136 <service-name> server <server>*	dns-dynamic.xml.in: service dns dynamic interface <interface> rfc2136 <rfc2136> server	service dns dynamic interface <text> rfc2136 <text> server <value>
✓	*set service dns dynamic interface <interface> rfc2136 <service-name> ttl <ttl>*	dns-dynamic.xml.in: service dns dynamic interface <interface> rfc2136 <rfc2136> ttl	service dns dynamic interface <text> rfc2136 <text> ttl <value>
✓	*set service dns dynamic interface <interface> rfc2136 <service-name> zone <zone>*	dns-dynamic.xml.in: service dns dynamic interface <interface> rfc2136 <rfc2136> zone	service dns dynamic interface <text> rfc2136 <text> zone <value>
✓	*set service dns dynamic interface <interface> service <service> host-name <hostname>*	dns-dynamic.xml.in: service dns dynamic interface <interface> service <service> host-name	service dns dynamic interface <text> service <text> host-name <value>
✓	*set service dns dynamic interface <interface> service <service> login <username>*	dns-dynamic.xml.in: service dns dynamic interface <interface> service <service> login	service dns dynamic interface <text> service <text> login <value>
✓	*set service dns dynamic interface <interface> service <service> password <password>*	dns-dynamic.xml.in: service dns dynamic interface <interface> service <service> password	service dns dynamic interface <text> service <text> password <value>
✓	*set service dns dynamic interface <interface> service <service> protocol <protocol>*	dns-dynamic.xml.in: service dns dynamic interface <interface> service <service> protocol	service dns dynamic interface <text> service <text> protocol <value>
✓	*set service dns dynamic interface <interface> service <service> server <server>*	dns-dynamic.xml.in: service dns dynamic interface <interface> service <service> server	service dns dynamic interface <text> service <text> server <value>
✓	*set service dns dynamic interface <interface> service <service> zone <zone>*	dns-dynamic.xml.in: service dns dynamic interface <interface> service <service> zone	service dns dynamic interface <text> service <text> zone <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set service dns dynamic interface <interface> use-web skip <pattern>*	dns-dynamic.xml.in: service dns dynamic interface <interface> use-web skip	service dns dynamic interface <text> use-web skip <value>
✓	*set service dns dynamic interface <interface> use-web url <url>*	dns-dynamic.xml.in: service dns dynamic interface <interface> use-web url	service dns dynamic interface <text> use-web url <value>
✓	*set service dns forwarding allow-from <network>*	dns-forwarding.xml.in: service dns forwarding allow-from	service dns forwarding allow-from <value>
✓	*set service dns forwarding cache-size <0-2147483647>*	dns-forwarding.xml.in: service dns forwarding cache-size	service dns forwarding cache-size <value>
✓	*set service dns forwarding dhcp <interface>*	dns-forwarding.xml.in: service dns forwarding dhcp	service dns forwarding dhcp <value>
×	not yet documented	dns-forwarding.xml.in: service dns forwarding dns64-prefix	service dns forwarding dns64-prefix <value>
✓	*set service dns forwarding dnssec <off | process-no-validate | process | log-fail | validate>*	dns-forwarding.xml.in: service dns forwarding dnssec	service dns forwarding dnssec <value>
✓	*set service dns forwarding domain <domain-name> addnta*	dns-forwarding.xml.in: service dns forwarding domain <domain> addnta	service dns forwarding domain <text> addnta
✓	*set service dns forwarding domain <domain-name> recursion-desired*	dns-forwarding.xml.in: service dns forwarding domain <domain> recursion-desired	service dns forwarding domain <text> recursion-desired
✓	*set service dns forwarding domain <domain-name> server <address>*	dns-forwarding.xml.in: service dns forwarding domain <domain> server	service dns forwarding domain <text> server <value>
✓	*set service dns forwarding ignore-hosts-file*	dns-forwarding.xml.in: service dns forwarding ignore-hosts-file	service dns forwarding ignore-hosts-file
✓	*set service dns forwarding listen-address <address>*	dns-forwarding.xml.in: service dns forwarding listen-address	service dns forwarding listen-address <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set service dns forwarding name-server <address>*	dns-forwarding.xml.in: service dns forwarding name-server	service dns forwarding name-server <value>
✓	*set service dns forwarding negative-ttl <0-7200>*	dns-forwarding.xml.in: service dns forwarding negative-ttl	service dns forwarding negative-ttl <value>
✓	*set service dns forwarding no-serve-rfc1918*	dns-forwarding.xml.in: service dns forwarding no-serve-rfc1918	service dns forwarding no-serve-rfc1918
×	not yet documented	dns-forwarding.xml.in: service dns forwarding port	Nothing found in VyOS
✓	*set service dns forwarding source-address <address>*	dns-forwarding.xml.in: service dns forwarding source-address	service dns forwarding source-address <value>
✓	*set service dns forwarding system*	dns-forwarding.xml.in: service dns forwarding system	service dns forwarding system
×	*set service event-handler event <event-handler name>*	Nothing found in XML Definitions	Nothing found in VyOS
✓	*set service event-handler event <event-handler name> filter pattern <regex>*	service-event-handler.xml.in: service event-handler event <event> filter pattern	service event-handler event <text> filter pattern <value>
✓	*set service event-handler event <event-handler name> filter syslog-identifier <sylogid name>*	service-event-handler.xml.in: service event-handler event <event> filter syslog-identifier	service event-handler event <text> filter syslog-identifier <value>
✓	*set service event-handler event <event-handler name> script arguments <arguments>*	service-event-handler.xml.in: service event-handler event <event> script arguments	service event-handler event <text> script arguments <value>
✓	*set service event-handler event <event-handler name> script environment <env name> value <env value>*	service-event-handler.xml.in: service event-handler event <event> script environment <environment> value	service event-handler event <text> script environment <text> value <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set service event-handler event <event-handler name> script path <path to script>*	service-event-handler.xml.in: service event-handler event <event> script path	service event-handler event <text> script path <value>
✓	*set service https api-restrict virtual-host <vhost>*	https.xml.in: service https api-restrict virtual-host	service https api-restrict virtual-host <value>
×	not yet documented	https.xml.in: service https api cors allow-origin	service https api cors allow-origin <value>
✓	*set service https api debug*	https.xml.in: service https api debug	service https api debug
✓	*set service https api keys id <name> key <apikey>*	https.xml.in: service https api keys id <id> key	service https api keys id <text> key <value>
✓	*set service https api port*	https.xml.in: service https api port	service https api port <value>
✓	*set service https api socket*	https.xml.in: service https api socket	service https api socket
✓	*set service https api strict*	https.xml.in: service https api strict	service https api strict
✓	*set service https certificates certbot domain-name <text>*	https.xml.in: service https certificates certbot domain-name	service https certificates certbot domain-name <value>
✓	*set service https certificates certbot email*	https.xml.in: service https certificates certbot email	service https certificates certbot email <value>
×	*set service https certificates system-generated-cert*	Nothing found in XML Definitions	Nothing found in VyOS
✓	*set service https certificates system-generated-cert lifetime <days>*	https.xml.in: service https certificates system-generated-certificate lifetime	service https certificates system-generated-certificate lifetime <value>
✓	*set service https virtual-host <vhost> listen-address <ipv4 or ipv6 address>*	https.xml.in: service https virtual-host <virtual-host> listen-address	service https virtual-host <text> listen-address <value>
✓	*set service https virtual-host <vhost> listen-port <1-65535>*	https.xml.in: service https virtual-host <virtual-host> listen-port	service https virtual-host <text> listen-port <value>
✓	*set service https virtual-host <vhost> server-name <text>*	https.xml.in: service https virtual-host <virtual-host> server-name	service https virtual-host <text> server-name <value>
×	not yet documented	https.xml.in: service https vrf	service https vrf <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	service-ids-ddos-protection.xml.in: service ids ddos-protection alert-script	service ids ddos-protection alert-script <value>
×	not yet documented	service-ids-ddos-protection.xml.in: service ids ddos-protection direction	service ids ddos-protection direction <value>
×	not yet documented	service-ids-ddos-protection.xml.in: service ids ddos-protection listen-interface	service ids ddos-protection listen-interface <value>
×	not yet documented	service-ids-ddos-protection.xml.in: service ids ddos-protection mode mirror	service ids ddos-protection mode mirror
×	not yet documented	service-ids-ddos-protection.xml.in: service ids ddos-protection network	service ids ddos-protection network <value>
×	not yet documented	service-ids-ddos-protection.xml.in: service ids ddos-protection threshold fps	service ids ddos-protection threshold fps <value>
×	not yet documented	service-ids-ddos-protection.xml.in: service ids ddos-protection threshold mbps	service ids ddos-protection threshold mbps <value>
×	not yet documented	service-ids-ddos-protection.xml.in: service ids ddos-protection threshold pps	service ids ddos-protection threshold pps <value>
×	not yet documented	service_ipoe-server.xml.in: service ipoe-server authentication interface <interface> mac-address <mac-address> rate-limit download	service ipoe-server authentication interface <text> mac-address <text> rate-limit download <value>
×	not yet documented	service_ipoe-server.xml.in: service ipoe-server authentication interface <interface> mac-address <mac-address> rate-limit upload	service ipoe-server authentication interface <text> mac-address <text> rate-limit upload <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	service_ipoe-server.xml.in: service ipoe-server authentication interface <interface> mac-address <mac-address> vlan-id	service ipoe-server authentication interface <text> mac-address <text> vlan-id <value>
×	not yet documented	service_ipoe-server.xml.in: service ipoe-server authentication mode	service ipoe-server authentication mode <value>
×	not yet documented	service_ipoe-server.xml.in: service ipoe-server authentication radius accounting-interim-interval	Nothing found in VyOS
×	not yet documented	service_ipoe-server.xml.in: service ipoe-server authentication radius acct-interim-jitter	service ipoe-server authentication radius acct-interim-jitter <value>
×	not yet documented	service_ipoe-server.xml.in: service ipoe-server authentication radius acct-timeout	service ipoe-server authentication radius acct-timeout <value>
×	not yet documented	service_ipoe-server.xml.in: service ipoe-server authentication radius dynamic-author key	service ipoe-server authentication radius dynamic-author key <value>
×	not yet documented	service_ipoe-server.xml.in: service ipoe-server authentication radius dynamic-author port	service ipoe-server authentication radius dynamic-author port <value>
×	not yet documented	service_ipoe-server.xml.in: service ipoe-server authentication radius dynamic-author server	service ipoe-server authentication radius dynamic-author server <value>
×	not yet documented	service_ipoe-server.xml.in: service ipoe-server authentication radius max-try	service ipoe-server authentication radius max-try <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	service_ipoe-server.xml.in: service ipoe-server authentication radius nas-identifier	service ipoe-server authentication radius nas-identifier <value>
×	not yet documented	service_ipoe-server.xml.in: service ipoe-server authentication radius nas-ip-address	service ipoe-server authentication radius nas-ip-address <value>
×	not yet documented	service_ipoe-server.xml.in: service ipoe-server authentication radius preallocate-vif	service ipoe-server authentication radius preallocate-vif
×	not yet documented	service_ipoe-server.xml.in: service ipoe-server authentication radius rate-limit attribute	service ipoe-server authentication radius rate-limit attribute <value>
×	not yet documented	service_ipoe-server.xml.in: service ipoe-server authentication radius rate-limit enable	service ipoe-server authentication radius rate-limit enable
×	not yet documented	service_ipoe-server.xml.in: service ipoe-server authentication radius rate-limit multiplier	service ipoe-server authentication radius rate-limit multiplier <value>
×	not yet documented	service_ipoe-server.xml.in: service ipoe-server authentication radius rate-limit vendor	service ipoe-server authentication radius rate-limit vendor <value>
×	not yet documented	service_ipoe-server.xml.in: service ipoe-server authentication radius server <server> acct-port	service ipoe-server authentication radius server <text> acct-port <value>
×	not yet documented	service_ipoe-server.xml.in: service ipoe-server authentication radius server <server> disable	service ipoe-server authentication radius server <text> disable

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	service_ipoe-server.xml.in: service ipoe-server authentication radius server <server> disable-accounting	service ipoe-server authentication radius server <text> disable-accounting
×	not yet documented	service_ipoe-server.xml.in: service ipoe-server authentication radius server <server> fail-time	service ipoe-server authentication radius server <text> fail-time <value>
×	not yet documented	service_ipoe-server.xml.in: service ipoe-server authentication radius server <server> key	service ipoe-server authentication radius server <text> key <value>
×	not yet documented	service_ipoe-server.xml.in: service ipoe-server authentication radius server <server> port	service ipoe-server authentication radius server <text> port <value>
×	not yet documented	service_ipoe-server.xml.in: service ipoe-server authentication radius source-address	service ipoe-server authentication radius source-address <value>
×	not yet documented	service_ipoe-server.xml.in: service ipoe-server authentication radius timeout	service ipoe-server authentication radius timeout <value>
×	not yet documented	service_ipoe-server.xml.in: service ipoe-server client-ip-pool name <name> gateway-address	service ipoe-server client-ip-pool name <text> gateway-address <value>
×	not yet documented	service_ipoe-server.xml.in: service ipoe-server client-ip-pool name <name> subnet	service ipoe-server client-ip-pool name <text> subnet <value>
×	not yet documented	service_ipoe-server.xml.in: service ipoe-server client-ipv6-pool delegate <delegate> delegation-prefix	service ipoe-server client-ipv6-pool delegate <text> delegation-prefix <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	service_ipoe-server.xml.in: service ipoe-server client-ipv6-pool prefix <prefix> mask	service ipoe-server client-ipv6-pool prefix <text> mask <value>
×	not yet documented	service_ipoe-server.xml.in: service ipoe-server gateway-address	Nothing found in VyOS
×	not yet documented	service_ipoe-server.xml.in: service ipoe-server interface <interface> client-subnet	service ipoe-server interface <text> client-subnet <value>
×	not yet documented	service_ipoe-server.xml.in: service ipoe-server interface <interface> external-dhcp dhcp-relay	service ipoe-server interface <text> external-dhcp dhcp-relay <value>
×	not yet documented	service_ipoe-server.xml.in: service ipoe-server interface <interface> external-dhcp giaddr	service ipoe-server interface <text> external-dhcp giaddr <value>
×	not yet documented	service_ipoe-server.xml.in: service ipoe-server interface <interface> network	service ipoe-server interface <text> network <value>
×	not yet documented	service_ipoe-server.xml.in: service ipoe-server interface <interface> network-mode	service ipoe-server interface <text> network-mode <value>
×	not yet documented	service_ipoe-server.xml.in: service ipoe-server interface <interface> vlan-id	service ipoe-server interface <text> vlan-id <value>
×	not yet documented	service_ipoe-server.xml.in: service ipoe-server interface <interface> vlan-range	service ipoe-server interface <text> vlan-range <value>
×	not yet documented	service_ipoe-server.xml.in: service ipoe-server name-server	service ipoe-server name-server <value>
×	*set service lldp*	Nothing found in XML Definitions	Nothing found in VyOS

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	***set service lldp interface <interface>***	Nothing found in XML Definitions	Nothing found in VyOS
✓	***set service lldp interface <interface> disable***	lldp.xml.in: service lldp interface <interface> disable	service lldp interface <text> disable
×	not yet documented	lldp.xml.in: service lldp interface <interface> location coordinate-based altitude	service lldp interface <text> location coordinate-based altitude <value>
×	not yet documented	lldp.xml.in: service lldp interface <interface> location coordinate-based datum	service lldp interface <text> location coordinate-based datum <value>
×	not yet documented	lldp.xml.in: service lldp interface <interface> location coordinate-based latitude	service lldp interface <text> location coordinate-based latitude <value>
×	not yet documented	lldp.xml.in: service lldp interface <interface> location coordinate-based longitude	service lldp interface <text> location coordinate-based longitude <value>
×	not yet documented	lldp.xml.in: service lldp interface <interface> location elin	service lldp interface <text> location elin <value>
×	***set service lldp legacy-protocols <cdp|edp|fdp|sonmp>***	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	lldp.xml.in: service lldp legacy-protocols cdp	service lldp legacy-protocols cdp
×	not yet documented	lldp.xml.in: service lldp legacy-protocols edp	service lldp legacy-protocols edp
×	not yet documented	lldp.xml.in: service lldp legacy-protocols fdp	service lldp legacy-protocols fdp
×	not yet documented	lldp.xml.in: service lldp legacy-protocols sonmp	service lldp legacy-protocols sonmp
✓	***set service lldp management-address <address>***	lldp.xml.in: service lldp management-address	service lldp management-address <value>
✓	***set service lldp snmp enable***	lldp.xml.in: service lldp snmp enable	service lldp snmp enable
✓	***set service mdns repeater disable***	service_mdns-repeater.xml.in: service mdns repeater disable	service mdns repeater disable

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	***set service mdns repeater interface <interface>***	service_mdns-repeater.xml.in: service mdns repeater interface	service mdns repeater interface <value>
×	not yet documented	service_monitoring_telegraf.xi service monitoring telegraf authentication organization	service monitoring telegraf authentication organization <value>
×	not yet documented	service_monitoring_telegraf.xi service monitoring telegraf authentication token	service monitoring telegraf authentication token <value>
×	not yet documented	service_monitoring_telegraf.xi service monitoring telegraf bucket	service monitoring telegraf bucket <value>
×	not yet documented	service_monitoring_telegraf.xi service monitoring telegraf port	service monitoring telegraf port <value>
×	not yet documented	service_monitoring_telegraf.xi service monitoring telegraf prometheus-client allow-from	service monitoring telegraf prometheus-client allow-from <value>
×	not yet documented	service_monitoring_telegraf.xi service monitoring telegraf prometheus-client authentication password	service monitoring telegraf prometheus-client authentication password <value>
×	not yet documented	service_monitoring_telegraf.xi service monitoring telegraf prometheus-client authentication username	service monitoring telegraf prometheus-client authentication username <value>
×	not yet documented	service_monitoring_telegraf.xi service monitoring telegraf prometheus-client listen-address	service monitoring telegraf prometheus-client listen-address <value>
×	not yet documented	service_monitoring_telegraf.xi service monitoring telegraf prometheus-client metric-version	service monitoring telegraf prometheus-client metric-version <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	service_monitoring_telegraf.xml.in: service monitoring telegraf prometheus-client port	service monitoring telegraf prometheus-client port <value>
×	not yet documented	service_monitoring_telegraf.xml.in: service monitoring telegraf source	service monitoring telegraf source <value>
×	not yet documented	service_monitoring_telegraf.xml.in: service monitoring telegraf url	service monitoring telegraf url <value>
✓	*set service pppoe-server access-concentrator <name>*	service_pppoe-server.xml.in: service pppoe-server access-concentrator	service pppoe-server access-concentrator <value>
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server authentication local-users username <username> disable	service pppoe-server authentication local-users username <text> disable
✓	*set service pppoe-server authentication local-users username <name> password <password>*	service_pppoe-server.xml.in: service pppoe-server authentication local-users username <username> password	service pppoe-server authentication local-users username <text> password <value>
×	*set service pppoe-server authentication local-users username <name> rate-limit <download | upload>*	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server authentication local-users username <username> rate-limit download	service pppoe-server authentication local-users username <text> rate-limit download <value>
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server authentication local-users username <username> rate-limit upload	service pppoe-server authentication local-users username <text> rate-limit upload <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server authentication local-users username <username> static-ip	service pppoe-server authentication local-users username <text> static-ip <value>
✓	***set service pppoe-server authentication mode <local | radius>***	service_pppoe-server.xml.in: service pppoe-server authentication mode	service pppoe-server authentication mode <value>
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server authentication protocols	service pppoe-server authentication protocols <value>
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server authentication radius accounting-interim-interval	Nothing found in VyOS
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server authentication radius acct-interim-jitter	service pppoe-server authentication radius acct-interim-jitter <value>
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server authentication radius acct-timeout	service pppoe-server authentication radius acct-timeout <value>
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server authentication radius called-sid-format	service pppoe-server authentication radius called-sid-format <value>
×	***set service pppoe-server authentication radius dynamic-author <key | port | server>***	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server authentication radius dynamic-author key	service pppoe-server authentication radius dynamic-author key <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server authentication radius dynamic-author port	service pppoe-server authentication radius dynamic-author port <value>
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server authentication radius dynamic-author server	service pppoe-server authentication radius dynamic-author server <value>
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server authentication radius max-try	service pppoe-server authentication radius max-try <value>
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server authentication radius nas-identifier	service pppoe-server authentication radius nas-identifier <value>
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server authentication radius nas-ip-address	service pppoe-server authentication radius nas-ip-address <value>
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server authentication radius preallocate-vif	service pppoe-server authentication radius preallocate-vif
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server authentication radius rate-limit attribute	service pppoe-server authentication radius rate-limit attribute <value>
✓	*set service pppoe-server authentication radius rate-limit enable*	service_pppoe-server.xml.in: service pppoe-server authentication radius rate-limit enable	service pppoe-server authentication radius rate-limit enable
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server authentication radius rate-limit multiplier	service pppoe-server authentication radius rate-limit multiplier <value>
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server authentication radius rate-limit vendor	service pppoe-server authentication radius rate-limit vendor <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server authentication radius server <server> acct-port	service pppoe-server authentication radius server <text> acct-port <value>
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server authentication radius server <server> disable	service pppoe-server authentication radius server <text> disable
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server authentication radius server <server> disable-accounting	service pppoe-server authentication radius server <text> disable-accounting
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server authentication radius server <server> fail-time	service pppoe-server authentication radius server <text> fail-time <value>
✓	*set service pppoe-server authentication radius server <address> key <secret>*	service_pppoe-server.xml.in: service pppoe-server authentication radius server <server> key	service pppoe-server authentication radius server <text> key <value>
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server authentication radius server <server> port	service pppoe-server authentication radius server <text> port <value>
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server authentication radius source-address	service pppoe-server authentication radius source-address <value>
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server authentication radius timeout	service pppoe-server authentication radius timeout <value>
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server client-ip-pool name <name> gateway-address	service pppoe-server client-ip-pool name <text> gateway-address <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server client-ip-pool name <name> subnet	service pppoe-server client-ip-pool name <text> subnet <value>
✓	***set service pppoe-server client-ip-pool start <address>***	service_pppoe-server.xml.in: service pppoe-server client-ip-pool start	service pppoe-server client-ip-pool start <value>
✓	***set service pppoe-server client-ip-pool stop <address>***	service_pppoe-server.xml.in: service pppoe-server client-ip-pool stop	service pppoe-server client-ip-pool stop <value>
✓	***set service pppoe-server client-ip-pool subnet <address>***	service_pppoe-server.xml.in: service pppoe-server client-ip-pool subnet	service pppoe-server client-ip-pool subnet <value>
✓	***set service pppoe-server client-ipv6-pool delegate <address> delegation-prefix <number-of-bits>***	service_pppoe-server.xml.in: service pppoe-server client-ipv6-pool delegate <delegate> delegation-prefix	service pppoe-server client-ipv6-pool delegate <text> delegation-prefix <value>
✓	***set service pppoe-server client-ipv6-pool prefix <address> mask <number-of-bits>***	service_pppoe-server.xml.in: service pppoe-server client-ipv6-pool prefix <prefix> mask	service pppoe-server client-ipv6-pool prefix <text> mask <value>
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server extended-scripts on-change	Nothing found in VyOS
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server extended-scripts on-down	Nothing found in VyOS
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server extended-scripts on-pre-up	Nothing found in VyOS
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server extended-scripts on-up	Nothing found in VyOS

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	***set service pppoe-server gateway-address <address>***	service_pppoe-server.xml.in: service pppoe-server gateway-address	service pppoe-server gateway-address <value>
×	***set service pppoe-server interface <interface> <vlan-id | vlan range> <text>***	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server interface <interface> vlan-id	service pppoe-server interface <text> vlan-id <value>
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server interface <interface> vlan-range	service pppoe-server interface <text> vlan-range <value>
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server limits burst	service pppoe-server limits burst <value>
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server limits connection-limit	service pppoe-server limits connection-limit <value>
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server limits timeout	service pppoe-server limits timeout <value>
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server mtu	service pppoe-server mtu <value>
✓	***set service pppoe-server name-server <address>***	service_pppoe-server.xml.in: service pppoe-server name-server	service pppoe-server name-server <value>
✓	***set service pppoe-server pado-delay <number-of-ms> sessions <number-of-sessions>***	service_pppoe-server.xml.in: service pppoe-server pado-delay <pado-delay> sessions	service pppoe-server pado-delay <text> sessions <value>
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server ppp-options ccp	service pppoe-server ppp-options ccp

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server ppp-options interface-cache	service pppoe-server ppp-options interface-cache <value>
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server ppp-options ipv4	service pppoe-server ppp-options ipv4 <value>
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server ppp-options ipv6	service pppoe-server ppp-options ipv6 <value>
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server ppp-options ipv6-accept-peer-intf-id	service pppoe-server ppp-options ipv6-accept-peer-intf-id
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server ppp-options ipv6-intf-id	service pppoe-server ppp-options ipv6-intf-id <value>
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server ppp-options ipv6-peer-intf-id	service pppoe-server ppp-options ipv6-peer-intf-id <value>
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server ppp-options lcp-echo-failure	service pppoe-server ppp-options lcp-echo-failure <value>
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server ppp-options lcp-echo-interval	service pppoe-server ppp-options lcp-echo-interval <value>
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server ppp-options lcp-echo-timeout	service pppoe-server ppp-options lcp-echo-timeout <value>
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server ppp-options min-mtu	service pppoe-server ppp-options min-mtu <value>
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server ppp-options mppe	service pppoe-server ppp-options mppe <value>
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server ppp-options mru	service pppoe-server ppp-options mru <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server service-name	service pppoe-server service-name <value>
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server session-control	service pppoe-server session-control <value>
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server shaper fwmark	service pppoe-server shaper fwmark <value>
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server snmp master-agent	service pppoe-server snmp master-agent
×	not yet documented	service_pppoe-server.xml.in: service pppoe-server wins-server	service pppoe-server wins-server <value>
×	*set service router-advert interface <interface> ....*	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	service_router-advert.xml.in: service router-advert interface <interface> default-lifetime	service router-advert interface <text> default-lifetime <value>
×	not yet documented	service_router-advert.xml.in: service router-advert interface <interface> default-preference	service router-advert interface <text> default-preference <value>
×	not yet documented	service_router-advert.xml.in: service router-advert interface <interface> dnssl	service router-advert interface <text> dnssl <value>
×	not yet documented	service_router-advert.xml.in: service router-advert interface <interface> hop-limit	service router-advert interface <text> hop-limit <value>
×	not yet documented	service_router-advert.xml.in: service router-advert interface <interface> interval max	service router-advert interface <text> interval max <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	service_router-advert.xml.in: service router-advert interface <interface> interval min	service router-advert interface <text> interval min <value>
×	not yet documented	service_router-advert.xml.in: service router-advert interface <interface> link-mtu	service router-advert interface <text> link-mtu <value>
×	not yet documented	service_router-advert.xml.in: service router-advert interface <interface> managed-flag	service router-advert interface <text> managed-flag
×	not yet documented	service_router-advert.xml.in: service router-advert interface <interface> name-server	service router-advert interface <text> name-server <value>
✓	*set service router-advert interface <interface> no-send-advert*	service_router-advert.xml.in: service router-advert interface <interface> no-send-advert	service router-advert interface <text> no-send-advert
×	not yet documented	service_router-advert.xml.in: service router-advert interface <interface> other-config-flag	service router-advert interface <text> other-config-flag
×	*set service router-advert interface <interface> prefix 2001:DB8::/32*	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	service_router-advert.xml.in: service router-advert interface <interface> prefix <prefix> no-autonomous-flag	service router-advert interface <text> prefix <text> no-autonomous-flag
×	not yet documented	service_router-advert.xml.in: service router-advert interface <interface> prefix <prefix> no-on-link-flag	service router-advert interface <text> prefix <text> no-on-link-flag

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	service_router-advert.xml.in: service router-advert interface <interface> prefix <prefix> preferred-lifetime	service router-advert interface <text> prefix <text> preferred-lifetime <value>
×	not yet documented	service_router-advert.xml.in: service router-advert interface <interface> prefix <prefix> valid-lifetime	service router-advert interface <text> prefix <text> valid-lifetime <value>
×	not yet documented	service_router-advert.xml.in: service router-advert interface <interface> reachable-time	service router-advert interface <text> reachable-time <value>
×	not yet documented	service_router-advert.xml.in: service router-advert interface <interface> retrans-timer	service router-advert interface <text> retrans-timer <value>
×	not yet documented	service_router-advert.xml.in: service router-advert interface <interface> route <route> no-remove-route	service router-advert interface <text> route <text> no-remove-route
×	not yet documented	service_router-advert.xml.in: service router-advert interface <interface> route <route> route-preference	service router-advert interface <text> route <text> route-preference <value>
×	not yet documented	service_router-advert.xml.in: service router-advert interface <interface> route <route> valid-lifetime	service router-advert interface <text> route <text> valid-lifetime <value>
×	not yet documented	service_router-advert.xml.in: service router-advert interface <interface> source-address	service router-advert interface <text> source-address <value>
✓	*set service salt-minion hash <type>*	salt-minion.xml.in: service salt-minion hash	service salt-minion hash <value>
✓	*set service salt-minion id <id>*	salt-minion.xml.in: service salt-minion id	service salt-minion id <value>
✓	*set service salt-minion interval <1-1440>*	salt-minion.xml.in: service salt-minion interval	service salt-minion interval <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set service salt-minion master <hostname | IP>*	salt-minion.xml.in: service salt-minion master	service salt-minion master <value>
✓	*set service salt-minion master-key <key>*	salt-minion.xml.in: service salt-minion master-key	service salt-minion master-key <value>
×	not yet documented	snmp.xml.in: service snmp community <community> authorization	service snmp community <text> authorization <value>
×	not yet documented	snmp.xml.in: service snmp community <community> client	service snmp community <text> client <value>
×	not yet documented	snmp.xml.in: service snmp community <community> network	service snmp community <text> network <value>
×	not yet documented	snmp.xml.in: service snmp contact	service snmp contact <value>
×	not yet documented	snmp.xml.in: service snmp description	service snmp description <value>
×	not yet documented	snmp.xml.in: service snmp listen-address <listen-address> port	service snmp listen-address <text> port <value>
×	not yet documented	snmp.xml.in: service snmp location	service snmp location <value>
×	not yet documented	snmp.xml.in: service snmp protocol	service snmp protocol <value>
×	not yet documented	snmp.xml.in: service snmp script-extensions extension-name <extension-name> script	service snmp script-extensions extension-name <text> script <value>
×	not yet documented	snmp.xml.in: service snmp smux-peer	service snmp smux-peer <value>
×	not yet documented	snmp.xml.in: service snmp trap-source	service snmp trap-source <value>
×	not yet documented	snmp.xml.in: service snmp trap-target <trap-target> community	service snmp trap-target <text> community <value>
×	not yet documented	snmp.xml.in: service snmp trap-target <trap-target> port	service snmp trap-target <text> port <value>
×	not yet documented	snmp.xml.in: service snmp v3 engineid	service snmp v3 engineid <value>
×	not yet documented	snmp.xml.in: service snmp v3 group <group> mode	service snmp v3 group <text> mode <value>

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	snmp.xml.in: service snmp v3 group <group> seclevel	service snmp v3 group <text> seclevel <value>
×	not yet documented	snmp.xml.in: service snmp v3 group <group> view	service snmp v3 group <text> view <value>
×	not yet documented	snmp.xml.in: service snmp v3 trap-target <trap-target> auth encrypted-password	service snmp v3 trap-target <text> auth encrypted-password <value>
×	not yet documented	snmp.xml.in: service snmp v3 trap-target <trap-target> auth plaintext-password	service snmp v3 trap-target <text> auth plaintext-password <value>
×	not yet documented	snmp.xml.in: service snmp v3 trap-target <trap-target> auth type	service snmp v3 trap-target <text> auth type <value>
×	not yet documented	snmp.xml.in: service snmp v3 trap-target <trap-target> port	service snmp v3 trap-target <text> port <value>
×	not yet documented	snmp.xml.in: service snmp v3 trap-target <trap-target> privacy encrypted-password	service snmp v3 trap-target <text> privacy encrypted-password <value>
×	not yet documented	snmp.xml.in: service snmp v3 trap-target <trap-target> privacy plaintext-password	service snmp v3 trap-target <text> privacy plaintext-password <value>
×	not yet documented	snmp.xml.in: service snmp v3 trap-target <trap-target> privacy type	service snmp v3 trap-target <text> privacy type <value>
×	not yet documented	snmp.xml.in: service snmp v3 trap-target <trap-target> protocol	service snmp v3 trap-target <text> protocol <value>
×	not yet documented	snmp.xml.in: service snmp v3 trap-target <trap-target> type	service snmp v3 trap-target <text> type <value>
×	not yet documented	snmp.xml.in: service snmp v3 trap-target <trap-target> user	service snmp v3 trap-target <text> user <value>
×	not yet documented	snmp.xml.in: service snmp v3 user <user> auth encrypted-password	service snmp v3 user <text> auth encrypted-password <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	snmp.xml.in: service snmp v3 user <user> auth plaintext-password	service snmp v3 user <text> auth plaintext-password <value>
×	not yet documented	snmp.xml.in: service snmp v3 user <user> auth type	service snmp v3 user <text> auth type <value>
×	not yet documented	snmp.xml.in: service snmp v3 user <user> group	service snmp v3 user <text> group <value>
×	not yet documented	snmp.xml.in: service snmp v3 user <user> mode	service snmp v3 user <text> mode <value>
×	not yet documented	snmp.xml.in: service snmp v3 user <user> privacy encrypted-password	service snmp v3 user <text> privacy encrypted-password <value>
×	not yet documented	snmp.xml.in: service snmp v3 user <user> privacy plaintext-password	service snmp v3 user <text> privacy plaintext-password <value>
×	not yet documented	snmp.xml.in: service snmp v3 user <user> privacy type	service snmp v3 user <text> privacy type <value>
×	not yet documented	snmp.xml.in: service snmp v3 view <view> oid <oid> exclude	service snmp v3 view <text> oid <text> exclude <value>
×	not yet documented	snmp.xml.in: service snmp v3 view <view> oid <oid> mask	service snmp v3 view <text> oid <text> mask <value>
×	not yet documented	snmp.xml.in: service snmp vrf	service snmp vrf <value>
×	***set service ssh access-control <allow | deny> <group | user> <name>***	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	ssh.xml.in: service ssh access-control allow group	service ssh access-control allow group <value>
×	not yet documented	ssh.xml.in: service ssh access-control allow user	service ssh access-control allow user <value>
×	not yet documented	ssh.xml.in: service ssh access-control deny group	service ssh access-control deny group <value>
×	not yet documented	ssh.xml.in: service ssh access-control deny user	service ssh access-control deny user <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	***set service ssh ciphers <cipher>***	ssh.xml.in: service ssh ciphers	service ssh ciphers <value>
✓	***set service ssh client-keepalive-inte <interval>***	ssh.xml.in: service ssh client-keepalive-interval	service ssh client-keepalive-interval <value>
✓	***set service ssh disable-host-validati***	ssh.xml.in: service ssh disable-host-validation	service ssh disable-host-validation
✓	***set service ssh disable-password-auth***	ssh.xml.in: service ssh disable-password-authentication	service ssh disable-password-authentication
×	not yet documented	ssh.xml.in: service ssh dynamic-protection allow-from	Nothing found in VyOS
×	not yet documented	ssh.xml.in: service ssh dynamic-protection block-time	Nothing found in VyOS
×	not yet documented	ssh.xml.in: service ssh dynamic-protection detect-time	Nothing found in VyOS
×	not yet documented	ssh.xml.in: service ssh dynamic-protection threshold	Nothing found in VyOS
✓	***set service ssh key-exchange <kex>***	ssh.xml.in: service ssh key-exchange	service ssh key-exchange <value>
✓	***set service ssh listen-address <address>***	ssh.xml.in: service ssh listen-address	service ssh listen-address <value>
✓	***set service ssh loglevel <quiet | fatal | error | info | verbose>***	ssh.xml.in: service ssh loglevel	service ssh loglevel <value>
×	not yet documented	ssh.xml.in: service ssh mac	service ssh mac <value>
×	***set service ssh macs <mac>***	Nothing found in XML Definitions	Nothing found in VyOS
✓	***set service ssh port <port>***	ssh.xml.in: service ssh port	service ssh port <value>
✓	***set service ssh vrf <name>***	ssh.xml.in: service ssh vrf	service ssh vrf <value>
✓	***set service tftp-server allow-upload***	tftp-server.xml.in: service tftp-server allow-upload	service tftp-server allow-upload
✓	***set service tftp-server directory <directory>***	tftp-server.xml.in: service tftp-server directory	service tftp-server directory <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	*set service tftp-server listen-address <address>*	Nothing found in XML Definitions	Nothing found in VyOS
✓	*set service tftp-server listen-address <address> vrf <name>*	tftp-server.xml.in: service tftp-server listen-address <listen-address> vrf	service tftp-server listen-address <text> vrf <value>
×	not yet documented	tftp-server.xml.in: service tftp-server port	service tftp-server port <value>
✓	*set service webproxy append-domain <domain>*	service_webproxy.xml.in: service webproxy append-domain	service webproxy append-domain <value>
✓	*set service webproxy authentication children <number>*	service_webproxy.xml.in: service webproxy authentication children	service webproxy authentication children <value>
✓	*set service webproxy authentication credentials-ttl <time>*	service_webproxy.xml.in: service webproxy authentication credentials-ttl	service webproxy authentication credentials-ttl <value>
✓	*set service webproxy authentication ldap base-dn <base-dn>*	service_webproxy.xml.in: service webproxy authentication ldap base-dn	service webproxy authentication ldap base-dn <value>
✓	*set service webproxy authentication ldap bind-dn <bind-dn>*	service_webproxy.xml.in: service webproxy authentication ldap bind-dn	service webproxy authentication ldap bind-dn <value>
✓	*set service webproxy authentication ldap filter-expression <expr>*	service_webproxy.xml.in: service webproxy authentication ldap filter-expression	service webproxy authentication ldap filter-expression <value>
✓	*set service webproxy authentication ldap password <password>*	service_webproxy.xml.in: service webproxy authentication ldap password	service webproxy authentication ldap password <value>
✓	*set service webproxy authentication ldap persistent-connection*	service_webproxy.xml.in: service webproxy authentication ldap persistent-connection	service webproxy authentication ldap persistent-connection
✓	*set service webproxy authentication ldap port <port>*	service_webproxy.xml.in: service webproxy authentication ldap port	service webproxy authentication ldap port <value>
✓	*set service webproxy authentication ldap server <server>*	service_webproxy.xml.in: service webproxy authentication ldap server	service webproxy authentication ldap server <value>
✓	*set service webproxy authentication ldap use-ssl*	service_webproxy.xml.in: service webproxy authentication ldap use-ssl	service webproxy authentication ldap use-ssl

