BROCADE

CONFIGURATION GUIDE

Brocade Vyatta Network OS Basic Routing Configuration Guide, 5.2R1

Supporting Brocade 5600 vRouter, VNF Platform, and Distributed Services Platform

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Contents

Preface

Document conventions

The document conventions describe text formatting conventions, command syntax conventions, and important notice formats used in Brocade technical documentation.

Notes, cautions, and warnings

Notes, cautions, and warning statements may be used in this document. They are listed in the order of increasing severity of potential hazards.

NOTE

A Note provides a tip, guidance, or advice, emphasizes important information, or provides a reference to related information.

ATTENTION

An Attention statement indicates a stronger note, for example, to alert you when traffic might be interrupted or the device might reboot.

CAUTION

A Caution statement alerts you to situations that can be potentially hazardous to you or cause damage to hardware, firmware, software, or data.

DANGER

A Danger statement indicates conditions or situations that can be potentially lethal or extremely hazardous to you. Safety labels are also attached directly to products to warn of these conditions or situations.

Text formatting conventions

Text formatting conventions such as boldface, italic, or Courier font may be used to highlight specific words or phrases.

Format	Description
bold text	Identifies command names.
	Identifies keywords and operands.
	Identifies the names of GUI elements.
	Identifies text to enter in the GUI.
italic text	Identifies emphasis.
	Identifies variables.
	Identifies document titles.
`Courier font`	Identifies CLI output.
	Identifies command syntax examples.

Command syntax conventions

Bold and italic text identify command syntax components. Delimiters and operators define groupings of parameters and their logical relationships.

Convention	Description
bold text	Identifies command names, keywords, and command options.
italic text	Identifies a variable.
value	In Fibre Channel products, a fixed value provided as input to a command option is printed in plain text, for example, **--show** WWN.
[ ]	Syntax components displayed within square brackets are optional. Default responses to system prompts are enclosed in square brackets.
{ **x** | **y** | **z** }	A choice of required parameters is enclosed in curly brackets separated by vertical bars. You must select one of the options. In Fibre Channel products, square brackets may be used instead for this purpose.
x | **y**	A vertical bar separates mutually exclusive elements.
< >	Nonprinting characters, for example, passwords, are enclosed in angle brackets.
...	Repeat the previous element, for example, *member*[*member*...].
\	Indicates a "soft" line break in command examples. If a backslash separates two lines of a command input, enter the entire command at the prompt without the backslash.

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- For questions regarding service levels and response times, contact your OEM/solution provider.

About This Guide

This guide describes information about forwarding and routing on Brocade products that run on the Brocade Vyatta Network OS (referred to as a virtual router, vRouter, or router in the guide)

Forwarding and Routing Commands

clear ip prefix-list

Clears statistics for or the status of a prefix list.

Syntax

clear ip prefix-list [*list-name* [*ipv4net*]]

Command Default

Statistics for or the status of all prefix lists is cleared.

Parameters

list-name

Optional. A prefix list.

ipv4net

Optional. A network.

Modes

Operational mode

Usage Guidelines

Use this command to clear statistics for or the status of a prefix list.

clear ipv6 prefix-list

Clears statistics for or the status of an IPv6 prefix list.

Syntax

clear ipv6 prefix-list [*list-name* [*ipv6net*]]

Command Default

Statistics for or the status of all IPv6 prefix lists is cleared.

Parameters

list-name

Optional. An IPv6 prefix list.

ipv6net

Optional. An IPv6 network.

Modes

Operational mode

Usage Guidelines

Use this command to clear statistics for or the status of an IPv6 prefix list.

monitor command <traceroute-command>

Monitors a traceroute command.

Syntax

monitor command *traceroute-command*

run monitor command *traceroute-command*

Parameters

traceroute-command

The **traceroute** command to be monitored. The **traceroute** command must be enclosed in quotation marks.

Modes

Operational mode

Configuration mode

Usage Guidelines

Use this command to display the output of a **traceroute** command. The display information is refreshed every two seconds.

Use the **run** form of this command in configuration mode.

ping <host>

Sends Internet Control Message Protocol (ICMP) ECHO_REQUEST packets to a network host.

Syntax

ping { *ipv4_address* | *ipv6_address* | *hostname* }

Parameters

ipv4_address

Pings the IPv4 address of the host.

ipv6_address

Pings the IPv6 address of the host.

hostname

A host being pinged. This keyword is used when the host is specified as a host name rather than as an IP address.

Modes

Operational mode

Usage Guidelines

The **ping** command tests whether a network host is reachable.

The **ping** command uses the ECHO_REQUEST datagram (ping) of the ICMP protocol to get an ICMP ECHO_RESPONSE from a host or gateway. ECHO_REQUEST datagrams have an IP and an ICMP header, followed by a *struct timeval* data type and then an arbitrary number of pad bytes that are used to fill the packet.

ipv4 ipv6

When using the **ping** command for fault isolation, enter the command on the local host to verify that the local network interface is up and running. Then, ping hosts and gateways farther away. Round-trip times and packet-loss statistics are computed.

If duplicate packets are received, they are not included in the packet-loss calculation, although the round-trip time of these packets is used in calculating the minimum, average, and maximum round-trip times.

When the **ping** command is interrupted by typing `<Ctrl>+c`, a brief statistical summary is displayed.

Examples

This example shows how to test whether the network host, www.google.com is reachable.

```
vyatta@vyatta:~$ ping www.google.com
PING www.google.com (216.58.196.100) 56(84) bytes of data.
64 bytes from maa03s19-in-f4.1e100.net (216.58.196.100): icmp_req=1 ttl=54 time=42.3 ms
^C
--- www.google.com ping statistics ---
1 packets transmitted, 1 received, 0% packet loss, time 0ms
rtt min/avg/max/mdev = 42.364/42.364/42.364/0.000 ms
```

ping <host> adaptive <option>

Sets the interpacket interval adaptively such that the interpacket interval adjusts to round-trip time.