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set service webproxy authentication ldap username-attribute <attr>*	service_webproxy.xml.in: service webproxy authentication ldap username-attribute	service webproxy authentication ldap username-attribute <value>
✓	*set service webproxy authentication ldap version <2 | 3>*	service_webproxy.xml.in: service webproxy authentication ldap version	service webproxy authentication ldap version <value>
✓	*set service webproxy authentication method <ldap>*	service_webproxy.xml.in: service webproxy authentication method	service webproxy authentication method <value>
✓	*set service webproxy authentication realm*	service_webproxy.xml.in: service webproxy authentication realm	service webproxy authentication realm <value>
×	not yet documented	service_webproxy.xml.in: service webproxy cache-peer <cache-peer> address	service webproxy cache-peer <text> address <value>
×	not yet documented	service_webproxy.xml.in: service webproxy cache-peer <cache-peer> http-port	service webproxy cache-peer <text> http-port <value>
×	not yet documented	service_webproxy.xml.in: service webproxy cache-peer <cache-peer> icp-port	service webproxy cache-peer <text> icp-port <value>
×	not yet documented	service_webproxy.xml.in: service webproxy cache-peer <cache-peer> options	service webproxy cache-peer <text> options <value>
×	not yet documented	service_webproxy.xml.in: service webproxy cache-peer <cache-peer> type	service webproxy cache-peer <text> type <value>
✓	*set service webproxy cache-size <size>*	service_webproxy.xml.in: service webproxy cache-size	service webproxy cache-size <value>
✓	*set service webproxy default-port <port>*	service_webproxy.xml.in: service webproxy default-port	service webproxy default-port <value>
×	not yet documented	service_webproxy.xml.in: service webproxy disable-access-log	service webproxy disable-access-log
✓	*set service webproxy domain-block <domain>*	service_webproxy.xml.in: service webproxy domain-block	service webproxy domain-block <value>
✓	*set service webproxy domain-noncache <domain>*	service_webproxy.xml.in: service webproxy domain-noncache	service webproxy domain-noncache <value>
×	*set service webproxy listen-address <address>*	Nothing found in XML Definitions	Nothing found in VyOS

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set service webproxy listen-address <address> disable-transparent*	service_webproxy.xml.in: service webproxy listen-address <listen-address> disable-transparent	service webproxy listen-address <text> disable-transparent
✓	*set service webproxy listen-address <address> port <port>*	service_webproxy.xml.in: service webproxy listen-address <listen-address> port	service webproxy listen-address <text> port <value>
×	not yet documented	service_webproxy.xml.in: service webproxy maximum-object-size	service webproxy maximum-object-size <value>
×	not yet documented	service_webproxy.xml.in: service webproxy mem-cache-size	service webproxy mem-cache-size <value>
×	not yet documented	service_webproxy.xml.in: service webproxy minimum-object-size	service webproxy minimum-object-size <value>
×	not yet documented	service_webproxy.xml.in: service webproxy outgoing-address	service webproxy outgoing-address <value>
✓	*set service webproxy reply-block-mime <mime>*	service_webproxy.xml.in: service webproxy reply-block-mime	service webproxy reply-block-mime <value>
✓	*set service webproxy reply-body-max-size <size>*	service_webproxy.xml.in: service webproxy reply-body-max-size	service webproxy reply-body-max-size <value>
✓	*set service webproxy url-filtering disable*	service_webproxy.xml.in: service webproxy url-filtering disable	service webproxy url-filtering disable
×	not yet documented	service_webproxy.xml.in: service webproxy url-filtering squidguard allow-category	service webproxy url-filtering squidguard allow-category <value>
×	not yet documented	service_webproxy.xml.in: service webproxy url-filtering squidguard allow-ipaddr-url	service webproxy url-filtering squidguard allow-ipaddr-url
×	not yet documented	service_webproxy.xml.in: service webproxy url-filtering squidguard auto-update update-hour	service webproxy url-filtering squidguard auto-update update-hour <value>
×	not yet documented	service_webproxy.xml.in: service webproxy url-filtering squidguard block-category	service webproxy url-filtering squidguard block-category <value>
×	not yet documented	service_webproxy.xml.in: service webproxy url-filtering squidguard default-action	service webproxy url-filtering squidguard default-action <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	service_webproxy.xml.in: service webproxy url-filtering squidguard enable-safe-search	service webproxy url-filtering squidguard enable-safe-search
×	not yet documented	service_webproxy.xml.in: service webproxy url-filtering squidguard local-block	service webproxy url-filtering squidguard local-block <value>
×	not yet documented	service_webproxy.xml.in: service webproxy url-filtering squidguard local-block-keyword	service webproxy url-filtering squidguard local-block-keyword <value>
×	not yet documented	service_webproxy.xml.in: service webproxy url-filtering squidguard local-block-url	service webproxy url-filtering squidguard local-block-url <value>
×	not yet documented	service_webproxy.xml.in: service webproxy url-filtering squidguard local-ok	service webproxy url-filtering squidguard local-ok <value>
×	not yet documented	service_webproxy.xml.in: service webproxy url-filtering squidguard local-ok-url	service webproxy url-filtering squidguard local-ok-url <value>
×	not yet documented	service_webproxy.xml.in: service webproxy url-filtering squidguard log	service webproxy url-filtering squidguard log <value>
×	not yet documented	service_webproxy.xml.in: service webproxy url-filtering squidguard redirect-url	service webproxy url-filtering squidguard redirect-url <value>
×	not yet documented	service_webproxy.xml.in: service webproxy url-filtering squidguard rule <rule> allow-category	service webproxy url-filtering squidguard rule <text> allow-category <value>
×	not yet documented	service_webproxy.xml.in: service webproxy url-filtering squidguard rule <rule> allow-ipaddr-url	service webproxy url-filtering squidguard rule <text> allow-ipaddr-url
×	not yet documented	service_webproxy.xml.in: service webproxy url-filtering squidguard rule <rule> block-category	service webproxy url-filtering squidguard rule <text> block-category <value>
×	not yet documented	service_webproxy.xml.in: service webproxy url-filtering squidguard rule <rule> default-action	service webproxy url-filtering squidguard rule <text> default-action <value>

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	service_webproxy.xml.in: service webproxy url-filtering squidguard rule <rule> enable-safe-search	service webproxy url-filtering squidguard rule <text> enable-safe-search
×	not yet documented	service_webproxy.xml.in: service webproxy url-filtering squidguard rule <rule> local-block	service webproxy url-filtering squidguard rule <text> local-block <value>
×	not yet documented	service_webproxy.xml.in: service webproxy url-filtering squidguard rule <rule> local-block-keyword	service webproxy url-filtering squidguard rule <text> local-block-keyword <value>
×	not yet documented	service_webproxy.xml.in: service webproxy url-filtering squidguard rule <rule> local-block-url	service webproxy url-filtering squidguard rule <text> local-block-url <value>
×	not yet documented	service_webproxy.xml.in: service webproxy url-filtering squidguard rule <rule> local-ok	service webproxy url-filtering squidguard rule <text> local-ok <value>
×	not yet documented	service_webproxy.xml.in: service webproxy url-filtering squidguard rule <rule> local-ok-url	service webproxy url-filtering squidguard rule <text> local-ok-url <value>
×	not yet documented	service_webproxy.xml.in: service webproxy url-filtering squidguard rule <rule> log	service webproxy url-filtering squidguard rule <text> log <value>
×	not yet documented	service_webproxy.xml.in: service webproxy url-filtering squidguard rule <rule> redirect-url	service webproxy url-filtering squidguard rule <text> redirect-url <value>
×	not yet documented	service_webproxy.xml.in: service webproxy url-filtering squidguard rule <rule> source-group	service webproxy url-filtering squidguard rule <text> source-group <value>
×	not yet documented	service_webproxy.xml.in: service webproxy url-filtering squidguard rule <rule> time-period	service webproxy url-filtering squidguard rule <text> time-period <value>
×	not yet documented	service_webproxy.xml.in: service webproxy url-filtering squidguard source-group <source-group> address	service webproxy url-filtering squidguard source-group <text> address <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	service_webproxy.xml.in: service webproxy url-filtering squidguard source-group <source-group> description	service webproxy url-filtering squidguard source-group <text> description <value>
×	not yet documented	service_webproxy.xml.in: service webproxy url-filtering squidguard source-group <source-group> domain	service webproxy url-filtering squidguard source-group <text> domain <value>
×	not yet documented	service_webproxy.xml.in: service webproxy url-filtering squidguard source-group <source-group> ldap-ip-search	service webproxy url-filtering squidguard source-group <text> ldap-ip-search <value>
×	not yet documented	service_webproxy.xml.in: service webproxy url-filtering squidguard source-group <source-group> ldap-user-search	service webproxy url-filtering squidguard source-group <text> ldap-user-search <value>
×	not yet documented	service_webproxy.xml.in: service webproxy url-filtering squidguard source-group <source-group> user	service webproxy url-filtering squidguard source-group <text> user <value>
×	not yet documented	service_webproxy.xml.in: service webproxy url-filtering squidguard time-period <time-period> days <days> time	service webproxy url-filtering squidguard time-period <text> days <text> time <value>
×	not yet documented	service_webproxy.xml.in: service webproxy url-filtering squidguard time-period <time-period> description	service webproxy url-filtering squidguard time-period <text> description <value>
×	*show*	Nothing found in XML Definitions	Nothing found in VyOS
✓	*set system acceleration qat*	intel_qat.xml.in: system acceleration qat	system acceleration qat
✓	*set system config-management commit-archive location <URI>*	Nothing found in XML Definitions	system config-management commit-archive location <value>
×	not yet documented	Nothing found in XML Definitions	system config-management commit-archive source-address <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set system config-management commit-revisions <N>*	Nothing found in XML Definitions	system config-management commit-revisions <value>
✓	*set system conntrack expect-table-size <1-50000000>*	system-conntrack.xml.in: system conntrack expect-table-size	system conntrack expect-table-size <value>
✓	*set system conntrack hash-size <1-50000000>*	system-conntrack.xml.in: system conntrack hash-size	system conntrack hash-size <value>
✓	*set system conntrack ignore rule <1-9999> description <text>*	Nothing found in XML Definitions	system conntrack ignore rule <text> description <value>
✓	*set system conntrack ignore rule <1-9999> destination address <ip-address>*	Nothing found in XML Definitions	system conntrack ignore rule <text> destination address <value>
✓	*set system conntrack ignore rule <1-9999> destination port <port>*	Nothing found in XML Definitions	system conntrack ignore rule <text> destination port <value>
✓	*set system conntrack ignore rule <1-9999> inbound-interface <interface>*	Nothing found in XML Definitions	system conntrack ignore rule <text> inbound-interface <value>
✓	*set system conntrack ignore rule <1-9999> protocol <protocol>*	Nothing found in XML Definitions	system conntrack ignore rule <text> protocol <value>
✓	*set system conntrack ignore rule <1-9999> source address <ip-address>*	Nothing found in XML Definitions	system conntrack ignore rule <text> source address <value>
✓	*set system conntrack ignore rule <1-9999> source port <port>*	Nothing found in XML Definitions	system conntrack ignore rule <text> source port <value>
✓	*set system conntrack log icmp destroy*	Nothing found in XML Definitions	system conntrack log icmp destroy
✓	*set system conntrack log icmp new*	Nothing found in XML Definitions	system conntrack log icmp new
✓	*set system conntrack log icmp update*	Nothing found in XML Definitions	system conntrack log icmp update
✓	*set system conntrack log other destroy*	Nothing found in XML Definitions	system conntrack log other destroy
✓	*set system conntrack log other new*	Nothing found in XML Definitions	system conntrack log other new
✓	*set system conntrack log other update*	Nothing found in XML Definitions	system conntrack log other update
✓	*set system conntrack log tcp destroy*	Nothing found in XML Definitions	system conntrack log tcp destroy

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set system conntrack log tcp new*	Nothing found in XML Definitions	system conntrack log tcp new
✓	*set system conntrack log tcp update close-wait*	Nothing found in XML Definitions	system conntrack log tcp update close-wait
✓	*set system conntrack log tcp update established*	Nothing found in XML Definitions	system conntrack log tcp update established
✓	*set system conntrack log tcp update fin-wait*	Nothing found in XML Definitions	system conntrack log tcp update fin-wait
✓	*set system conntrack log tcp update last-ack*	Nothing found in XML Definitions	system conntrack log tcp update last-ack
✓	*set system conntrack log tcp update syn-received*	Nothing found in XML Definitions	system conntrack log tcp update syn-received
✓	*set system conntrack log tcp update time-wait*	Nothing found in XML Definitions	system conntrack log tcp update time-wait
✓	*set system conntrack log udp destroy*	Nothing found in XML Definitions	system conntrack log udp destroy
✓	*set system conntrack log udp new*	Nothing found in XML Definitions	system conntrack log udp new
✓	*set system conntrack log udp update*	Nothing found in XML Definitions	system conntrack log udp update
✓	*set system conntrack modules ftp*	system-conntrack.xml.in: system conntrack modules ftp	system conntrack modules ftp
✓	*set system conntrack modules h323*	system-conntrack.xml.in: system conntrack modules h323	system conntrack modules h323
✓	*set system conntrack modules nfs*	system-conntrack.xml.in: system conntrack modules nfs	system conntrack modules nfs
✓	*set system conntrack modules pptp*	system-conntrack.xml.in: system conntrack modules pptp	system conntrack modules pptp
✓	*set system conntrack modules sip*	system-conntrack.xml.in: system conntrack modules sip	system conntrack modules sip
✓	*set system conntrack modules sqlnet*	system-conntrack.xml.in: system conntrack modules sqlnet	system conntrack modules sqlnet
✓	*set system conntrack modules tftp*	system-conntrack.xml.in: system conntrack modules tftp	system conntrack modules tftp
✓	*set system conntrack table-size <1-50000000>*	system-conntrack.xml.in: system conntrack table-size	system conntrack table-size <value>

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set system conntrack tcp half-open-connections <1-21474836>*	system-conntrack.xml.in: system conntrack tcp half-open-connections	system conntrack tcp half-open-connections <value>
✓	*set system conntrack tcp loose <enable | disable>*	system-conntrack.xml.in: system conntrack tcp loose	system conntrack tcp loose <value>
✓	*set system conntrack tcp max-retrans <1-2147483647>*	system-conntrack.xml.in: system conntrack tcp max-retrans	system conntrack tcp max-retrans <value>
✓	*set system conntrack timeout custom rule <1-9999> description <test>*	Nothing found in XML Definitions	system conntrack timeout custom rule <text> description <value>
✓	*set system conntrack timeout custom rule <1-9999> destination address <ip-address>*	Nothing found in XML Definitions	system conntrack timeout custom rule <text> destination address <value>
✓	*set system conntrack timeout custom rule <1-9999> destination port <value>*	Nothing found in XML Definitions	system conntrack timeout custom rule <text> destination port <value>
✓	*set system conntrack timeout custom rule <1-9999> protocol icmp <1-21474836>*	Nothing found in XML Definitions	system conntrack timeout custom rule <text> protocol icmp <value>
✓	*set system conntrack timeout custom rule <1-9999> protocol other <1-21474836>*	Nothing found in XML Definitions	system conntrack timeout custom rule <text> protocol other <value>
✓	*set system conntrack timeout custom rule <1-9999> protocol tcp close <1-21474836>*	Nothing found in XML Definitions	system conntrack timeout custom rule <text> protocol tcp close <value>
✓	*set system conntrack timeout custom rule <1-9999> protocol tcp close-wait <1-21474836>*	Nothing found in XML Definitions	system conntrack timeout custom rule <text> protocol tcp close-wait <value>
✓	*set system conntrack timeout custom rule <1-9999> protocol tcp established <1-21474836>*	Nothing found in XML Definitions	system conntrack timeout custom rule <text> protocol tcp established <value>

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set system conntrack timeout custom rule <1-9999> protocol tcp fin-wait <1-21474836>*	Nothing found in XML Definitions	system conntrack timeout custom rule <text> protocol tcp fin-wait <value>
✓	*set system conntrack timeout custom rule <1-9999> protocol tcp last-ack <1-21474836>*	Nothing found in XML Definitions	system conntrack timeout custom rule <text> protocol tcp last-ack <value>
✓	*set system conntrack timeout custom rule <1-9999> protocol tcp syn-recv <1-21474836>*	Nothing found in XML Definitions	system conntrack timeout custom rule <text> protocol tcp syn-recv <value>
✓	*set system conntrack timeout custom rule <1-9999> protocol tcp syn-sent <1-21474836>*	Nothing found in XML Definitions	system conntrack timeout custom rule <text> protocol tcp syn-sent <value>
✓	*set system conntrack timeout custom rule <1-9999> protocol tcp time-wait <1-21474836>*	Nothing found in XML Definitions	system conntrack timeout custom rule <text> protocol tcp time-wait <value>
✓	*set system conntrack timeout custom rule <1-9999> protocol udp other <1-21474836>*	Nothing found in XML Definitions	system conntrack timeout custom rule <text> protocol udp other <value>
✓	*set system conntrack timeout custom rule <1-9999> protocol udp stream <1-21474836>*	Nothing found in XML Definitions	system conntrack timeout custom rule <text> protocol udp stream <value>
✓	*set system conntrack timeout custom rule <1-9999> source address <ip-address>*	Nothing found in XML Definitions	system conntrack timeout custom rule <text> source address <value>
✓	*set system conntrack timeout custom rule <1-9999> source port <value>*	Nothing found in XML Definitions	system conntrack timeout custom rule <text> source port <value>
✓	*set system conntrack timeout icmp <1-21474836>*	system-conntrack.xml.in: system conntrack timeout icmp	system conntrack timeout icmp <value>
✓	*set system conntrack timeout other <1-21474836>*	system-conntrack.xml.in: system conntrack timeout other	system conntrack timeout other <value>

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set system conntrack timeout tcp close <1-21474836>*	system-conntrack.xml.in: system conntrack timeout tcp close	system conntrack timeout tcp close <value>
✓	*set system conntrack timeout tcp close-wait <1-21474836>*	system-conntrack.xml.in: system conntrack timeout tcp close-wait	system conntrack timeout tcp close-wait <value>
✓	*set system conntrack timeout tcp established <1-21474836>*	system-conntrack.xml.in: system conntrack timeout tcp established	system conntrack timeout tcp established <value>
✓	*set system conntrack timeout tcp fin-wait <1-21474836>*	system-conntrack.xml.in: system conntrack timeout tcp fin-wait	system conntrack timeout tcp fin-wait <value>
✓	*set system conntrack timeout tcp last-ack <1-21474836>*	system-conntrack.xml.in: system conntrack timeout tcp last-ack	system conntrack timeout tcp last-ack <value>
✓	*set system conntrack timeout tcp syn-recv <1-21474836>*	system-conntrack.xml.in: system conntrack timeout tcp syn-recv	system conntrack timeout tcp syn-recv <value>
✓	*set system conntrack timeout tcp syn-sent <1-21474836>*	system-conntrack.xml.in: system conntrack timeout tcp syn-sent	system conntrack timeout tcp syn-sent <value>
✓	*set system conntrack timeout tcp time-wait <1-21474836>*	system-conntrack.xml.in: system conntrack timeout tcp time-wait	system conntrack timeout tcp time-wait <value>
✓	*set system conntrack timeout udp other <1-21474836>*	system-conntrack.xml.in: system conntrack timeout udp other	system conntrack timeout udp other <value>
✓	*set system conntrack timeout udp stream <1-21474836>*	system-conntrack.xml.in: system conntrack timeout udp stream	system conntrack timeout udp stream <value>
×	*set system console device <device>*	Nothing found in XML Definitions	Nothing found in VyOS
✓	*set system console device <device> speed <speed>*	system-console.xml.in: system console device <device> speed	system console device <text> speed <value>
×	not yet documented	system-console.xml.in: system console powersave	system console powersave
✓	*set system domain-name <domain>*	dns-domain-name.xml.in: system domain-name	system domain-name <value>
✓	*set system domain-search domain <domain>*	dns-domain-name.xml.in: system domain-search domain	system domain-search domain <value>
✓	*set system flow-accounting buffer-size <buffer size>*	flow-accounting-conf.xml.in: system flow-accounting buffer-size	system flow-accounting buffer-size <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set system flow-accounting disable-imt*	flow-accounting-conf.xml.in: system flow-accounting disable-imt	system flow-accounting disable-imt
✓	*set system flow-accounting enable-egress*	flow-accounting-conf.xml.in: system flow-accounting enable-egress	system flow-accounting enable-egress
✓	*set system flow-accounting interface <interface>*	flow-accounting-conf.xml.in: system flow-accounting interface	system flow-accounting interface <value>
✓	*set system flow-accounting netflow engine-id <id>*	flow-accounting-conf.xml.in: system flow-accounting netflow engine-id	system flow-accounting netflow engine-id <value>
✓	*set system flow-accounting netflow max-flows <n>*	flow-accounting-conf.xml.in: system flow-accounting netflow max-flows	system flow-accounting netflow max-flows <value>
✓	*set system flow-accounting netflow sampling-rate <rate>*	flow-accounting-conf.xml.in: system flow-accounting netflow sampling-rate	system flow-accounting netflow sampling-rate <value>
×	*set system flow-accounting netflow server <address>*	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	flow-accounting-conf.xml.in: system flow-accounting netflow server <server> port	system flow-accounting netflow server <text> port <value>
✓	*set system flow-accounting netflow source-ip <address>*	flow-accounting-conf.xml.in: system flow-accounting netflow source-ip	system flow-accounting netflow source-ip <value>
✓	*set system flow-accounting netflow timeout expiry-interval <interval>*	flow-accounting-conf.xml.in: system flow-accounting netflow timeout expiry-interval	system flow-accounting netflow timeout expiry-interval <value>
×	not yet documented	flow-accounting-conf.xml.in: system flow-accounting netflow timeout flow-generic	system flow-accounting netflow timeout flow-generic <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	flow-accounting-conf.xml.in: system flow-accounting netflow timeout icmp	system flow-accounting netflow timeout icmp <value>
×	not yet documented	flow-accounting-conf.xml.in: system flow-accounting netflow timeout max-active-life	system flow-accounting netflow timeout max-active-life <value>
×	not yet documented	flow-accounting-conf.xml.in: system flow-accounting netflow timeout tcp-fin	system flow-accounting netflow timeout tcp-fin <value>
×	not yet documented	flow-accounting-conf.xml.in: system flow-accounting netflow timeout tcp-generic	system flow-accounting netflow timeout tcp-generic <value>
×	not yet documented	flow-accounting-conf.xml.in: system flow-accounting netflow timeout tcp-rst	system flow-accounting netflow timeout tcp-rst <value>
×	not yet documented	flow-accounting-conf.xml.in: system flow-accounting netflow timeout udp	system flow-accounting netflow timeout udp <value>
✓	*set system flow-accounting netflow version <version>*	flow-accounting-conf.xml.in: system flow-accounting netflow version	system flow-accounting netflow version <value>
✓	*set system flow-accounting sflow agent-address <address>*	flow-accounting-conf.xml.in: system flow-accounting sflow agent-address	system flow-accounting sflow agent-address <value>
✓	*set system flow-accounting sflow sampling-rate <rate>*	flow-accounting-conf.xml.in: system flow-accounting sflow sampling-rate	system flow-accounting sflow sampling-rate <value>
×	*set system flow-accounting sflow server <address>*	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	flow-accounting-conf.xml.in: system flow-accounting sflow server <server> port	system flow-accounting sflow server <text> port <value>
×	not yet documented	flow-accounting-conf.xml.in: system flow-accounting sflow source-address	system flow-accounting sflow source-address <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	***set system flow-accounting syslog-facility <facility>***	flow-accounting-conf.xml.in: system flow-accounting syslog-facility	system flow-accounting syslog-facility <value>
✓	***set system host-name <hostname>***	dns-domain-name.xml.in: system host-name	system host-name <value>
✓	***set system ip arp table-size <number>***	system-ip.xml.in: system ip arp table-size	system ip arp table-size <value>
✓	***set system ip disable-forwarding***	system-ip.xml.in: system ip disable-forwarding	system ip disable-forwarding
×	not yet documented	system-ip.xml.in: system ip multipath ignore-unreachable-nexthops	system ip multipath ignore-unreachable-nexthops
✓	***set system ip multipath layer4-hashing***	system-ip.xml.in: system ip multipath layer4-hashing	system ip multipath layer4-hashing
✓	***set system ipv6 disable***	system-ipv6.xml.in: system ipv6 disable	system ipv6 disable
✓	***set system ipv6 disable-forwarding***	system-ipv6.xml.in: system ipv6 disable-forwarding	system ipv6 disable-forwarding
✓	***set system ipv6 multipath layer4-hashing***	system-ipv6.xml.in: system ipv6 multipath layer4-hashing	system ipv6 multipath layer4-hashing
✓	***set system ipv6 neighbor table-size <number>***	system-ipv6.xml.in: system ipv6 neighbor table-size	system ipv6 neighbor table-size <value>
✓	***set system ipv6 strict-dad***	system-ipv6.xml.in: system ipv6 strict-dad	system ipv6 strict-dad
✓	***set system lcd device <device>***	system-lcd.xml.in: system lcd device	system lcd device <value>
✓	***set system lcd model <model>***	system-lcd.xml.in: system lcd model	system lcd model <value>
✓	***set system login banner post-login <message>***	system-login-banner.xml.in: system login banner post-login	system login banner post-login <value>
✓	***set system login banner pre-login <message>***	system-login-banner.xml.in: system login banner pre-login	system login banner pre-login <value>
×	not yet documented	system-login.xml.in: system login radius security-mode	Nothing found in VyOS
✓	***set system login radius server <address> disable***	system-login.xml.in: system login radius server <server> disable	system login radius server <text> disable

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set system login radius server <address> key <secret>*	system-login.xml.in: system login radius server <server> key	system login radius server <text> key <value>
✓	*set system login radius server <address> port <port>*	system-login.xml.in: system login radius server <server> port	system login radius server <text> port <value>
×	not yet documented	system-login.xml.in: system login radius server <server> priority	system login radius server <text> priority <value>
✓	*set system login radius server <address> timeout <timeout>*	system-login.xml.in: system login radius server <server> timeout	system login radius server <text> timeout <value>
✓	*set system login radius source-address <address>*	system-login.xml.in: system login radius source-address	system login radius source-address <value>
×	not yet documented	system-login.xml.in: system login radius vrf	system login radius vrf <value>
✓	*set system login user <name> authentication encrypted-password <password>*	system-login.xml.in: system login user <user> authentication encrypted-password	system login user <text> authentication encrypted-password <value>
✓	*set system login user <name> authentication plaintext-password <password>*	system-login.xml.in: system login user <user> authentication plaintext-password	system login user <text> authentication plaintext-password <value>
✓	*set system login user <username> authentication public-keys <identifier> key <key>*	system-login.xml.in: system login user <user> authentication public-keys <public-keys> key	system login user <text> authentication public-keys <text> key <value>
✓	*set system login user <username> authentication public-keys <identifier> options <options>*	system-login.xml.in: system login user <user> authentication public-keys <public-keys> options	system login user <text> authentication public-keys <text> options <value>
✓	*set system login user <username> authentication public-keys <identifier> type <type>*	system-login.xml.in: system login user <user> authentication public-keys <public-keys> type	system login user <text> authentication public-keys <text> type <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	system-login.xml.in: system login user <user> full-name	system login user <text> full-name <value>
×	***set system login user <name> full-name "<string>"***	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	system-login.xml.in: system login user <user> home-directory	system login user <text> home-directory <value>
✓	***set system name-server <address>***	dns-domain-name.xml.in: system name-server	system name-server <value>
✓	***set system ntp allow-clients address <address>***	ntp.xml.in: system ntp allow-clients address	system ntp allow-clients address <value>
✓	***set system ntp interface <interface>***	ntp.xml.in: system ntp interface	system ntp interface <value>
✓	***set system ntp listen-address <address>***	ntp.xml.in: system ntp listen-address	system ntp listen-address <value>
×	***set system ntp server <address> <noselect | pool | preempt | prefer>***	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	ntp.xml.in: system ntp server <server> noselect	system ntp server <text> noselect
×	not yet documented	ntp.xml.in: system ntp server <server> pool	system ntp server <text> pool
×	not yet documented	ntp.xml.in: system ntp server <server> preempt	system ntp server <text> preempt
×	not yet documented	ntp.xml.in: system ntp server <server> prefer	system ntp server <text> prefer
✓	***set system ntp vrf <name>***	ntp.xml.in: system ntp vrf	system ntp vrf <value>
✓	***set system option ctrl-alt-delete <ignore | reboot | poweroff>***	system-option.xml.in: system option ctrl-alt-delete	system option ctrl-alt-delete <value>
✓	***set system option http-client source-address <address>***	system-option.xml.in: system option http-client source-address	system option http-client source-address <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set system option http-client source-interface <interface>*	system-option.xml.in: system option http-client source-interface	system option http-client source-interface <value>
✓	*set system option keyboard-layout <us | fr | de | fi | no | dk>*	system-option.xml.in: system option keyboard-layout	system option keyboard-layout <value>
✓	*set system option performance <throughput | latency>*	system-option.xml.in: system option performance	system option performance <value>
✓	*set system option reboot-on-panic*	system-option.xml.in: system option reboot-on-panic	system option reboot-on-panic
✓	*set system option root-partition-auto-r*	system-option.xml.in: system option root-partition-auto-resize	system option root-partition-auto-resize
×	not yet documented	system-option.xml.in: system option ssh-client source-address	system option ssh-client source-address <value>
×	not yet documented	system-option.xml.in: system option ssh-client source-interface	system option ssh-client source-interface <value>
✓	*set system option startup-beep*	system-option.xml.in: system option startup-beep	system option startup-beep
✓	*set system proxy password <password>*	system-proxy.xml.in: system proxy password	system proxy password <value>
✓	*set system proxy port <port>*	system-proxy.xml.in: system proxy port	system proxy port <value>
✓	*set system proxy url <url>*	system-proxy.xml.in: system proxy url	system proxy url <value>
✓	*set system proxy username <username>*	system-proxy.xml.in: system proxy username	system proxy username <value>
✓	*set system static-host-mapping host-name <hostname> alias <alias>*	dns-domain-name.xml.in: system static-host-mapping host-name <host-name> alias	system static-host-mapping host-name <text> alias <value>
✓	*set system static-host-mapping host-name <hostname> inet <address>*	dns-domain-name.xml.in: system static-host-mapping host-name <host-name> inet	system static-host-mapping host-name <text> inet <value>
×	not yet documented	Nothing found in XML Definitions	system sysctl all <text> value <value>
×	not yet documented	Nothing found in XML Definitions	system sysctl custom <text> value <value>
×	not yet documented	Nothing found in XML Definitions	system sysctl net.ipv4.igmp_max_memberships <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	system sysctl net.ipv4.ipfrag_time <value>
✓	***set system syslog console facility <keyword> level <keyword>***	system-syslog.xml.in: system syslog console facility <facility> level	system syslog console facility <text> level <value>
✓	***set system syslog file <filename> archive file <number>***	system-syslog.xml.in: system syslog file <file> archive file	system syslog file <text> archive file <value>
✓	***set system syslog file <filename> archive size <size>***	system-syslog.xml.in: system syslog file <file> archive size	system syslog file <text> archive size <value>
✓	***set system syslog file <filename> facility <keyword> level <keyword>***	system-syslog.xml.in: system syslog file <file> facility <facility> level	system syslog file <text> facility <text> level <value>
×	not yet documented	system-syslog.xml.in: system syslog global archive file	system syslog global archive file <value>
×	not yet documented	system-syslog.xml.in: system syslog global archive size	system syslog global archive size <value>
×	not yet documented	system-syslog.xml.in: system syslog global facility <facility> level	system syslog global facility <text> level <value>
×	not yet documented	system-syslog.xml.in: system syslog global marker interval	system syslog global marker interval <value>
×	not yet documented	system-syslog.xml.in: system syslog global preserve-fqdn	system syslog global preserve-fqdn
✓	***set system syslog host <address> facility <keyword> level <keyword>***	system-syslog.xml.in: system syslog host <host> facility <facility> level	system syslog host <text> facility <text> level <value>
✓	***set system syslog host <address> facility <keyword> protocol <udp|tcp>***	system-syslog.xml.in: system syslog host <host> facility <facility> protocol	system syslog host <text> facility <text> protocol <value>
×	not yet documented	system-syslog.xml.in: system syslog host <host> format octet-counted	system syslog host <text> format octet-counted
×	not yet documented	system-syslog.xml.in: system syslog host <host> port	system syslog host <text> port <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set system syslog user <username> facility <keyword> level <keyword>*	system-syslog.xml.in: system syslog user <user> facility <facility> level	system syslog user <text> facility <text> level <value>
✓	*set system syslog vrf <name>*	system-syslog.xml.in: system syslog vrf	system syslog vrf <value>
✓	*set system task-scheduler task <task> crontab-spec <spec>*	cron.xml.in: system task-scheduler task <task> crontab-spec	system task-scheduler task <text> crontab-spec <value>
✓	*set system task-scheduler task <task> executable arguments <args>*	cron.xml.in: system task-scheduler task <task> executable arguments	system task-scheduler task <text> executable arguments <value>
✓	*set system task-scheduler task <task> executable path <path>*	cron.xml.in: system task-scheduler task <task> executable path	system task-scheduler task <text> executable path <value>
✓	*set system task-scheduler task <task> interval <interval>*	cron.xml.in: system task-scheduler task <task> interval	system task-scheduler task <text> interval <value>
✓	*set system time-zone <timezone>*	system-time-zone.xml.in: system time-zone	system time-zone <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy drop-tail <text> description <value>
✓	*set traffic-policy drop-tail <policy-name> queue-limit <number-of-packets>*	Nothing found in XML Definitions	traffic-policy drop-tail <text> queue-limit <value>
×	*set traffic-policy fair-queue <policy-name>*	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	Nothing found in XML Definitions	traffic-policy fair-queue <text> description <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy fair-queue <text> hash-interval <value>
×	*set traffic-policy fair-queue <policy-name> hash-interval <seconds>`*	Nothing found in XML Definitions	Nothing found in VyOS
✓	*set traffic-policy fair-queue <policy-name> queue-limit <limit>*	Nothing found in XML Definitions	traffic-policy fair-queue <text> queue-limit <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set traffic-policy fq-codel <policy name> codel-quantum <bytes>*	Nothing found in XML Definitions	traffic-policy fq-codel <text> codel-quantum <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy fq-codel <text> description <value>
✓	*set traffic-policy fq-codel <policy name> flows <number-of-flows>*	Nothing found in XML Definitions	traffic-policy fq-codel <text> flows <value>
✓	*set traffic-policy fq-codel <policy name> interval <miliseconds>*	Nothing found in XML Definitions	traffic-policy fq-codel <text> interval <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy fq-codel <text> queue-limit <value>
×	*set traffic-policy fq-codel <policy-name> queue-limit <number-of-packets>`*	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	Nothing found in XML Definitions	traffic-policy fq-codel <text> target <value>
×	*set traffic-policy fq-codel <policy-name> target <miliseconds>`*	Nothing found in XML Definitions	Nothing found in VyOS
✓	*set traffic-policy limiter <policy-name> class <class-ID> bandwidth <rate>*	Nothing found in XML Definitions	traffic-policy limiter <text> class <text> bandwidth <value>
✓	*set traffic-policy limiter <policy-name> class <class-ID> burst <burst-size>*	Nothing found in XML Definitions	traffic-policy limiter <text> class <text> burst <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy limiter <text> class <text> description <value>
✓	*set traffic-policy limiter <policy-name> class <class ID> match <match-name> description <description>*	Nothing found in XML Definitions	traffic-policy limiter <text> class <text> match <text> description <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	traffic-policy limiter <text> class <text> match <text> ether destination <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy limiter <text> class <text> match <text> ether protocol <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy limiter <text> class <text> match <text> ether source <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy limiter <text> class <text> match <text> interface <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy limiter <text> class <text> match <text> ip destination address <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy limiter <text> class <text> match <text> ip destination port <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy limiter <text> class <text> match <text> ip dscp <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy limiter <text> class <text> match <text> ip max-length <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy limiter <text> class <text> match <text> ip protocol <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy limiter <text> class <text> match <text> ip source address <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy limiter <text> class <text> match <text> ip source port <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy limiter <text> class <text> match <text> ip tcp ack
×	not yet documented	Nothing found in XML Definitions	traffic-policy limiter <text> class <text> match <text> ip tcp syn

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	traffic-policy limiter <text> class <text> match <text> ipv6 destination address <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy limiter <text> class <text> match <text> ipv6 destination port <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy limiter <text> class <text> match <text> ipv6 dscp <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy limiter <text> class <text> match <text> ipv6 max-length <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy limiter <text> class <text> match <text> ipv6 protocol <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy limiter <text> class <text> match <text> ipv6 source address <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy limiter <text> class <text> match <text> ipv6 source port <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy limiter <text> class <text> match <text> ipv6 tcp ack
×	not yet documented	Nothing found in XML Definitions	traffic-policy limiter <text> class <text> match <text> ipv6 tcp syn
×	not yet documented	Nothing found in XML Definitions	traffic-policy limiter <text> class <text> match <text> mark <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy limiter <text> class <text> match <text> vif <value>
✓	*set traffic-policy limiter <policy-name> class <class ID> priority <value>*	Nothing found in XML Definitions	traffic-policy limiter <text> class <text> priority <value>
✓	*set traffic-policy limiter <policy-name> default bandwidth <rate>*	Nothing found in XML Definitions	traffic-policy limiter <text> default bandwidth <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set traffic-policy limiter <policy-name> default burst <burst-size>*	Nothing found in XML Definitions	traffic-policy limiter <text> default burst <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy limiter <text> description <value>
✓	*set traffic-policy network-emulator <policy-name> bandwidth <rate>*	Nothing found in XML Definitions	traffic-policy network-emulator <text> bandwidth <value>
✓	*set traffic-policy network-emulator <policy-name> burst <burst-size>*	Nothing found in XML Definitions	traffic-policy network-emulator <text> burst <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy network-emulator <text> description <value>
✓	*set traffic-policy network-emulator <policy-name> network-delay <delay>*	Nothing found in XML Definitions	traffic-policy network-emulator <text> network-delay <value>
✓	*set traffic-policy network-emulator <policy-name> packet-corruption <percent>*	Nothing found in XML Definitions	traffic-policy network-emulator <text> packet-corruption <value>
✓	*set traffic-policy network-emulator <policy-name> packet-loss <percent>*	Nothing found in XML Definitions	traffic-policy network-emulator <text> packet-loss <value>
✓	*set traffic-policy network-emulator <policy-name> packet-reordering <percent>*	Nothing found in XML Definitions	traffic-policy network-emulator <text> packet-reordering <value>
✓	*set traffic-policy network-emulator <policy-name> queue-limit <limit>*	Nothing found in XML Definitions	traffic-policy network-emulator <text> queue-limit <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy priority-queue <text> class <text> codel-quantum <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy priority-queue <text> class <text> description <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	traffic-policy priority-queue <text> class <text> flows <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy priority-queue <text> class <text> interval <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy priority-queue <text> class <text> match <text> description <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy priority-queue <text> class <text> match <text> ether destination <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy priority-queue <text> class <text> match <text> ether protocol <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy priority-queue <text> class <text> match <text> ether source <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy priority-queue <text> class <text> match <text> interface <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy priority-queue <text> class <text> match <text> ip destination address <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy priority-queue <text> class <text> match <text> ip destination port <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy priority-queue <text> class <text> match <text> ip dscp <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy priority-queue <text> class <text> match <text> ip max-length <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy priority-queue <text> class <text> match <text> ip protocol <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy priority-queue <text> class <text> match <text> ip source address <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	traffic-policy priority-queue <text> class <text> match <text> ip source port <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy priority-queue <text> class <text> match <text> ip tcp ack
×	not yet documented	Nothing found in XML Definitions	traffic-policy priority-queue <text> class <text> match <text> ip tcp syn
×	not yet documented	Nothing found in XML Definitions	traffic-policy priority-queue <text> class <text> match <text> ipv6 destination address <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy priority-queue <text> class <text> match <text> ipv6 destination port <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy priority-queue <text> class <text> match <text> ipv6 dscp <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy priority-queue <text> class <text> match <text> ipv6 max-length <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy priority-queue <text> class <text> match <text> ipv6 protocol <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy priority-queue <text> class <text> match <text> ipv6 source address <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy priority-queue <text> class <text> match <text> ipv6 source port <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy priority-queue <text> class <text> match <text> ipv6 tcp ack
×	not yet documented	Nothing found in XML Definitions	traffic-policy priority-queue <text> class <text> match <text> ipv6 tcp syn
×	not yet documented	Nothing found in XML Definitions	traffic-policy priority-queue <text> class <text> match <text> mark <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	traffic-policy priority-queue <text> class <text> match <text> vif <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy priority-queue <text> class <text> queue-limit <value>
×	*set traffic-policy priority-queue <policy-name> class <class-ID> queue-limit <limit>`*	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	Nothing found in XML Definitions	traffic-policy priority-queue <text> class <text> queue-type <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy priority-queue <text> class <text> target <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy priority-queue <text> default codel-quantum <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy priority-queue <text> default flows <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy priority-queue <text> default interval <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy priority-queue <text> default queue-limit <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy priority-queue <text> default queue-type <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy priority-queue <text> default target <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy priority-queue <text> description <value>
✓	*set traffic-policy random-detect <policy-name> bandwidth <bandwidth>*	Nothing found in XML Definitions	traffic-policy random-detect <text> bandwidth <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy random-detect <text> description <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set traffic-policy random-detect <policy-name> precedence <IP-precedence-value> average-packet <bytes>*	Nothing found in XML Definitions	traffic-policy random-detect <text> precedence <text> average-packet <value>
✓	*set traffic-policy random-detect <policy-name> precedence <IP-precedence-value> mark-probability <value>*	Nothing found in XML Definitions	traffic-policy random-detect <text> precedence <text> mark-probability <value>
✓	*set traffic-policy random-detect <policy-name> precedence <IP-precedence-value> maximum-threshold <packets>*	Nothing found in XML Definitions	traffic-policy random-detect <text> precedence <text> maximum-threshold <value>
✓	*set traffic-policy random-detect <policy-name> precedence <IP-precedence-value> minimum-threshold <packets>*	Nothing found in XML Definitions	traffic-policy random-detect <text> precedence <text> minimum-threshold <value>
✓	*set traffic-policy random-detect <policy-name> precedence <IP-precedence-value> queue-limit <packets>*	Nothing found in XML Definitions	traffic-policy random-detect <text> precedence <text> queue-limit <value>
✓	*set traffic-policy rate-control <policy-name> bandwidth <rate>*	Nothing found in XML Definitions	traffic-policy rate-control <text> bandwidth <value>
✓	*set traffic-policy rate-control <policy-name> burst <burst-size>*	Nothing found in XML Definitions	traffic-policy rate-control <text> burst <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy rate-control <text> description <value>
✓	*set traffic-policy rate-control <policy-name> latency*	Nothing found in XML Definitions	traffic-policy rate-control <text> latency <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	traffic-policy round-robin <text> class <text> codel-quantum <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy round-robin <text> class <text> description <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy round-robin <text> class <text> flows <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy round-robin <text> class <text> interval <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy round-robin <text> class <text> match <text> description <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy round-robin <text> class <text> match <text> ether destination <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy round-robin <text> class <text> match <text> ether protocol <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy round-robin <text> class <text> match <text> ether source <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy round-robin <text> class <text> match <text> interface <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy round-robin <text> class <text> match <text> ip destination address <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy round-robin <text> class <text> match <text> ip destination port <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy round-robin <text> class <text> match <text> ip dscp <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy round-robin <text> class <text> match <text> ip max-length <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy round-robin <text> class <text> match <text> ip protocol <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	traffic-policy round-robin <text> class <text> match <text> ip source address <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy round-robin <text> class <text> match <text> ip source port <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy round-robin <text> class <text> match <text> ip tcp ack
×	not yet documented	Nothing found in XML Definitions	traffic-policy round-robin <text> class <text> match <text> ip tcp syn
×	not yet documented	Nothing found in XML Definitions	traffic-policy round-robin <text> class <text> match <text> ipv6 destination address <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy round-robin <text> class <text> match <text> ipv6 destination port <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy round-robin <text> class <text> match <text> ipv6 dscp <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy round-robin <text> class <text> match <text> ipv6 max-length <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy round-robin <text> class <text> match <text> ipv6 protocol <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy round-robin <text> class <text> match <text> ipv6 source address <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy round-robin <text> class <text> match <text> ipv6 source port <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy round-robin <text> class <text> match <text> ipv6 tcp ack
×	not yet documented	Nothing found in XML Definitions	traffic-policy round-robin <text> class <text> match <text> ipv6 tcp syn
×	not yet documented	Nothing found in XML Definitions	traffic-policy round-robin <text> class <text> match <text> mark <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	traffic-policy round-robin <text> class <text> match <text> vif <value>
✓	*set traffic-policy round-robin <policy name> class <class-ID> quantum <packets>*	Nothing found in XML Definitions	traffic-policy round-robin <text> class <text> quantum <value>
✓	*set traffic-policy round-robin <policy name> class <class ID> queue-limit <packets>*	Nothing found in XML Definitions	traffic-policy round-robin <text> class <text> queue-limit <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy round-robin <text> class <text> queue-type <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy round-robin <text> class <text> target <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy round-robin <text> default codel-quantum <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy round-robin <text> default flows <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy round-robin <text> default interval <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy round-robin <text> default quantum <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy round-robin <text> default queue-limit <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy round-robin <text> default queue-type <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy round-robin <text> default target <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy round-robin <text> description <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper-hfsc <text> bandwidth <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper-hfsc <text> class <text> description <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper-hfsc <text> class <text> linkshare d <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper-hfsc <text> class <text> linkshare m1 <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper-hfsc <text> class <text> linkshare m2 <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper-hfsc <text> class <text> match <text> description <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper-hfsc <text> class <text> match <text> ether destination <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper-hfsc <text> class <text> match <text> ether protocol <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper-hfsc <text> class <text> match <text> ether source <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper-hfsc <text> class <text> match <text> interface <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper-hfsc <text> class <text> match <text> ip destination address <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper-hfsc <text> class <text> match <text> ip destination port <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper-hfsc <text> class <text> match <text> ip dscp <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper-hfsc <text> class <text> match <text> ip max-length <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper-hfsc <text> class <text> match <text> ip protocol <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper-hfsc <text> class <text> match <text> ip source address <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper-hfsc <text> class <text> match <text> ip source port <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper-hfsc <text> class <text> match <text> ip tcp ack
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper-hfsc <text> class <text> match <text> ip tcp syn
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper-hfsc <text> class <text> match <text> ipv6 destination address <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper-hfsc <text> class <text> match <text> ipv6 destination port <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper-hfsc <text> class <text> match <text> ipv6 dscp <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper-hfsc <text> class <text> match <text> ipv6 max-length <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper-hfsc <text> class <text> match <text> ipv6 protocol <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper-hfsc <text> class <text> match <text> ipv6 source address <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper-hfsc <text> class <text> match <text> ipv6 source port <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper-hfsc <text> class <text> match <text> ipv6 tcp ack
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper-hfsc <text> class <text> match <text> ipv6 tcp syn
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper-hfsc <text> class <text> match <text> mark <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper-hfsc <text> class <text> match <text> vif <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper-hfsc <text> class <text> realtime d <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper-hfsc <text> class <text> realtime m1 <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper-hfsc <text> class <text> realtime m2 <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper-hfsc <text> class <text> upperlimit d <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper-hfsc <text> class <text> upperlimit m1 <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper-hfsc <text> class <text> upperlimit m2 <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper-hfsc <text> default linkshare d <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper-hfsc <text> default linkshare m1 <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper-hfsc <text> default linkshare m2 <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper-hfsc <text> default realtime d <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper-hfsc <text> default realtime m1 <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper-hfsc <text> default realtime m2 <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper-hfsc <text> default upperlimit d <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper-hfsc <text> default upperlimit m1 <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper-hfsc <text> default upperlimit m2 <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper-hfsc <text> description <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set traffic-policy shaper <policy-name> bandwidth <rate>*	Nothing found in XML Definitions	traffic-policy shaper <text> bandwidth <value>
✓	*set traffic-policy shaper <policy-name> class <class-ID> bandwidth <rate>*	Nothing found in XML Definitions	traffic-policy shaper <text> class <text> bandwidth <value>
✓	*set traffic-policy shaper <policy-name> class <class-ID> burst <bytes>*	Nothing found in XML Definitions	traffic-policy shaper <text> class <text> burst <value>
✓	*set traffic-policy shaper <policy-name> class <class-ID> ceiling <bandwidth>*	Nothing found in XML Definitions	traffic-policy shaper <text> class <text> ceiling <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper <text> class <text> codel-quantum <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper <text> class <text> description <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper <text> class <text> flows <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper <text> class <text> interval <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper <text> class <text> match <text> description <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper <text> class <text> match <text> ether destination <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper <text> class <text> match <text> ether protocol <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper <text> class <text> match <text> ether source <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper <text> class <text> match <text> interface <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper <text> class <text> match <text> ip destination address <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper <text> class <text> match <text> ip destination port <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper <text> class <text> match <text> ip dscp <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper <text> class <text> match <text> ip max-length <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper <text> class <text> match <text> ip protocol <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper <text> class <text> match <text> ip source address <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper <text> class <text> match <text> ip source port <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper <text> class <text> match <text> ip tcp ack
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper <text> class <text> match <text> ip tcp syn
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper <text> class <text> match <text> ipv6 destination address <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper <text> class <text> match <text> ipv6 destination port <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper <text> class <text> match <text> ipv6 dscp <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper <text> class <text> match <text> ipv6 max-length <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper <text> class <text> match <text> ipv6 protocol <value>

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper <text> class <text> match <text> ipv6 source address <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper <text> class <text> match <text> ipv6 source port <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper <text> class <text> match <text> ipv6 tcp ack
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper <text> class <text> match <text> ipv6 tcp syn
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper <text> class <text> match <text> mark <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper <text> class <text> match <text> vif <value>
✓	*set traffic-policy shaper <policy-name> class <class-ID> priority <0-7>*	Nothing found in XML Definitions	traffic-policy shaper <text> class <text> priority <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper <text> class <text> queue-limit <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper <text> class <text> queue-type <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper <text> class <text> set-dscp <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper <text> class <text> target <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper <text> default bandwidth <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper <text> default burst <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper <text> default ceiling <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper <text> default codel-quantum <value>

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper <text> default flows <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper <text> default interval <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper <text> default priority <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper <text> default queue-limit <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper <text> default queue-type <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper <text> default set-dscp <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper <text> default target <value>
×	not yet documented	Nothing found in XML Definitions	traffic-policy shaper <text> description <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec auto-update <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec disable-uniqreqids
×	not yet documented	Nothing found in XML Definitions	vpn ipsec esp-group <text> compression <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec esp-group <text> lifetime <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec esp-group <text> mode <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec esp-group <text> pfs <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec esp-group <text> proposal <text> encryption <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec esp-group <text> proposal <text> hash <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec ike-group <text> close-action <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec ike-group <text> dead-peer-detection action <value>

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	vpn ipsec ike-group <text> dead-peer-detection interval <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec ike-group <text> dead-peer-detection timeout <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec ike-group <text> ikev2-reauth <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec ike-group <text> key-exchange <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec ike-group <text> lifetime <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec ike-group <text> mobike <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec ike-group <text> mode <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec ike-group <text> proposal <text> dh-group <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec ike-group <text> proposal <text> encryption <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec ike-group <text> proposal <text> hash <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec ike-group <text> proposal <text> prf <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec include-ipsec-conf <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec include-ipsec-secrets <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec ipsec-interfaces interface <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec logging log-level <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec logging log-modes <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec nat-networks allowed-network <text> exclude <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec nat-traversal <value>
×	not yet documented	ipsec-settings.xml.in: vpn ipsec options disable-route-autoinstall	vpn ipsec options disable-route-autoinstall
×	not yet documented	Nothing found in XML Definitions	vpn ipsec profile <text> authentication mode <value>

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	vpn ipsec profile <text> authentication pre-shared-secret <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec profile <text> bind tunnel <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec profile <text> esp-group <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec profile <text> ike-group <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec site-to-site peer <text> authentication id <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec site-to-site peer <text> authentication mode <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec site-to-site peer <text> authentication pre-shared-secret <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec site-to-site peer <text> authentication remote-id <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec site-to-site peer <text> authentication rsa-key-name <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec site-to-site peer <text> authentication use-x509-id
×	not yet documented	Nothing found in XML Definitions	vpn ipsec site-to-site peer <text> authentication x509 ca-cert-file <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec site-to-site peer <text> authentication x509 cert-file <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec site-to-site peer <text> authentication x509 crl-file <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec site-to-site peer <text> authentication x509 key file <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec site-to-site peer <text> authentication x509 key password <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec site-to-site peer <text> connection-type <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec site-to-site peer <text> default-esp-group <value>

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	vpn ipsec site-to-site peer <text> description <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec site-to-site peer <text> dhcp-interface <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec site-to-site peer <text> force-encapsulation <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec site-to-site peer <text> ike-group <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec site-to-site peer <text> ikev2-reauth <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec site-to-site peer <text> local-address <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec site-to-site peer <text> tunnel <text> allow-nat-networks <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec site-to-site peer <text> tunnel <text> allow-public-networks <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec site-to-site peer <text> tunnel <text> disable
×	not yet documented	Nothing found in XML Definitions	vpn ipsec site-to-site peer <text> tunnel <text> esp-group <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec site-to-site peer <text> tunnel <text> local port <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec site-to-site peer <text> tunnel <text> local prefix <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec site-to-site peer <text> tunnel <text> protocol <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec site-to-site peer <text> tunnel <text> remote port <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec site-to-site peer <text> tunnel <text> remote prefix <value>
×	not yet documented	Nothing found in XML Definitions	vpn ipsec site-to-site peer <text> vti bind <value>

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	vpn ipsec site-to-site peer <text> vti esp-group <value>
×	not yet documented	vpn_l2tp.xml.in: vpn l2tp remote-access authentication local-users username <username> disable	vpn l2tp remote-access authentication local-users username <text> disable
×	not yet documented	vpn_l2tp.xml.in: vpn l2tp remote-access authentication local-users username <username> password	vpn l2tp remote-access authentication local-users username <text> password <value>
×	not yet documented	vpn_l2tp.xml.in: vpn l2tp remote-access authentication local-users username <username> rate-limit download	vpn l2tp remote-access authentication local-users username <text> rate-limit download <value>
×	not yet documented	vpn_l2tp.xml.in: vpn l2tp remote-access authentication local-users username <username> rate-limit upload	vpn l2tp remote-access authentication local-users username <text> rate-limit upload <value>
×	not yet documented	vpn_l2tp.xml.in: vpn l2tp remote-access authentication local-users username <username> static-ip	vpn l2tp remote-access authentication local-users username <text> static-ip <value>
×	not yet documented	vpn_l2tp.xml.in: vpn l2tp remote-access authentication mode	vpn l2tp remote-access authentication mode <value>
×	not yet documented	vpn_l2tp.xml.in: vpn l2tp remote-access authentication mppe	vpn l2tp remote-access authentication mppe <value>
×	not yet documented	vpn_l2tp.xml.in: vpn l2tp remote-access authentication radius acct-timeout	vpn l2tp remote-access authentication radius acct-timeout <value>
×	not yet documented	vpn_l2tp.xml.in: vpn l2tp remote-access authentication radius dae-server ip-address	vpn l2tp remote-access authentication radius dae-server ip-address <value>
×	not yet documented	vpn_l2tp.xml.in: vpn l2tp remote-access authentication radius dae-server port	vpn l2tp remote-access authentication radius dae-server port <value>
×	not yet documented	vpn_l2tp.xml.in: vpn l2tp remote-access authentication radius dae-server secret	vpn l2tp remote-access authentication radius dae-server secret <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	vpn_l2tp.xml.in: vpn l2tp remote-access authentication radius max-try	vpn l2tp remote-access authentication radius max-try <value>
×	not yet documented	vpn_l2tp.xml.in: vpn l2tp remote-access authentication radius nas-identifier	vpn l2tp remote-access authentication radius nas-identifier <value>
×	not yet documented	vpn_l2tp.xml.in: vpn l2tp remote-access authentication radius rate-limit attribute	vpn l2tp remote-access authentication radius rate-limit attribute <value>
×	not yet documented	vpn_l2tp.xml.in: vpn l2tp remote-access authentication radius rate-limit enable	vpn l2tp remote-access authentication radius rate-limit enable
×	not yet documented	vpn_l2tp.xml.in: vpn l2tp remote-access authentication radius rate-limit vendor	vpn l2tp remote-access authentication radius rate-limit vendor <value>
×	not yet documented	vpn_l2tp.xml.in: vpn l2tp remote-access authentication radius server <server> disable	vpn l2tp remote-access authentication radius server <text> disable
×	not yet documented	vpn_l2tp.xml.in: vpn l2tp remote-access authentication radius server <server> disable-accounting	vpn l2tp remote-access authentication radius server <text> disable-accounting
×	not yet documented	vpn_l2tp.xml.in: vpn l2tp remote-access authentication radius server <server> fail-time	vpn l2tp remote-access authentication radius server <text> fail-time <value>
×	not yet documented	vpn_l2tp.xml.in: vpn l2tp remote-access authentication radius server <server> key	vpn l2tp remote-access authentication radius server <text> key <value>
×	not yet documented	vpn_l2tp.xml.in: vpn l2tp remote-access authentication radius server <server> port	vpn l2tp remote-access authentication radius server <text> port <value>
×	not yet documented	vpn_l2tp.xml.in: vpn l2tp remote-access authentication radius source-address	vpn l2tp remote-access authentication radius source-address <value>
×	not yet documented	vpn_l2tp.xml.in: vpn l2tp remote-access authentication radius timeout	vpn l2tp remote-access authentication radius timeout <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	vpn_l2tp.xml.in: vpn l2tp remote-access authentication require	vpn l2tp remote-access authentication require <value>
×	not yet documented	vpn_l2tp.xml.in: vpn l2tp remote-access ccp-disable	vpn l2tp remote-access ccp-disable
×	not yet documented	vpn_l2tp.xml.in: vpn l2tp remote-access client-ip-pool start	vpn l2tp remote-access client-ip-pool start <value>
×	not yet documented	vpn_l2tp.xml.in: vpn l2tp remote-access client-ip-pool stop	vpn l2tp remote-access client-ip-pool stop <value>
×	not yet documented	vpn_l2tp.xml.in: vpn l2tp remote-access client-ip-pool subnet	vpn l2tp remote-access client-ip-pool subnet <value>
×	not yet documented	vpn_l2tp.xml.in: vpn l2tp remote-access client-ipv6-pool delegate <delegate> delegation-prefix	vpn l2tp remote-access client-ipv6-pool delegate <text> delegation-prefix <value>
×	not yet documented	vpn_l2tp.xml.in: vpn l2tp remote-access client-ipv6-pool prefix <prefix> mask	vpn l2tp remote-access client-ipv6-pool prefix <text> mask <value>
×	not yet documented	vpn_l2tp.xml.in: vpn l2tp remote-access description	vpn l2tp remote-access description <value>
×	not yet documented	vpn_l2tp.xml.in: vpn l2tp remote-access dhcp-interface	vpn l2tp remote-access dhcp-interface <value>
×	not yet documented	vpn_l2tp.xml.in: vpn l2tp remote-access gateway-address	vpn l2tp remote-access gateway-address <value>
×	not yet documented	vpn_l2tp.xml.in: vpn l2tp remote-access idle	vpn l2tp remote-access idle <value>
×	not yet documented	vpn_l2tp.xml.in: vpn l2tp remote-access ipsec-settings authentication mode	vpn l2tp remote-access ipsec-settings authentication mode <value>
×	not yet documented	vpn_l2tp.xml.in: vpn l2tp remote-access ipsec-settings authentication pre-shared-secret	vpn l2tp remote-access ipsec-settings authentication pre-shared-secret <value>
×	not yet documented	vpn_l2tp.xml.in: vpn l2tp remote-access ipsec-settings authentication x509 ca-cert-file	vpn l2tp remote-access ipsec-settings authentication x509 ca-cert-file <value>

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	vpn_l2tp.xml.in: vpn l2tp remote-access ipsec-settings authentication x509 crl-file	vpn l2tp remote-access ipsec-settings authentication x509 crl-file <value>
×	not yet documented	vpn_l2tp.xml.in: vpn l2tp remote-access ipsec-settings authentication x509 server-cert-file	vpn l2tp remote-access ipsec-settings authentication x509 server-cert-file <value>
×	not yet documented	vpn_l2tp.xml.in: vpn l2tp remote-access ipsec-settings authentication x509 server-key-file	vpn l2tp remote-access ipsec-settings authentication x509 server-key-file <value>
×	not yet documented	vpn_l2tp.xml.in: vpn l2tp remote-access ipsec-settings authentication x509 server-key-password	vpn l2tp remote-access ipsec-settings authentication x509 server-key-password <value>
×	not yet documented	vpn_l2tp.xml.in: vpn l2tp remote-access ipsec-settings ike-lifetime	vpn l2tp remote-access ipsec-settings ike-lifetime <value>
×	not yet documented	vpn_l2tp.xml.in: vpn l2tp remote-access ipsec-settings lifetime	vpn l2tp remote-access ipsec-settings lifetime <value>
×	not yet documented	vpn_l2tp.xml.in: vpn l2tp remote-access lns host-name	vpn l2tp remote-access lns host-name <value>
×	not yet documented	vpn_l2tp.xml.in: vpn l2tp remote-access lns shared-secret	vpn l2tp remote-access lns shared-secret <value>
×	not yet documented	vpn_l2tp.xml.in: vpn l2tp remote-access mtu	vpn l2tp remote-access mtu <value>
×	not yet documented	vpn_l2tp.xml.in: vpn l2tp remote-access name-server	vpn l2tp remote-access name-server <value>
×	not yet documented	vpn_l2tp.xml.in: vpn l2tp remote-access outside-address	vpn l2tp remote-access outside-address <value>
×	not yet documented	vpn_l2tp.xml.in: vpn l2tp remote-access ppp-options lcp-echo-failure	vpn l2tp remote-access ppp-options lcp-echo-failure <value>
×	not yet documented	vpn_l2tp.xml.in: vpn l2tp remote-access ppp-options lcp-echo-interval	vpn l2tp remote-access ppp-options lcp-echo-interval <value>
×	not yet documented	vpn_l2tp.xml.in: vpn l2tp remote-access wins-server	vpn l2tp remote-access wins-server <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	vpn_openconnect.xml.in: vpn openconnect authentication local-users username <username> disable	vpn openconnect authentication local-users username <text> disable
×	not yet documented	vpn_openconnect.xml.in: vpn openconnect authentication local-users username <username> password	vpn openconnect authentication local-users username <text> password <value>
×	not yet documented	vpn_openconnect.xml.in: vpn openconnect authentication mode	vpn openconnect authentication mode <value>
×	not yet documented	vpn_openconnect.xml.in: vpn openconnect authentication radius server <server> disable	vpn openconnect authentication radius server <text> disable
×	not yet documented	vpn_openconnect.xml.in: vpn openconnect authentication radius server <server> key	vpn openconnect authentication radius server <text> key <value>
×	not yet documented	vpn_openconnect.xml.in: vpn openconnect authentication radius server <server> port	vpn openconnect authentication radius server <text> port <value>
×	not yet documented	vpn_openconnect.xml.in: vpn openconnect authentication radius source-address	vpn openconnect authentication radius source-address <value>
×	not yet documented	vpn_openconnect.xml.in: vpn openconnect authentication radius timeout	vpn openconnect authentication radius timeout <value>
×	not yet documented	vpn_openconnect.xml.in: vpn openconnect http-security-headers	Nothing found in VyOS
×	not yet documented	vpn_openconnect.xml.in: vpn openconnect listen-ports tcp	vpn openconnect listen-ports tcp <value>
×	not yet documented	vpn_openconnect.xml.in: vpn openconnect listen-ports udp	vpn openconnect listen-ports udp <value>
×	not yet documented	vpn_openconnect.xml.in: vpn openconnect network-settings client-ip-settings subnet	vpn openconnect network-settings client-ip-settings subnet <value>
×	not yet documented	vpn_openconnect.xml.in: vpn openconnect network-settings client-ipv6-pool mask	vpn openconnect network-settings client-ipv6-pool mask <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	vpn_openconnect.xml.in: vpn openconnect network-settings client-ipv6-pool prefix	vpn openconnect network-settings client-ipv6-pool prefix <value>
×	not yet documented	vpn_openconnect.xml.in: vpn openconnect network-settings name-server	vpn openconnect network-settings name-server <value>
×	not yet documented	vpn_openconnect.xml.in: vpn openconnect network-settings push-route	vpn openconnect network-settings push-route <value>
×	not yet documented	vpn_openconnect.xml.in: vpn openconnect network-settings split-dns	vpn openconnect network-settings split-dns <value>
×	not yet documented	vpn_openconnect.xml.in: vpn openconnect ssl ca-cert-file	vpn openconnect ssl ca-cert-file <value>
×	not yet documented	vpn_openconnect.xml.in: vpn openconnect ssl cert-file	vpn openconnect ssl cert-file <value>
×	not yet documented	vpn_openconnect.xml.in: vpn openconnect ssl key-file	vpn openconnect ssl key-file <value>
×	not yet documented	vpn_pptp.xml.in: vpn pptp remote-access authentication local-users username <username> disable	vpn pptp remote-access authentication local-users username <text> disable
×	not yet documented	vpn_pptp.xml.in: vpn pptp remote-access authentication local-users username <username> password	vpn pptp remote-access authentication local-users username <text> password <value>
×	not yet documented	vpn_pptp.xml.in: vpn pptp remote-access authentication local-users username <username> static-ip	vpn pptp remote-access authentication local-users username <text> static-ip <value>
×	not yet documented	vpn_pptp.xml.in: vpn pptp remote-access authentication mode	vpn pptp remote-access authentication mode <value>
×	not yet documented	vpn_pptp.xml.in: vpn pptp remote-access authentication mppe	vpn pptp remote-access authentication mppe <value>
×	not yet documented	vpn_pptp.xml.in: vpn pptp remote-access authentication radius accounting-interim-interval	Nothing found in VyOS

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	vpn_pptp.xml.in: vpn pptp remote-access authentication radius acct-interim-jitter	vpn pptp remote-access authentication radius acct-interim-jitter <value>
×	not yet documented	vpn_pptp.xml.in: vpn pptp remote-access authentication radius acct-timeout	vpn pptp remote-access authentication radius acct-timeout <value>
×	not yet documented	vpn_pptp.xml.in: vpn pptp remote-access authentication radius dynamic-author key	vpn pptp remote-access authentication radius dynamic-author key <value>
×	not yet documented	vpn_pptp.xml.in: vpn pptp remote-access authentication radius dynamic-author port	vpn pptp remote-access authentication radius dynamic-author port <value>
×	not yet documented	vpn_pptp.xml.in: vpn pptp remote-access authentication radius dynamic-author server	vpn pptp remote-access authentication radius dynamic-author server <value>
×	not yet documented	vpn_pptp.xml.in: vpn pptp remote-access authentication radius max-try	vpn pptp remote-access authentication radius max-try <value>
×	not yet documented	vpn_pptp.xml.in: vpn pptp remote-access authentication radius nas-identifier	vpn pptp remote-access authentication radius nas-identifier <value>
×	not yet documented	vpn_pptp.xml.in: vpn pptp remote-access authentication radius nas-ip-address	vpn pptp remote-access authentication radius nas-ip-address <value>
×	not yet documented	vpn_pptp.xml.in: vpn pptp remote-access authentication radius preallocate-vif	vpn pptp remote-access authentication radius preallocate-vif
×	not yet documented	vpn_pptp.xml.in: vpn pptp remote-access authentication radius rate-limit attribute	vpn pptp remote-access authentication radius rate-limit attribute <value>
×	not yet documented	vpn_pptp.xml.in: vpn pptp remote-access authentication radius rate-limit enable	vpn pptp remote-access authentication radius rate-limit enable
×	not yet documented	vpn_pptp.xml.in: vpn pptp remote-access authentication radius rate-limit multiplier	vpn pptp remote-access authentication radius rate-limit multiplier <value>

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Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	vpn_pptp.xml.in: vpn pptp remote-access authentication radius rate-limit vendor	vpn pptp remote-access authentication radius rate-limit vendor <value>
×	not yet documented	vpn_pptp.xml.in: vpn pptp remote-access authentication radius server <server> acct-port	vpn pptp remote-access authentication radius server <text> acct-port <value>
×	not yet documented	vpn_pptp.xml.in: vpn pptp remote-access authentication radius server <server> disable	vpn pptp remote-access authentication radius server <text> disable
×	not yet documented	vpn_pptp.xml.in: vpn pptp remote-access authentication radius server <server> disable-accounting	vpn pptp remote-access authentication radius server <text> disable-accounting
×	not yet documented	vpn_pptp.xml.in: vpn pptp remote-access authentication radius server <server> fail-time	vpn pptp remote-access authentication radius server <text> fail-time <value>
×	not yet documented	vpn_pptp.xml.in: vpn pptp remote-access authentication radius server <server> key	vpn pptp remote-access authentication radius server <text> key <value>
×	not yet documented	vpn_pptp.xml.in: vpn pptp remote-access authentication radius server <server> port	vpn pptp remote-access authentication radius server <text> port <value>
×	not yet documented	vpn_pptp.xml.in: vpn pptp remote-access authentication radius source-address	vpn pptp remote-access authentication radius source-address <value>
×	not yet documented	vpn_pptp.xml.in: vpn pptp remote-access authentication radius timeout	vpn pptp remote-access authentication radius timeout <value>
×	not yet documented	vpn_pptp.xml.in: vpn pptp remote-access authentication require	vpn pptp remote-access authentication require <value>
×	not yet documented	vpn_pptp.xml.in: vpn pptp remote-access client-ip-pool start	vpn pptp remote-access client-ip-pool start <value>
×	not yet documented	vpn_pptp.xml.in: vpn pptp remote-access client-ip-pool stop	vpn pptp remote-access client-ip-pool stop <value>
×	not yet documented	vpn_pptp.xml.in: vpn pptp remote-access gateway-address	vpn pptp remote-access gateway-address <value>

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	vpn_pptp.xml.in: vpn pptp remote-access mtu	vpn pptp remote-access mtu <value>
×	not yet documented	vpn_pptp.xml.in: vpn pptp remote-access name-server	vpn pptp remote-access name-server <value>
×	not yet documented	vpn_pptp.xml.in: vpn pptp remote-access outside-address	vpn pptp remote-access outside-address <value>
×	not yet documented	vpn_pptp.xml.in: vpn pptp remote-access wins-server	vpn pptp remote-access wins-server <value>
×	not yet documented	Nothing found in XML Definitions	vpn rsa-keys local-key file <value>
×	not yet documented	Nothing found in XML Definitions	vpn rsa-keys rsa-key-name <text> rsa-key <value>
✓	*set vpn sstp authentication local-users username <user> disable*	vpn_sstp.xml.in: vpn sstp authentication local-users username <username> disable	vpn sstp authentication local-users username <text> disable
✓	*set vpn sstp authentication local-users username <user> password <pass>*	vpn_sstp.xml.in: vpn sstp authentication local-users username <username> password	vpn sstp authentication local-users username <text> password <value>
✓	*set vpn sstp authentication local-users username <user> rate-limit download <bandwidth>*	vpn_sstp.xml.in: vpn sstp authentication local-users username <username> rate-limit download	vpn sstp authentication local-users username <text> rate-limit download <value>
✓	*set vpn sstp authentication local-users username <user> rate-limit upload <bandwidth>*	vpn_sstp.xml.in: vpn sstp authentication local-users username <username> rate-limit upload	vpn sstp authentication local-users username <text> rate-limit upload <value>
✓	*set vpn sstp authentication local-users username <user> static-ip <address>*	vpn_sstp.xml.in: vpn sstp authentication local-users username <username> static-ip	vpn sstp authentication local-users username <text> static-ip <value>
✓	*set vpn sstp authentication mode <local | radius>*	vpn_sstp.xml.in: vpn sstp authentication mode	vpn sstp authentication mode <value>
✓	*set vpn sstp authentication protocols <pap | chap | mschap | mschap-v2>*	vpn_sstp.xml.in: vpn sstp authentication protocols	vpn sstp authentication protocols <value>