Syntax

ping { *ipv4_address* | *ipv6_address* | *hostname* } **adaptive** *option*

Parameters

ipv4_address

The IPv4 address of the host.

ipv6_address

The IPv6 address of the host.

hostname

A host being pinged. This keyword is used when the host is specified as a host name rather than as an IP address.

adaptive

Sets the interpacket interval adaptively such that the interpacket interval adjusts to round-trip time. The **adaptive** setting ensures that not more than one (or more, if preload is set) unanswered probes are present in the network.

option

Each of the following entries are considered options. These options can be issued consecutively, that is, in the same command line.

adaptive

Adaptively sets interpacket interval.

allow-broadcast

Allows you to ping broadcast address.

audible

Makes a beep sound on every ping, while the router pings for host details.

bypass-route

Bypasses normal routing tables during ping.

count

Specifies the number of ping requests to send.

deadline

Specifies the number of seconds before which ping expires.

ether-size

Matches the overall size of the data packet with the resultant size of the Layer 3 packet.

flood

Sends 100 ping requests each second.

interface

Specifies an interface that the device must use as the source address.

interval

Specifies the time in seconds for which the device must wait between ping requests.

mark
Specifies that the device must consider the ping request for special processing.

mtu-discovery
Specifies the path MTU discovery strategy.

no-loopback
Suppresses loop-back of multicast pings.

numeric
Does not resolve domain name system (DNS) names during ping.

pattern
Specifies the hexadecimal digit pattern to fill the packet.

quiet
Prints only the ping summary page.

record-route
Records the route that the packet takes.

size
Specifies the number of bytes to send for a ping request.

timestamp
Displays the timestamp during ping output.

tos
Marks packet with specified type of service (TOS).

ttl
Specifies the maximum packet life-time for a host.

verbose
Displays a detailed output for the ping command.

Modes

Operational mode

Usage Guidelines

The **ping** command tests whether a network host is reachable.

The **ping** command uses the ECHO_REQUEST datagram (ping) of the ICMP protocol to get an ICMP ECHO_RESPONSE from a host or gateway. ECHO_REQUEST datagrams have an IP and an ICMP header, followed by a *struct timeval* data type and then an arbitrary number of pad bytes that are used to fill the packet.

ipv4 ipv6

When using the **ping** command for fault isolation, enter the command on the local host to verify that the local network interface is up and running. Then, ping hosts and gateways farther away. Round-trip times and packet-loss statistics are computed.

If duplicate packets are received, they are not included in the packet-loss calculation, although the round-trip time of these packets is used in calculating the minimum, average, and maximum round-trip times.

NOTE
The minimum interpacket interval is 200 ms for all users, except for a super-user.

When the **ping** command is interrupted by typing <Ctrl>+c , a brief statistical summary is displayed.

Examples

This example shows how to test whether the www.google.com network is reachable with an interpacket interval. The example also displays the time stamp in the ping output.

```
vyatta@vyatta:~$ ping www.google.com adaptive timestamp audible
PING www.google.com (216.58.216.164) 56(84) bytes of data.
[1428886179.416698] 64 bytes from sea15s02-in-f4.1e100.net (216.58.216.164): icmp_req=2 ttl=54
time=20.0 ms
[1428886179.457896] 64 bytes from sea15s02-in-f4.1e100.net (216.58.216.164): icmp_req=4 ttl=54
time=20.0 ms
[1428886179.499170] 64 bytes from sea15s02-in-f4.1e100.net (216.58.216.164): icmp_req=6 ttl=54
time=20.2 ms
[1428886179.539836] 64 bytes from sea15s02-in-f4.1e100.net (216.58.216.164): icmp_req=8 ttl=54
time=19.9 ms
[1428886179.580788] 64 bytes from sea15s02-in-f4.1e100.net (216.58.216.164): icmp_req=10 ttl=54
time=19.9 ms
[1428886179.621507] 64 bytes from sea15s02-in-f4.1e100.net (216.58.216.164): icmp_req=12 ttl=54
time=20.0 ms
[1428886179.662363] 64 bytes from sea15s02-in-f4.1e100.net (216.58.216.164): icmp_req=14 ttl=54
time=19.8 ms
[1428886179.703528] 64 bytes from sea15s02-in-f4.1e100.net (216.58.216.164): icmp_req=16 ttl=54
time=20.1 ms
[1428886179.744554] 64 bytes from sea15s02-in-f4.1e100.net (216.58.216.164): icmp_req=18 ttl=54
time=20.0 ms
[1428886179.785702] 64 bytes from sea15s02-in-f4.1e100.net (216.58.216.164): icmp_req=20 ttl=54
time=20.1 ms
[1428886179.826861] 64 bytes from sea15s02-in-f4.1e100.net (216.58.216.164): icmp_req=22 ttl=54
time=20.2 ms
[1428886181.384621] From 10.18.170.201 icmp_seq=1 Destination Host Unreachable
[1428886181.385770] From 10.18.170.201 icmp_seq=3 Destination Host Unreachable
[1428886181.386512] From 10.18.170.201 icmp_seq=5 Destination Host Unreachable
[1428886181.387046] From 10.18.170.201 icmp_seq=7 Destination Host Unreachable
[1428886181.387599] From 10.18.170.201 icmp_seq=9 Destination Host Unreachable
[1428886181.388177] From 10.18.170.201 icmp_seq=11 Destination Host Unreachable
[1428886181.388707] From 10.18.170.201 icmp_seq=13 Destination Host Unreachable
[1428886181.389269] From 10.18.170.201 icmp_seq=15 Destination Host Unreachable
[1428886181.389865] From 10.18.170.201 icmp_seq=17 Destination Host Unreachable
[1428886181.390681] From 10.18.170.201 icmp_seq=19 Destination Host Unreachable
[1428886181.391494] From 10.18.170.201 icmp_seq=21 Destination Host Unreachable
[216.164): icmp_req=165 ttl=54 time=20.4 ms
```

ping <host> allow-broadcast <option>

Allows the pinging of a broadcast address.

Syntax

ping { *ipv4_address* | *ipv6_address* | *hostname* } **allow-broadcast** *option*

Parameters

ipv4_address

The IPv4 address of the host.

ipv6_address

The IPv6 address of the host.

hostname

A host being pinged. This keyword is used when the host is specified as a host name rather than as an IP address.

allow-broadcast

Allows pinging a broadcast address.

option

Each of the following entries are considered options. These options can be issued consecutively, that is, in the same command line.

adaptive

Adaptively sets interpacket interval.

allow-broadcast

Allows you to ping broadcast address.

audible

Makes a beep sound on every ping, while the router pings for host details.

bypass-route

Bypasses normal routing tables during ping.

count

Specifies the number of ping requests to send.

deadline

Specifies the number of seconds before which ping expires.

ether-size

Matches the overall size of the data packet with the resultant size of the Layer 3 packet.

flood

Sends 100 ping requests each second.

interface

Specifies the interface that the device must use as source address.

interval

Specifies the time in seconds for which the device must wait between ping requests.

mark

Specifies that the device must consider the request for special processing.

mtu-discovery
Specifies the path MTU discovery strategy.

no-loopback
Suppresses loop-back of multicast pings.

numeric
Does not resolve domain name system (DNS) names during ping.

pattern
Specifies the hexadecimal digit pattern to fill the packet.

quiet
Prints only the ping summary page.

record-route
Records the route that the packet takes.

size
Specifies the number of bytes to send for a ping request.

timestamp
Displays the timestamp during ping output.

tos
Marks packet with specified type of service (TOS).

ttl
Specifies the maximum packet life-time for a host.

verbose
Displays a detailed output for the ping command.

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Usage Guidelines

The **ping** command tests whether a network host is reachable.

The **ping** command uses the ECHO_REQUEST datagram (ping) of the ICMP protocol to get an ICMP ECHO_RESPONSE from a host or gateway. ECHO_REQUEST datagrams have an IP and an ICMP header, followed by a *struct timeval* data type and then an arbitrary number of pad bytes that are used to fill the packet.

The host is specified either as host name (if DNS is being used on the network) or as an IPv4 or IPv6 address. If a host name is specified and neither the **ipv4** nor **ipv6** keyword is used, the IPv4 or IPv6 address associated with the host name is pinged, depending on which address is resolved first.

When using the **ping** command for fault isolation, enter the command on the local host to verify that the local network interface is up and running. Then, ping hosts and gateways farther away. Round-trip times and packet-loss statistics are computed.

If duplicate packets are received, they are not included in the packet-loss calculation, although the round-trip time of these packets is used in calculating the minimum, average, and maximum round-trip times.

When the **ping** command is interrupted by typing `<Ctrl>+c`s, a brief statistical summary is displayed.

Examples

This example shows how to test whether www.google.com network is reachable. It also shows how to allow the pinging of the broadcast address and define a life-time of 30 hops for each host.

```
vyatta@vyatta:~$ ping www.google.com allow-broadcast ttl
Possible completions:
  <hops>    Number of hops

vyatta@vyatta:~$ ping www.google.com allow-broadcast ttl 30
PING www.google.com (216.58.216.164) 56(84) bytes of data.
64 bytes from sea15s02-in-f4.1e100.net (216.58.216.164): icmp_req=2 ttl=54 time=20.1 ms
From 10.18.170.201 icmp_seq=1 Destination Host Unreachable
From 10.18.170.201 icmp_seq=3 Destination Host Unreachable
64 bytes from sea15s02-in-f4.1e100.net (216.58.216.164): icmp_req=4 ttl=54 time=20.2 ms
64 bytes from sea15s02-in-f4.1e100.net (216.58.216.164): icmp_req=6 ttl=54 time=20.3 ms
From 10.18.170.201 icmp_seq=5 Destination Host Unreachable
From 10.18.170.201 icmp_seq=7 Destination Host Unreachable
64 bytes from sea15s02-in-f4.1e100.net (216.58.216.164): icmp_req=8 ttl=54 time=19.9 ms
64 bytes from sea15s02-in-f4.1e100.net (216.58.216.164): icmp_req=10 ttl=54 time=20.4 ms
From 10.18.170.201 icmp_seq=9 Destination Host Unreachable
From 10.18.170.201 icmp_seq=11 Destination Host Unreachable
64 bytes from sea15s02-in-f4.1e100.net (216.58.216.164): icmp_req=12 ttl=54 time=20.0 ms
```

ping <host> audible <option>

Makes a beep sound when the router pings for the host details.

Syntax

ping { *ipv4_address* | *ipv6_address* | *hostname* } **audible** *option*

Parameters

ipv4_address

The IPv4 address of the host.

ipv6_address

The IPv6 address of the host.

hostname

A host being pinged. This keyword is used when the host is specified as a host name rather than as an IP address.

audible

Makes a beep sound while the device pings for the host details.

option

Each of the following entries are considered options. These options can be issued consecutively, that is, in the same command line.

adaptive

Adaptively sets interpacket interval.

allow-broadcast

Allows you to ping broadcast address.

audible

Makes a beep sound on every ping, while the router pings for host details.

bypass-route

Bypasses normal routing tables during ping.

count

Specifies the number of ping requests to send.

deadline

Specifies the number of seconds before which ping expires.

ether-size

Matches the overall size of the data packet with the resultant size of the Layer 3 packet.

flood

Sends 100 ping requests each second.

interface

Specifies the interface that the device must use as source address.

interval

Specifies the time in seconds for which the device must wait between ping requests.

mark

Specifies that the device must consider the request for special processing.

mtu-discovery
Specifies the path MTU discovery strategy.

no-loopback
Suppresses loop-back of multicast pings.

numeric
Does not resolve domain name system (DNS) names during ping.

pattern
Specifies the hexadecimal digit pattern to fill the packet.

quiet
Prints only the ping summary page.

record-route
Records the route that the packet takes.

size
Specifies the number of bytes to send for a ping request.

timestamp
Displays the timestamp during ping output.

tos
Marks packet with specified type of service (TOS).

ttl
Specifies the maximum packet life-time for a host.

verbose
Displays a detailed output for the ping command.

Modes

Operational mode

Usage Guidelines

The **ping** command tests whether a network host is reachable.

The **ping** command uses the ECHO_REQUEST datagram (ping) of the ICMP protocol to get an ICMP ECHO_RESPONSE from a host or gateway. ECHO_REQUEST datagrams have an IP and an ICMP header, followed by a *struct timeval* data type and then an arbitrary number of pad bytes that are used to fill the packet.

The host is specified either as host name (if DNS is being used on the network) or as an IPv4 or IPv6 address. If a host name is specified and neither the **ipv4** nor **ipv6** keyword is used, the IPv4 or IPv6 address associated with the host name is pinged, depending on which address is resolved first.

When using the **ping** command for fault isolation, enter the command on the local host to verify that the local network interface is up and running. Then, ping hosts and gateways farther away. Round-trip times and packet-loss statistics are computed.

If duplicate packets are received, they are not included in the packet-loss calculation, although the round-trip time of these packets is used in calculating the minimum, average, and maximum round-trip times.

When the **ping** command is interrupted by typing `<Ctrl>+c`, a brief statistical summary is displayed.