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	vpn_sstp.xml.in: vpn sstp authentication radius accounting-interim-interval	Nothing found in VyOS
×	not yet documented	vpn_sstp.xml.in: vpn sstp authentication radius acct-interim-jitter	vpn sstp authentication radius acct-interim-jitter <value>
✓	***set vpn sstp authentication radius acct-timeout <timeout>***	vpn_sstp.xml.in: vpn sstp authentication radius acct-timeout	vpn sstp authentication radius acct-timeout <value>
✓	***set vpn sstp authentication radius dynamic-author key <secret>***	vpn_sstp.xml.in: vpn sstp authentication radius dynamic-author key	vpn sstp authentication radius dynamic-author key <value>
✓	***set vpn sstp authentication radius dynamic-author port <port>***	vpn_sstp.xml.in: vpn sstp authentication radius dynamic-author port	vpn sstp authentication radius dynamic-author port <value>
✓	***set vpn sstp authentication radius dynamic-author server <address>***	vpn_sstp.xml.in: vpn sstp authentication radius dynamic-author server	vpn sstp authentication radius dynamic-author server <value>
✓	***set vpn sstp authentication radius max-try <number>***	vpn_sstp.xml.in: vpn sstp authentication radius max-try	vpn sstp authentication radius max-try <value>
✓	***set vpn sstp authentication radius nas-identifier <identifier>***	vpn_sstp.xml.in: vpn sstp authentication radius nas-identifier	vpn sstp authentication radius nas-identifier <value>
✓	***set vpn sstp authentication radius nas-ip-address <address>***	vpn_sstp.xml.in: vpn sstp authentication radius nas-ip-address	vpn sstp authentication radius nas-ip-address <value>
×	not yet documented	vpn_sstp.xml.in: vpn sstp authentication radius preallocate-vif	vpn sstp authentication radius preallocate-vif
✓	***set vpn sstp authentication radius rate-limit attribute <attribute>***	vpn_sstp.xml.in: vpn sstp authentication radius rate-limit attribute	vpn sstp authentication radius rate-limit attribute <value>

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	***set vpn sstp authentication radius rate-limit enable***	vpn_sstp.xml.in: vpn sstp authentication radius rate-limit enable	vpn sstp authentication radius rate-limit enable
×	not yet documented	vpn_sstp.xml.in: vpn sstp authentication radius rate-limit multiplier	vpn sstp authentication radius rate-limit multiplier <value>
✓	***set vpn sstp authentication radius rate-limit vendor***	vpn_sstp.xml.in: vpn sstp authentication radius rate-limit vendor	vpn sstp authentication radius rate-limit vendor <value>
×	not yet documented	vpn_sstp.xml.in: vpn sstp authentication radius server <server> acct-port	vpn sstp authentication radius server <text> acct-port <value>
✓	***set vpn sstp authentication radius server <server> disable***	vpn_sstp.xml.in: vpn sstp authentication radius server <server> disable	vpn sstp authentication radius server <text> disable
×	not yet documented	vpn_sstp.xml.in: vpn sstp authentication radius server <server> disable-accounting	vpn sstp authentication radius server <text> disable-accounting
✓	***set vpn sstp authentication radius server <server> fail-time <time>***	vpn_sstp.xml.in: vpn sstp authentication radius server <server> fail-time	vpn sstp authentication radius server <text> fail-time <value>
✓	***set vpn sstp authentication radius server <server> key <secret>***	vpn_sstp.xml.in: vpn sstp authentication radius server <server> key	vpn sstp authentication radius server <text> key <value>
✓	***set vpn sstp authentication radius server <server> port <port>***	vpn_sstp.xml.in: vpn sstp authentication radius server <server> port	vpn sstp authentication radius server <text> port <value>
✓	***set vpn sstp authentication radius source-address <address>***	vpn_sstp.xml.in: vpn sstp authentication radius source-address	vpn sstp authentication radius source-address <value>
✓	***set vpn sstp authentication radius timeout <timeout>***	vpn_sstp.xml.in: vpn sstp authentication radius timeout	vpn sstp authentication radius timeout <value>
✓	***set vpn sstp client-ip-pool subnet <subnet>***	vpn_sstp.xml.in: vpn sstp client-ip-pool subnet	vpn sstp client-ip-pool subnet <value>

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
✓	*set vpn sstp client-ipv6-pool delegate <address> delegation-prefix <number-of-bits>*	vpn_sstp.xml.in: vpn sstp client-ipv6-pool delegate <delegate> delegation-prefix	vpn sstp client-ipv6-pool delegate <text> delegation-prefix <value>
✓	*set vpn sstp client-ipv6-pool prefix <address> mask <number-of-bits>*	vpn_sstp.xml.in: vpn sstp client-ipv6-pool prefix <prefix> mask	vpn sstp client-ipv6-pool prefix <text> mask <value>
✓	*set vpn sstp gateway-address <gateway>*	vpn_sstp.xml.in: vpn sstp gateway-address	vpn sstp gateway-address <value>
×	not yet documented	vpn_sstp.xml.in: vpn sstp mtu	vpn sstp mtu <value>
✓	*set vpn sstp name-server <address>*	vpn_sstp.xml.in: vpn sstp name-server	vpn sstp name-server <value>
×	not yet documented	vpn_sstp.xml.in: vpn sstp ppp-options ipv4	vpn sstp ppp-options ipv4 <value>
×	not yet documented	vpn_sstp.xml.in: vpn sstp ppp-options ipv6	vpn sstp ppp-options ipv6 <value>
✓	*set vpn sstp ppp-options lcp-echo-failure <number>*	vpn_sstp.xml.in: vpn sstp ppp-options lcp-echo-failure	vpn sstp ppp-options lcp-echo-failure <value>
✓	*set vpn sstp ppp-options lcp-echo-interval <interval>*	vpn_sstp.xml.in: vpn sstp ppp-options lcp-echo-interval	vpn sstp ppp-options lcp-echo-interval <value>
✓	*set vpn sstp ppp-options lcp-echo-timeout*	vpn_sstp.xml.in: vpn sstp ppp-options lcp-echo-timeout	vpn sstp ppp-options lcp-echo-timeout <value>
✓	*set vpn sstp ppp-options mppe <require | prefer | deny>*	vpn_sstp.xml.in: vpn sstp ppp-options mppe	vpn sstp ppp-options mppe <value>
✓	*set vpn sstp ssl ca-cert-file <file>*	vpn_sstp.xml.in: vpn sstp ssl ca-cert-file	vpn sstp ssl ca-cert-file <value>
✓	*set vpn sstp ssl cert-file <file>*	vpn_sstp.xml.in: vpn sstp ssl cert-file	vpn sstp ssl cert-file <value>
✓	*set vpn sstp ssl key-file <file>*	vpn_sstp.xml.in: vpn sstp ssl key-file	vpn sstp ssl key-file <value>
✓	*set vrf bind-to-all*	vrf.xml.in: vrf bind-to-all	vrf bind-to-all
×	*set vrf name <name>*	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	vrf.xml.in: vrf name <name> description	vrf name <text> description <value>

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Table 1 – continued from previous page

Status 1296/4624	Documentation	XML	in VyOS 1.3.3
×	not yet documented	vrf.xml.in: vrf name <name> disable	vrf name <text> disable
✓	*set vrf name <name> table <id>*	vrf.xml.in: vrf name <name> table	vrf name <text> table <value>
✓	*set zone-policy zone <name> default-action [drop | reject]*	Nothing found in XML Definitions	zone-policy zone <text> default-action <value>
✓	*set zone-policy zone <name> description*	Nothing found in XML Definitions	zone-policy zone <text> description <value>
✓	*set zone-policy zone <name> from <name> firewall ipv6-name <rule-set>*	Nothing found in XML Definitions	zone-policy zone <text> from <text> firewall ipv6-name <value>
✓	*set zone-policy zone <name> from <name> firewall name <rule-set>*	Nothing found in XML Definitions	zone-policy zone <text> from <text> firewall name <value>
✓	*set zone-policy zone <name> interface <interfacenames>*	Nothing found in XML Definitions	zone-policy zone <text> interface <value>
✓	*set zone-policy zone <name> local-zone*	Nothing found in XML Definitions	zone-policy zone <text> local-zone

18.2 Operational Commands

Status 181/1791	Documentation	XML	in VyOS 1.3.3
✓	*add container image <containername>*	Nothing found in XML Definitions	add container image <text>
✓	*add raid <RAID-1-device> member <disk-partition>*	Nothing found in XML Definitions	add raid <text> member <text>
✓	*add system image <url | path> [vrf name] [username user [password pass]]*	add-system-image.xml.in: add system image <image>	add system image <text>
×	not yet documented	add-system-image.xml.in: add system image <image> username <username> password <password>	add system image <text> username <text> password <text>
×	not yet documented	add-system-image.xml.in: add system image <image> vrf <vrf>	add system image <text> vrf <text>

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Table 2 – continued from previous page

Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	add-system-image.xml.in: add system image <image> vrf <vrf> username <username> password <password>	add system image <text> vrf <text> username <text> password <text>
×	not yet documented	terminal.xml.in: set builtin <builtin>	set builtin <text>
×	not yet documented	Nothing found in XML Definitions	clear console
×	not yet documented	clear-dhcp-server-lease.xml.in: clear dhcp-server lease <lease>	clear dhcp-server lease <text>
×	not yet documented	Nothing found in XML Definitions	clear firewall ipv6-name <text> counters
×	not yet documented	Nothing found in XML Definitions	clear firewall ipv6-name <text> rule <text> counters
×	not yet documented	Nothing found in XML Definitions	clear firewall name <text> counters
×	not yet documented	Nothing found in XML Definitions	clear firewall name <text> rule <text> counters
×	not yet documented	flow-accounting-op.xml.in: clear flow-accounting counters	clear flow-accounting counters
×	not yet documented	Nothing found in XML Definitions	clear interfaces bonding <text> counters
×	not yet documented	Nothing found in XML Definitions	clear interfaces bridge <text> counters
×	not yet documented	Nothing found in XML Definitions	clear interfaces connection <text>
×	not yet documented	Nothing found in XML Definitions	clear interfaces counters
×	not yet documented	Nothing found in XML Definitions	clear interfaces dummy <text> counters
×	not yet documented	Nothing found in XML Definitions	clear interfaces ethernet <text> counters
×	not yet documented	Nothing found in XML Definitions	clear interfaces l2tpv3 <text> counters
×	not yet documented	Nothing found in XML Definitions	clear interfaces loopback <text> counters
×	not yet documented	Nothing found in XML Definitions	clear interfaces pseudo-ethernet <text> counters
×	not yet documented	Nothing found in XML Definitions	clear interfaces tunnel <text> counters
×	not yet documented	Nothing found in XML Definitions	clear interfaces vti <text> counters

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	wireless.xml.in: clear interfaces wireless <wireless> counters	clear interfaces wireless <text> counters
×	not yet documented	clear-ip.xml.in: clear ip prefix-list <prefix-list>	clear ip prefix-list <text> <text>
×	not yet documented	clear-ip.xml.in: clear ip prefix-list <prefix-list> node.tag	Nothing found in VyOS
×	not yet documented	clear-ipv6.xml.in: clear ipv6 prefix-list <prefix-list>	clear ipv6 prefix-list <text> <text>
×	not yet documented	clear-ipv6.xml.in: clear ipv6 prefix-list <prefix-list> node.tag	Nothing found in VyOS
×	not yet documented	clear-log.xml.in: clear log	clear log
×	not yet documented	Nothing found in XML Definitions	clear nat destination counters
×	not yet documented	Nothing found in XML Definitions	clear nat destination counters rule <text>
×	not yet documented	Nothing found in XML Definitions	clear nat source counters
×	not yet documented	Nothing found in XML Definitions	clear nat source counters rule <text>
×	not yet documented	Nothing found in XML Definitions	clear policy ipv6-route <text> counters
×	not yet documented	Nothing found in XML Definitions	clear policy ipv6-route <text> rule <text> counters
×	not yet documented	Nothing found in XML Definitions	clear policy route <text> counters
×	not yet documented	Nothing found in XML Definitions	clear policy route <text> rule <text> counters
×	not yet documented	Nothing found in XML Definitions	clone system config <text>
×	not yet documented	Nothing found in XML Definitions	clone system config <text> from <text>
×	not yet documented	configure.xml.in: configure	configure
✓	*connect console <device>*	connect.xml.in: connect console <console>	connect console <text>
×	not yet documented	Nothing found in XML Definitions	connect container <text>
✓	*connect interface <interface>*	connect.xml.in: connect interface <interface>	connect interface <text>
×	not yet documented	terminal.xml.in: set console keymap	set console keymap

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Table 2 – continued from previous page

Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	copy file <text> to <text>
×	not yet documented	date.xml.in: set date <date>	set date <text>
×	not yet documented	date.xml.in: set date ntp <ntp>	set date ntp <text>
×	not yet documented	Nothing found in XML Definitions	delete conntrack table ipv4 conn-id <text>
×	not yet documented	Nothing found in XML Definitions	delete conntrack table ipv4 conn-id <text> quiet
×	not yet documented	Nothing found in XML Definitions	delete conntrack table ipv4 source <text>
×	not yet documented	Nothing found in XML Definitions	delete conntrack table ipv4 source <text> destination <text>
×	not yet documented	Nothing found in XML Definitions	delete conntrack table ipv4 source <text> destination <text> quiet
×	not yet documented	Nothing found in XML Definitions	delete conntrack table ipv6 conn-id <text>
×	not yet documented	Nothing found in XML Definitions	delete conntrack table ipv6 conn-id <text> quiet
×	not yet documented	Nothing found in XML Definitions	delete conntrack table ipv6 source <text>
×	not yet documented	Nothing found in XML Definitions	delete conntrack table ipv6 source <text> destination <text>
×	not yet documented	Nothing found in XML Definitions	delete conntrack table ipv6 source <text> destination <text> quiet
×	not yet documented	Nothing found in XML Definitions	delete container image <text>
×	not yet documented	Nothing found in XML Definitions	delete file <text>
✓	***delete log file <text>***	Nothing found in XML Definitions	delete log file <text>
✓	***delete raid <RAID-1-device> member <disk-partition>***	Nothing found in XML Definitions	delete raid <text> member <text>
✓	***delete system image [image-name]***	Nothing found in XML Definitions	delete system image <text>
×	not yet documented	wireguard.xml.in: delete wireguard keypair <keypair>	delete wireguard keypair <text>
×	***delete wireguard keypair pubkey <name>***	Nothing found in XML Definitions	Nothing found in VyOS

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Table 2 – continued from previous page

Status 181/1791	Documentation	XML	in VyOS 1.3.3
✓	*disconnect interface <interface>*	disconnect.xml.in: disconnect interface <interface>	disconnect interface <text>
×	not yet documented	force-arp.xml.in: force arp duplicate interface <interface> address <address>	force arp duplicate interface <text> address <text>
×	not yet documented	force-arp.xml.in: force arp reply interface <interface> address <address>	force arp reply interface <text> address <text>
×	not yet documented	force-arp.xml.in: force arp reply interface <interface> address <address> count <count>	force arp reply interface <text> address <text> count <text>
×	not yet documented	force-arp.xml.in: force arp request interface <interface> address <address>	force arp request interface <text> address <text>
×	not yet documented	force-arp.xml.in: force arp request interface <interface> address <address> count <count>	force arp request interface <text> address <text> count <text>
×	not yet documented	Nothing found in XML Definitions	force cluster active
×	not yet documented	Nothing found in XML Definitions	force cluster standby
×	*force ipv6-nd interface <interface> address <ipv6-address>*	Nothing found in XML Definitions	Nothing found in VyOS
×	*force ipv6-rd interface <interface> [address <ipv6-address>]*	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	force-ipv6.xml.in: force ipv6 nd interface <interface> address <address>	force ipv6 nd interface <text> address <text>
×	not yet documented	force-ipv6.xml.in: force ipv6 rd interface <interface>	force ipv6 rd interface <text>
×	not yet documented	force-ipv6.xml.in: force ipv6 rd interface <interface> address <address>	force ipv6 rd interface <text> address <text>
×	not yet documented	force-mtu-host.xml.in: force mtu host <host>	force mtu host <text>

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	force-mtu-host.xml.in: force mtu host <host> interface <interface>	force mtu host <text> interface <text>
×	not yet documented	force-root-partition-auto-resize.xml.in: force root-partition-auto-resize	force root-partition-auto-resize
✓	*format disk <disk-device1> like <disk-device2>*	Nothing found in XML Definitions	format disk <text> like <text>
×	not yet documented	Nothing found in XML Definitions	generate container image <text> path <text>
×	not yet documented	generate-interfaces-debug-archive.xml.in: generate interfaces debug-archive	Nothing found in VyOS
×	not yet documented	generate-ipsec-debug-archive.xml.in: generate ipsec debug-archive	generate ipsec debug-archive
×	not yet documented	generate-macsec-key.xml.in: generate macsec mka-cak	generate macsec mka-cak
×	not yet documented	generate-macsec-key.xml.in: generate macsec mka-ckn	generate macsec mka-ckn
×	not yet documented	Nothing found in XML Definitions	generate openvpn key <text>
✓	*generate public-key-command user <username> path <location>*	generate-public-key-command.xml.in: generate public-key-command user <user> path <path>	generate public-key-command user <text> path <text>
×	not yet documented	generate-ssh-server-key.xml.in: generate ssh client-key <client-key>	generate ssh client-key <text>
×	*generate ssh client-key /path/to/private_key*	Nothing found in XML Definitions	Nothing found in VyOS
✓	*generate ssh server-key*	generate-ssh-server-key.xml.in: generate ssh server-key	generate ssh server-key
×	not yet documented	Nothing found in XML Definitions	generate tech-support archive <text>
×	not yet documented	Nothing found in XML Definitions	generate vpn rsa-key
×	not yet documented	Nothing found in XML Definitions	generate vpn rsa-key <value>.in

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Table 2 – continued from previous page

Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	generate vpn rsa-key bits <text>
×	not yet documented	Nothing found in XML Definitions	generate vpn rsa-key bits <text> <value>.in
×	not yet documented	Nothing found in XML Definitions	generate vpn x509 key-pair <text>
×	not yet documented	Nothing found in XML Definitions	generate vpn x509 key-pair <text> <value>.in
×	not yet documented	Nothing found in XML Definitions	generate wireguard client-config <text> interface <text> server <text>
✓	*generate wireguard client-config <name> interface <interface> server <ip|fqdn> address <client-ip>*	Nothing found in XML Definitions	generate wireguard client-config <text> interface <text> server <text> address <text>
×	not yet documented	Nothing found in XML Definitions	generate wireguard client-config <text> interface <text> server <text> address <text> address <text>
✓	*generate wireguard default-keypair*	Nothing found in XML Definitions	generate wireguard default-keypair
✓	*generate wireguard named-keypairs <name>*	Nothing found in XML Definitions	generate wireguard named-keypairs <text>
×	not yet documented	Nothing found in XML Definitions	generate wireguard preshared-key
×	not yet documented	Nothing found in XML Definitions	install image
×	not yet documented	monitor-bandwidth-test.xml.in: monitor bandwidth-test accept	monitor bandwidth-test accept
×	not yet documented	monitor-bandwidth-test.xml.in: monitor bandwidth-test initiate <initiate>	monitor bandwidth-test initiate <text>
×	not yet documented	monitor-bandwidth.xml.in: monitor bandwidth interface <interface>	monitor bandwidth interface <text>
×	not yet documented	Nothing found in XML Definitions	monitor cluster
×	not yet documented	Nothing found in XML Definitions	monitor cluster background start
×	not yet documented	Nothing found in XML Definitions	monitor cluster background stop

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Table 2 – continued from previous page

Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	monitor command <text>
×	not yet documented	Nothing found in XML Definitions	monitor conntrack-sync
×	not yet documented	Nothing found in XML Definitions	monitor conntrack-sync background start
×	not yet documented	Nothing found in XML Definitions	monitor conntrack-sync background stop
×	not yet documented	Nothing found in XML Definitions	monitor content-inspection
×	not yet documented	Nothing found in XML Definitions	monitor content-inspection background start
×	not yet documented	Nothing found in XML Definitions	monitor content-inspection background stop
×	not yet documented	Nothing found in XML Definitions	monitor dhcp
×	not yet documented	Nothing found in XML Definitions	monitor dhcp background start
×	not yet documented	Nothing found in XML Definitions	monitor dhcp background stop
×	not yet documented	Nothing found in XML Definitions	monitor dns dynamic
×	not yet documented	Nothing found in XML Definitions	monitor dns dynamic background start
×	not yet documented	Nothing found in XML Definitions	monitor dns dynamic background stop
×	not yet documented	Nothing found in XML Definitions	monitor dns forwarding
×	not yet documented	Nothing found in XML Definitions	monitor dns forwarding background start
×	not yet documented	Nothing found in XML Definitions	monitor dns forwarding background stop
×	not yet documented	Nothing found in XML Definitions	monitor firewall ipv6-name <text>
×	not yet documented	Nothing found in XML Definitions	monitor firewall ipv6-name <text> background start
×	not yet documented	Nothing found in XML Definitions	monitor firewall ipv6-name <text> background stop
×	not yet documented	Nothing found in XML Definitions	monitor firewall ipv6-name <text> rule <text>
×	not yet documented	Nothing found in XML Definitions	monitor firewall ipv6-name <text> rule <text> background start
×	not yet documented	Nothing found in XML Definitions	monitor firewall ipv6-name <text> rule <text> background stop

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	monitor firewall name <text>
×	not yet documented	Nothing found in XML Definitions	monitor firewall name <text> background start
×	not yet documented	Nothing found in XML Definitions	monitor firewall name <text> background stop
×	not yet documented	Nothing found in XML Definitions	monitor firewall name <text> rule <text>
×	not yet documented	Nothing found in XML Definitions	monitor firewall name <text> rule <text> background start
×	not yet documented	Nothing found in XML Definitions	monitor firewall name <text> rule <text> background stop
×	not yet documented	Nothing found in XML Definitions	monitor https
×	not yet documented	Nothing found in XML Definitions	monitor https background start
×	not yet documented	Nothing found in XML Definitions	monitor https background stop
×	not yet documented	Nothing found in XML Definitions	monitor lldp
×	not yet documented	Nothing found in XML Definitions	monitor lldp background start
×	not yet documented	Nothing found in XML Definitions	monitor lldp background stop
×	not yet documented	monitor-log.xml.in: monitor log	monitor log
×	not yet documented	monitor-log.xml.in: monitor log colored	monitor log colored
×	not yet documented	Nothing found in XML Definitions	monitor log container <text>
×	not yet documented	monitor-log.xml.in: monitor log dhcp client	monitor log dhcp client
×	not yet documented	monitor-log.xml.in: monitor log dhcp client interface <interface>	monitor log dhcp client interface <text>
×	not yet documented	monitor-log.xml.in: monitor log dhcp server	monitor log dhcp server
×	not yet documented	monitor-log.xml.in: monitor log dhcpv6 client	monitor log dhcpv6 client
×	not yet documented	monitor-log.xml.in: monitor log dhcpv6 client interface <interface>	monitor log dhcpv6 client interface <text>
×	not yet documented	monitor-log.xml.in: monitor log dhcpv6 server	monitor log dhcpv6 server
×	not yet documented	monitor-log.xml.in: monitor log https	monitor log https
×	not yet documented	monitor-log.xml.in: monitor log ipoe-server	monitor log ipoe-server

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	monitor-log.xml.in: monitor log lldp	monitor log lldp
×	not yet documented	monitor-log.xml.in: monitor log openvpn	monitor log openvpn
×	not yet documented	monitor-log.xml.in: monitor log openvpn interface <interface>	monitor log openvpn interface <text>
×	not yet documented	monitor-log.xml.in: monitor log pppoe	monitor log pppoe
×	not yet documented	monitor-log.xml.in: monitor log pppoe-server	monitor log pppoe-server
×	not yet documented	monitor-log.xml.in: monitor log pppoe interface <interface>	monitor log pppoe interface <text>
×	not yet documented	monitor-log.xml.in: monitor log snmp	monitor log snmp
×	not yet documented	monitor-log.xml.in: monitor log vrrp	monitor log vrrp
×	not yet documented	monitor-log.xml.in: monitor log webproxy	monitor log webproxy
×	not yet documented	Nothing found in XML Definitions	monitor nat destination
×	not yet documented	Nothing found in XML Definitions	monitor nat destination background start
×	not yet documented	Nothing found in XML Definitions	monitor nat destination background stop
×	not yet documented	Nothing found in XML Definitions	monitor nat destination rule <text>
×	not yet documented	Nothing found in XML Definitions	monitor nat destination rule <text> background start
×	not yet documented	Nothing found in XML Definitions	monitor nat destination rule <text> background stop
×	not yet documented	Nothing found in XML Definitions	monitor nat destination translations
×	not yet documented	Nothing found in XML Definitions	monitor nat destination translations detail
×	not yet documented	Nothing found in XML Definitions	monitor nat source
×	not yet documented	Nothing found in XML Definitions	monitor nat source background start
×	not yet documented	Nothing found in XML Definitions	monitor nat source background stop
×	not yet documented	Nothing found in XML Definitions	monitor nat source rule <text>
×	not yet documented	Nothing found in XML Definitions	monitor nat source rule <text> background start
×	not yet documented	Nothing found in XML Definitions	monitor nat source rule <text> background stop

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	monitor nat source translations
×	not yet documented	Nothing found in XML Definitions	monitor nat source translations detail
×	not yet documented	monitor-ndp.xml.in: monitor ndp	monitor ndp
×	not yet documented	monitor-ndp.xml.in: monitor ndp interface <interface>	monitor ndp interface <text>
×	not yet documented	monitor-ndp.xml.in: monitor ndp interface <interface> type <type>	monitor ndp interface <text> type <text>
×	not yet documented	monitor-ndp.xml.in: monitor ndp type <type>	monitor ndp type <text>
×	not yet documented	Nothing found in XML Definitions	monitor openvpn
×	not yet documented	Nothing found in XML Definitions	monitor openvpn background start
×	not yet documented	Nothing found in XML Definitions	monitor openvpn background stop
×	not yet documented	Nothing found in XML Definitions	monitor openvpn interface <text>
×	not yet documented	Nothing found in XML Definitions	monitor openvpn interface <text> background start
×	not yet documented	Nothing found in XML Definitions	monitor openvpn interface <text> background stop
×	not yet documented	monitor-protocol.xml.in: monitor protocol bgp background start	monitor protocol bgp background start
×	not yet documented	monitor-protocol.xml.in: monitor protocol bgp background stop	monitor protocol bgp background stop
×	not yet documented	monitor-protocol.xml.in: monitor protocol bgp disable all	monitor protocol bgp disable all
×	not yet documented	monitor-protocol.xml.in: monitor protocol bgp disable allow-martians	monitor protocol bgp disable allow-martians
×	not yet documented	monitor-protocol.xml.in: monitor protocol bgp disable as4	monitor protocol bgp disable as4
×	not yet documented	monitor-protocol.xml.in: monitor protocol bgp disable bestpath <bestpath>	monitor protocol bgp disable bestpath <text>
×	not yet documented	monitor-protocol.xml.in: monitor protocol bgp disable flowspec	monitor protocol bgp disable flowspec
×	not yet documented	monitor-protocol.xml.in: monitor protocol bgp disable keepalives	monitor protocol bgp disable keepalives

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	monitor-protocol.xml.in: monitor protocol bgp disable labelpool	monitor protocol bgp disable labelpool
×	not yet documented	monitor-protocol.xml.in: monitor protocol bgp disable neighbor-events	monitor protocol bgp disable neighbor-events
×	not yet documented	monitor-protocol.xml.in: monitor protocol bgp disable nht	monitor protocol bgp disable nht
×	not yet documented	monitor-protocol.xml.in: monitor protocol bgp disable pbr	monitor protocol bgp disable pbr
×	not yet documented	monitor-protocol.xml.in: monitor protocol bgp disable rib	monitor protocol bgp disable rib
×	not yet documented	monitor-protocol.xml.in: monitor protocol bgp disable update-groups	monitor protocol bgp disable update-groups
×	not yet documented	monitor-protocol.xml.in: monitor protocol bgp disable updates	monitor protocol bgp disable updates
×	not yet documented	monitor-protocol.xml.in: monitor protocol bgp disable vnc	monitor protocol bgp disable vnc
×	not yet documented	monitor-protocol.xml.in: monitor protocol bgp disable vnc import-bi-attach	monitor protocol bgp disable vnc import-bi-attach
×	not yet documented	monitor-protocol.xml.in: monitor protocol bgp disable vnc import-del-remote	monitor protocol bgp disable vnc import-del-remote
×	not yet documented	monitor-protocol.xml.in: monitor protocol bgp disable vnc rfapi-query	monitor protocol bgp disable vnc rfapi-query
×	not yet documented	monitor-protocol.xml.in: monitor protocol bgp disable vnc verbose	monitor protocol bgp disable vnc verbose
×	not yet documented	monitor-protocol.xml.in: monitor protocol bgp enable allow-martians	monitor protocol bgp enable allow-martians
×	not yet documented	monitor-protocol.xml.in: monitor protocol bgp enable as4	monitor protocol bgp enable as4
×	not yet documented	monitor-protocol.xml.in: monitor protocol bgp enable bestpath <bestpath>	monitor protocol bgp enable bestpath <text>
×	not yet documented	monitor-protocol.xml.in: monitor protocol bgp enable flowspec	monitor protocol bgp enable flowspec

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	monitor-protocol.xml.in: monitor protocol bgp enable keepalives	monitor protocol bgp enable keepalives
×	not yet documented	monitor-protocol.xml.in: monitor protocol bgp enable labelpool	monitor protocol bgp enable labelpool
×	not yet documented	monitor-protocol.xml.in: monitor protocol bgp enable neighbor-events	monitor protocol bgp enable neighbor-events
×	not yet documented	monitor-protocol.xml.in: monitor protocol bgp enable nht	monitor protocol bgp enable nht
×	not yet documented	monitor-protocol.xml.in: monitor protocol bgp enable pbr	monitor protocol bgp enable pbr
×	not yet documented	monitor-protocol.xml.in: monitor protocol bgp enable rib	monitor protocol bgp enable rib
×	not yet documented	monitor-protocol.xml.in: monitor protocol bgp enable update-groups	monitor protocol bgp enable update-groups
×	not yet documented	monitor-protocol.xml.in: monitor protocol bgp enable updates	monitor protocol bgp enable updates
×	not yet documented	monitor-protocol.xml.in: monitor protocol bgp enable vnc	monitor protocol bgp enable vnc
×	not yet documented	monitor-protocol.xml.in: monitor protocol bgp enable vnc import-bi-attach	monitor protocol bgp enable vnc import-bi-attach
×	not yet documented	monitor-protocol.xml.in: monitor protocol bgp enable vnc import-del-remote	monitor protocol bgp enable vnc import-del-remote
×	not yet documented	monitor-protocol.xml.in: monitor protocol bgp enable vnc rfapi-query	monitor protocol bgp enable vnc rfapi-query
×	not yet documented	monitor-protocol.xml.in: monitor protocol bgp enable vnc verbose	monitor protocol bgp enable vnc verbose
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf background start	monitor protocol ospf background start
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf background stop	monitor protocol ospf background stop
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable event	monitor protocol ospf disable event

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable ism	monitor protocol ospf disable ism
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable ism events	monitor protocol ospf disable ism events
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable ism status	monitor protocol ospf disable ism status
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable ism timers	monitor protocol ospf disable ism timers
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable lsa	monitor protocol ospf disable lsa
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable lsa flooding	monitor protocol ospf disable lsa flooding
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable lsa generate	monitor protocol ospf disable lsa generate
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable lsa install	monitor protocol ospf disable lsa install
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable lsa refresh	monitor protocol ospf disable lsa refresh
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable nsm	monitor protocol ospf disable nsm
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable nsm events	monitor protocol ospf disable nsm events
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable nsm status	monitor protocol ospf disable nsm status
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable nsm timers	monitor protocol ospf disable nsm timers
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable nssa	monitor protocol ospf disable nssa
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable packet	monitor protocol ospf disable packet
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable packet all	monitor protocol ospf disable packet all

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable packet all detail	monitor protocol ospf disable packet all detail
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable packet all recv	monitor protocol ospf disable packet all recv
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable packet all recv detail	monitor protocol ospf disable packet all recv detail
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable packet all send	monitor protocol ospf disable packet all send
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable packet all send detail	monitor protocol ospf disable packet all send detail
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable packet dd	monitor protocol ospf disable packet dd
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable packet dd detail	monitor protocol ospf disable packet dd detail
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable packet dd recv	monitor protocol ospf disable packet dd recv
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable packet dd recv detail	monitor protocol ospf disable packet dd recv detail
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable packet dd send	monitor protocol ospf disable packet dd send
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable packet dd send detail	monitor protocol ospf disable packet dd send detail
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable packet hello	monitor protocol ospf disable packet hello
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable packet hello detail	monitor protocol ospf disable packet hello detail
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable packet hello recv	monitor protocol ospf disable packet hello recv
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable packet hello recv detail	monitor protocol ospf disable packet hello recv detail
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable packet hello send	monitor protocol ospf disable packet hello send

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable packet hello send detail	monitor protocol ospf disable packet hello send detail
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable packet ls-ack	monitor protocol ospf disable packet ls-ack
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable packet ls-ack detail	monitor protocol ospf disable packet ls-ack detail
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable packet ls-ack recv	monitor protocol ospf disable packet ls-ack recv
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable packet ls-ack recv detail	monitor protocol ospf disable packet ls-ack recv detail
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable packet ls-ack send	monitor protocol ospf disable packet ls-ack send
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable packet ls-ack send detail	monitor protocol ospf disable packet ls-ack send detail
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable packet ls-request	monitor protocol ospf disable packet ls-request
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable packet ls-request detail	monitor protocol ospf disable packet ls-request detail
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable packet ls-request recv	monitor protocol ospf disable packet ls-request recv
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable packet ls-request recv detail	monitor protocol ospf disable packet ls-request recv detail
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable packet ls-request send	monitor protocol ospf disable packet ls-request send
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable packet ls-request send detail	monitor protocol ospf disable packet ls-request send detail
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable packet ls-update	monitor protocol ospf disable packet ls-update

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Table 2 – continued from previous page

Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable packet ls-update detail	monitor protocol ospf disable packet ls-update detail
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable packet ls-update recv	monitor protocol ospf disable packet ls-update recv
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable packet ls-update recv detail	monitor protocol ospf disable packet ls-update recv detail
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable packet ls-update send	monitor protocol ospf disable packet ls-update send
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable packet ls-update send detail	monitor protocol ospf disable packet ls-update send detail
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable rib	monitor protocol ospf disable rib
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable rib interface	monitor protocol ospf disable rib interface
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf disable rib redistribute	monitor protocol ospf disable rib redistribute
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable event	monitor protocol ospf enable event
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable ism	monitor protocol ospf enable ism
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable ism events	monitor protocol ospf enable ism events
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable ism status	monitor protocol ospf enable ism status
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable ism timers	monitor protocol ospf enable ism timers
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable lsa	monitor protocol ospf enable lsa
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable lsa flooding	monitor protocol ospf enable lsa flooding

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Table 2 – continued from previous page

Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable lsa generate	monitor protocol ospf enable lsa generate
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable lsa install	monitor protocol ospf enable lsa install
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable lsa refresh	monitor protocol ospf enable lsa refresh
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable nsm	monitor protocol ospf enable nsm
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable nsm events	monitor protocol ospf enable nsm events
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable nsm status	monitor protocol ospf enable nsm status
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable nsm timers	monitor protocol ospf enable nsm timers
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable nssa	monitor protocol ospf enable nssa
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable packet	monitor protocol ospf enable packet
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable packet all	monitor protocol ospf enable packet all
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable packet all detail	monitor protocol ospf enable packet all detail
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable packet all recv	monitor protocol ospf enable packet all recv
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable packet all recv detail	monitor protocol ospf enable packet all recv detail
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable packet all send	monitor protocol ospf enable packet all send
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable packet all send detail	monitor protocol ospf enable packet all send detail
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable packet dd	monitor protocol ospf enable packet dd