Examples

This example shows how to configure the router to send an ICMP_ECHO request five times, making a beep sound on every ping.

```
vyatta@vyatta:~$ ping www.google.com audible count 5
PING www.google.com (216.58.216.164) 56(84) bytes of data.
64 bytes from sea15s02-in-f4.1e100.net (216.58.216.164): icmp_req=2 ttl=54 time=20.0 ms
From 10.18.170.201 icmp_seq=1 Destination Host Unreachable
From 10.18.170.201 icmp_seq=3 Destination Host Unreachable
64 bytes from sea15s02-in-f4.1e100.net (216.58.216.164): icmp_req=4 ttl=54 time=20.1 ms

--- www.google.com ping statistics ---
5 packets transmitted, 2 received, +2 errors, 60% packet loss, time 4010ms
rtt min/avg/max/mdev = 20.048/20.075/20.103/0.144 ms, pipe 3
vyatta@vyatta:~$
```

ping <host> bypass-route <option>

Bypasses the normal routing tables and sends a ping request directly to a host on an attached interface.

Syntax

ping { *ipv4_address* | *ipv6_address* | *hostname* } **bypass-route** *option*

Parameters

ipv4_address

The IPv4 address of the host.

ipv6_address

The IPv6 address of the host.

hostname

A host being pinged. This keyword is used when the host is specified as a host name rather than as an IP address.

bypass-route

Bypasses the normal routing tables and sends directly to a host on an attached interface. If the host is not directly attached to a network, an error is returned.

option

Each of the following entries are considered options. These options can be issued consecutively, that is, in the same command line.

adaptive

Adaptively sets interpacket interval.

allow-broadcast

Allows you to ping broadcast address.

audible

Makes a beep sound on every ping, while the router pings for host details.

bypass-route

Bypasses normal routing tables during ping.

count

Specifies the number of ping requests to send.

deadline

Specifies the number of seconds before which ping expires.

ether-size

Matches the overall size of the data packet with the resultant size of the Layer 3 packet.

flood

Sends 100 ping requests each second.

interface

Specifies an interface that the device must use as the source address.

interval

Specifies the time in seconds for which the device must wait between ping requests.

mark
Specifies that the device must consider the ping request for special processing.

mtu-discovery
Specifies the path MTU discovery strategy.

no-loopback
Suppresses loop-back of multicast pings.

numeric
Does not resolve domain name system (DNS) names during ping.

pattern
Specifies the hexadecimal digit pattern to fill the packet.

quiet
Prints only the ping summary page.

record-route
Records the route that the packet takes.

size
Specifies the number of bytes to send for a ping request.

timestamp
Displays the timestamp during ping output.

tos
Marks packet with specified type of service (TOS).

ttl
Specifies the maximum packet life-time for a host.

verbose
Displays a detailed output for the ping command.

Modes

Operational mode

Usage Guidelines

The **ping** command tests whether a network host is reachable.

The **ping** command uses the ECHO_REQUEST datagram (ping) of the ICMP protocol to get an ICMP ECHO_RESPONSE from a host or gateway. ECHO_REQUEST datagrams have an IP and an ICMP header, followed by a *struct timeval* data type and then an arbitrary number of pad bytes that are used to fill the packet.

If the host is not directly attached to a network, an error is returned.

When the **ping** command is interrupted by typing `<Ctrl>+c`, a brief statistical summary is displayed.

Examples

This example shows how to bypass the normal routing tables and send a ping request directly to a host on an attached interface.

```
vyatta@vyatta:~$ ping www.google.com bypass-route
PING www.google.com (216.58.216.164) 56(84) bytes of data.
ping: sendmsg: Network is unreachable
ping: sendmsg: Network is unreachable
ping: sendmsg: Network is unreachable
ping: sendmsg: Network is unreachable
ping: sendmsg: Network is unreachable
ping: sendmsg: Network is unreachable
```

ping <host> count <option>

Specifies a number of ping requests that the router must send.

Syntax

ping { *ipv4_address* | *ipv6_address* | *hostname* } **count** *numberoption*

Parameters

ipv4_address

The IPv4 address of the host.

ipv6_address

The IPv6 address of the host.

hostname

A host being pinged. This keyword is used when the host is specified as a host name rather than as an IP address.

number

The number of ping requests to send.

option

Each of the following entries are considered options. These options can be issued consecutively, that is, in the same command line.

adaptive

Adaptively sets interpacket interval.

allow-broadcast

Allows you to ping broadcast address.

audible

Makes a beep sound, while the router pings for host details.

bypass-route

Bypasses normal routing tables during ping.

count

Specifies the number of ping requests to send.

deadline

Specifies the number of seconds before which ping expires.

ether-size

Matches the overall size of the data packet with the resultant size of the Layer 3 packet.

flood

Sends 100 ping requests each second.

interface

Specifies an interface that the device must use as the source address.

interval

Specifies the time in seconds for which the device must wait between ping requests.

mark

Specifies that the device must consider the ping request for special processing.

mtu-discovery
Specifies the path MTU discovery strategy.

no-loopback
Supress loop-back of multicast pings.

numeric
Does not resolve domain name system (DNS) names during ping.

pattern
Specifies the hexadecimal digit pattern to fill the packet.

quiet
Prints only the ping summary page.

record-route
Records the route that the packet takes.

size
Specifies the number of bytes to send for a ping request.

timestamp
Displays the timestamp during ping output.

tos
Marks packet with specified type of service (TOS).

ttl
Specifies the maximum packet life-time for a host.

verbose
Displays a detailed output for the ping command.

Modes

Operational mode.

Usage Guidelines

The **ping** command tests whether a network host is reachable.

The **ping** command uses the ECHO_REQUEST datagram (ping) of the ICMP protocol to get an ICMP ECHO_RESPONSE from a host or gateway. ECHO_REQUEST datagrams have an IP and an ICMP header, followed by a *struct timeval* data type and then an arbitrary number of pad bytes that are used to fill the packet.

When the **ping** command is interrupted by typing `<Ctrl>+c`, a brief statistical summary is displayed.

Examples

This example shows how to test whether www.google.com network is reachable by sending five ICMP_ECHO requests and that the router waits for five reply packets for ten seconds.

```
vyatta@vyatta:~$ ping www.google.com count 5 deadline 10
PING www.google.com (216.58.216.164) 56(84) bytes of data.
64 bytes from sea15s02-in-f4.1e100.net (216.58.216.164): icmp_req=2 ttl=54 time=20.0 ms
From 10.18.170.201 icmp_seq=1 Destination Host Unreachable
From 10.18.170.201 icmp_seq=3 Destination Host Unreachable
64 bytes from sea15s02-in-f4.1e100.net (216.58.216.164): icmp_req=4 ttl=54 time=20.1 ms

--- www.google.com ping statistics ---
5 packets transmitted, 2 received, +2 errors, 60% packet loss, time 4010ms
rtt min/avg/max/mdev = 20.048/20.075/20.103/0.144 ms, pipe 3

vyatta@vyatta:~$ ping www.google.com count 5
```

ping <host> deadline <seconds> <option>

Specifies the number of seconds before which the ping expires.

Syntax

ping { *ipv4_address* | *ipv6_address* | *hostname* } **deadline** *seconds option*

Parameters

ipv4_address

The IPv4 address of the host.

ipv6_address

The IPv6 address of the host.

hostname

A host being pinged. This keyword is used when the host is specified as a host name rather than as an IP address.

seconds

The number of seconds before which ping exits.

option

Each of the following entries are considered options. These options can be issued consecutively, that is, in the same command line.

adaptive

Adaptively sets interpacket interval.

allow-broadcast

Allows you to ping broadcast address.

audible

Makes a beep sound on every ping, while the router pings for host details.

bypass-route

Bypasses normal routing tables during ping.

count

Specifies the number of ping requests to send.

deadline

Specifies the number of seconds before which ping expires.

ether-size

Matches the overall size of the data packet with the resultant size of the Layer 3 packet.

flood

Sends 100 ping requests each second.

interface

Specifies an interface that the device must use as the source address.

interval

Specifies the time in seconds for which the device must wait between ping requests.

mark

Specifies that the device must consider the request for special processing.

mtu-discovery
Specifies the path MTU discovery strategy.

no-loopback
Suppresses loop-back of multicast pings.

numeric
Does not resolve domain name system (DNS) names during ping.

pattern
Specifies the hexadecimal digit pattern to fill the packet.

quiet
Prints only the ping summary page.

record-route
Records the route that the packet takes.

size
Specifies the number of bytes to send for a ping request.

timestamp
Displays the timestamp during ping output.

tos
Marks packet with specified type of service (TOS).

ttl
Specifies the maximum packet life-time for a host.

verbose
Displays a detailed output for the ping command.

Modes

Operational mode

Usage Guidelines

The **ping** command tests whether a network host is reachable.

The **ping** command uses the ECHO_REQUEST datagram (ping) of the ICMP protocol to get an ICMP ECHO_RESPONSE from a host or gateway. ECHO_REQUEST datagrams have an IP and an ICMP header, followed by a *struct timeval* data type and then an arbitrary number of pad bytes that are used to fill the packet.

When the **ping** command is interrupted by typing `<Ctrl>+c` , a brief statistical summary is displayed.

Examples

This example shows how to test whether www.google.com network is reachable within three seconds.

```
vyatta@vyatta:~$ ping www.google.com deadline 3
PING www.google.com (216.58.216.164) 56(84) bytes of data.
64 bytes from sea15s02-in-f4.1e100.net (216.58.216.164): icmp_req=1 ttl=54 time=19.8 ms
64 bytes from sea15s02-in-f4.1e100.net (216.58.216.164): icmp_req=3 ttl=54 time=20.1 ms

--- www.google.com ping statistics ---
3 packets transmitted, 2 received, 33% packet loss, time 2004ms
rtt min/avg/max/mdev = 19.873/19.995/20.118/0.187 ms
```

ping <host> ether-size <bytes> <option>

Matches the overall size of the data packet with the resultant size of the Layer 3 packet.

Syntax

ping { *ipv4_address* | *ipv6_address* | *hostname* } **ether-size** *bytes option*

Parameters

ipv4_address

The IPv4 address of the host.

ipv6_address

The IPv6 address of the host.

hostname

A host being pinged. This keyword is used when the host is specified as a host name rather than as an IP address.

bytes

The number of bytes.

Each of the following entries are considered options. These options can be issued consecutively, that is, in the same command line.

adaptive

Adaptively sets interpacket interval.

allow-broadcast

Allows you to ping broadcast address.

audible

Makes a beep sound during every ping, while the router pings for host details.

bypass-route

Bypasses normal routing tables during ping.

count

Specifies the number of ping requests to send.

deadline

Specifies the number of seconds before which ping expires.

ether-size

Matches the overall size of the data packet with the resultant size of the Layer 3 packet.

flood

Sends 100 ping requests each second.

interface

Specifies the interface that the device must use as source address.

interval

Specifies the time in seconds for which the device must wait between ping requests.

mark

Specifies that the device must consider the ping request for special processing.

mtu-discovery
Specifies the path MTU discovery strategy.

no-loopback
Suppresses loop-back of multicast pings.

numeric
Does not resolve domain name system (DNS) names during ping.

pattern
Specifies the hexadecimal digit pattern to fill the packet.

quiet
Prints only the ping summary page.

record-route
Records the route that the packet takes.

size
Specifies the number of bytes to send for a ping request.

timestamp
Displays the timestamp during ping output.

tos
Marks packet with specified type of service (TOS).

ttl
Specifies the maximum packet life-time for a host.

verbose
Displays a detailed output for the ping command.

Modes

Operational mode

Usage Guidelines

The **ping** command tests whether a network host is reachable.

The **ping** command when used with the ether-size option specifies the size of the resultant Layer 3 packet, such as ICMP data plus ICMP headers, IP headers, and so on.

The **ping** *host* **ether-size** command ensures that the resultant size supports Layer 3 IP packet size. The Ethernet MTU is 1,500 bytes. Therefore, the **ping** *host* **ether-size** command subtracts 28 bytes from the host size of the Layer 3 packet to ensure that the resultant value matches the overall size of the data packet. The **ping** *host* **ether-size** command avoids the fragmentation overhead due to the MTU.

NOTE
You can use either the **ping** *host* **size** or **ping** *host* **ether-size** command to ping a host network. You cannot use both commands simultaneously.

ping <host> flood <option>

Sends 100 ping requests each second.