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Table 2 – continued from previous page

Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable packet dd detail	monitor protocol ospf enable packet dd detail
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable packet dd recv	monitor protocol ospf enable packet dd recv
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable packet dd recv detail	monitor protocol ospf enable packet dd recv detail
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable packet dd send	monitor protocol ospf enable packet dd send
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable packet dd send detail	monitor protocol ospf enable packet dd send detail
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable packet hello	monitor protocol ospf enable packet hello
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable packet hello detail	monitor protocol ospf enable packet hello detail
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable packet hello recv	monitor protocol ospf enable packet hello recv
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable packet hello recv detail	monitor protocol ospf enable packet hello recv detail
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable packet hello send	monitor protocol ospf enable packet hello send
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable packet hello send detail	monitor protocol ospf enable packet hello send detail
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable packet ls-ack	monitor protocol ospf enable packet ls-ack
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable packet ls-ack detail	monitor protocol ospf enable packet ls-ack detail
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable packet ls-ack recv	monitor protocol ospf enable packet ls-ack recv
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable packet ls-ack recv detail	monitor protocol ospf enable packet ls-ack recv detail

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Table 2 – continued from previous page

Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable packet ls-ack send	monitor protocol ospf enable packet ls-ack send
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable packet ls-ack send detail	monitor protocol ospf enable packet ls-ack send detail
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable packet ls-request	monitor protocol ospf enable packet ls-request
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable packet ls-request detail	monitor protocol ospf enable packet ls-request detail
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable packet ls-request recv	monitor protocol ospf enable packet ls-request recv
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable packet ls-request recv detail	monitor protocol ospf enable packet ls-request recv detail
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable packet ls-request send	monitor protocol ospf enable packet ls-request send
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable packet ls-request send detail	monitor protocol ospf enable packet ls-request send detail
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable packet ls-update	monitor protocol ospf enable packet ls-update
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable packet ls-update detail	monitor protocol ospf enable packet ls-update detail
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable packet ls-update recv	monitor protocol ospf enable packet ls-update recv
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable packet ls-update recv detail	monitor protocol ospf enable packet ls-update recv detail
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable packet ls-update send	monitor protocol ospf enable packet ls-update send
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable packet ls-update send detail	monitor protocol ospf enable packet ls-update send detail

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Table 2 – continued from previous page

Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable rib	monitor protocol ospf enable rib
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable rib interface	monitor protocol ospf enable rib interface
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospf enable rib redistribute	monitor protocol ospf enable rib redistribute
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 background start	monitor protocol ospfv3 background start
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 background stop	monitor protocol ospfv3 background stop
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 disable abr	monitor protocol ospfv3 disable abr
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 disable asbr	monitor protocol ospfv3 disable asbr
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 disable border-routers	monitor protocol ospfv3 disable border-routers
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 disable border-routers area-id	monitor protocol ospfv3 disable border-routers area-id
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 disable border-routers router-id	monitor protocol ospfv3 disable border-routers router-id
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 disable flooding	monitor protocol ospfv3 disable flooding
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 disable interface	monitor protocol ospfv3 disable interface
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 disable lsa	monitor protocol ospfv3 disable lsa
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 disable lsa as-external	monitor protocol ospfv3 disable lsa as-external
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 disable lsa inter-prefix	monitor protocol ospfv3 disable lsa inter-prefix
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 disable lsa inter-router	monitor protocol ospfv3 disable lsa inter-router

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Table 2 – continued from previous page

Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 disable lsa intra-prefix	monitor protocol ospfv3 disable lsa intra-prefix
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 disable lsa link	monitor protocol ospfv3 disable lsa link
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 disable lsa network	monitor protocol ospfv3 disable lsa network
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 disable lsa router	monitor protocol ospfv3 disable lsa router
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 disable lsa unknown	monitor protocol ospfv3 disable lsa unknown
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 disable message	monitor protocol ospfv3 disable message
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 disable message all	monitor protocol ospfv3 disable message all
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 disable message dbdesc	monitor protocol ospfv3 disable message dbdesc
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 disable message hello	monitor protocol ospfv3 disable message hello
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 disable message lsack	monitor protocol ospfv3 disable message lsack
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 disable message lsreq	monitor protocol ospfv3 disable message lsreq
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 disable message lsupdate	monitor protocol ospfv3 disable message lsupdate
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 disable message unknown	monitor protocol ospfv3 disable message unknown
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 disable neighbor	monitor protocol ospfv3 disable neighbor
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 disable neighbor event	monitor protocol ospfv3 disable neighbor event
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 disable neighbor state	monitor protocol ospfv3 disable neighbor state

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 disable rib	monitor protocol ospfv3 disable rib
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 disable rib recv	monitor protocol ospfv3 disable rib recv
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 disable rib send	monitor protocol ospfv3 disable rib send
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 disable route	monitor protocol ospfv3 disable route
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 disable route inter-area	monitor protocol ospfv3 disable route inter-area
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 disable route intra-area	monitor protocol ospfv3 disable route intra-area
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 disable route memory	monitor protocol ospfv3 disable route memory
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 disable route table	monitor protocol ospfv3 disable route table
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 disable spf	monitor protocol ospfv3 disable spf
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 disable spf database	monitor protocol ospfv3 disable spf database
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 disable spf process	monitor protocol ospfv3 disable spf process
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 disable spf time	monitor protocol ospfv3 disable spf time
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 enable abr	monitor protocol ospfv3 enable abr
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 enable asbr	monitor protocol ospfv3 enable asbr
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 enable border-routers	monitor protocol ospfv3 enable border-routers
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 enable border-routers area-id	monitor protocol ospfv3 enable border-routers area-id

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 enable border-routers router-id	monitor protocol ospfv3 enable border-routers router-id
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 enable flooding	monitor protocol ospfv3 enable flooding
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 enable interface	monitor protocol ospfv3 enable interface
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 enable lsa	monitor protocol ospfv3 enable lsa
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 enable lsa as-external	monitor protocol ospfv3 enable lsa as-external
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 enable lsa inter-prefix	monitor protocol ospfv3 enable lsa inter-prefix
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 enable lsa inter-router	monitor protocol ospfv3 enable lsa inter-router
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 enable lsa intra-prefix	monitor protocol ospfv3 enable lsa intra-prefix
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 enable lsa link	monitor protocol ospfv3 enable lsa link
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 enable lsa network	monitor protocol ospfv3 enable lsa network
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 enable lsa router	monitor protocol ospfv3 enable lsa router
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 enable lsa unknown	monitor protocol ospfv3 enable lsa unknown
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 enable message	monitor protocol ospfv3 enable message
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 enable message all	monitor protocol ospfv3 enable message all
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 enable message dbdesc	monitor protocol ospfv3 enable message dbdesc
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 enable message hello	monitor protocol ospfv3 enable message hello

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 enable message lsack	monitor protocol ospfv3 enable message lsack
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 enable message lsreq	monitor protocol ospfv3 enable message lsreq
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 enable message lsupdate	monitor protocol ospfv3 enable message lsupdate
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 enable message unknown	monitor protocol ospfv3 enable message unknown
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 enable neighbor	monitor protocol ospfv3 enable neighbor
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 enable neighbor event	monitor protocol ospfv3 enable neighbor event
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 enable neighbor state	monitor protocol ospfv3 enable neighbor state
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 enable rib	monitor protocol ospfv3 enable rib
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 enable rib recv	monitor protocol ospfv3 enable rib recv
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 enable rib send	monitor protocol ospfv3 enable rib send
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 enable route	monitor protocol ospfv3 enable route
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 enable route inter-area	monitor protocol ospfv3 enable route inter-area
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 enable route intra-area	monitor protocol ospfv3 enable route intra-area
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 enable route memory	monitor protocol ospfv3 enable route memory
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 enable route table	monitor protocol ospfv3 enable route table
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 enable spf	monitor protocol ospfv3 enable spf

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 enable spf database	monitor protocol ospfv3 enable spf database
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 enable spf process	monitor protocol ospfv3 enable spf process
×	not yet documented	monitor-protocol.xml.in: monitor protocol ospfv3 enable spf time	monitor protocol ospfv3 enable spf time
×	not yet documented	monitor-protocol.xml.in: monitor protocol rib background start	monitor protocol rib background start
×	not yet documented	monitor-protocol.xml.in: monitor protocol rib background stop	monitor protocol rib background stop
×	not yet documented	monitor-protocol.xml.in: monitor protocol rib disable events	monitor protocol rib disable events
×	not yet documented	monitor-protocol.xml.in: monitor protocol rib disable kernel	monitor protocol rib disable kernel
×	not yet documented	monitor-protocol.xml.in: monitor protocol rib disable mpls	monitor protocol rib disable mpls
×	not yet documented	monitor-protocol.xml.in: monitor protocol rib disable nexthop	monitor protocol rib disable nexthop
×	not yet documented	monitor-protocol.xml.in: monitor protocol rib disable packet	monitor protocol rib disable packet
×	not yet documented	monitor-protocol.xml.in: monitor protocol rib disable packet detail	monitor protocol rib disable packet detail
×	not yet documented	monitor-protocol.xml.in: monitor protocol rib disable packet recv	monitor protocol rib disable packet recv
×	not yet documented	monitor-protocol.xml.in: monitor protocol rib disable packet send	monitor protocol rib disable packet send
×	not yet documented	monitor-protocol.xml.in: monitor protocol rib disable rib	monitor protocol rib disable rib
×	not yet documented	monitor-protocol.xml.in: monitor protocol rib disable rib detailed	monitor protocol rib disable rib detailed
×	not yet documented	monitor-protocol.xml.in: monitor protocol rib enable events	monitor protocol rib enable events

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	monitor-protocol.xml.in: monitor protocol rib enable kernel	monitor protocol rib enable kernel
×	not yet documented	monitor-protocol.xml.in: monitor protocol rib enable mpls	monitor protocol rib enable mpls
×	not yet documented	monitor-protocol.xml.in: monitor protocol rib enable nexthop	monitor protocol rib enable nexthop
×	not yet documented	monitor-protocol.xml.in: monitor protocol rib enable packet	monitor protocol rib enable packet
×	not yet documented	monitor-protocol.xml.in: monitor protocol rib enable packet detail	monitor protocol rib enable packet detail
×	not yet documented	monitor-protocol.xml.in: monitor protocol rib enable packet recv	monitor protocol rib enable packet recv
×	not yet documented	monitor-protocol.xml.in: monitor protocol rib enable packet send	monitor protocol rib enable packet send
×	not yet documented	monitor-protocol.xml.in: monitor protocol rib enable rib	monitor protocol rib enable rib
×	not yet documented	monitor-protocol.xml.in: monitor protocol rib enable rib detailed	monitor protocol rib enable rib detailed
×	not yet documented	monitor-protocol.xml.in: monitor protocol rip background start	monitor protocol rip background start
×	not yet documented	monitor-protocol.xml.in: monitor protocol rip background stop	monitor protocol rip background stop
×	not yet documented	monitor-protocol.xml.in: monitor protocol rip disable all	monitor protocol rip disable all
×	not yet documented	monitor-protocol.xml.in: monitor protocol rip disable events	monitor protocol rip disable events
×	not yet documented	monitor-protocol.xml.in: monitor protocol rip disable packet	monitor protocol rip disable packet
×	not yet documented	monitor-protocol.xml.in: monitor protocol rip disable packet recv	monitor protocol rip disable packet recv
×	not yet documented	monitor-protocol.xml.in: monitor protocol rip disable packet send	monitor protocol rip disable packet send

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	monitor-protocol.xml.in: monitor protocol rip disable rib	monitor protocol rip disable rib
×	not yet documented	monitor-protocol.xml.in: monitor protocol rip enable events	monitor protocol rip enable events
×	not yet documented	monitor-protocol.xml.in: monitor protocol rip enable packet	monitor protocol rip enable packet
×	not yet documented	monitor-protocol.xml.in: monitor protocol rip enable packet recv	monitor protocol rip enable packet recv
×	not yet documented	monitor-protocol.xml.in: monitor protocol rip enable packet send	monitor protocol rip enable packet send
×	not yet documented	monitor-protocol.xml.in: monitor protocol rip enable rib	monitor protocol rip enable rib
×	not yet documented	monitor-protocol.xml.in: monitor protocol ripng background start	monitor protocol ripng background start
×	not yet documented	monitor-protocol.xml.in: monitor protocol ripng background stop	monitor protocol ripng background stop
×	not yet documented	monitor-protocol.xml.in: monitor protocol ripng disable all	monitor protocol ripng disable all
×	not yet documented	monitor-protocol.xml.in: monitor protocol ripng disable events	monitor protocol ripng disable events
×	not yet documented	monitor-protocol.xml.in: monitor protocol ripng disable packet	monitor protocol ripng disable packet
×	not yet documented	monitor-protocol.xml.in: monitor protocol ripng disable packet recv	monitor protocol ripng disable packet recv
×	not yet documented	monitor-protocol.xml.in: monitor protocol ripng disable packet send	monitor protocol ripng disable packet send
×	not yet documented	monitor-protocol.xml.in: monitor protocol ripng disable rib	monitor protocol ripng disable rib
×	not yet documented	monitor-protocol.xml.in: monitor protocol ripng enable events	monitor protocol ripng enable events
×	not yet documented	monitor-protocol.xml.in: monitor protocol ripng enable packet	monitor protocol ripng enable packet

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	monitor-protocol.xml.in: monitor protocol ripng enable packet recv	monitor protocol ripng enable packet recv
×	not yet documented	monitor-protocol.xml.in: monitor protocol ripng enable packet send	monitor protocol ripng enable packet send
×	not yet documented	monitor-protocol.xml.in: monitor protocol ripng enable rib	monitor protocol ripng enable rib
×	not yet documented	Nothing found in XML Definitions	monitor snmp
×	not yet documented	Nothing found in XML Definitions	monitor snmp background start
×	not yet documented	Nothing found in XML Definitions	monitor snmp background stop
×	not yet documented	Nothing found in XML Definitions	monitor stop-all
✓	*monitor traceroute <destination>*	traceroute.xml.in: monitor traceroute <traceroute>	monitor traceroute <text>
×	not yet documented	traceroute.xml.in: monitor traceroute ipv4 <ipv4>	monitor traceroute ipv4 <text>
×	not yet documented	traceroute.xml.in: monitor traceroute ipv6 <ipv6>	monitor traceroute ipv6 <text>
×	not yet documented	traceroute.xml.in: monitor traceroute vrf <vrf> <>	monitor traceroute vrf <text> <text>
×	not yet documented	traceroute.xml.in: monitor traceroute vrf <vrf> ipv4 <ipv4>	monitor traceroute vrf <text> ipv4 <text>
×	not yet documented	traceroute.xml.in: monitor traceroute vrf <vrf> ipv6 <ipv6>	monitor traceroute vrf <text> ipv6 <text>
×	not yet documented	traffic-dump.xml.in: monitor traffic interface <interface>	monitor traffic interface <text>
×	not yet documented	traffic-dump.xml.in: monitor traffic interface <interface> filter <filter>	monitor traffic interface <text> filter <text>
×	not yet documented	traffic-dump.xml.in: monitor traffic interface <interface> save <save>	monitor traffic interface <text> save <text>
×	not yet documented	traffic-dump.xml.in: monitor traffic interface <interface> save <save> filter <filter>	monitor traffic interface <text> save <text> filter <text>
×	not yet documented	Nothing found in XML Definitions	monitor vpn all

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	monitor vpn all background start
×	not yet documented	Nothing found in XML Definitions	monitor vpn all background stop
×	not yet documented	Nothing found in XML Definitions	monitor vpn ipsec
×	not yet documented	Nothing found in XML Definitions	monitor vpn ipsec background start
×	not yet documented	Nothing found in XML Definitions	monitor vpn ipsec background stop
×	not yet documented	Nothing found in XML Definitions	monitor vpn l2tp
×	not yet documented	Nothing found in XML Definitions	monitor vpn l2tp background start
×	not yet documented	Nothing found in XML Definitions	monitor vpn l2tp background stop
×	not yet documented	Nothing found in XML Definitions	monitor vpn pptp
×	not yet documented	Nothing found in XML Definitions	monitor vpn pptp background start
×	not yet documented	Nothing found in XML Definitions	monitor vpn pptp background stop
×	not yet documented	Nothing found in XML Definitions	monitor vrrp
×	not yet documented	Nothing found in XML Definitions	monitor vrrp background start
×	not yet documented	Nothing found in XML Definitions	monitor vrrp background stop
×	not yet documented	Nothing found in XML Definitions	monitor webproxy
×	not yet documented	Nothing found in XML Definitions	monitor webproxy access-log
×	not yet documented	Nothing found in XML Definitions	monitor webproxy background start
×	not yet documented	Nothing found in XML Definitions	monitor webproxy background stop
×	not yet documented	Nothing found in XML Definitions	monitor webproxy cache-log
✓	*ping <destination>*	ping.xml.in: ping <ping>	ping <text> <text>
×	not yet documented	ping.xml.in: ping <ping> node.tag	Nothing found in VyOS
×	*ping <host> vrf <name>*	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	poweroff.xml.in: poweroff	poweroff
×	not yet documented	poweroff.xml.in: poweroff at <at>	poweroff at <text>

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	poweroff.xml.in: poweroff at <at> date <date>	poweroff at <text> date <text>
×	not yet documented	poweroff.xml.in: poweroff cancel	poweroff cancel
×	not yet documented	poweroff.xml.in: poweroff in <in>	poweroff in <text>
×	not yet documented	poweroff.xml.in: poweroff now	poweroff now
×	*set pppoe-server maintenance-mode <enable | disable>*	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	pppoe-server.xml.in: set pppoe-server maintenance-mode cancel	set pppoe-server maintenance-mode cancel
×	not yet documented	pppoe-server.xml.in: set pppoe-server maintenance-mode enable	set pppoe-server maintenance-mode enable
×	not yet documented	reboot.xml.in: reboot	reboot
×	not yet documented	reboot.xml.in: reboot at <at>	reboot at <text>
×	not yet documented	reboot.xml.in: reboot at <at> date <date>	reboot at <text> date <text>
×	not yet documented	reboot.xml.in: reboot cancel	reboot cancel
×	not yet documented	reboot.xml.in: reboot in <in>	reboot in <text>
×	not yet documented	reboot.xml.in: reboot now	reboot now
×	not yet documented	Nothing found in XML Definitions	release dhcp interface <text>
×	not yet documented	Nothing found in XML Definitions	release dhcpv6 interface <text>
×	not yet documented	Nothing found in XML Definitions	rename system image <text> <text>
×	not yet documented	dhcp.xml.in: renew dhcp interface <interface>	renew dhcp interface <text>
×	not yet documented	dhcp.xml.in: renew dhcpv6 interface <interface>	renew dhcpv6 interface <text>
×	*reset <ip|ipv6> bgp <address> [soft [in|out]]*	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	reset-conntrack.xml.in: reset conntrack	reset conntrack
×	not yet documented	Nothing found in XML Definitions	reset conntrack-sync external-cache

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	reset conntrack-sync internal-cache
×	***reset dns forwarding <all | domain>***	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	dns-forwarding.xml.in: reset dns forwarding all	reset dns forwarding all
×	not yet documented	dns-forwarding.xml.in: reset dns forwarding domain <domain>	reset dns forwarding domain <text>
×	not yet documented	Nothing found in XML Definitions	reset firewall group
×	not yet documented	Nothing found in XML Definitions	reset firewall group address-group <text>
×	not yet documented	Nothing found in XML Definitions	reset firewall group network-group <text>
×	not yet documented	Nothing found in XML Definitions	reset firewall group port-group <text>
×	not yet documented	ipv4-route.xml.in: reset ip arp address <address>	reset ip arp address <text>
×	not yet documented	ipv4-route.xml.in: reset ip arp interface <interface>	reset ip arp interface <text>
×	not yet documented	reset-ip-bgp.xml.in: reset ip bgp <bgp>	reset ip bgp <text>
✓	***reset ip bgp all***	reset-ip-bgp.xml.in: reset ip bgp all	reset ip bgp all
✓	***reset ip bgp dampening***	reset-ip-bgp.xml.in: reset ip bgp dampening <dampening>	reset ip bgp dampening <text> <text>
×	not yet documented	reset-ip-bgp.xml.in: reset ip bgp dampening <dampening> node.tag	Nothing found in VyOS
✓	***reset ip bgp external***	reset-ip-bgp.xml.in: reset ip bgp external	reset ip bgp external
×	not yet documented	reset-ip-bgp.xml.in: reset ip bgp external in	reset ip bgp external in
×	not yet documented	reset-ip-bgp.xml.in: reset ip bgp external in prefix-filter	reset ip bgp external in prefix-filter
×	not yet documented	reset-ip-bgp.xml.in: reset ip bgp external out	reset ip bgp external out
×	not yet documented	reset-ip-bgp.xml.in: reset ip bgp external soft	reset ip bgp external soft
×	not yet documented	reset-ip-bgp.xml.in: reset ip bgp external soft in	reset ip bgp external soft in
×	not yet documented	reset-ip-bgp.xml.in: reset ip bgp external soft out	reset ip bgp external soft out

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	reset-ip-bgp.xml.in: reset ip bgp <bgp> in	reset ip bgp <text> in
×	not yet documented	reset-ip-bgp.xml.in: reset ip bgp <bgp> in prefix-filter	reset ip bgp <text> in prefix-filter
×	not yet documented	reset-ip-bgp.xml.in: reset ip bgp <bgp> out	reset ip bgp <text> out
✓	*reset ip bgp peer-group <name> [soft [in|out]]*	reset-ip-bgp.xml.in: reset ip bgp peer-group <peer-group>	reset ip bgp peer-group <text>
×	not yet documented	reset-ip-bgp.xml.in: reset ip bgp peer-group <peer-group> in	reset ip bgp peer-group <text> in
×	not yet documented	reset-ip-bgp.xml.in: reset ip bgp peer-group <peer-group> in prefix-filter	reset ip bgp peer-group <text> in prefix-filter
×	not yet documented	reset-ip-bgp.xml.in: reset ip bgp peer-group <peer-group> out	reset ip bgp peer-group <text> out
×	not yet documented	reset-ip-bgp.xml.in: reset ip bgp peer-group <peer-group> soft	reset ip bgp peer-group <text> soft
×	not yet documented	reset-ip-bgp.xml.in: reset ip bgp peer-group <peer-group> soft in	reset ip bgp peer-group <text> soft in
×	not yet documented	reset-ip-bgp.xml.in: reset ip bgp peer-group <peer-group> soft out	reset ip bgp peer-group <text> soft out
×	not yet documented	reset-ip-bgp.xml.in: reset ip bgp <bgp> soft	reset ip bgp <text> soft
×	not yet documented	reset-ip-bgp.xml.in: reset ip bgp <bgp> soft in	reset ip bgp <text> soft in
×	not yet documented	reset-ip-bgp.xml.in: reset ip bgp <bgp> soft out	reset ip bgp <text> soft out
×	not yet documented	reset-ip-igmp.xml.in: reset ip igmp interfaces	reset ip igmp interfaces
×	not yet documented	reset-ip-multicast.xml.in: reset ip multicast route	reset ip multicast route
×	not yet documented	Nothing found in XML Definitions	reset ipoe-server session interface <text>
×	not yet documented	Nothing found in XML Definitions	reset ipoe-server session sid <text>
×	not yet documented	Nothing found in XML Definitions	reset ipoe-server session username <text>
×	not yet documented	ipv4-route.xml.in: reset ip route cache <cache>	reset ip route cache <text>
✓	*reset ipv6 bgp <address>*	reset-ipv6-bgp.xml.in: reset ipv6 bgp <bgp>	reset ipv6 bgp <text>

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	reset-ipv6-bgp.xml.in: reset ipv6 bgp <bgp> in	reset ipv6 bgp <text> in
×	not yet documented	reset-ipv6-bgp.xml.in: reset ipv6 bgp <bgp> in prefix-filter	reset ipv6 bgp <text> in prefix-filter
×	not yet documented	reset-ipv6-bgp.xml.in: reset ipv6 bgp <bgp> out	reset ipv6 bgp <text> out
×	not yet documented	reset-ipv6-bgp.xml.in: reset ipv6 bgp <bgp> soft	reset ipv6 bgp <text> soft
×	not yet documented	reset-ipv6-bgp.xml.in: reset ipv6 bgp <bgp> soft in	reset ipv6 bgp <text> soft in
×	not yet documented	reset-ipv6-bgp.xml.in: reset ipv6 bgp <bgp> soft out	reset ipv6 bgp <text> soft out
×	*reset ipv6 neighbors <address | interface>*	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	ipv6-route.xml.in: reset ipv6 neighbors address <address>	reset ipv6 neighbors address <text>
×	not yet documented	ipv6-route.xml.in: reset ipv6 neighbors interface <interface>	reset ipv6 neighbors interface <text>
✓	*reset ipv6 route cache*	ipv6-route.xml.in: reset ipv6 route cache <cache>	reset ipv6 route cache <text>
✓	*reset mpls ldp neighbor <IPv4 or IPv6 address>*	reset-mpls.xml.in: reset mpls ldp neighbor <neighbor>	reset mpls ldp neighbor <text>
×	not yet documented	Nothing found in XML Definitions	reset nhrp flush tunnel <text>
×	not yet documented	Nothing found in XML Definitions	reset nhrp purge tunnel <text>
✓	*reset openvpn client <text>*	Nothing found in XML Definitions	reset openvpn client <text>
✓	*reset openvpn interface <interface>*	Nothing found in XML Definitions	reset openvpn interface <text>
×	not yet documented	Nothing found in XML Definitions	reset pppoe-server all
×	not yet documented	Nothing found in XML Definitions	reset pppoe-server interface <text>
×	not yet documented	Nothing found in XML Definitions	reset pppoe-server username <text>
×	not yet documented	Nothing found in XML Definitions	reset terminal
×	not yet documented	Nothing found in XML Definitions	reset vpn ipsec-peer <text>

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	reset vpn ipsec-peer <text> <value>.in
×	not yet documented	Nothing found in XML Definitions	reset vpn ipsec-peer <text> tunnel <text>
×	not yet documented	Nothing found in XML Definitions	reset vpn ipsec-peer <text> tunnel <text> <value>.in
×	not yet documented	Nothing found in XML Definitions	reset vpn ipsec-peer <text> vti
×	not yet documented	Nothing found in XML Definitions	reset vpn ipsec-peer <text> vti <value>.in
×	not yet documented	Nothing found in XML Definitions	reset vpn ipsec-profile <text>
×	not yet documented	Nothing found in XML Definitions	reset vpn ipsec-profile <text> <value>.in
×	not yet documented	Nothing found in XML Definitions	reset vpn ipsec-profile <text> tunnel <text>
×	not yet documented	Nothing found in XML Definitions	reset vpn ipsec-profile <text> tunnel <text> <value>.in
×	not yet documented	reset-vpn.xml.in: reset vpn remote-access all	reset vpn remote-access all
×	not yet documented	reset-vpn.xml.in: reset vpn remote-access all protocol l2tp	reset vpn remote-access all protocol l2tp
×	not yet documented	reset-vpn.xml.in: reset vpn remote-access all protocol pptp	reset vpn remote-access all protocol pptp
×	not yet documented	reset-vpn.xml.in: reset vpn remote-access all protocol sstp	reset vpn remote-access all protocol sstp
×	not yet documented	reset-vpn.xml.in: reset vpn remote-access interface <interface>	reset vpn remote-access interface <text>
×	not yet documented	reset-vpn.xml.in: reset vpn remote-access user <user>	reset vpn remote-access user <text>
×	not yet documented	reset-vpn.xml.in: reset vpn remote-access user <user> protocol l2tp	reset vpn remote-access user <text> protocol l2tp
×	not yet documented	reset-vpn.xml.in: reset vpn remote-access user <user> protocol pptp	reset vpn remote-access user <text> protocol pptp
×	not yet documented	reset-vpn.xml.in: reset vpn remote-access user <user> protocol sstp	reset vpn remote-access user <text> protocol sstp
×	not yet documented	restart-frr.xml.in: restart all	restart all

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Table 2 – continued from previous page

Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	restart-frr.xml.in: restart bfd	restart bfd
×	not yet documented	restart-frr.xml.in: restart bgp	restart bgp
×	not yet documented	Nothing found in XML Definitions	restart cluster
×	not yet documented	Nothing found in XML Definitions	restart conntrack-sync
✓	*restart container <containername>*	Nothing found in XML Definitions	restart container <text>
✓	*restart dhcp relay-agent*	Nothing found in XML Definitions	restart dhcp relay-agent
✓	*restart dhcp server*	Nothing found in XML Definitions	restart dhcp server
✓	*restart dhcpv6 relay-agent*	Nothing found in XML Definitions	restart dhcpv6 relay-agent
✓	*restart dhcpv6 server*	Nothing found in XML Definitions	restart dhcpv6 server
×	not yet documented	Nothing found in XML Definitions	restart dns dynamic
✓	*restart dns forwarding*	Nothing found in XML Definitions	restart dns forwarding
×	not yet documented	Nothing found in XML Definitions	restart flow-accounting
✓	*restart igmp-proxy*	igmp-proxy.xml.in: restart igmp-proxy	restart igmp-proxy
×	not yet documented	ipoe-server.xml.in: restart ipoe-server	restart ipoe-server
×	not yet documented	restart-frr.xml.in: restart isis	restart isis
×	not yet documented	restart-frr.xml.in: restart ldp	restart ldp
×	not yet documented	openconnect.xml.in: restart openconnect-server	restart openconnect-server
×	not yet documented	restart-frr.xml.in: restart ospf	restart ospf
×	not yet documented	restart-frr.xml.in: restart ospfv3	restart ospfv3
×	not yet documented	Nothing found in XML Definitions	restart pppoe-server
×	not yet documented	restart-frr.xml.in: restart rip	restart rip
×	not yet documented	restart-frr.xml.in: restart ripng	restart ripng
×	not yet documented	restart-snmp.xml.in: restart snmp	restart snmp
✓	*restart ssh*	restart-ssh.xml.in: restart ssh	restart ssh
×	not yet documented	restart-frr.xml.in: restart static	restart static

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	restart vpn
×	not yet documented	Nothing found in XML Definitions	restart vpn <value>.in
×	not yet documented	vrrp.xml.in: restart vrrp	restart vrrp
×	not yet documented	Nothing found in XML Definitions	restart wan-load-balance
×	not yet documented	Nothing found in XML Definitions	restart webproxy
×	not yet documented	restart-frr.xml.in: restart zebra	restart zebra
×	***run generate macsec mka-cak***	Nothing found in XML Definitions	Nothing found in VyOS
×	***run generate macsec mka-ckn***	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	show-arp.xml.in: show arp	show arp
×	not yet documented	show-arp.xml.in: show arp interface <interface>	show arp interface <text>
×	not yet documented	show-bfd.xml.in: show bfd peer <peer>	show bfd peer <text>
×	not yet documented	show-bfd.xml.in: show bfd peer <peer> counters	show bfd peer <text> counters
×	not yet documented	show-bfd.xml.in: show bfd peers	show bfd peers
×	not yet documented	show-bfd.xml.in: show bfd peers brief	show bfd peers brief
×	not yet documented	show-bfd.xml.in: show bfd peers counters	show bfd peers counters
✓	***show <ip|ipv6> bgp <address|prefix>***	show-bgp.xml.in: show bgp	show bgp
×	not yet documented	show-bgp.xml.in: show bgp cidr-only	show bgp cidr-only
×	not yet documented	show-bgp.xml.in: show bgp cidr-only wide	show bgp cidr-only wide
✓	***show <ip|ipv6> bgp community <value>***	show-bgp.xml.in: show bgp community	show bgp community <text>
✓	***show <ip|ipv6> bgp community-list <name>***	show-bgp.xml.in: show bgp community-list <community-list>	show bgp community-list <text>
×	not yet documented	show-bgp.xml.in: show bgp community-list <community-list> exact-match	show bgp community-list <text> exact-match
×	not yet documented	show-bgp.xml.in: show bgp community accept-own	show bgp community accept-own

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	show-bgp.xml.in: show bgp community accept-own-nexthop	show bgp community accept-own-nexthop
×	not yet documented	show-bgp.xml.in: show bgp community blackhole	show bgp community blackhole
×	not yet documented	show-bgp.xml.in: show bgp community exact-match	show bgp community <text> exact-match
×	not yet documented	show-bgp.xml.in: show bgp community graceful-shutdown	show bgp community graceful-shutdown
×	not yet documented	show-bgp.xml.in: show bgp community llgr-stale	show bgp community llgr-stale
×	not yet documented	show-bgp.xml.in: show bgp community local-AS	show bgp community local-AS
×	not yet documented	show-bgp.xml.in: show bgp community no-advertise	show bgp community no-advertise
×	not yet documented	show-bgp.xml.in: show bgp community no-export	show bgp community no-export
×	not yet documented	show-bgp.xml.in: show bgp community no-llgr	show bgp community no-llgr
×	not yet documented	show-bgp.xml.in: show bgp community no-peer	show bgp community no-peer
×	not yet documented	show-bgp.xml.in: show bgp community route-filter-translated-v4	show bgp community route-filter-translated-v4
×	not yet documented	show-bgp.xml.in: show bgp community route-filter-translated-v6	show bgp community route-filter-translated-v6
×	not yet documented	show-bgp.xml.in: show bgp community route-filter-v4	show bgp community route-filter-v4
×	not yet documented	show-bgp.xml.in: show bgp community route-filter-v6	show bgp community route-filter-v6
×	not yet documented	show-bgp.xml.in: show bgp dampening dampened-paths	show bgp dampening dampened-paths
×	not yet documented	show-bgp.xml.in: show bgp dampening flap-statistics	show bgp dampening flap-statistics

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	show-bgp.xml.in: show bgp dampening parameters	show bgp dampening parameters
×	not yet documented	show-bgp.xml.in: show bgp filter-list <filter-list>	Nothing found in VyOS
×	not yet documented	show-bgp.xml.in: show bgp ipv4	show bgp ipv4 <text>
×	not yet documented	show-bgp.xml.in: show bgp ipv4 <ipv4> bestpath	show bgp ipv4 <text> bestpath
×	not yet documented	show-bgp.xml.in: show bgp ipv4 community	show bgp ipv4 community <text>
×	not yet documented	show-bgp.xml.in: show bgp ipv4 community-list <community-list>	show bgp ipv4 community-list <text>
×	not yet documented	show-bgp.xml.in: show bgp ipv4 community-list <community-list> exact-match	show bgp ipv4 community-list <text> exact-match
×	not yet documented	show-bgp.xml.in: show bgp ipv4 community accept-own	show bgp ipv4 community accept-own
×	not yet documented	show-bgp.xml.in: show bgp ipv4 community accept-own-nexthop	show bgp ipv4 community accept-own-nexthop
×	not yet documented	show-bgp.xml.in: show bgp ipv4 community blackhole	show bgp ipv4 community blackhole
×	not yet documented	show-bgp.xml.in: show bgp ipv4 community exact-match	show bgp ipv4 community <text> exact-match
×	not yet documented	show-bgp.xml.in: show bgp ipv4 community graceful-shutdown	show bgp ipv4 community graceful-shutdown
×	not yet documented	show-bgp.xml.in: show bgp ipv4 community llgr-stale	show bgp ipv4 community llgr-stale
×	not yet documented	show-bgp.xml.in: show bgp ipv4 community local-AS	show bgp ipv4 community local-AS
×	not yet documented	show-bgp.xml.in: show bgp ipv4 community no-advertise	show bgp ipv4 community no-advertise
×	not yet documented	show-bgp.xml.in: show bgp ipv4 community no-export	show bgp ipv4 community no-export

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	show-bgp.xml.in: show bgp ipv4 community no-llgr	show bgp ipv4 community no-llgr
×	not yet documented	show-bgp.xml.in: show bgp ipv4 community no-peer	show bgp ipv4 community no-peer
×	not yet documented	show-bgp.xml.in: show bgp ipv4 community route-filter-translated-v4	show bgp ipv4 community route-filter-translated-v4
×	not yet documented	show-bgp.xml.in: show bgp ipv4 community route-filter-translated-v6	show bgp ipv4 community route-filter-translated-v6
×	not yet documented	show-bgp.xml.in: show bgp ipv4 community route-filter-v4	show bgp ipv4 community route-filter-v4
×	not yet documented	show-bgp.xml.in: show bgp ipv4 community route-filter-v6	show bgp ipv4 community route-filter-v6
×	not yet documented	show-bgp.xml.in: show bgp ipv4 dampening dampened-paths	show bgp ipv4 dampening dampened-paths
×	not yet documented	show-bgp.xml.in: show bgp ipv4 dampening flap-statistics	show bgp ipv4 dampening flap-statistics
×	not yet documented	show-bgp.xml.in: show bgp ipv4 dampening parameters	show bgp ipv4 dampening parameters
×	not yet documented	show-bgp.xml.in: show bgp ipv4 filter-list <filter-list>	Nothing found in VyOS
×	not yet documented	show-bgp.xml.in: show bgp ipv4 large-community	show bgp ipv4 large-community <text>
×	not yet documented	show-bgp.xml.in: show bgp ipv4 large-community-list <large-community-list>	show bgp ipv4 large-community-list <text>
×	not yet documented	show-bgp.xml.in: show bgp ipv4 large-community-list <large-community-list> exact-match	show bgp ipv4 large-community-list <text> exact-match
×	not yet documented	show-bgp.xml.in: show bgp ipv4 large-community <large-community> exact-match	show bgp ipv4 large-community <text> exact-match
×	not yet documented	show-bgp.xml.in: show bgp ipv4 <ipv4> longer-prefixes	show bgp ipv4 <text> longer-prefixes