Syntax

ping { *ipv4_address* | *ipv6_address* | *hostname* } **flood** *option*

Parameters

ipv4_address

The IPv4 address of the host.

ipv6_address

The IPv6 address of the host.

hostname

A host being pinged. This keyword is used when the host is specified as a host name rather than as an IP address.

option

Each of the following entries are considered options. These options can be issued consecutively, that is, in the same command line.

adaptive

Adaptively sets interpacket interval.

allow-broadcast

Allows you to ping broadcast address.

audible

Makes noise while the device pings for the host details.

bypass-route

Bypasses normal routing tables during ping.

count

Specifies the number of ping requests to send.

deadline

Specifies the number of seconds before which ping expires.

ether-size

Matches the overall size of the data packet with the resultant size of the Layer 3 packet.

flood

Sends 100 ping requests each second.

interface

Specifies the interface that the device must use as source address.

interval

Specifies the time in seconds for which the device must wait between ping requests.

mark

Specifies that the device must consider the ping request for special processing.

mtu-discovery

Specifies the path MTU discovery strategy.

no-loopback
Suppresses loop-back of multicast pings.

numeric
Does not resolve domain name system (DNS) names during ping.

pattern
Specifies the hexadecimal digit pattern to fill the packet.

quiet
Prints only the ping summary page.

record-route
Records the route that the packet takes.

size
Specifies the number of bytes to send for a ping request.

timestamp
Displays the timestamp during ping output.

tos
Marks packet with specified type of service (TOS).

ttl
Specifies the maximum packet life-time for a host.

verbose
Displays a detailed output for the ping command.

Modes

Operational mode

Usage Guidelines

The **ping** command tests whether a network host is reachable.

The **ping** command uses the ECHO_REQUEST datagram (ping) of the ICMP protocol to get an ICMP ECHO_RESPONSE from a host or gateway. ECHO_REQUEST datagrams have an IP and an ICMP header, followed by a *struct timeval* data type and then an arbitrary number of pad bytes that are used to fill the packet.

When the **ping** command is interrupted by typing `<Ctrl>+c`, a brief statistical summary is displayed.

Examples

This example shows how to test whether www.google.com network is reachable by sending a maximum of 100 ping requests each second.

```
vyatta@vyatta:~$ ping www.google.com flood
PING www.google.com (216.58.216.164) 56(84) bytes of data.
.........E.........E.........E.........E.........E.........E.........E.......
....E.........E.........E.........E.........E.........E.......^C
--- www.google.com ping statistics ---
345 packets transmitted, 169 received, +168 errors, 51% packet loss, time 42361ms
rtt min/avg/max/mdev = 19.917/20.779/33.826/1.092 ms, pipe 24, ipg/ewma 123.144/20.398 ms
```

ping <host> interface <host> <option>

Specifies an interface that the device must use as the source address.

Syntax

ping { *ipv4_addres* | *ipv6_address* | *hostname* } **interface** { *ipv4_addres* | *ipv6_address* | *hostname* } *option*

Parameters

ipv4_address

The IPv4 address of the host.

ipv6_address

The IPv6 address of the host.

hostname

A host being pinged. This keyword is used when the host is specified as a host name rather than as an IP address.

option

Each of the following entries are considered options. These options can be issued consecutively, that is, in the same command line.

adaptive

Adaptively sets interpacket interval.

allow-broadcast

Allows you to ping broadcast address.

audible

Makes a beep sound on every ping, while the device pings for host details.

bypass-route

Bypasses normal routing tables during ping.

count

Specifies the number of ping requests to send.

deadline

Specifies the number of seconds before which ping expires.

ether-size

Matches the overall size of the data packet with the resultant size of the Layer 3 packet.

flood

Sends 100 ping requests each second.

interface

Specifies an interface that the device must use as the source address.

interval

Specifies the time in seconds for which the device must wait between ping requests.

mark

Specifies that the device must consider the ping request for special processing.

mtu-discovery

Specifies the path MTU discovery strategy.

no-loopback
Suppresses loop-back of multicast pings.

numeric
Does not resolve domain name system (DNS) names during ping.

pattern
Specifies the hexadecimal digit pattern to fill the packet.

quiet
Prints only the ping summary page.

record-route
Records the route that the packet takes.

size
Specifies the number of bytes to send for a ping request.

timestamp
Displays the timestamp during ping output.

tos
Marks packet with specified type of service (TOS).

ttl
Specifies the maximum packet life-time for a host.

verbose
Displays a detailed output for the ping command.

Modes

Operational mode

Usage Guidelines

The **ping** command tests whether a network host is reachable.

The **ping** command uses the ECHO_REQUEST datagram (ping) of the ICMP protocol to get an ICMP ECHO_RESPONSE from a host or gateway. ECHO_REQUEST datagrams have an IP and an ICMP header, followed by a *struct timeval* data type and then an arbitrary number of pad bytes that are used to fill the packet.

Use the **ping** *host* **interface** command when pinging IPv6 link-local address.

When the **ping** command is interrupted by typing `<Ctrl>+c`, a brief statistical summary is displayed.

Examples

This example shows how to test whether an IPv4 interface is reachable.

```
vyatta@vyatta:~$ ping 192.1.2.2 interface dp0s6
PING 192.1.2.2 (192.1.2.2) from 192.1.2.1 dp0s6: 56(84) bytes of data.
64 bytes from 192.1.2.2: icmp_req=1 ttl=64 time=1.66 ms
^C
--- 192.1.2.2 ping statistics ---
1 packets transmitted, 1 received, 0% packet loss, time 0ms
rtt min/avg/max/mdev = 1.664/1.664/1.664/0.000 ms
```

This example shows how to test whether an IPv4 address is reachable using the specified interface address.

```
vyatta@vyatta:~$ ping 192.1.2.2 interface 192.1.2.1
PING 192.1.2.2 (192.1.2.2) from 192.1.2.1 : 56(84) bytes of data.
64 bytes from 192.1.2.2: icmp_req=1 ttl=64 time=1.02 ms
^C
```

This example shows how to test whether an IPv6 interface is reachable.

```
vyatta@vyatta:~$ ping  2012:dead::2 interface  2012:dead::1
PING 2012:dead::2(2012:dead::2) from 2012:dead::1 : 56 data bytes
64 bytes from 2012:dead::2: icmp_seq=1 ttl=64 time=3.04 ms
64 bytes from 2012:dead::2: icmp_seq=2 ttl=64 time=1.01 ms
^C
--- 2012:dead::2 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1001ms
rtt min/avg/max/mdev = 1.012/2.027/3.043/1.016 ms
```

ping <host> interval <seconds> <option>

Specifies the time in seconds for which the device must wait between ping requests.

Syntax

ping { *ipv4_address* | *ipv6_address* | *hostname* } **interval** *secondsoption*

Parameters

ipv4_address

The IPv4 address of the host.

ipv6_address

The IPv6 address of the host.

hostname

A host being pinged. This keyword is used when the host is specified as a host name rather than as an IP address.

seconds

The number of seconds for which the device must wait between ping requests.

option

Each of the following entries are considered options. These options can be issued consecutively, that is, in the same command line.

adaptive

Adaptively sets interpacket interval.

allow-broadcast

Allows you to ping broadcast address.

audible

Makes a beep sound on every ping, while the device pings for host details.

bypass-route

Bypasses normal routing tables during ping.

count

Specifies the number of ping requests to send.

deadline

Specifies the number of seconds before which ping expires.

ether-size

Matches the overall size of the data packet with the resultant size of the Layer 3 packet.

flood

Sends 100 ping requests each second.

interface

Specifies an interface that the device must use as the source address.

interval

Specifies the time in seconds for which the device must wait between ping requests.

mark

Specifies that the device must consider the ping request for special processing.

mtu-discovery
Specifies the path MTU discovery strategy.

no-loopback
Suppresses loop-back of multicast pings.

numeric
Does not resolve domain name system (DNS) names during ping.

pattern
Specifies the hexadecimal digit pattern to fill the packet.

quiet
Prints only the ping summary page.

record-route
Records the route that the packet takes.

size
Specifies the number of bytes to send for a ping request.

timestamp
Displays the timestamp during ping output.

tos
Marks packet with specified type of service (TOS).

ttl
Specifies the maximum packet life-time for a host.

verbose
Displays a detailed output for the ping command.

Modes

Operational mode

Usage Guidelines

The **ping** command tests whether a network host is reachable.

The **ping** command uses the ECHO_REQUEST datagram (ping) of the ICMP protocol to get an ICMP ECHO_RESPONSE from a host or gateway. ECHO_REQUEST datagrams have an IP and an ICMP header, followed by a *struct timeval* data type and then an arbitrary number of pad bytes that are used to fill the packet.

When the **ping** command is interrupted by typing `<Ctrl>+c`, a brief statistical summary is displayed.

Examples

This example shows how to test whether www.google.com network is reachable by providing 3 seconds of time between 5 ping attempts.

```
vyatta@vyatta:~$ ping www.google.com interval 3 count 15
PING www.google.com (216.58.216.164) 56(84) bytes of data.
64 bytes from sea15s02-in-f4.1e100.net (216.58.216.164): icmp_req=1 ttl=54 time=20.2 ms
From 10.18.170.201 icmp_seq=2 Destination Host Unreachable
From 10.18.170.201 icmp_seq=3 Destination Host Unreachable
From 10.18.170.201 icmp_seq=4 Destination Host Unreachable
From 10.18.170.201 icmp_seq=5 Destination Host Unreachable
From 10.18.170.201 icmp_seq=6 Destination Host Unreachable
From 10.18.170.201 icmp_seq=7 Destination Host Unreachable
From 10.18.170.201 icmp_seq=8 Destination Host Unreachable
From 10.18.170.201 icmp_seq=9 Destination Host Unreachable
From 10.18.170.201 icmp_seq=10 Destination Host Unreachable
From 10.18.170.201 icmp_seq=11 Destination Host Unreachable
From 10.18.170.201 icmp_seq=12 Destination Host Unreachable
From 10.18.170.201 icmp_seq=13 Destination Host Unreachable
From 10.18.170.201 icmp_seq=14 Destination Host Unreachable
From 10.18.170.201 icmp_seq=15 Destination Host Unreachable

--- www.google.com ping statistics ---
15 packets transmitted, 1 received, +14 errors, 93% packet loss, time 41999ms
rtt min/avg/max/mdev = 20.264/20.264/20.264/0.000 ms
```

ping <host> mark <fwmark> <option>

Specifies that the device must consider the ping request for special processing.

Syntax

ping { *ipv4_address* | *ipv6_address* | *hostname* } **mark** *fwmark option*

Parameters

ipv4_address

The IPv4 address of the host.

ipv6_address

The IPv6 address of the host.

hostname

A host being pinged. This keyword is used when the host is specified as a host name rather than as an IP address.

fwmark

Marks the outgoing packet.

option

Each of the following entries are considered options. These options can be issued consecutively, that is, in the same command line.

adaptive

Adaptively sets interpacket interval.

allow-broadcast

Allows you to ping broadcast address.

audible

Makes a beep sound on every ping, while the device pings for host details.

bypass-route

Bypasses normal routing tables during ping.

count

Specifies the number of ping requests to send.

deadline

Specifies the number of seconds before which ping expires.

ether-size

Matches the overall size of the data packet with the resultant size of the Layer 3 packet.

flood

Sends 100 ping requests each second.

interface

Specifies an interface that the device must use as the source address.

interval

Specifies the time in seconds for which the device must wait between ping requests.

mark

Specifies that the device must consider the request for special processing.

mtu-discovery
Specifies the path MTU discovery strategy.

no-loopback
Suppresses loop-back of multicast pings.

numeric
Does not resolve domain name system (DNS) names during ping.

pattern
Specifies the hexadecimal digit pattern to fill the packet.

quiet
Prints only the ping summary page.

record-route
Records the route that the packet takes.

size
Specifies the number of bytes to send for a ping request.

timestamp
Displays the timestamp during ping output.

tos
Marks packet with specified type of service (TOS).

ttl
Specifies the maximum packet life-time for a host.

verbose
Displays a detailed output for the ping command.

Modes

Operational mode

Usage Guidelines

The **ping** command tests whether a network host is reachable.

The **ping** command uses the ECHO_REQUEST datagram (ping) of the ICMP protocol to get an ICMP ECHO_RESPONSE from a host or gateway. ECHO_REQUEST datagrams have an IP and an ICMP header, followed by a *struct timeval* data type and then an arbitrary number of pad bytes that are used to fill the packet.

The **ping** *host* **mark** *fwmark* command is used in usecases within the operating system. For example, to tag the outgoing packets while configuring policy routing, to select specific outbound processing.

When the **ping** command is interrupted by typing `<Ctrl>+c`, a brief statistical summary is displayed.

ping <host> mtu-discovery < do | dont | want > <option>

Selects the discovery strategy of the path maximum transmission unit (PMTU).