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	show-bgp.xml.in: show bgp ipv4 <ipv4> multipath	show bgp ipv4 <text> multipath
×	not yet documented	show-bgp.xml.in: show bgp ipv4 neighbors <neighbors>	show bgp ipv4 neighbors <text>
×	not yet documented	show-bgp.xml.in: show bgp ipv4 neighbors <neighbors> advertised-routes	show bgp ipv4 neighbors <text> advertised-routes
×	not yet documented	show-bgp.xml.in: show bgp ipv4 neighbors <neighbors> dampened-routes	show bgp ipv4 neighbors <text> dampened-routes
×	not yet documented	show-bgp.xml.in: show bgp ipv4 neighbors <neighbors> flap-statistics	show bgp ipv4 neighbors <text> flap-statistics
×	not yet documented	show-bgp.xml.in: show bgp ipv4 neighbors <neighbors> prefix-counts	show bgp ipv4 neighbors <text> prefix-counts
×	not yet documented	show-bgp.xml.in: show bgp ipv4 neighbors <neighbors> received-routes	show bgp ipv4 neighbors <text> received-routes
×	not yet documented	show-bgp.xml.in: show bgp ipv4 neighbors <neighbors> received prefix-filter	show bgp ipv4 neighbors <text> received prefix-filter
×	not yet documented	show-bgp.xml.in: show bgp ipv4 neighbors <neighbors> routes	show bgp ipv4 neighbors <text> routes
×	not yet documented	show-bgp.xml.in: show bgp ipv4 prefix-list <prefix-list>	show bgp ipv4 prefix-list <text>
×	not yet documented	show-bgp.xml.in: show bgp ipv4 regexp <regexp>	show bgp ipv4 regexp <text>
×	not yet documented	show-bgp.xml.in: show bgp ipv4 route-map <route-map>	show bgp ipv4 route-map <text>
×	not yet documented	show-bgp.xml.in: show bgp ipv4 statistics	show bgp ipv4 statistics
×	not yet documented	show-bgp.xml.in: show bgp ipv4 summary	show bgp ipv4 summary
×	not yet documented	show-bgp.xml.in: show bgp ipv4 summary established	show bgp ipv4 summary established
×	not yet documented	show-bgp.xml.in: show bgp ipv4 summary failed	show bgp ipv4 summary failed

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	show-bgp.xml.in: show bgp ipv4 wide	show bgp ipv4 wide
×	not yet documented	show-bgp.xml.in: show bgp ipv6	show bgp ipv6 <text>
×	not yet documented	show-bgp.xml.in: show bgp ipv6 <ipv6> bestpath	show bgp ipv6 <text> bestpath
×	not yet documented	show-bgp.xml.in: show bgp ipv6 community	show bgp ipv6 community <text>
×	not yet documented	show-bgp.xml.in: show bgp ipv6 community-list <community-list>	show bgp ipv6 community-list <text>
×	not yet documented	show-bgp.xml.in: show bgp ipv6 community-list <community-list> exact-match	show bgp ipv6 community-list <text> exact-match
×	not yet documented	show-bgp.xml.in: show bgp ipv6 community accept-own	show bgp ipv6 community accept-own
×	not yet documented	show-bgp.xml.in: show bgp ipv6 community accept-own-nexthop	show bgp ipv6 community accept-own-nexthop
×	not yet documented	show-bgp.xml.in: show bgp ipv6 community blackhole	show bgp ipv6 community blackhole
×	not yet documented	show-bgp.xml.in: show bgp ipv6 community exact-match	show bgp ipv6 community <text> exact-match
×	not yet documented	show-bgp.xml.in: show bgp ipv6 community graceful-shutdown	show bgp ipv6 community graceful-shutdown
×	not yet documented	show-bgp.xml.in: show bgp ipv6 community llgr-stale	show bgp ipv6 community llgr-stale
×	not yet documented	show-bgp.xml.in: show bgp ipv6 community local-AS	show bgp ipv6 community local-AS
×	not yet documented	show-bgp.xml.in: show bgp ipv6 community no-advertise	show bgp ipv6 community no-advertise
×	not yet documented	show-bgp.xml.in: show bgp ipv6 community no-export	show bgp ipv6 community no-export
×	not yet documented	show-bgp.xml.in: show bgp ipv6 community no-llgr	show bgp ipv6 community no-llgr

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	show-bgp.xml.in: show bgp ipv6 community no-peer	show bgp ipv6 community no-peer
×	not yet documented	show-bgp.xml.in: show bgp ipv6 community route-filter-translated-v4	show bgp ipv6 community route-filter-translated-v4
×	not yet documented	show-bgp.xml.in: show bgp ipv6 community route-filter-translated-v6	show bgp ipv6 community route-filter-translated-v6
×	not yet documented	show-bgp.xml.in: show bgp ipv6 community route-filter-v4	show bgp ipv6 community route-filter-v4
×	not yet documented	show-bgp.xml.in: show bgp ipv6 community route-filter-v6	show bgp ipv6 community route-filter-v6
×	not yet documented	show-bgp.xml.in: show bgp ipv6 dampening dampened-paths	show bgp ipv6 dampening dampened-paths
×	not yet documented	show-bgp.xml.in: show bgp ipv6 dampening flap-statistics	show bgp ipv6 dampening flap-statistics
×	not yet documented	show-bgp.xml.in: show bgp ipv6 dampening parameters	show bgp ipv6 dampening parameters
×	not yet documented	show-bgp.xml.in: show bgp ipv6 filter-list <filter-list>	Nothing found in VyOS
×	not yet documented	show-bgp.xml.in: show bgp ipv6 large-community	show bgp ipv6 large-community <text>
×	not yet documented	show-bgp.xml.in: show bgp ipv6 large-community-list <large-community-list>	show bgp ipv6 large-community-list <text>
×	not yet documented	show-bgp.xml.in: show bgp ipv6 large-community-list <large-community-list> exact-match	show bgp ipv6 large-community-list <text> exact-match
×	not yet documented	show-bgp.xml.in: show bgp ipv6 large-community <large-community> exact-match	show bgp ipv6 large-community <text> exact-match
×	not yet documented	show-bgp.xml.in: show bgp ipv6 <ipv6> longer-prefixes	show bgp ipv6 <text> longer-prefixes
×	not yet documented	show-bgp.xml.in: show bgp ipv6 <ipv6> multipath	show bgp ipv6 <text> multipath

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	show-bgp.xml.in: show bgp ipv6 neighbors <neighbors>	show bgp ipv6 neighbors <text>
×	not yet documented	show-bgp.xml.in: show bgp ipv6 neighbors <neighbors> advertised-routes	show bgp ipv6 neighbors <text> advertised-routes
×	not yet documented	show-bgp.xml.in: show bgp ipv6 neighbors <neighbors> dampened-routes	show bgp ipv6 neighbors <text> dampened-routes
×	not yet documented	show-bgp.xml.in: show bgp ipv6 neighbors <neighbors> flap-statistics	show bgp ipv6 neighbors <text> flap-statistics
×	not yet documented	show-bgp.xml.in: show bgp ipv6 neighbors <neighbors> prefix-counts	show bgp ipv6 neighbors <text> prefix-counts
×	not yet documented	show-bgp.xml.in: show bgp ipv6 neighbors <neighbors> received-routes	show bgp ipv6 neighbors <text> received-routes
×	not yet documented	show-bgp.xml.in: show bgp ipv6 neighbors <neighbors> received prefix-filter	show bgp ipv6 neighbors <text> received prefix-filter
×	not yet documented	show-bgp.xml.in: show bgp ipv6 neighbors <neighbors> routes	show bgp ipv6 neighbors <text> routes
×	not yet documented	show-bgp.xml.in: show bgp ipv6 prefix-list <prefix-list>	show bgp ipv6 prefix-list <text>
×	not yet documented	show-bgp.xml.in: show bgp ipv6 regexp <regexp>	show bgp ipv6 regexp <text>
×	not yet documented	show-bgp.xml.in: show bgp ipv6 route-map <route-map>	show bgp ipv6 route-map <text>
×	not yet documented	show-bgp.xml.in: show bgp ipv6 statistics	show bgp ipv6 statistics
×	not yet documented	show-bgp.xml.in: show bgp ipv6 summary	show bgp ipv6 summary
×	not yet documented	show-bgp.xml.in: show bgp ipv6 summary established	show bgp ipv6 summary established
×	not yet documented	show-bgp.xml.in: show bgp ipv6 summary failed	show bgp ipv6 summary failed
×	not yet documented	show-bgp.xml.in: show bgp ipv6 wide	show bgp ipv6 wide

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	show-bgp.xml.in: show bgp large-community	show bgp large-community <text>
×	not yet documented	show-bgp.xml.in: show bgp large-community-list <large-community-list>	show bgp large-community-list <text>
×	not yet documented	show-bgp.xml.in: show bgp large-community-list <large-community-list> exact-match	show bgp large-community-list <text> exact-match
×	not yet documented	show-bgp.xml.in: show bgp large-community <large-community> exact-match	show bgp large-community <text> exact-match
×	not yet documented	show-bgp.xml.in: show bgp mac hash	show bgp mac hash
×	not yet documented	show-bgp.xml.in: show bgp martian next-hop	show bgp martian next-hop
×	not yet documented	show-bgp.xml.in: show bgp memory	show bgp memory
×	not yet documented	show-bgp.xml.in: show bgp neighbors <neighbors>	show bgp neighbors <text>
✓	*show <ip|ipv6> bgp neighbors <address> advertised-routes*	show-bgp.xml.in: show bgp neighbors <neighbors> advertised-routes	show bgp neighbors <text> advertised-routes
✓	*show <ip|ipv6> bgp neighbors <address> dampened-routes*	show-bgp.xml.in: show bgp neighbors <neighbors> dampened-routes	show bgp neighbors <text> dampened-routes
×	not yet documented	show-bgp.xml.in: show bgp neighbors <neighbors> flap-statistics	show bgp neighbors <text> flap-statistics
×	not yet documented	show-bgp.xml.in: show bgp neighbors <neighbors> prefix-counts	show bgp neighbors <text> prefix-counts
✓	*show <ip|ipv6> bgp neighbors <address> received-routes*	show-bgp.xml.in: show bgp neighbors <neighbors> received-routes	show bgp neighbors <text> received-routes
×	not yet documented	show-bgp.xml.in: show bgp neighbors <neighbors> received prefix-filter	show bgp neighbors <text> received prefix-filter

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
✓	***show <ip|ipv6> bgp neighbors <address> routes***	show-bgp.xml.in: show bgp neighbors <neighbors> routes	show bgp neighbors <text> routes
×	not yet documented	show-bgp.xml.in: show bgp nexthop <nexthop>	show bgp nexthop <text>
×	not yet documented	show-bgp.xml.in: show bgp nexthop <nexthop> detail	show bgp nexthop <text> detail
×	not yet documented	show-bgp.xml.in: show bgp prefix-list <prefix-list>	show bgp prefix-list <text>
✓	***show <ip|ipv6> bgp regexp <text>***	show-bgp.xml.in: show bgp regexp <regexp>	show bgp regexp <text>
×	not yet documented	show-bgp.xml.in: show bgp route-map <route-map>	show bgp route-map <text>
×	not yet documented	show-bgp.xml.in: show bgp statistics	show bgp statistics
×	not yet documented	show-bgp.xml.in: show bgp statistics-all	show bgp statistics-all
✓	***show <ip|ipv6> bgp summary***	show-bgp.xml.in: show bgp summary	show bgp summary
×	not yet documented	show-bgp.xml.in: show bgp summary established	show bgp summary established
×	not yet documented	show-bgp.xml.in: show bgp summary failed	show bgp summary failed
×	not yet documented	show-bgp.xml.in: show bgp wide	show bgp wide
✓	***show bridge***	show-bridge.xml.in: show bridge <bridge>	show bridge <text>
×	not yet documented	show-bridge.xml.in: show bridge <bridge> macs	show bridge <text> macs
✓	***show bridge <name> spanning-tree***	show-bridge.xml.in: show bridge <bridge> spanning-tree	show bridge <text> spanning-tree
×	not yet documented	Nothing found in XML Definitions	show cluster status
✓	***show configuration***	show-configuration.xml.in: show configuration	show configuration
×	not yet documented	show-configuration.xml.in: show configuration all	show configuration all
✓	***show configuration commands***	show-configuration.xml.in: show configuration commands	show configuration commands

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	show-configuration.xml.in: show configuration files	show configuration files
✓	***show configuration json***	show-configuration.xml.in: show configuration json	show configuration json
✓	***show configuration json pretty***	show-configuration.xml.in: show configuration json pretty	show configuration json pretty
✓	***show conntrack-sync cache external***	conntrack-sync.xml.in: show conntrack-sync cache external	show conntrack-sync cache external
×	not yet documented	conntrack-sync.xml.in: show conntrack-sync cache external expect	show conntrack-sync cache external expect
×	not yet documented	conntrack-sync.xml.in: show conntrack-sync cache external main	show conntrack-sync cache external main
✓	***show conntrack-sync cache internal***	conntrack-sync.xml.in: show conntrack-sync cache internal	show conntrack-sync cache internal
×	not yet documented	conntrack-sync.xml.in: show conntrack-sync cache internal expect	show conntrack-sync cache internal expect
×	not yet documented	conntrack-sync.xml.in: show conntrack-sync cache internal main	show conntrack-sync cache internal main
✓	***show conntrack-sync statistics***	conntrack-sync.xml.in: show conntrack-sync statistics	show conntrack-sync statistics
✓	***show conntrack-sync status***	conntrack-sync.xml.in: show conntrack-sync status	show conntrack-sync status
×	not yet documented	Nothing found in XML Definitions	show conntrack ignore
✓	***show conntrack table ipv4***	Nothing found in XML Definitions	show conntrack table ipv4
×	not yet documented	Nothing found in XML Definitions	show conntrack table ipv4 source <text>
×	not yet documented	Nothing found in XML Definitions	show conntrack table ipv4 source <text> destination <text>
×	not yet documented	Nothing found in XML Definitions	show conntrack table ipv6
×	not yet documented	Nothing found in XML Definitions	show conntrack table ipv6 source <text>
×	not yet documented	Nothing found in XML Definitions	show conntrack table ipv6 source <text> destination <text>

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
✓	***show console-server ports***	show-console-server.xml.in: show console-server ports	show console-server ports
✓	***show console-server user***	show-console-server.xml.in: show console-server user	show console-server user
✓	***show container***	Nothing found in XML Definitions	show container
✓	***show container image***	Nothing found in XML Definitions	show container image
✓	***show container log <containername>***	Nothing found in XML Definitions	show container log <text>
✓	***show container network***	Nothing found in XML Definitions	show container network
×	not yet documented	Nothing found in XML Definitions	show date
×	not yet documented	Nothing found in XML Definitions	show date utc
×	not yet documented	Nothing found in XML Definitions	show date utc maya
×	not yet documented	Nothing found in XML Definitions	show dhcp client leases
×	not yet documented	Nothing found in XML Definitions	show dhcp client leases interface <text>
✓	***show dhcp server leases***	Nothing found in XML Definitions	show dhcp server leases
✓	***show dhcp server leases pool <pool>***	Nothing found in XML Definitions	show dhcp server leases pool <text>
✓	***show dhcp server leases sort <key>***	Nothing found in XML Definitions	show dhcp server leases sort <text>
✓	***show dhcp server leases state <state>***	Nothing found in XML Definitions	show dhcp server leases state <text>
✓	***show dhcp server statistics***	Nothing found in XML Definitions	show dhcp server statistics
✓	***show dhcp server statistics pool <pool>***	Nothing found in XML Definitions	show dhcp server statistics pool <text>
✓	***show dhcpv6 server leases***	Nothing found in XML Definitions	show dhcpv6 server leases
✓	***show dhcpv6 server leases pool <pool>***	Nothing found in XML Definitions	show dhcpv6 server leases pool <text>
✓	***show dhcpv6 server leases sort <key>***	Nothing found in XML Definitions	show dhcpv6 server leases sort <text>
✓	***show dhcpv6 server leases state <state>***	Nothing found in XML Definitions	show dhcpv6 server leases state <text>
×	***show dhcpv6 server status***	Nothing found in XML Definitions	Nothing found in VyOS

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	disks.xml.in: show disk <disk> format	show disk <text> format
×	not yet documented	Nothing found in XML Definitions	show dns dynamic status
×	not yet documented	Nothing found in XML Definitions	show dns forwarding statistics
×	not yet documented	show-environment.xml.in: show environment sensors	show environment sensors
×	not yet documented	Nothing found in XML Definitions	show file <text>
✓	*show firewall [name | ipv6name] <name>*	Nothing found in XML Definitions	show firewall
✓	*show firewall group <name>*	Nothing found in XML Definitions	show firewall group <text>
×	not yet documented	Nothing found in XML Definitions	show firewall ipv6-name <text>
×	not yet documented	Nothing found in XML Definitions	show firewall ipv6-name <text> rule <text>
×	not yet documented	Nothing found in XML Definitions	show firewall ipv6-name statistics
×	not yet documented	Nothing found in XML Definitions	show firewall name <text>
×	not yet documented	Nothing found in XML Definitions	show firewall name <text> rule <text>
×	not yet documented	Nothing found in XML Definitions	show firewall name statistics
×	not yet documented	show-firewall-policy.xml.in: show firewall policy	show firewall policy
×	*show firewall [name | ipv6name] <name> rule <1-999999>*	Nothing found in XML Definitions	Nothing found in VyOS
✓	*show firewall [name | ipv6name] <name> statistics*	Nothing found in XML Definitions	show firewall statistics
✓	*show firewall summary*	Nothing found in XML Definitions	show firewall summary
×	not yet documented	Nothing found in XML Definitions	show flow-accounting
✓	*show flow-accounting interface <interface>*	Nothing found in XML Definitions	show flow-accounting interface <text>
✓	*show flow-accounting interface <interface> host <address>*	Nothing found in XML Definitions	show flow-accounting interface <text> host <text>
×	not yet documented	Nothing found in XML Definitions	show flow-accounting interface <text> port <text>
×	not yet documented	Nothing found in XML Definitions	show flow-accounting interface <text> top <text>

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	show-hardware.xml.in: show hardware cpu	show hardware cpu
×	not yet documented	show-hardware.xml.in: show hardware cpu detail	show hardware cpu detail
×	not yet documented	show-hardware.xml.in: show hardware cpu summary	show hardware cpu summary
×	not yet documented	show-hardware.xml.in: show hardware dmi	show hardware dmi
×	not yet documented	show-hardware.xml.in: show hardware mem	show hardware mem
×	not yet documented	show-hardware.xml.in: show hardware pci	show hardware pci
×	not yet documented	show-hardware.xml.in: show hardware pci detail	show hardware pci detail
×	not yet documented	show-hardware.xml.in: show hardware storage nvme	show hardware storage nvme
×	not yet documented	show-hardware.xml.in: show hardware storage scsi	show hardware storage scsi
×	not yet documented	show-hardware.xml.in: show hardware storage scsi detail	show hardware storage scsi detail
×	not yet documented	show-hardware.xml.in: show hardware storage smart <smart>	show hardware storage smart <text>
✓	***show hardware usb***	show-hardware.xml.in: show hardware usb	show hardware usb
×	not yet documented	show-hardware.xml.in: show hardware usb detail	show hardware usb detail
✓	***show hardware usb serial***	show-hardware.xml.in: show hardware usb serial	show hardware usb serial
×	not yet documented	show-history.xml.in: show history <history>	show history <text>
×	not yet documented	show-history.xml.in: show history brief	show history brief
×	not yet documented	show-host.xml.in: show host date	show host date
×	not yet documented	show-host.xml.in: show host domain	show host domain
×	not yet documented	show-host.xml.in: show host lookup <lookup>	show host lookup <text>
×	not yet documented	show-host.xml.in: show host name	show host name
×	not yet documented	show-host.xml.in: show host os	show host os
×	not yet documented	Nothing found in XML Definitions	show incoming

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	show incoming bonding <text>
×	not yet documented	Nothing found in XML Definitions	show incoming ethernet <text>
×	not yet documented	Nothing found in XML Definitions	show incoming input <text>
×	not yet documented	Nothing found in XML Definitions	show incoming pppoe <text>
×	not yet documented	Nothing found in XML Definitions	show incoming pseudo-ethernet
×	not yet documented	Nothing found in XML Definitions	show incoming tunnel
×	not yet documented	Nothing found in XML Definitions	show incoming vrrp <text>
×	not yet documented	Nothing found in XML Definitions	show incoming vti
×	not yet documented	Nothing found in XML Definitions	show incoming wireless <text>
×	not yet documented	show-interfaces.xml.in: show interfaces	show interfaces
✓	***show interfaces bonding <interface>***	show-interfaces-bonding.xml.in: show interfaces bonding	show interfaces bonding <text>
×	not yet documented	show-interfaces-bonding.xml.in: show interfaces bonding <bonding> brief	show interfaces bonding <text> brief
✓	***show interfaces bonding <interface> detail***	show-interfaces-bonding.xml.in: show interfaces bonding detail	show interfaces bonding <text> detail
×	not yet documented	Nothing found in XML Definitions	show interfaces bonding slaves
×	not yet documented	show-interfaces-bonding.xml.in: show interfaces bonding <bonding> vif <vif>	show interfaces bonding <text> vif <text>
×	not yet documented	show-interfaces-bonding.xml.in: show interfaces bonding <bonding> vif <vif> brief	show interfaces bonding <text> vif <text> brief
×	not yet documented	show-interfaces-bridge.xml.in: show interfaces bridge	show interfaces bridge <text>
×	not yet documented	show-interfaces-bridge.xml.in: show interfaces bridge <bridge> brief	show interfaces bridge <text> brief

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	show-interfaces-bridge.xml.in: show interfaces bridge detail	show interfaces bridge detail
×	not yet documented	show-interfaces-bridge.xml.in: show interfaces bridge vlan	show interfaces bridge vlan
×	not yet documented	show-interfaces.xml.in: show interfaces counters	show interfaces counters
×	not yet documented	show-interfaces.xml.in: show interfaces detail	show interfaces detail
✓	*show interfaces dummy <interface>*	show-interfaces-dummy.xml.in: show interfaces dummy	show interfaces dummy <text>
×	not yet documented	show-interfaces-dummy.xml.in: show interfaces dummy <dummy> brief	show interfaces dummy <text> brief
×	not yet documented	show-interfaces-dummy.xml.in: show interfaces dummy detail	show interfaces dummy detail
✓	*show interfaces ethernet <interface>*	show-interfaces-ethernet.xml.in: show interfaces ethernet	show interfaces ethernet <text>
×	not yet documented	show-interfaces-ethernet.xml.in: show interfaces ethernet <ethernet> brief	show interfaces ethernet <text> brief
×	not yet documented	show-interfaces-ethernet.xml.in: show interfaces ethernet detail	show interfaces ethernet detail
×	not yet documented	show-interfaces-ethernet.xml.in: show interfaces ethernet <ethernet> identify	show interfaces ethernet <text> identify
✓	*show interfaces ethernet <interface> physical*	show-interfaces-ethernet.xml.in: show interfaces ethernet <ethernet> physical	show interfaces ethernet <text> physical
✓	*show interfaces ethernet <interface> physical offload*	show-interfaces-ethernet.xml.in: show interfaces ethernet <ethernet> physical offload	show interfaces ethernet <text> physical offload
×	not yet documented	Nothing found in XML Definitions	show interfaces ethernet <text> queue

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	show interfaces ethernet <text> queue class
×	not yet documented	Nothing found in XML Definitions	show interfaces ethernet <text> queue filter
×	not yet documented	show-interfaces-ethernet.xml.in: show interfaces ethernet <ethernet> statistics	show interfaces ethernet <text> statistics
✓	***show interfaces ethernet <interface> transceiver***	show-interfaces-ethernet.xml.in: show interfaces ethernet <ethernet> transceiver	show interfaces ethernet <text> transceiver
×	not yet documented	show-interfaces-ethernet.xml.in: show interfaces ethernet <ethernet> vif <vif>	show interfaces ethernet <text> vif <text>
×	not yet documented	show-interfaces-ethernet.xml.in: show interfaces ethernet <ethernet> vif <vif> brief	show interfaces ethernet <text> vif <text> brief
×	not yet documented	Nothing found in XML Definitions	show interfaces ethernet <text> vif <text> queue
×	not yet documented	Nothing found in XML Definitions	show interfaces ethernet <text> vif <text> queue class
×	not yet documented	Nothing found in XML Definitions	show interfaces ethernet <text> vif <text> queue filter
×	not yet documented	show-interfaces-geneve.xml.in: show interfaces geneve	show interfaces geneve <text>
×	not yet documented	show-interfaces-geneve.xml.in: show interfaces geneve <geneve> brief	show interfaces geneve <text> brief
×	not yet documented	show-interfaces-geneve.xml.in: show interfaces geneve detail	show interfaces geneve detail
×	not yet documented	show-interfaces-input.xml.in: show interfaces input	show interfaces input <text>
×	not yet documented	show-interfaces-input.xml.in: show interfaces input <input> brief	show interfaces input <text> brief
×	not yet documented	show-interfaces-input.xml.in: show interfaces input detail	show interfaces input detail

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	show interfaces input <text> queue
×	not yet documented	Nothing found in XML Definitions	show interfaces input <text> queue class
×	not yet documented	Nothing found in XML Definitions	show interfaces input <text> queue filter
×	not yet documented	show-interfaces-l2tpv3.xml.in: show interfaces l2tpv3	show interfaces l2tpv3 <text>
×	not yet documented	show-interfaces-l2tpv3.xml.in: show interfaces l2tpv3 <l2tpv3> brief	show interfaces l2tpv3 <text> brief
×	not yet documented	show-interfaces-l2tpv3.xml.in: show interfaces l2tpv3 detail	show interfaces l2tpv3 detail
✓	***show interfaces loopback***	show-interfaces-loopback.xml.in: show interfaces loopback	show interfaces loopback <text>
×	not yet documented	show-interfaces-loopback.xml.in: show interfaces loopback <loopback> brief	show interfaces loopback <text> brief
×	not yet documented	show-interfaces-loopback.xml.in: show interfaces loopback detail	show interfaces loopback detail
×	***show interfaces loopback lo***	Nothing found in XML Definitions	Nothing found in VyOS
✓	***show interfaces macsec <interface>***	show-interfaces-macsec.xml.in: show interfaces macsec <macsec>	show interfaces macsec <text>
×	not yet documented	openvpn.xml.in: show interfaces openvpn <openvpn>	show interfaces openvpn <text>
×	not yet documented	openvpn.xml.in: show interfaces openvpn <openvpn> brief	show interfaces openvpn <text> brief
×	not yet documented	openvpn.xml.in: show interfaces openvpn detail	show interfaces openvpn detail
✓	***show interfaces pppoe <interface>***	show-interfaces-pppoe.xml.in: show interfaces pppoe	show interfaces pppoe <text>
×	not yet documented	show-interfaces-pppoe.xml.in: show interfaces pppoe detail	show interfaces pppoe detail

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	show-interfaces-pppoe.xml.in: show interfaces pppoe <pppoe> log	show interfaces pppoe <text> log
✓	***show interfaces pppoe <interface> queue***	Nothing found in XML Definitions	show interfaces pppoe <text> queue
×	not yet documented	Nothing found in XML Definitions	show interfaces pppoe <text> queue class
×	not yet documented	Nothing found in XML Definitions	show interfaces pppoe <text> queue filter
×	not yet documented	show-interfaces-pppoe.xml.in: show interfaces pppoe <pppoe> statistics	show interfaces pppoe <text> statistics
×	not yet documented	show-interfaces-pseudo-ethernet.xml.in: show interfaces pseudo-ethernet	show interfaces pseudo-ethernet <text>
×	not yet documented	show-interfaces-pseudo-ethernet.xml.in: show interfaces pseudo-ethernet <pseudo-ethernet> brief	show interfaces pseudo-ethernet <text> brief
×	not yet documented	show-interfaces-pseudo-ethernet.xml.in: show interfaces pseudo-ethernet detail	show interfaces pseudo-ethernet detail
×	not yet documented	Nothing found in XML Definitions	show interfaces system
×	not yet documented	Nothing found in XML Definitions	show interfaces system enabled
×	not yet documented	show-interfaces-tunnel.xml.in: show interfaces tunnel	show interfaces tunnel <text>
×	not yet documented	show-interfaces-tunnel.xml.in: show interfaces tunnel <tunnel> brief	show interfaces tunnel <text> brief
×	not yet documented	show-interfaces-tunnel.xml.in: show interfaces tunnel detail	show interfaces tunnel detail
×	not yet documented	Nothing found in XML Definitions	show interfaces vrrp <text>
×	not yet documented	Nothing found in XML Definitions	show interfaces vrrp <text> brief
×	not yet documented	Nothing found in XML Definitions	show interfaces vrrp detail

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	show-interfaces-vti.xml.in: show interfaces vti	show interfaces vti <text>
×	not yet documented	show-interfaces-vti.xml.in: show interfaces vti <vti> brief	show interfaces vti <text> brief
×	not yet documented	show-interfaces-vti.xml.in: show interfaces vti detail	show interfaces vti detail
×	not yet documented	show-interfaces-vxlan.xml.in: show interfaces vxlan	show interfaces vxlan <text>
×	not yet documented	show-interfaces-vxlan.xml.in: show interfaces vxlan <vxlan> brief	show interfaces vxlan <text> brief
×	not yet documented	show-interfaces-vxlan.xml.in: show interfaces vxlan detail	show interfaces vxlan detail
✓	*show interfaces wireguard <interface>*	show-interfaces-wireguard.xml.in: show interfaces wireguard	show interfaces wireguard <text>
×	not yet documented	show-interfaces-wireguard.xml.in: show interfaces wireguard <wireguard> allowed-ips	show interfaces wireguard <text> allowed-ips
×	not yet documented	show-interfaces-wireguard.xml.in: show interfaces wireguard detail	show interfaces wireguard detail
×	not yet documented	show-interfaces-wireguard.xml.in: show interfaces wireguard <wireguard> endpoints	show interfaces wireguard <text> endpoints
×	not yet documented	show-interfaces-wireguard.xml.in: show interfaces wireguard <wireguard> peers	show interfaces wireguard <text> peers
×	not yet documented	show-interfaces-wireguard.xml.in: show interfaces wireguard <wireguard> public-key	show interfaces wireguard <text> public-key
×	not yet documented	show-interfaces-wireguard.xml.in: show interfaces wireguard <wireguard> summary	show interfaces wireguard <text> summary

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
✓	***show interfaces wireless <wlanX>***	show-interfaces-wireless.xml.in: show interfaces wireless <wireless>	show interfaces wireless <text>
✓	***show interfaces wireless <wlanX> brief***	show-interfaces-wireless.xml.in: show interfaces wireless <wireless> brief	show interfaces wireless <text> brief
✓	***show interfaces wireless detail***	show-interfaces-wireless.xml.in: show interfaces wireless detail	show interfaces wireless detail
✓	***show interfaces wireless info***	show-interfaces-wireless.xml.in: show interfaces wireless info	show interfaces wireless info
✓	***show interfaces wireless <wlanX> queue***	Nothing found in XML Definitions	show interfaces wireless <text> queue
×	not yet documented	Nothing found in XML Definitions	show interfaces wireless <text> queue class
×	not yet documented	Nothing found in XML Definitions	show interfaces wireless <text> queue filter
✓	***show interfaces wireless <wlanX> scan***	show-interfaces-wireless.xml.in: show interfaces wireless <wireless> scan	show interfaces wireless <text> scan
×	not yet documented	show-interfaces-wireless.xml.in: show interfaces wireless <wireless> scan detail	show interfaces wireless <text> scan detail
×	not yet documented	show-interfaces-wireless.xml.in: show interfaces wireless <wireless> stations	show interfaces wireless <text> stations
×	not yet documented	show-interfaces-wireless.xml.in: show interfaces wireless <wireless> vif <vif>	show interfaces wireless <text> vif <text>
×	not yet documented	show-interfaces-wireless.xml.in: show interfaces wireless <wireless> vif <vif> brief	show interfaces wireless <text> vif <text> brief
×	not yet documented	Nothing found in XML Definitions	show interfaces wireless <text> vif <text> queue
×	not yet documented	Nothing found in XML Definitions	show interfaces wireless <text> vif <text> queue class

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	show interfaces wireless <text> vif <text> queue filter
✓	***show interfaces wwan <interface>***	show-interfaces-wwan.xml.in: show interfaces wwan	show interfaces wwan <text>
✓	***show interfaces wwan <interface> capabilities***	show-interfaces-wwan.xml.in: show interfaces wwan <wwan> capabilities	show interfaces wwan <text> capabilities
×	not yet documented	show-interfaces-wwan.xml.in: show interfaces wwan detail	show interfaces wwan <text> detail
✓	***show interfaces wwan <interface> firmware***	show-interfaces-wwan.xml.in: show interfaces wwan <wwan> firmware	show interfaces wwan <text> firmware
✓	***show interfaces wwan <interface> imei***	show-interfaces-wwan.xml.in: show interfaces wwan <wwan> imei	show interfaces wwan <text> imei
✓	***show interfaces wwan <interface> imsi***	show-interfaces-wwan.xml.in: show interfaces wwan <wwan> imsi	show interfaces wwan <text> imsi
×	not yet documented	show-interfaces-wwan.xml.in: show interfaces wwan <wwan> log	show interfaces wwan <text> log
✓	***show interfaces wwan <interface> model***	show-interfaces-wwan.xml.in: show interfaces wwan <wwan> model	show interfaces wwan <text> model
✓	***show interfaces wwan <interface> msisdn***	show-interfaces-wwan.xml.in: show interfaces wwan <wwan> msisdn	show interfaces wwan <text> msisdn
✓	***show interfaces wwan <interface> revision***	show-interfaces-wwan.xml.in: show interfaces wwan <wwan> revision	show interfaces wwan <text> revision
✓	***show interfaces wwan <interface> signal***	show-interfaces-wwan.xml.in: show interfaces wwan <wwan> signal	show interfaces wwan <text> signal
✓	***show interfaces wwan <interface> sim***	show-interfaces-wwan.xml.in: show interfaces wwan <wwan> sim	show interfaces wwan <text> sim

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	***show interfaces wwan <interface> summary***	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	show-ip-access-paths-prefix-community-lists.xml.in: show ip access-list <access-list>	show ip access-list <text>
×	not yet documented	show-ip-access-paths-prefix-community-lists.xml.in: show ip as-path-access-list <as-path-access-list>	show ip as-path-access-list <text>
×	not yet documented	show-ip-bgp.xml.in: show ip bgp <bgp>	show ip bgp <text>
×	not yet documented	show-ip-bgp.xml.in: show ip bgp attribute-info	show ip bgp attribute-info
✓	***show ip bgp cidr-only***	show-ip-bgp.xml.in: show ip bgp cidr-only	show ip bgp cidr-only
×	not yet documented	show-ip-bgp.xml.in: show ip bgp community <community>	show ip bgp community <text>
×	not yet documented	show-ip-bgp.xml.in: show ip bgp community-info	show ip bgp community-info
×	not yet documented	show-ip-bgp.xml.in: show ip bgp community-list <community-list>	show ip bgp community-list <text>
×	not yet documented	show-ip-bgp.xml.in: show ip bgp community-list <community-list> exact-match	show ip bgp community-list <text> exact-match
✓	***show ip bgp dampened-paths***	show-ip-bgp.xml.in: show ip bgp dampened-paths	show ip bgp dampened-paths
✓	***show ip bgp filter-list <name>***	show-ip-bgp.xml.in: show ip bgp filter-list <filter-list>	show ip bgp filter-list <text>
✓	***show ip bgp flap-statistics***	show-ip-bgp.xml.in: show ip bgp flap-statistics	show ip bgp flap-statistics
×	not yet documented	show-ip-bgp.xml.in: show ip bgp ipv4 unicast <unicast>	show ip bgp ipv4 unicast <text>
×	not yet documented	show-ip-bgp.xml.in: show ip bgp ipv4 unicast cidr-only	show ip bgp ipv4 unicast cidr-only
×	not yet documented	show-ip-bgp.xml.in: show ip bgp ipv4 unicast community <community>	show ip bgp ipv4 unicast community <text>

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	show-ip-bgp.xml.in: show ip bgp ipv4 unicast community-list <community-list>	show ip bgp ipv4 unicast community-list <text>
×	not yet documented	show-ip-bgp.xml.in: show ip bgp ipv4 unicast community-list <community-list> exact-match	show ip bgp ipv4 unicast community-list <text> exact-match
×	not yet documented	show-ip-bgp.xml.in: show ip bgp ipv4 unicast filter-list <filter-list>	show ip bgp ipv4 unicast filter-list <text>
×	not yet documented	show-ip-bgp.xml.in: show ip bgp ipv4 unicast neighbors <neighbors>	show ip bgp ipv4 unicast neighbors <text>
×	not yet documented	show-ip-bgp.xml.in: show ip bgp ipv4 unicast neighbors <neighbors> advertised-routes	show ip bgp ipv4 unicast neighbors <text> advertised-routes
×	not yet documented	show-ip-bgp.xml.in: show ip bgp ipv4 unicast neighbors <neighbors> prefix-counts	show ip bgp ipv4 unicast neighbors <text> prefix-counts
×	not yet documented	show-ip-bgp.xml.in: show ip bgp ipv4 unicast neighbors <neighbors> received-routes	show ip bgp ipv4 unicast neighbors <text> received-routes
×	not yet documented	show-ip-bgp.xml.in: show ip bgp ipv4 unicast neighbors <neighbors> routes	show ip bgp ipv4 unicast neighbors <text> routes
×	not yet documented	show-ip-bgp.xml.in: show ip bgp ipv4 unicast paths	show ip bgp ipv4 unicast paths
×	not yet documented	show-ip-bgp.xml.in: show ip bgp ipv4 unicast prefix-list <prefix-list>	show ip bgp ipv4 unicast prefix-list <text>
×	not yet documented	show-ip-bgp.xml.in: show ip bgp ipv4 unicast regexp <regexp>	show ip bgp ipv4 unicast regexp <text>
×	not yet documented	show-ip-bgp.xml.in: show ip bgp ipv4 unicast route-map <route-map>	show ip bgp ipv4 unicast route-map <text>
×	not yet documented	show-ip-bgp.xml.in: show ip bgp ipv4 unicast summary	show ip bgp ipv4 unicast summary
×	not yet documented	show-ip-bgp.xml.in: show ip bgp large-community	show ip bgp large-community

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	show-ip-bgp.xml.in: show ip bgp large-community-info	show ip bgp large-community-info
×	not yet documented	show-ip-bgp.xml.in: show ip bgp large-community-list <large-community-list>	show ip bgp large-community-list <text>
×	not yet documented	show-ip-bgp.xml.in: show ip bgp memory	show ip bgp memory
×	not yet documented	show-ip-bgp.xml.in: show ip bgp neighbors <neighbors>	show ip bgp neighbors <text>
×	not yet documented	show-ip-bgp.xml.in: show ip bgp neighbors <neighbors> advertised-routes	show ip bgp neighbors <text> advertised-routes
×	not yet documented	show-ip-bgp.xml.in: show ip bgp neighbors <neighbors> dampened-routes	show ip bgp neighbors <text> dampened-routes
×	not yet documented	show-ip-bgp.xml.in: show ip bgp neighbors <neighbors> flap-statistics	show ip bgp neighbors <text> flap-statistics
×	not yet documented	show-ip-bgp.xml.in: show ip bgp neighbors <neighbors> prefix-counts	show ip bgp neighbors <text> prefix-counts
×	not yet documented	show-ip-bgp.xml.in: show ip bgp neighbors <neighbors> received-routes	show ip bgp neighbors <text> received-routes
×	not yet documented	show-ip-bgp.xml.in: show ip bgp neighbors <neighbors> received prefix-filter	show ip bgp neighbors <text> received prefix-filter
×	not yet documented	show-ip-bgp.xml.in: show ip bgp neighbors <neighbors> routes	show ip bgp neighbors <text> routes
×	not yet documented	show-ip-bgp.xml.in: show ip bgp paths	show ip bgp paths
×	not yet documented	show-ip-bgp.xml.in: show ip bgp prefix-list <prefix-list>	show ip bgp prefix-list <text>
×	not yet documented	show-ip-bgp.xml.in: show ip bgp regexp <regexp>	show ip bgp regexp <text>
×	not yet documented	show-ip-bgp.xml.in: show ip bgp route-map <route-map>	show ip bgp route-map <text>
×	not yet documented	show-ip-bgp.xml.in: show ip bgp statistics	show ip bgp statistics

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	show-ip-bgp.xml.in: show ip bgp summary	show ip bgp summary
×	not yet documented	show-ip-access-paths-prefix-community-lists.xml.in: show ip community-list <community-list>	show ip community-list <text>
×	not yet documented	show-ip-access-paths-prefix-community-lists.xml.in: show ip extcommunity-list <extcommunity-list>	show ip extcommunity-list <text>
×	not yet documented	show-ip-access-paths-prefix-community-lists.xml.in: show ip forwarding	show ip forwarding
×	not yet documented	Nothing found in XML Definitions	show ip groups
×	not yet documented	show-ip-igmp.xml.in: show ip igmp groups	show ip igmp groups
×	not yet documented	show-ip-igmp.xml.in: show ip igmp interfaces	show ip igmp interfaces
×	not yet documented	show-ip-igmp.xml.in: show ip igmp join	show ip igmp join
×	not yet documented	show-ip-igmp.xml.in: show ip igmp sources	show ip igmp sources
×	not yet documented	show-ip-igmp.xml.in: show ip igmp statistics	show ip igmp statistics
×	not yet documented	show-ip-access-paths-prefix-community-lists.xml.in: show ip large-community-list <large-community-list>	show ip large-community-list <text>
×	not yet documented	show-ip-multicast.xml.in: show ip multicast interface	show ip multicast interface
×	not yet documented	show-ip-multicast.xml.in: show ip multicast mfc	show ip multicast mfc
×	not yet documented	show-ip-multicast.xml.in: show ip multicast route	show ip multicast route
×	not yet documented	show-ip-multicast.xml.in: show ip multicast summary	show ip multicast summary
×	not yet documented	Nothing found in XML Definitions	show ipoe-server sessions
×	not yet documented	Nothing found in XML Definitions	show ipoe-server statistics
×	not yet documented	show-ip-ospf.xml.in: show ip ospf	show ip ospf

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
✓	***show ip ospf border-routers***	show-ip-ospf.xml.in: show ip ospf border-routers	show ip ospf border-routers
✓	***show ip ospf database <type> [A.B.C.D] [adv-router <A.B.C.D>|self-originate]***	show-ip-ospf.xml.in: show ip ospf database	show ip ospf database
×	not yet documented	show-ip-ospf.xml.in: show ip ospf database asbr-summary <asbr-summary>	show ip ospf database asbr-summary <text>
×	not yet documented	show-ip-ospf.xml.in: show ip ospf database asbr-summary <asbr-summary> adv-router <adv-router>	show ip ospf database asbr-summary <text> adv-router <text>
×	not yet documented	show-ip-ospf.xml.in: show ip ospf database asbr-summary <asbr-summary> self-originate	show ip ospf database asbr-summary <text> self-originate
×	not yet documented	show-ip-ospf.xml.in: show ip ospf database external <external>	show ip ospf database external <text>
×	not yet documented	show-ip-ospf.xml.in: show ip ospf database external <external> adv-router <adv-router>	show ip ospf database external <text> adv-router <text>
×	not yet documented	show-ip-ospf.xml.in: show ip ospf database external <external> self-originate	show ip ospf database external <text> self-originate
✓	***show ip ospf database max-age***	show-ip-ospf.xml.in: show ip ospf database max-age	show ip ospf database max-age
×	not yet documented	show-ip-ospf.xml.in: show ip ospf database network <network>	show ip ospf database network <text>
×	not yet documented	show-ip-ospf.xml.in: show ip ospf database network <network> adv-router <adv-router>	show ip ospf database network <text> adv-router <text>
×	not yet documented	show-ip-ospf.xml.in: show ip ospf database network <network> self-originate	show ip ospf database network <text> self-originate
×	not yet documented	show-ip-ospf.xml.in: show ip ospf database nssa-external <nssa-external>	show ip ospf database nssa-external <text>

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	show-ip-ospf.xml.in: show ip ospf database nssa-external <nssa-external> adv-router <adv-router>	show ip ospf database nssa-external <text> adv-router <text>
×	not yet documented	show-ip-ospf.xml.in: show ip ospf database nssa-external <nssa-external> self-originate	show ip ospf database nssa-external <text> self-originate
×	not yet documented	show-ip-ospf.xml.in: show ip ospf database opaque-area <opaque-area>	show ip ospf database opaque-area <text>
×	not yet documented	show-ip-ospf.xml.in: show ip ospf database opaque-area <opaque-area> adv-router <adv-router>	show ip ospf database opaque-area <text> adv-router <text>
×	not yet documented	show-ip-ospf.xml.in: show ip ospf database opaque-area <opaque-area> self-originate	show ip ospf database opaque-area <text> self-originate
×	not yet documented	show-ip-ospf.xml.in: show ip ospf database opaque-as <opaque-as>	show ip ospf database opaque-as <text>
×	not yet documented	show-ip-ospf.xml.in: show ip ospf database opaque-as <opaque-as> adv-router <adv-router>	show ip ospf database opaque-as <text> adv-router <text>
×	not yet documented	show-ip-ospf.xml.in: show ip ospf database opaque-as <opaque-as> self-originate	show ip ospf database opaque-as <text> self-originate
×	not yet documented	show-ip-ospf.xml.in: show ip ospf database opaque-link <opaque-link>	show ip ospf database opaque-link <text>
×	not yet documented	show-ip-ospf.xml.in: show ip ospf database opaque-link <opaque-link> adv-router <adv-router>	show ip ospf database opaque-link <text> adv-router <text>
×	not yet documented	show-ip-ospf.xml.in: show ip ospf database opaque-link <opaque-link> self-originate	show ip ospf database opaque-link <text> self-originate
×	not yet documented	show-ip-ospf.xml.in: show ip ospf database router <router>	show ip ospf database router <text>

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	show-ip-ospf.xml.in: show ip ospf database router <router> adv-router <adv-router>	show ip ospf database router <text> adv-router <text>
×	not yet documented	show-ip-ospf.xml.in: show ip ospf database router <router> self-originate	show ip ospf database router <text> self-originate
×	not yet documented	show-ip-ospf.xml.in: show ip ospf database self-originate	show ip ospf database self-originate
×	not yet documented	show-ip-ospf.xml.in: show ip ospf database summary <summary>	show ip ospf database summary <text>
×	not yet documented	show-ip-ospf.xml.in: show ip ospf database summary <summary> adv-router <adv-router>	show ip ospf database summary <text> adv-router <text>
×	not yet documented	show-ip-ospf.xml.in: show ip ospf database summary <summary> self-originate	show ip ospf database summary <text> self-originate
✓	***show ip ospf interface [<interface>]***	show-ip-ospf.xml.in: show ip ospf interface <interface>	show ip ospf interface <text>
✓	***show ip ospf neighbor <interface>***	show-ip-ospf.xml.in: show ip ospf neighbor <neighbor>	show ip ospf neighbor <text>
×	not yet documented	show-ip-ospf.xml.in: show ip ospf neighbor address <address>	show ip ospf neighbor address <text>
✓	***show ip ospf neighbor detail***	show-ip-ospf.xml.in: show ip ospf neighbor detail	show ip ospf neighbor detail
✓	***show ip ospf route***	show-ip-ospf.xml.in: show ip ospf route	show ip ospf route
×	not yet documented	show-ip-pim.xml.in: show ip pim interfaces	show ip pim interfaces
×	not yet documented	show-ip-pim.xml.in: show ip pim join	show ip pim join
×	not yet documented	show-ip-pim.xml.in: show ip pim neighbor	show ip pim neighbor
×	not yet documented	show-ip-pim.xml.in: show ip pim nexthop	show ip pim nexthop
×	not yet documented	show-ip-pim.xml.in: show ip pim rp	show ip pim rp
×	not yet documented	show-ip-pim.xml.in: show ip pim rpf	show ip pim rpf
×	not yet documented	show-ip-pim.xml.in: show ip pim state	show ip pim state

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	show-ip-pim.xml.in: show ip pim statistics	show ip pim statistics
×	not yet documented	show-ip-pim.xml.in: show ip pim upstream	show ip pim upstream
×	not yet documented	show-ip-ports.xml.in: show ip ports	show ip ports
×	not yet documented	show-ip-access-paths-prefix-community-lists.xml.in: show ip prefix-list <prefix-list>	show ip prefix-list <text>
×	not yet documented	show-ip-access-paths-prefix-community-lists.xml.in: show ip protocol	show ip protocol
✓	***show ip rip***	show-ip-rip.xml.in: show ip rip	show ip rip
✓	***show ip rip status***	show-ip-rip.xml.in: show ip rip status	show ip rip status
×	not yet documented	show-ip-route.xml.in: show ip route <route>	show ip route <text>
×	***show ip route 0.0.0.0***	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	show-ip-route.xml.in: show ip route bgp	show ip route bgp
×	not yet documented	show-ip-route.xml.in: show ip route cache <cache>	show ip route cache <text>
×	not yet documented	show-ip-route.xml.in: show ip route connected	show ip route connected
×	not yet documented	show-ip-route.xml.in: show ip route forward <forward>	show ip route forward <text>
×	not yet documented	show-ip-route.xml.in: show ip route isis	show ip route isis
×	not yet documented	show-ip-route.xml.in: show ip route kernel	show ip route kernel
×	not yet documented	show-ip-route.xml.in: show ip route <route> longer-prefixes	show ip route <text> longer-prefixes
×	not yet documented	show-ip-route.xml.in: show ip route ospf	show ip route ospf
×	not yet documented	show-ip-route.xml.in: show ip route rip	show ip route rip
×	not yet documented	show-ip-route.xml.in: show ip route static	show ip route static
×	not yet documented	show-ip-route.xml.in: show ip route summary	show ip route summary

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	show-ip-route.xml.in: show ip route supernets-only	show ip route supernets-only
×	not yet documented	show-ip-route.xml.in: show ip route table <table>	show ip route table <text>
×	not yet documented	show-ip-route.xml.in: show ip route tag <tag>	show ip route tag <text>
✓	***show ip route vrf <name>***	show-ip-route.xml.in: show ip route vrf <vrf>	show ip route vrf <text>
✓	***show ipv6 access-list***	show-ipv6.xml.in: show ipv6 access-list <access-list>	show ipv6 access-list <text>
✓	***show ipv6 bgp***	show-ipv6-bgp.xml.in: show ipv6 bgp <bgp>	show ipv6 bgp <text>
×	not yet documented	show-ipv6-bgp.xml.in: show ipv6 bgp community <community>	show ipv6 bgp community <text>
×	not yet documented	show-ipv6-bgp.xml.in: show ipv6 bgp community-list <community-list>	show ipv6 bgp community-list <text>
×	not yet documented	show-ipv6-bgp.xml.in: show ipv6 bgp community-list <community-list> exact-match	show ipv6 bgp community-list <text> exact-match
×	not yet documented	show-ipv6-bgp.xml.in: show ipv6 bgp community <community> exact-match	show ipv6 bgp community <text> exact-match
×	not yet documented	show-ipv6-bgp.xml.in: show ipv6 bgp filter-list <filter-list>	show ipv6 bgp filter-list <text>
×	not yet documented	show-ipv6-bgp.xml.in: show ipv6 bgp large-community <large-community>	show ipv6 bgp large-community <text>
×	not yet documented	show-ipv6-bgp.xml.in: show ipv6 bgp large-community-list <large-community-list>	show ipv6 bgp large-community-list <text>
×	not yet documented	show-ipv6-bgp.xml.in: show ipv6 bgp large-community-list <large-community-list> exact-match	show ipv6 bgp large-community-list <text> exact-match

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	show-ipv6-bgp.xml.in: show ipv6 bgp large-community <large-community> exact-match	show ipv6 bgp large-community <text> exact-match
×	not yet documented	show-ipv6-bgp.xml.in: show ipv6 bgp <bgp> longer-prefixes	show ipv6 bgp <text> longer-prefixes
×	not yet documented	show-ipv6-bgp.xml.in: show ipv6 bgp neighbors <neighbors>	show ipv6 bgp neighbors <text>
×	not yet documented	show-ipv6-bgp.xml.in: show ipv6 bgp neighbors <neighbors> advertised-routes	show ipv6 bgp neighbors <text> advertised-routes
×	not yet documented	show-ipv6-bgp.xml.in: show ipv6 bgp neighbors <neighbors> dampened-routes	show ipv6 bgp neighbors <text> dampened-routes
×	not yet documented	show-ipv6-bgp.xml.in: show ipv6 bgp neighbors <neighbors> filtered-routes	show ipv6 bgp neighbors <text> filtered-routes
×	not yet documented	show-ipv6-bgp.xml.in: show ipv6 bgp neighbors <neighbors> flap-statistics	show ipv6 bgp neighbors <text> flap-statistics
×	not yet documented	show-ipv6-bgp.xml.in: show ipv6 bgp neighbors <neighbors> prefix-counts	show ipv6 bgp neighbors <text> prefix-counts
×	not yet documented	show-ipv6-bgp.xml.in: show ipv6 bgp neighbors <neighbors> received-routes	show ipv6 bgp neighbors <text> received-routes
×	not yet documented	show-ipv6-bgp.xml.in: show ipv6 bgp neighbors <neighbors> received prefix-filter	show ipv6 bgp neighbors <text> received prefix-filter
×	not yet documented	show-ipv6-bgp.xml.in: show ipv6 bgp neighbors <neighbors> routes	show ipv6 bgp neighbors <text> routes
×	not yet documented	show-ipv6-bgp.xml.in: show ipv6 bgp prefix-list <prefix-list>	show ipv6 bgp prefix-list <text>
×	not yet documented	show-ipv6-bgp.xml.in: show ipv6 bgp regexp <regexp>	show ipv6 bgp regexp <text>
×	not yet documented	show-ipv6-bgp.xml.in: show ipv6 bgp route-map <route-map>	show ipv6 bgp route-map <text>
×	not yet documented	show-ipv6-bgp.xml.in: show ipv6 bgp summary	show ipv6 bgp summary

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
✓	***show ipv6 forwarding***	show-ipv6.xml.in: show ipv6 forwarding	show ipv6 forwarding
✓	***show ipv6 groups***	Nothing found in XML Definitions	show ipv6 groups
✓	***show ipv6 neighbors***	Nothing found in XML Definitions	show ipv6 neighbors
✓	***show ipv6 ospfv3***	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3	show ipv6 ospfv3
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 area <area>	show ipv6 ospfv3 area <text>
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 area <area> router <router>	show ipv6 ospfv3 area <text> router <text>
✓	***show ipv6 ospfv3 border-routers***	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 border-routers <border-routers>	show ipv6 ospfv3 border-routers <text>
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 border-routers detail	show ipv6 ospfv3 border-routers detail
✓	***show ipv6 ospfv3 database <type> [A.B.C.D] [adv-router <A.B.C.D>|self-originate]***	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database	show ipv6 ospfv3 database <text> <text>
×	not yet documented	Nothing found in XML Definitions	show ipv6 ospfv3 database <text> adv-router <text> detail
×	not yet documented	Nothing found in XML Definitions	show ipv6 ospfv3 database <text> adv-router <text> dump
×	not yet documented	Nothing found in XML Definitions	show ipv6 ospfv3 database <text> adv-router <text> internal
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database adv-router <adv-router> linkstate-id <linkstate-id> detail	show ipv6 ospfv3 database <text> adv-router <text> linkstate-id <text> detail
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database adv-router <adv-router> linkstate-id <linkstate-id> dump	show ipv6 ospfv3 database <text> adv-router <text> linkstate-id <text> dump
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database adv-router <adv-router> linkstate-id <linkstate-id> internal	show ipv6 ospfv3 database <text> adv-router <text> linkstate-id <text> internal

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database any <any>	show ipv6 ospfv3 database any <text> <text>
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database any any <any> detail	show ipv6 ospfv3 database any any <text> detail
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database any any <any> dump	show ipv6 ospfv3 database any any <text> dump
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database any any <any> internal	show ipv6 ospfv3 database any any <text> internal
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database any <any> detail	show ipv6 ospfv3 database any <text> <text> detail
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database any <any> dump	show ipv6 ospfv3 database any <text> <text> dump
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database any <any> internal	show ipv6 ospfv3 database any <text> <text> internal
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database any <any> node.tag	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database any <any> node.tag detail	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database any <any> node.tag dump	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database any <any> node.tag internal	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database as-external	show ipv6 ospfv3 database as-external <text> <text>
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database as-external adv-router <adv-router> detail	show ipv6 ospfv3 database as-external adv-router <text> detail
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database as-external adv-router <adv-router> dump	show ipv6 ospfv3 database as-external adv-router <text> dump
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database as-external adv-router <adv-router> internal	show ipv6 ospfv3 database as-external adv-router <text> internal

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database as-external adv-router <adv-router> linkstate-id <linkstate-id> detail	show ipv6 ospfv3 database as-external adv-router <text> linkstate-id <text> detail
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database as-external adv-router <adv-router> linkstate-id <linkstate-id> dump	show ipv6 ospfv3 database as-external adv-router <text> linkstate-id <text> dump
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database as-external adv-router <adv-router> linkstate-id <linkstate-id> internal	show ipv6 ospfv3 database as-external adv-router <text> linkstate-id <text> internal
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database as-external any <any>	show ipv6 ospfv3 database as-external any <text>
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database as-external any <any> detail	show ipv6 ospfv3 database as-external any <text> detail
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database as-external any <any> dump	show ipv6 ospfv3 database as-external any <text> dump
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database as-external any <any> internal	show ipv6 ospfv3 database as-external any <text> internal
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database as-external <as-external> detail	show ipv6 ospfv3 database as-external <text> <text> detail
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database as-external <as-external> dump	show ipv6 ospfv3 database as-external <text> <text> dump
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database as-external <as-external> internal	show ipv6 ospfv3 database as-external <text> <text> internal
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database as-external linkstate-id <linkstate-id> detail	show ipv6 ospfv3 database as-external linkstate-id <text> detail
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database as-external linkstate-id <linkstate-id> dump	show ipv6 ospfv3 database as-external linkstate-id <text> dump

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database as-external linkstate-id <linkstate-id> internal	show ipv6 ospfv3 database as-external linkstate-id <text> internal
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database as-external <as-external> node.tag	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database as-external <as-external> node.tag detail	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database as-external <as-external> node.tag dump	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database as-external <as-external> node.tag internal	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database as-external <as-external> self-originated	show ipv6 ospfv3 database as-external self-originated
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database as-external <as-external> self-originated detail	show ipv6 ospfv3 database as-external self-originated detail
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database as-external <as-external> self-originated dump	show ipv6 ospfv3 database as-external self-originated dump
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database as-external <as-external> self-originated internal	show ipv6 ospfv3 database as-external self-originated internal
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database detail	show ipv6 ospfv3 database <text> <text> detail
×	not yet documented	Nothing found in XML Definitions	show ipv6 ospfv3 database <text> <text> dump
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database group-membership	show ipv6 ospfv3 database group-membership <text>
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database group-membership adv-router <adv-router> detail	show ipv6 ospfv3 database group-membership adv-router <text> detail

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Table 2 – continued from previous page

Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database group-membership adv-router <adv-router> dump	show ipv6 ospfv3 database group-membership adv-router <text> dump
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database group-membership adv-router <adv-router> internal	show ipv6 ospfv3 database group-membership adv-router <text> internal
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database group-membership adv-router <adv-router> linkstate-id <linkstate-id> detail	show ipv6 ospfv3 database group-membership adv-router <text> linkstate-id <text> detail
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database group-membership adv-router <adv-router> linkstate-id <linkstate-id> dump	show ipv6 ospfv3 database group-membership adv-router <text> linkstate-id <text> dump
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database group-membership adv-router <adv-router> linkstate-id <linkstate-id> internal	show ipv6 ospfv3 database group-membership adv-router <text> linkstate-id <text> internal
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database group-membership detail	show ipv6 ospfv3 database group-membership <text> detail
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database group-membership dump	show ipv6 ospfv3 database group-membership <text> dump
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database group-membership internal	show ipv6 ospfv3 database group-membership <text> internal
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database group-membership linkstate-id <linkstate-id> detail	show ipv6 ospfv3 database group-membership linkstate-id <text> detail
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database group-membership linkstate-id <linkstate-id> dump	show ipv6 ospfv3 database group-membership linkstate-id <text> dump

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Table 2 – continued from previous page

Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database group-membership linkstate-id <linkstate-id> internal	show ipv6 ospfv3 database group-membership linkstate-id <text> internal
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database group-membership node.tag	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database group-membership node.tag detail	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database group-membership node.tag dump	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database group-membership node.tag internal	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database group-membership node.tag self-originated	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database group-membership node.tag self-originated detail	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database group-membership node.tag self-originated dump	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database group-membership node.tag self-originated internal	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database group-membership self-originated	show ipv6 ospfv3 database group-membership self-originated
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database group-membership self-originated detail	show ipv6 ospfv3 database group-membership self-originated detail

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Table 2 – continued from previous page

Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database group-membership self-originated dump	show ipv6 ospfv3 database group-membership self-originated dump
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database group-membership self-originated internal	show ipv6 ospfv3 database group-membership self-originated internal
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database inter-prefix	show ipv6 ospfv3 database inter-prefix <text>
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database inter-prefix adv-router <adv-router> detail	show ipv6 ospfv3 database inter-prefix adv-router <text> detail
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database inter-prefix adv-router <adv-router> dump	show ipv6 ospfv3 database inter-prefix adv-router <text> dump
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database inter-prefix adv-router <adv-router> internal	show ipv6 ospfv3 database inter-prefix adv-router <text> internal
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database inter-prefix adv-router <adv-router> linkstate-id <linkstate-id> detail	show ipv6 ospfv3 database inter-prefix adv-router <text> linkstate-id <text> detail
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database inter-prefix adv-router <adv-router> linkstate-id <linkstate-id> dump	show ipv6 ospfv3 database inter-prefix adv-router <text> linkstate-id <text> dump
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database inter-prefix adv-router <adv-router> linkstate-id <linkstate-id> internal	show ipv6 ospfv3 database inter-prefix adv-router <text> linkstate-id <text> internal
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database inter-prefix detail	show ipv6 ospfv3 database inter-prefix <text> detail
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database inter-prefix dump	show ipv6 ospfv3 database inter-prefix <text> dump
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database inter-prefix internal	show ipv6 ospfv3 database inter-prefix <text> internal

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Table 2 – continued from previous page

Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database inter-prefix linkstate-id <linkstate-id> detail	show ipv6 ospfv3 database inter-prefix linkstate-id <text> detail
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database inter-prefix linkstate-id <linkstate-id> dump	show ipv6 ospfv3 database inter-prefix linkstate-id <text> dump
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database inter-prefix linkstate-id <linkstate-id> internal	show ipv6 ospfv3 database inter-prefix linkstate-id <text> internal
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database inter-prefix node.tag	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database inter-prefix node.tag detail	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database inter-prefix node.tag dump	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database inter-prefix node.tag internal	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database inter-prefix node.tag self-originated	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database inter-prefix node.tag self-originated detail	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database inter-prefix node.tag self-originated dump	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database inter-prefix node.tag self-originated internal	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database inter-prefix self-originated	show ipv6 ospfv3 database inter-prefix self-originated
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database inter-prefix self-originated detail	show ipv6 ospfv3 database inter-prefix self-originated detail

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Table 2 – continued from previous page

Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database inter-prefix self-originated dump	show ipv6 ospfv3 database inter-prefix self-originated dump
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database inter-prefix self-originated internal	show ipv6 ospfv3 database inter-prefix self-originated internal
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database inter-router	show ipv6 ospfv3 database inter-router <text>
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database inter-router adv-router <adv-router> detail	show ipv6 ospfv3 database inter-router adv-router <text> detail
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database inter-router adv-router <adv-router> dump	show ipv6 ospfv3 database inter-router adv-router <text> dump
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database inter-router adv-router <adv-router> internal	show ipv6 ospfv3 database inter-router adv-router <text> internal
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database inter-router adv-router <adv-router> linkstate-id <linkstate-id> detail	show ipv6 ospfv3 database inter-router adv-router <text> linkstate-id <text> detail
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database inter-router adv-router <adv-router> linkstate-id <linkstate-id> dump	show ipv6 ospfv3 database inter-router adv-router <text> linkstate-id <text> dump
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database inter-router adv-router <adv-router> linkstate-id <linkstate-id> internal	show ipv6 ospfv3 database inter-router adv-router <text> linkstate-id <text> internal
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database inter-router detail	show ipv6 ospfv3 database inter-router <text> detail
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database inter-router dump	show ipv6 ospfv3 database inter-router <text> dump
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database inter-router internal	show ipv6 ospfv3 database inter-router <text> internal

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Table 2 – continued from previous page

Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database inter-router linkstate-id <linkstate-id> detail	show ipv6 ospfv3 database inter-router linkstate-id <text> detail
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database inter-router linkstate-id <linkstate-id> dump	show ipv6 ospfv3 database inter-router linkstate-id <text> dump
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database inter-router linkstate-id <linkstate-id> internal	show ipv6 ospfv3 database inter-router linkstate-id <text> internal
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database inter-router node.tag	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database inter-router node.tag detail	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database inter-router node.tag dump	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database inter-router node.tag internal	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database inter-router node.tag self-originated	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database inter-router node.tag self-originated detail	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database inter-router node.tag self-originated dump	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database inter-router node.tag self-originated internal	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database inter-router self-originated	show ipv6 ospfv3 database inter-router self-originated
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database inter-router self-originated detail	show ipv6 ospfv3 database inter-router self-originated detail

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Table 2 – continued from previous page

Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database inter-router self-originated dump	show ipv6 ospfv3 database inter-router self-originated dump
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database inter-router self-originated internal	show ipv6 ospfv3 database inter-router self-originated internal
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database internal	show ipv6 ospfv3 database <text> <text> internal
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database intra-prefix	show ipv6 ospfv3 database intra-prefix <text>
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database intra-prefix adv-router <adv-router> detail	show ipv6 ospfv3 database intra-prefix adv-router <text> detail
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database intra-prefix adv-router <adv-router> dump	show ipv6 ospfv3 database intra-prefix adv-router <text> dump
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database intra-prefix adv-router <adv-router> internal	show ipv6 ospfv3 database intra-prefix adv-router <text> internal
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database intra-prefix adv-router <adv-router> linkstate-id <linkstate-id> detail	show ipv6 ospfv3 database intra-prefix adv-router <text> linkstate-id <text> detail
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database intra-prefix adv-router <adv-router> linkstate-id <linkstate-id> dump	show ipv6 ospfv3 database intra-prefix adv-router <text> linkstate-id <text> dump
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database intra-prefix adv-router <adv-router> linkstate-id <linkstate-id> internal	show ipv6 ospfv3 database intra-prefix adv-router <text> linkstate-id <text> internal
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database intra-prefix detail	show ipv6 ospfv3 database intra-prefix <text> detail
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database intra-prefix dump	show ipv6 ospfv3 database intra-prefix <text> dump
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database intra-prefix internal	show ipv6 ospfv3 database intra-prefix <text> internal

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Table 2 – continued from previous page

Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database intra-prefix linkstate-id <linkstate-id> detail	show ipv6 ospfv3 database intra-prefix linkstate-id <text> detail
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database intra-prefix linkstate-id <linkstate-id> dump	show ipv6 ospfv3 database intra-prefix linkstate-id <text> dump
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database intra-prefix linkstate-id <linkstate-id> internal	show ipv6 ospfv3 database intra-prefix linkstate-id <text> internal
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database intra-prefix node.tag	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database intra-prefix node.tag detail	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database intra-prefix node.tag dump	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database intra-prefix node.tag internal	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database intra-prefix node.tag self-originated	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database intra-prefix node.tag self-originated detail	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database intra-prefix node.tag self-originated dump	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database intra-prefix node.tag self-originated internal	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database intra-prefix self-originated	show ipv6 ospfv3 database intra-prefix self-originated
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database intra-prefix self-originated detail	show ipv6 ospfv3 database intra-prefix self-originated detail

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Table 2 – continued from previous page

Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database intra-prefix self-originated dump	show ipv6 ospfv3 database intra-prefix self-originated dump
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database intra-prefix self-originated internal	show ipv6 ospfv3 database intra-prefix self-originated internal
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database link	show ipv6 ospfv3 database link <text>
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database link adv-router <adv-router> detail	show ipv6 ospfv3 database link adv-router <text> detail
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database link adv-router <adv-router> dump	show ipv6 ospfv3 database link adv-router <text> dump
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database link adv-router <adv-router> internal	show ipv6 ospfv3 database link adv-router <text> internal
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database link adv-router <adv-router> linkstate-id <linkstate-id> detail	show ipv6 ospfv3 database link adv-router <text> linkstate-id <text> detail
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database link adv-router <adv-router> linkstate-id <linkstate-id> dump	show ipv6 ospfv3 database link adv-router <text> linkstate-id <text> dump
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database link adv-router <adv-router> linkstate-id <linkstate-id> internal	show ipv6 ospfv3 database link adv-router <text> linkstate-id <text> internal
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database link detail	show ipv6 ospfv3 database link <text> detail
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database link dump	show ipv6 ospfv3 database link <text> dump
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database link internal	show ipv6 ospfv3 database link <text> internal

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database link linkstate-id <linkstate-id> detail	show ipv6 ospfv3 database link linkstate-id <text> detail
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database link linkstate-id <linkstate-id> dump	show ipv6 ospfv3 database link linkstate-id <text> dump
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database link linkstate-id <linkstate-id> internal	show ipv6 ospfv3 database link linkstate-id <text> internal
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database link node.tag	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database link node.tag detail	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database link node.tag dump	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database link node.tag internal	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database link node.tag self-originated	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database link node.tag self-originated detail	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database link node.tag self-originated dump	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database link node.tag self-originated internal	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database link self-originated	show ipv6 ospfv3 database link self-originated
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database link self-originated detail	show ipv6 ospfv3 database link self-originated detail
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database link self-originated dump	show ipv6 ospfv3 database link self-originated dump

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database link self-originated internal	show ipv6 ospfv3 database link self-originated internal
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database linkstate-id <linkstate-id> detail	show ipv6 ospfv3 database <text> linkstate-id <text> detail
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database linkstate-id <linkstate-id> dump	show ipv6 ospfv3 database <text> linkstate-id <text> dump
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database linkstate-id <linkstate-id> internal	show ipv6 ospfv3 database <text> linkstate-id <text> internal
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database network	show ipv6 ospfv3 database network <text>
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database network adv-router <adv-router> detail	show ipv6 ospfv3 database network adv-router <text> detail
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database network adv-router <adv-router> dump	show ipv6 ospfv3 database network adv-router <text> dump
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database network adv-router <adv-router> internal	show ipv6 ospfv3 database network adv-router <text> internal
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database network adv-router <adv-router> linkstate-id <linkstate-id> detail	show ipv6 ospfv3 database network adv-router <text> linkstate-id <text> detail
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database network adv-router <adv-router> linkstate-id <linkstate-id> dump	show ipv6 ospfv3 database network adv-router <text> linkstate-id <text> dump
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database network adv-router <adv-router> linkstate-id <linkstate-id> internal	show ipv6 ospfv3 database network adv-router <text> linkstate-id <text> internal
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database network detail	show ipv6 ospfv3 database network <text> detail

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database network dump	show ipv6 ospfv3 database network <text> dump
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database network internal	show ipv6 ospfv3 database network <text> internal
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database network linkstate-id <linkstate-id> detail	show ipv6 ospfv3 database network linkstate-id <text> detail
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database network linkstate-id <linkstate-id> dump	show ipv6 ospfv3 database network linkstate-id <text> dump
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database network linkstate-id <linkstate-id> internal	show ipv6 ospfv3 database network linkstate-id <text> internal
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database network node.tag	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database network node.tag detail	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database network node.tag dump	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database network node.tag internal	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database network node.tag self-originated	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database network node.tag self-originated detail	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database network node.tag self-originated dump	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database network node.tag self-originated internal	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database network self-originated	show ipv6 ospfv3 database network self-originated

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database network self-originated detail	show ipv6 ospfv3 database network self-originated detail
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database network self-originated dump	show ipv6 ospfv3 database network self-originated dump
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database network self-originated internal	show ipv6 ospfv3 database network self-originated internal
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database node.tag	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database node.tag adv-router <adv-router> detail	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database node.tag adv-router <adv-router> dump	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database node.tag adv-router <adv-router> internal	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database node.tag adv-router <adv-router> linkstate-id <linkstate-id> detail	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database node.tag adv-router <adv-router> linkstate-id <linkstate-id> dump	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database node.tag adv-router <adv-router> linkstate-id <linkstate-id> internal	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database node.tag detail	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database node.tag dump	Nothing found in VyOS

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database node.tag internal	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database node.tag linkstate-id <linkstate-id> detail	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database node.tag linkstate-id <linkstate-id> dump	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database node.tag linkstate-id <linkstate-id> internal	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database node.tag node.tag	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database node.tag node.tag detail	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database node.tag node.tag dump	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database node.tag node.tag internal	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database node.tag node.tag self-originated	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database node.tag node.tag self-originated detail	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database node.tag node.tag self-originated dump	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database node.tag node.tag self-originated internal	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database node.tag self-originated	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database node.tag self-originated detail	Nothing found in VyOS

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database node.tag self-originated dump	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database node.tag self-originated internal	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database router	show ipv6 ospfv3 database router <text>
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database router adv-router <adv-router> detail	show ipv6 ospfv3 database router adv-router <text> detail
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database router adv-router <adv-router> dump	show ipv6 ospfv3 database router adv-router <text> dump
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database router adv-router <adv-router> internal	show ipv6 ospfv3 database router adv-router <text> internal
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database router adv-router <adv-router> linkstate-id <linkstate-id> detail	show ipv6 ospfv3 database router adv-router <text> linkstate-id <text> detail
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database router adv-router <adv-router> linkstate-id <linkstate-id> dump	show ipv6 ospfv3 database router adv-router <text> linkstate-id <text> dump
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database router adv-router <adv-router> linkstate-id <linkstate-id> internal	show ipv6 ospfv3 database router adv-router <text> linkstate-id <text> internal
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database router detail	show ipv6 ospfv3 database router <text> detail
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database router dump	show ipv6 ospfv3 database router <text> dump
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database router internal	show ipv6 ospfv3 database router <text> internal

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database router linkstate-id <linkstate-id> detail	show ipv6 ospfv3 database router linkstate-id <text> detail
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database router linkstate-id <linkstate-id> dump	show ipv6 ospfv3 database router linkstate-id <text> dump
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database router linkstate-id <linkstate-id> internal	show ipv6 ospfv3 database router linkstate-id <text> internal
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database router node.tag	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database router node.tag detail	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database router node.tag dump	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database router node.tag internal	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database router node.tag self-originated	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database router node.tag self-originated detail	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database router node.tag self-originated dump	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database router node.tag self-originated internal	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database router self-originated	show ipv6 ospfv3 database router self-originated
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database router self-originated detail	show ipv6 ospfv3 database router self-originated detail

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database router self-originated dump	show ipv6 ospfv3 database router self-originated dump
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database router self-originated internal	show ipv6 ospfv3 database router self-originated internal
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database self-originated	show ipv6 ospfv3 database self-originated
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database self-originated detail	show ipv6 ospfv3 database self-originated detail
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database self-originated dump	show ipv6 ospfv3 database self-originated dump
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database self-originated internal	show ipv6 ospfv3 database self-originated internal
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database type-7	show ipv6 ospfv3 database type-7 <text>
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database type-7 adv-router <adv-router> detail	show ipv6 ospfv3 database type-7 adv-router <text> detail
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database type-7 adv-router <adv-router> dump	show ipv6 ospfv3 database type-7 adv-router <text> dump
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database type-7 adv-router <adv-router> internal	show ipv6 ospfv3 database type-7 adv-router <text> internal
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database type-7 adv-router <adv-router> linkstate-id <linkstate-id> detail	show ipv6 ospfv3 database type-7 adv-router <text> linkstate-id <text> detail
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database type-7 adv-router <adv-router> linkstate-id <linkstate-id> dump	show ipv6 ospfv3 database type-7 adv-router <text> linkstate-id <text> dump
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database type-7 adv-router <adv-router> linkstate-id <linkstate-id> internal	show ipv6 ospfv3 database type-7 adv-router <text> linkstate-id <text> internal

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database type-7 detail	show ipv6 ospfv3 database type-7 <text> detail
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database type-7 dump	show ipv6 ospfv3 database type-7 <text> dump
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database type-7 internal	show ipv6 ospfv3 database type-7 <text> internal
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database type-7 linkstate-id <linkstate-id> detail	show ipv6 ospfv3 database type-7 linkstate-id <text> detail
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database type-7 linkstate-id <linkstate-id> dump	show ipv6 ospfv3 database type-7 linkstate-id <text> dump
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database type-7 linkstate-id <linkstate-id> internal	show ipv6 ospfv3 database type-7 linkstate-id <text> internal
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database type-7 node.tag	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database type-7 node.tag detail	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database type-7 node.tag dump	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database type-7 node.tag internal	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database type-7 node.tag self-originated	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database type-7 node.tag self-originated detail	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database type-7 node.tag self-originated dump	Nothing found in VyOS
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database type-7 node.tag self-originated internal	Nothing found in VyOS

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Table 2 – continued from previous page

Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database type-7 self-originated	show ipv6 ospfv3 database type-7 self-originated
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database type-7 self-originated detail	show ipv6 ospfv3 database type-7 self-originated detail
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database type-7 self-originated dump	show ipv6 ospfv3 database type-7 self-originated dump
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 database type-7 self-originated internal	show ipv6 ospfv3 database type-7 self-originated internal
✓	***show ipv6 ospfv3 interface [prefix]|[<interface> [prefix]]***	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 interface <interface>	show ipv6 ospfv3 interface <text>
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 interface <interface> prefix <prefix>	show ipv6 ospfv3 interface prefix <text>
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 interface <interface> prefix <prefix> detail	show ipv6 ospfv3 interface prefix <text> detail
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 interface <interface> prefix <prefix> match	show ipv6 ospfv3 interface prefix <text> match
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 linkstate detail	show ipv6 ospfv3 linkstate detail
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 linkstate network <network> link-state-id <link-state-id>	show ipv6 ospfv3 linkstate network <text> link-state-id <text>
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 linkstate router <router>	show ipv6 ospfv3 linkstate router <text>
✓	***show ipv6 ospfv3 neighbor <interface>***	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 neighbor	show ipv6 ospfv3 neighbor
✓	***show ipv6 ospfv3 neighbor detail***	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 neighbor detail	show ipv6 ospfv3 neighbor detail
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 neighbor drchoice	show ipv6 ospfv3 neighbor drchoice

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
✓	*show ipv6 ospfv3 redistribute*	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 redistribute	show ipv6 ospfv3 redistribute
✓	*show ipv6 ospfv3 route*	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 route <route>	show ipv6 ospfv3 route <text>
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 route detail	show ipv6 ospfv3 route detail
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 route external-1	show ipv6 ospfv3 route external-1
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 route external-1 detail	show ipv6 ospfv3 route external-1 detail
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 route external-2	show ipv6 ospfv3 route external-2
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 route external-2 detail	show ipv6 ospfv3 route external-2 detail
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 route inter-area	show ipv6 ospfv3 route inter-area
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 route inter-area detail	show ipv6 ospfv3 route inter-area detail
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 route intra-area	show ipv6 ospfv3 route intra-area
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 route intra-area detail	show ipv6 ospfv3 route intra-area detail
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 route <route> longer	show ipv6 ospfv3 route <text> longer
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 route <route> match	show ipv6 ospfv3 route <text> match
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 route <route> match detail	show ipv6 ospfv3 route <text> match detail
×	not yet documented	show-ipv6-ospfv3.xml.in: show ipv6 ospfv3 route summary	show ipv6 ospfv3 route summary
✓	*show ipv6 prefix-list*	show-ipv6-prefix-list.xml.in: show ipv6 prefix-list <prefix-list>	show ipv6 prefix-list <text> <text>

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	show-ipv6-prefix-list.xml.in: show ipv6 prefix-list detail <detail>	show ipv6 prefix-list detail <text>
×	not yet documented	Nothing found in XML Definitions	show ipv6 prefix-list <text> <text> first-match
×	not yet documented	Nothing found in XML Definitions	show ipv6 prefix-list <text> <text> longer
×	not yet documented	show-ipv6-prefix-list.xml.in: show ipv6 prefix-list <prefix-list> node.tag	Nothing found in VyOS
×	not yet documented	show-ipv6-prefix-list.xml.in: show ipv6 prefix-list <prefix-list> node.tag first-match	Nothing found in VyOS
×	not yet documented	show-ipv6-prefix-list.xml.in: show ipv6 prefix-list <prefix-list> node.tag longer	Nothing found in VyOS
×	not yet documented	show-ipv6-prefix-list.xml.in: show ipv6 prefix-list <prefix-list> seq <seq>	show ipv6 prefix-list <text> seq <text>
×	not yet documented	show-ipv6-prefix-list.xml.in: show ipv6 prefix-list summary <summary>	show ipv6 prefix-list summary <text>
✓	***show ipv6 ripng***	show-ipv6.xml.in: show ipv6 ripng	show ipv6 ripng
✓	***show ipv6 ripng status***	show-ipv6.xml.in: show ipv6 ripng status	show ipv6 ripng status
✓	***show ipv6 route***	show-ipv6-route.xml.in: show ipv6 route <route>	show ipv6 route <text>
×	not yet documented	show-ipv6-route.xml.in: show ipv6 route bgp	show ipv6 route bgp
×	not yet documented	show-ipv6-route.xml.in: show ipv6 route cache <cache>	show ipv6 route cache <text>
×	not yet documented	show-ipv6-route.xml.in: show ipv6 route connected	show ipv6 route connected
×	not yet documented	show-ipv6-route.xml.in: show ipv6 route forward <forward>	show ipv6 route forward <text>
×	not yet documented	show-ipv6-route.xml.in: show ipv6 route isis	show ipv6 route isis
×	not yet documented	show-ipv6-route.xml.in: show ipv6 route kernel	show ipv6 route kernel

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	show-ipv6-route.xml.in: show ipv6 route <route> longer-prefixes	show ipv6 route <text> longer-prefixes
×	not yet documented	show-ipv6-route.xml.in: show ipv6 route ospfv3	show ipv6 route ospfv3
×	not yet documented	show-ipv6-route.xml.in: show ipv6 route ripng	show ipv6 route ripng
×	not yet documented	show-ipv6-route.xml.in: show ipv6 route static	show ipv6 route static
×	not yet documented	show-ipv6-route.xml.in: show ipv6 route summary	show ipv6 route summary
×	not yet documented	show-ipv6-route.xml.in: show ipv6 route table <table>	show ipv6 route table <text>
✓	***show ipv6 route vrf <name>***	show-ipv6-route.xml.in: show ipv6 route vrf <vrf>	show ipv6 route vrf <text>
×	not yet documented	show-isis.xml.in: show isis database <database>	show isis database <text>
×	not yet documented	show-isis.xml.in: show isis database detail	show isis database detail
×	not yet documented	show-isis.xml.in: show isis hostname	show isis hostname
×	not yet documented	show-isis.xml.in: show isis interface <interface>	show isis interface <text>
×	not yet documented	show-isis.xml.in: show isis interface detail	show isis interface detail
×	not yet documented	show-isis.xml.in: show isis neighbor <neighbor>	show isis neighbor <text>
×	not yet documented	show-isis.xml.in: show isis neighbor detail	show isis neighbor detail
×	not yet documented	show-isis.xml.in: show isis route	show isis route
×	not yet documented	show-isis.xml.in: show isis route level-1	show isis route level-1
×	not yet documented	show-isis.xml.in: show isis route level-2	show isis route level-2
×	not yet documented	show-isis.xml.in: show isis segment-routing node	show isis segment-routing node
×	not yet documented	show-isis.xml.in: show isis segment-routing prefix-sids	show isis segment-routing prefix-sids
×	not yet documented	show-isis.xml.in: show isis spf-delay	show isis spf-delay
×	not yet documented	show-isis.xml.in: show isis summary	show isis summary

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	show-isis.xml.in: show isis topology	show isis topology
×	not yet documented	show-isis.xml.in: show isis topology level-1	show isis topology level-1
×	not yet documented	show-isis.xml.in: show isis topology level-2	show isis topology level-2
×	not yet documented	show-isis.xml.in: show isis traffic-engineering interface <interface>	show isis traffic-engineering interface <text>
×	not yet documented	show-isis.xml.in: show isis traffic-engineering router	show isis traffic-engineering router
×	not yet documented	l2tp-server.xml.in: show l2tp-server sessions	show l2tp-server sessions
×	not yet documented	l2tp-server.xml.in: show l2tp-server statistics	show l2tp-server statistics
×	not yet documented	show-license.xml.in: show license	show license
✓	*show lldp neighbors*	lldp.xml.in: show lldp neighbors	show lldp neighbors
✓	*show lldp neighbors detail*	lldp.xml.in: show lldp neighbors detail	show lldp neighbors detail
✓	*show lldp neighbors interface <interface>*	lldp.xml.in: show lldp neighbors interface <interface>	show lldp neighbors interface <text>
✓	*show log [all | authorization | cluster | conntrack-sync | ...]*	show-log.xml.in: show log	show log
×	not yet documented	show-log.xml.in: show log all	show log all
×	not yet documented	show-log.xml.in: show log authorization	show log authorization
×	not yet documented	show-log.xml.in: show log cluster	show log cluster
×	not yet documented	show-log.xml.in: show log conntrack-sync	show log conntrack-sync
✓	*show log console-server*	show-console-server.xml.in: show log console-server	show log console-server
×	not yet documented	Nothing found in XML Definitions	show log container <text>
✓	*show log dhcp client*	show-log.xml.in: show log dhcp client	show log dhcp client
✓	*show log dhcp client interface <interface>*	show-log.xml.in: show log dhcp client interface <interface>	show log dhcp client interface <text>

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
✓	***show log dhcp server***	show-log.xml.in: show log dhcp server	show log dhcp server
✓	***show log dhcpv6 client***	show-log.xml.in: show log dhcpv6 client	show log dhcpv6 client
✓	***show log dhcpv6 client interface <interface>***	show-log.xml.in: show log dhcpv6 client interface <interface>	show log dhcpv6 client interface <text>
✓	***show log dhcpv6 server***	show-log.xml.in: show log dhcpv6 server	show log dhcpv6 server
×	not yet documented	Nothing found in XML Definitions	show log dns dynamic
×	not yet documented	Nothing found in XML Definitions	show log dns forwarding
×	***show log firewall [name | ipv6name] <name>***	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	show-log.xml.in: show log firewall ipv6-name <ipv6-name>	show log firewall ipv6-name <text>
×	not yet documented	show-log.xml.in: show log firewall ipv6-name <ipv6-name> rule <rule>	show log firewall ipv6-name <text> rule <text>
×	not yet documented	show-log.xml.in: show log firewall name <name>	show log firewall name <text>
×	not yet documented	show-log.xml.in: show log firewall name <name> rule <rule>	show log firewall name <text> rule <text>
×	not yet documented	show-log.xml.in: show log https	show log https
✓	***show log image <name> [all | authorization | directory | file <file name> | tail <lines>]***	show-log.xml.in: show log image <image>	show log image <text>
×	not yet documented	show-log.xml.in: show log image <image> all	show log image <text> all
×	not yet documented	show-log.xml.in: show log image <image> authorization	show log image <text> authorization
×	not yet documented	show-log.xml.in: show log image <image> tail <tail>	show log image <text> tail <text>
×	not yet documented	show-login.xml.in: show login	show login
×	not yet documented	show-login.xml.in: show login groups	show login groups

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	show-login.xml.in: show login level	show login level
×	not yet documented	show-login.xml.in: show login user	show login user
×	not yet documented	show-log.xml.in: show log ipoe-server	show log ipoe-server
×	not yet documented	show-log.xml.in: show log kernel	show log kernel
✓	***show log lldp***	show-log.xml.in: show log lldp	show log lldp
×	not yet documented	show-log.xml.in: show log nat	show log nat
×	not yet documented	show-log.xml.in: show log openvpn	show log openvpn
×	not yet documented	show-log.xml.in: show log openvpn interface <interface>	show log openvpn interface <text>
×	not yet documented	show-log.xml.in: show log pppoe	show log pppoe
×	not yet documented	show-log.xml.in: show log pppoe-server	show log pppoe-server
×	not yet documented	show-log.xml.in: show log pppoe interface <interface>	show log pppoe interface <text>
×	not yet documented	show-log.xml.in: show log snmp	show log snmp
×	not yet documented	show-log.xml.in: show log tail	show log tail <text>
×	not yet documented	show-log.xml.in: show log vpn all	show log vpn all
×	not yet documented	show-log.xml.in: show log vpn ipsec	show log vpn ipsec
×	not yet documented	show-log.xml.in: show log vpn l2tp	show log vpn l2tp
×	not yet documented	show-log.xml.in: show log vpn pptp	show log vpn pptp
×	not yet documented	show-log.xml.in: show log vpn sstp	show log vpn sstp
×	not yet documented	show-log.xml.in: show log vrrp	show log vrrp
×	not yet documented	show-log.xml.in: show log webproxy	show log webproxy
×	not yet documented	show-monitoring.xml.in: show monitoring	show monitoring
✓	***show mpls ldp binding***	show-mpls.xml.in: show mpls ldp binding <binding>	show mpls ldp binding <text>
×	not yet documented	show-mpls.xml.in: show mpls ldp binding <binding> detail	show mpls ldp binding <text> detail

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	show-mpls.xml.in: show mpls ldp binding local-label <local-label>	show mpls ldp binding local-label <text>
×	not yet documented	show-mpls.xml.in: show mpls ldp binding local-label <local-label> detail	show mpls ldp binding local-label <text> detail
×	not yet documented	show-mpls.xml.in: show mpls ldp binding local-label <local-label> neighbor <neighbor>	show mpls ldp binding local-label <text> neighbor <text>
×	not yet documented	show-mpls.xml.in: show mpls ldp binding local-label <local-label> remote-label <remote-label>	show mpls ldp binding local-label <text> remote-label <text>
×	not yet documented	show-mpls.xml.in: show mpls ldp binding neighbor <neighbor>	show mpls ldp binding neighbor <text>
×	not yet documented	show-mpls.xml.in: show mpls ldp binding neighbor <neighbor> detail	show mpls ldp binding neighbor <text> detail
×	not yet documented	show-mpls.xml.in: show mpls ldp binding neighbor <neighbor> local-label <local-label>	show mpls ldp binding neighbor <text> local-label <text>
×	not yet documented	show-mpls.xml.in: show mpls ldp binding neighbor <neighbor> remote-label <remote-label>	show mpls ldp binding neighbor <text> remote-label <text>
×	not yet documented	show-mpls.xml.in: show mpls ldp binding remote-label <remote-label>	show mpls ldp binding remote-label <text>
×	not yet documented	show-mpls.xml.in: show mpls ldp binding remote-label <remote-label> detail	show mpls ldp binding remote-label <text> detail
×	not yet documented	show-mpls.xml.in: show mpls ldp binding remote-label <remote-label> local-label <local-label>	show mpls ldp binding remote-label <text> local-label <text>
×	not yet documented	show-mpls.xml.in: show mpls ldp binding remote-label <remote-label> neighbor <neighbor>	show mpls ldp binding remote-label <text> neighbor <text>

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
✓	***show mpls ldp discovery***	show-mpls.xml.in: show mpls ldp discovery	show mpls ldp discovery
×	not yet documented	show-mpls.xml.in: show mpls ldp discovery detail	show mpls ldp discovery detail
✓	***show mpls ldp interface***	show-mpls.xml.in: show mpls ldp interface	show mpls ldp interface
✓	***show mpls ldp neighbor***	show-mpls.xml.in: show mpls ldp neighbor <neighbor>	show mpls ldp neighbor <text>
×	not yet documented	show-mpls.xml.in: show mpls ldp neighbor <neighbor> capabilities	show mpls ldp neighbor <text> capabilities
✓	***show mpls ldp neighbor detail***	show-mpls.xml.in: show mpls ldp neighbor <neighbor> detail	show mpls ldp neighbor <text> detail
×	not yet documented	show-mpls.xml.in: show mpls pseudowire	show mpls pseudowire
×	not yet documented	show-mpls.xml.in: show mpls table	show mpls table
×	not yet documented	nat.xml.in: show nat destination rules	show nat destination rules
×	not yet documented	nat.xml.in: show nat destination statistics	show nat destination statistics
×	not yet documented	nat.xml.in: show nat destination translations	show nat destination translations
×	not yet documented	nat.xml.in: show nat destination translations address <address>	show nat destination translations address <text>
×	not yet documented	nat.xml.in: show nat destination translations detail	show nat destination translations detail
×	not yet documented	nat.xml.in: show nat source rules	show nat source rules
×	not yet documented	nat.xml.in: show nat source statistics	show nat source statistics
×	not yet documented	nat.xml.in: show nat source translations	show nat source translations
×	not yet documented	nat.xml.in: show nat source translations address <address>	show nat source translations address <text>
×	not yet documented	nat.xml.in: show nat source translations detail	show nat source translations detail
×	not yet documented	Nothing found in XML Definitions	show nhrp interface

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	show nhrp tunnel
×	not yet documented	show-ntp.xml.in: show ntp	show ntp
×	not yet documented	show-ntp.xml.in: show ntp info	show ntp info
×	not yet documented	show-ntp.xml.in: show ntp server <server>	show ntp server <text>
×	not yet documented	Nothing found in XML Definitions	show openconnect-server sessions
✓	***show openvpn client***	openvpn.xml.in: show openvpn client	show openvpn client
✓	***show openvpn server***	openvpn.xml.in: show openvpn server	show openvpn server
✓	***show openvpn site-to-site***	openvpn.xml.in: show openvpn site-to-site	show openvpn site-to-site
×	not yet documented	Nothing found in XML Definitions	show policy
×	not yet documented	Nothing found in XML Definitions	show policy ipv6-route <text>
×	not yet documented	Nothing found in XML Definitions	show policy ipv6-route <text> rule <text>
×	not yet documented	Nothing found in XML Definitions	show policy ipv6-route statistics
×	not yet documented	Nothing found in XML Definitions	show policy route <text>
×	not yet documented	Nothing found in XML Definitions	show policy route <text> rule <text>
×	not yet documented	Nothing found in XML Definitions	show policy route statistics
×	not yet documented	show-poweroff.xml.in: show poweroff	show poweroff
×	not yet documented	Nothing found in XML Definitions	show pppoe-server interfaces
✓	***show pppoe-server sessions***	Nothing found in XML Definitions	show pppoe-server sessions
×	not yet documented	Nothing found in XML Definitions	show pppoe-server statistics
×	not yet documented	pptp-server.xml.in: show pptp-server sessions	show pptp-server sessions
×	not yet documented	pptp-server.xml.in: show pptp-server statistics	show pptp-server statistics
×	***show protocols bfd peer***	Nothing found in XML Definitions	Nothing found in VyOS
✓	***show protocols static arp***	show-protocols.xml.in: show protocols static arp	show protocols static arp
×	not yet documented	show-protocols.xml.in: show protocols static arp interface <interface>	show protocols static arp interface <text>

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	*show protocols static arp interface eth1*	Nothing found in XML Definitions	Nothing found in VyOS
✓	*show queueing <interface-type> <interface-name>*	Nothing found in XML Definitions	show queueing
×	not yet documented	Nothing found in XML Definitions	show queueing bonding <text>
×	not yet documented	Nothing found in XML Definitions	show queueing bonding <text> vif <text>
×	not yet documented	Nothing found in XML Definitions	show queueing ethernet <text>
×	not yet documented	Nothing found in XML Definitions	show queueing ethernet <text> vif <text>
×	not yet documented	Nothing found in XML Definitions	show queueing input <text>
×	not yet documented	Nothing found in XML Definitions	show queueing pppoe <text>
×	not yet documented	Nothing found in XML Definitions	show queueing pppoe <text> vif <text>
×	not yet documented	Nothing found in XML Definitions	show queueing pseudo-ethernet
×	not yet documented	Nothing found in XML Definitions	show queueing tunnel
×	not yet documented	Nothing found in XML Definitions	show queueing vrrp <text>
×	not yet documented	Nothing found in XML Definitions	show queueing vti
×	not yet documented	Nothing found in XML Definitions	show queueing wireless <text>
×	not yet documented	Nothing found in XML Definitions	show queueing wireless <text> vif <text>
✓	*show raid <RAID-1-device>*	show-raid.xml.in: show raid <raid>	show raid <text>
×	not yet documented	show-reboot.xml.in: show reboot	show reboot
×	not yet documented	Nothing found in XML Definitions	show remote-config openvpn <text> remote-platform <text>
×	not yet documented	show-route-map.xml.in: show route-map <route-map>	show route-map <text>
×	not yet documented	show-rpki.xml.in: show rpki cache-connection	show rpki cache-connection
×	not yet documented	show-rpki.xml.in: show rpki cache-server	show rpki cache-server
×	not yet documented	show-rpki.xml.in: show rpki prefix-table	show rpki prefix-table

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	snmp.xml.in: show snmp community <community>	show snmp community <text>
×	not yet documented	snmp.xml.in: show snmp community <community> host <host>	show snmp community <text> host <text>
×	not yet documented	snmp.xml.in: show snmp mib ifmib	show snmp mib ifmib
×	not yet documented	snmp.xml.in: show snmp mib ifmib ifAlias <ifAlias>	show snmp mib ifmib ifAlias <text>
×	not yet documented	snmp.xml.in: show snmp mib ifmib ifDescr <ifDescr>	show snmp mib ifmib ifDescr <text>
×	not yet documented	snmp.xml.in: show snmp mib ifmib ifIndex <ifIndex>	show snmp mib ifmib ifIndex <text>
×	not yet documented	snmp.xml.in: show snmp v3	show snmp v3
×	not yet documented	snmp.xml.in: show snmp v3 certificates	show snmp v3 certificates
×	not yet documented	snmp.xml.in: show snmp v3 group	show snmp v3 group
×	not yet documented	snmp.xml.in: show snmp v3 trap-target	show snmp v3 trap-target
×	not yet documented	snmp.xml.in: show snmp v3 user	show snmp v3 user
×	not yet documented	snmp.xml.in: show snmp v3 view	show snmp v3 view
×	not yet documented	sstp-server.xml.in: show sstp-server sessions	show sstp-server sessions
×	not yet documented	sstp-server.xml.in: show sstp-server statistics	show sstp-server statistics
✓	***show system acceleration qat***	show-acceleration.xml.in: show system acceleration qat	show system acceleration qat
✓	***show system acceleration qat device <device> config***	show-acceleration.xml.in: show system acceleration qat device <device> config	show system acceleration qat device <text> config
✓	***show system acceleration qat device <device> flows***	show-acceleration.xml.in: show system acceleration qat device <device> flows	show system acceleration qat device <text> flows
✓	***show system acceleration qat interrupts***	show-acceleration.xml.in: show system acceleration qat interrupts	show system acceleration qat interrupts
✓	***show system acceleration qat status***	show-acceleration.xml.in: show system acceleration qat status	show system acceleration qat status

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
✓	***show system commit***	Nothing found in XML Definitions	show system commit
✓	***show system commit diff <number>***	Nothing found in XML Definitions	show system commit diff <text>
×	not yet documented	Nothing found in XML Definitions	show system commit file <text>
×	not yet documented	Nothing found in XML Definitions	show system commit file <text> compare <text>
×	not yet documented	Nothing found in XML Definitions	show system commit file <text> compare <text> commands
×	not yet documented	show-system.xml.in: show system connections	show system connections
×	not yet documented	show-system.xml.in: show system connections tcp	show system connections tcp
×	not yet documented	show-system.xml.in: show system connections tcp all	show system connections tcp all
×	not yet documented	show-system.xml.in: show system connections tcp numeric	show system connections tcp numeric
×	not yet documented	show-system.xml.in: show system connections udp	show system connections udp
×	not yet documented	show-system.xml.in: show system connections udp numeric	show system connections udp numeric
×	not yet documented	show-system.xml.in: show system cpu	show system cpu
✓	***show system image***	Nothing found in XML Definitions	show system image
×	not yet documented	Nothing found in XML Definitions	show system image storage
×	not yet documented	Nothing found in XML Definitions	show system image version
×	not yet documented	show-system.xml.in: show system kernel-messages	show system kernel-messages
×	not yet documented	show-system.xml.in: show system login users	show system login users
×	not yet documented	show-system.xml.in: show system login users all	show system login users all
×	not yet documented	show-system.xml.in: show system login users locked	show system login users locked
×	not yet documented	show-system.xml.in: show system login users other	show system login users other

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	show-system.xml.in: show system login users vyos	show system login users vyos
×	not yet documented	show-system.xml.in: show system memory	show system memory
×	not yet documented	show-system.xml.in: show system memory cache	show system memory cache
×	not yet documented	show-system.xml.in: show system memory detail	show system memory detail
×	not yet documented	show-system.xml.in: show system memory routing-daemons	show system memory routing-daemons
×	not yet documented	show-system.xml.in: show system processes	show system processes
×	not yet documented	show-system.xml.in: show system processes extensive	show system processes extensive
×	not yet documented	show-system.xml.in: show system processes summary	show system processes summary
×	not yet documented	show-system.xml.in: show system processes tree	show system processes tree
×	not yet documented	show-system.xml.in: show system routing-daemons	show system routing-daemons
×	not yet documented	show-system.xml.in: show system storage	show system storage
×	not yet documented	show-system.xml.in: show system uptime	show system uptime
×	not yet documented	show-table.xml.in: show table	show table
×	not yet documented	Nothing found in XML Definitions	show tech-support
×	not yet documented	Nothing found in XML Definitions	show tech-support brief
×	not yet documented	Nothing found in XML Definitions	show tech-support brief save <text>
×	not yet documented	Nothing found in XML Definitions	show tech-support brief save-uncompressed <text>
×	not yet documented	Nothing found in XML Definitions	show tech-support private
×	not yet documented	Nothing found in XML Definitions	show tech-support private brief
×	not yet documented	Nothing found in XML Definitions	show tech-support private brief save <text>

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	show tech-support private brief save-uncompressed <text>
×	not yet documented	Nothing found in XML Definitions	show tech-support private save <text>
×	not yet documented	Nothing found in XML Definitions	show tech-support private save-uncompressed <text>
×	not yet documented	Nothing found in XML Definitions	show tech-support save <text>
×	not yet documented	Nothing found in XML Definitions	show tech-support save-uncompressed <text>
×	not yet documented	show-users.xml.in: show users	show users
×	not yet documented	show-users.xml.in: show users recent <recent>	show users recent <text>
✓	***show version***	show-version.xml.in: show version	show version
×	not yet documented	show-version.xml.in: show version all	show version all
✓	***show version frr***	show-version.xml.in: show version frr	show version frr
×	not yet documented	show-version.xml.in: show version funny	show version funny
✓	***show version kernel***	show-version.xml.in: show version kernel	show version kernel
×	not yet documented	Nothing found in XML Definitions	show vpn debug
×	not yet documented	Nothing found in XML Definitions	show vpn debug <value>.in
×	not yet documented	Nothing found in XML Definitions	show vpn debug peer <text>
×	not yet documented	Nothing found in XML Definitions	show vpn debug peer <text> <value>.in
×	not yet documented	Nothing found in XML Definitions	show vpn debug peer <text> tunnel <text>
×	not yet documented	Nothing found in XML Definitions	show vpn debug peer <text> tunnel <text> <value>.in
×	not yet documented	Nothing found in XML Definitions	show vpn ike rsa-keys
×	not yet documented	Nothing found in XML Definitions	show vpn ike rsa-keys <value>.in
×	not yet documented	Nothing found in XML Definitions	show vpn ike sa
×	not yet documented	Nothing found in XML Definitions	show vpn ike sa <value>.in
×	not yet documented	Nothing found in XML Definitions	show vpn ike sa nat-traversal

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Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	show vpn ike sa nat-traversal <value>.in
×	not yet documented	Nothing found in XML Definitions	show vpn ike sa peer <text>
×	not yet documented	Nothing found in XML Definitions	show vpn ike sa peer <text> <value>.in
×	not yet documented	Nothing found in XML Definitions	show vpn ike secrets
×	not yet documented	Nothing found in XML Definitions	show vpn ike secrets <value>.in
×	not yet documented	Nothing found in XML Definitions	show vpn ike status
×	not yet documented	Nothing found in XML Definitions	show vpn ike status <value>.in
×	not yet documented	Nothing found in XML Definitions	show vpn ipsec connections
×	not yet documented	Nothing found in XML Definitions	show vpn ipsec policy
×	not yet documented	Nothing found in XML Definitions	show vpn ipsec sa
×	not yet documented	Nothing found in XML Definitions	show vpn ipsec sa detail <value>.in
×	not yet documented	Nothing found in XML Definitions	show vpn ipsec sa stats <text> <value>.in
×	not yet documented	Nothing found in XML Definitions	show vpn ipsec sa stats <text> tunnel <text> <value>.in
×	not yet documented	Nothing found in XML Definitions	show vpn ipsec sa verbose
×	not yet documented	Nothing found in XML Definitions	show vpn ipsec state
×	not yet documented	Nothing found in XML Definitions	show vpn ipsec status
×	not yet documented	Nothing found in XML Definitions	show vpn ipsec status <value>.in
×	not yet documented	show-vpn.xml.in: show vpn remote-access	show vpn remote-access
✓	*show vrf <name>*	show-vrf.xml.in: show vrf <vrf>	show vrf <text>
×	not yet documented	show-vrf.xml.in: show vrf <vrf> processes	show vrf <text> processes
×	not yet documented	Nothing found in XML Definitions	show vrrp
×	not yet documented	Nothing found in XML Definitions	show vrrp detail
×	not yet documented	Nothing found in XML Definitions	show vrrp statistics
×	not yet documented	Nothing found in XML Definitions	show wan-load-balance

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Table 2 – continued from previous page

Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	show wan-load-balance connection
×	not yet documented	Nothing found in XML Definitions	show wan-load-balance status
×	not yet documented	Nothing found in XML Definitions	show wan-load-balance status with-dns
×	not yet documented	Nothing found in XML Definitions	show webproxy blacklist categories
×	not yet documented	Nothing found in XML Definitions	show webproxy log
×	not yet documented	Nothing found in XML Definitions	show webproxy update-log
×	***show wireguard keypair pubkey <name>***	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	Nothing found in XML Definitions	show wireguard keypairs privkey <text>
×	not yet documented	Nothing found in XML Definitions	show wireguard keypairs pubkey <text>
×	***show wireguard keypairs pubkey default***	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	Nothing found in XML Definitions	show zone-policy
✓	***show zone-policy zone <name>***	Nothing found in XML Definitions	show zone-policy zone <text>
✓	***set system image default-boot [image-name]***	Nothing found in XML Definitions	set system image default-boot <text>
×	not yet documented	telnet.xml.in: telnet to <to>	telnet to <text>
×	not yet documented	telnet.xml.in: telnet to <to> port <port>	telnet to <text> port <text>
×	not yet documented	terminal.xml.in: set terminal key query-help <query-help>	set terminal key query-help <text>
×	not yet documented	terminal.xml.in: set terminal length <length>	set terminal length <text>
×	not yet documented	terminal.xml.in: set terminal pager <pager>	set terminal pager <text>
×	not yet documented	terminal.xml.in: set terminal width <width>	set terminal width <text>
✓	***traceroute <destination>***	Nothing found in XML Definitions	traceroute <text>
×	not yet documented	Nothing found in XML Definitions	traceroute ipv4 <text>
×	not yet documented	Nothing found in XML Definitions	traceroute ipv4 <text> tcp

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Table 2 – continued from previous page

Status 181/1791	Documentation	XML	in VyOS 1.3.3
×	not yet documented	Nothing found in XML Definitions	traceroute ipv4 <text> tcp port <text>
×	not yet documented	Nothing found in XML Definitions	traceroute ipv6 <text>
×	not yet documented	Nothing found in XML Definitions	traceroute ipv6 <text> tcp
×	not yet documented	Nothing found in XML Definitions	traceroute ipv6 <text> tcp port <text>
✓	***traceroute vrf <name> [ipv4 | ipv6] <host>***	Nothing found in XML Definitions	traceroute vrf <text> <text>
×	not yet documented	Nothing found in XML Definitions	traceroute vrf <text> ipv4 <text>
×	not yet documented	Nothing found in XML Definitions	traceroute vrf <text> ipv4 <text> tcp
×	not yet documented	Nothing found in XML Definitions	traceroute vrf <text> ipv4 <text> tcp port <text>
×	not yet documented	Nothing found in XML Definitions	traceroute vrf <text> ipv6 <text>
×	not yet documented	Nothing found in XML Definitions	traceroute vrf <text> ipv6 <text> tcp
×	not yet documented	Nothing found in XML Definitions	traceroute vrf <text> ipv6 <text> tcp port <text>
✓	***update container image <containername>***	container.xml.in: update container image <image>	update container image <text>
×	not yet documented	dns-dynamic.xml.in: update dns dynamic	update dns dynamic
✓	***update webproxy blacklists***	webproxy.xml.in: update webproxy blacklists	update webproxy blacklists
×	***update webproxy blacklists category <category>***	Nothing found in XML Definitions	Nothing found in VyOS
×	not yet documented	wake-on-lan.xml.in: wake-on-lan interface <interface> host <host>	wake-on-lan interface <text> host <text>

CHAPTER

NINETEEN

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