Syntax

ping { *ipv4_address* | *ipv6_address* | *hostname* } **mtu-discovery** { **do** | **dont** | **want** } *option*

Parameters

ipv4_address

The IPv4 address of the host.

ipv6_address

The IPv6 address of the host.

hostname

A host being pinged. This keyword is used when the host is specified as a host name rather than as an IP address.

do

Prohibits fragmentation, even for the local packet. Sets a do-not fragment (DF) flag to the router.

want

Performs a PMTU discovery. During the discovery the device fragments the packet locally.

dont

Prohibits fragmentation, but does not set a DF flag.

option

Each of the following entries are considered options. These options can be issued consecutively, that is, in the same command line.

adaptive

Adaptively sets interpacket interval.

allow-broadcast

Allows you to ping broadcast address.

audible

Makes a beep sound on every ping, while the device pings for host details.

bypass-route

Bypasses normal routing tables during ping.

count

Specifies the number of ping requests to send.

deadline

Specifies the number of seconds before which ping expires.

ether-size

Matches the overall size of the data packet with the resultant size of the Layer 3 packet.

flood

Sends 100 ping requests each second.

interface

Specifies an interface that the device must use as the source address.

interval
Specifies the time in seconds for which the device must wait between ping requests.

mark
Specifies that the device must consider the ping request for special processing.

mtu-discovery
Specifies the path MTU discovery strategy.

no-loopback
Suppresses loop-back of multicast pings.

numeric
Does not resolve domain name system (DNS) names during ping.

pattern
Specifies the hexadecimal digit pattern to fill the packet.

quiet
Prints only the ping summary page.

record-route
Records the route that the packet takes.

size
Specifies the number of bytes to send for a ping request.

timestamp
Displays the timestamp during ping output.

tos
Marks packet with specified type of service (TOS).

ttl
Specifies the maximum packet life-time for a host.

verbose
Displays a detailed output for the ping command.

Modes

Operational mode

Usage Guidelines

The **ping** *host* **mtu-discovery** command selects the discovery strategy of the PMTU, based on the parameters provided. The command checks the size of the packet. If the size is equal to or greater than the maximum data payload that is available in a packet, the device determines whether the packet has to be fragmented, based on the discovery strategy of the PMTU.

Examples

This example shows how to test 1472 bytes of data of the host 10.0.0.103 for network reachability while prohibiting network fragmentation during the ping. However a do-not-fragment flag is set for the router.

```
vyatta@vyatta:~$ ping 10.0.0.103 size 1472 mtu-discovery do
PING 10.0.0.103 (10.0.0.103) 1472(1500) bytes of data.
1480 bytes from 10.0.0.103: icmp_req=1 ttl=64 time=0.923 ms
^[[A1480 bytes from 10.0.0.103: icmp_req=2 ttl=64 time=1.35 ms
^C
--- 10.0.0.103 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 999ms
rtt min/avg/max/mdev = 0.923/1.137/1.352/0.217 ms
```

This example shows how to test 1472 bytes of data of the host 10.0.0.103 for network reachability while prohibiting network fragmentation during the ping. However a do-not-fragment flag is not set for the router.

```
vyatta@VR-1:~$ ping 10.0.0.103 size 1472 mtu-discovery dont
PING 10.0.0.103 (10.0.0.103) 1472(1500) bytes of data.
1480 bytes from 10.0.0.103: icmp_req=1 ttl=64 time=1.25 ms
^C
--- 10.0.0.103 ping statistics ---
1 packets transmitted, 1 received, 0% packet loss, time 0ms
rtt min/avg/max/mdev = 1.250/1.250/1.250/0.000 ms
```

This example shows how to perform a discovery strategy for PMTU during a ping request. During the discovery, the router fragments the packet locally.

```
vyatta@VR-1:~$ ping 10.0.0.103 size 1472 mtu-discovery want
PING 10.0.0.103 (10.0.0.103) 1472(1500) bytes of data.
1480 bytes from 10.0.0.103: icmp_req=1 ttl=64 time=1.00 ms
^C
--- 10.0.0.103 ping statistics ---
1 packets transmitted, 1 received, 0% packet loss, time 0ms
rtt min/avg/max/mdev = 1.005/1.005/1.005/0.000 ms
```

ping <host> no-loopback <option>

Suppresses loopback of multicast pings.

Syntax

ping { *ipv4_address* | *ipv6_address* | *hostname*} **no-loopback** *option*

Parameters

ipv4_address

The IPv4 address of the host.

ipv6_address

The IPv6 address of the host.

hostname

A host being pinged. This keyword is used when the host is specified as a host name rather than as an IP address.

option

Each of the following entries are considered options. These options can be issued consecutively, that is, in the same command line.

adaptive

Adaptively sets interpacket interval.

allow-broadcast

Allows you to ping broadcast address.

audible

Makes noise while the device pings for the host details.

bypass-route

Bypasses normal routing tables during ping.

count

Specifies the number of ping requests to send.

deadline

Specifies the number of seconds before which ping expires.

ether-size

Matches the overall size of the data packet with the resultant size of the Layer 3 packet.

flood

Sends 100 ping requests each second.

interface

Specifies an interface that the device must use as the source address.

interval

Specifies the time in seconds for which the device must wait between ping requests.

mark

Specifies that the device must consider the ping request for special processing.

mtu-discovery

Specifies the path MTU discovery strategy.

no-loopback
Suppresses loop-back of multicast pings.

numeric
Does not resolve domain name system (DNS) names during ping.

pattern
Specifies the hexadecimal digit pattern to fill the packet.

quiet
Prints only the ping summary page.

record-route
Records the route that the packet takes.

size
Specifies the number of bytes to send for a ping request.

timestamp
Displays the timestamp during ping output.

tos
Marks packet with specified type of service (TOS).

ttl
Specifies the maximum packet life-time for a host.

verbose
Displays a detailed output for the ping command.

Modes

Operational mode

Usage Guidelines

The **ping** command tests whether a network host is reachable.

The **ping** command uses the ECHO_REQUEST datagram (ping) of the ICMP protocol to get an ICMP ECHO_RESPONSE from a host or gateway. ECHO_REQUEST datagrams have an IP and an ICMP header, followed by a *struct timeval* data type and then an arbitrary number of pad bytes that are used to fill the packet.

When the **ping** command is interrupted by typing `<Ctrl>+c` , a brief statistical summary is displayed.

ping <host> numeric <option>

Specifies that the router must not resolve domain name system (DNS) names during a ping.

Syntax

ping { *ipv4_address* | *ipv6_address* | *hostname* } **numeric** *option*

Parameters

ipv4_address

The IPv4 address of the host.

ipv6_address

The IPv6 address of the host.

hostname

A host being pinged. This keyword is used when the host is specified as a host name rather than as an IP address.

numeric

The number of ping requests to send.

option

Each of the following entries are considered options. These options can be issued consecutively, that is, in the same command line.

adaptive

Adaptively sets interpacket interval.

allow-broadcast

Allows you to ping broadcast address.

audible

Makes a beep sound on every ping, while the device pings for host details.

bypass-route

Bypasses normal routing tables during ping.

count

Specifies the number of ping requests to send.

deadline

Specifies the number of seconds before which ping expires.

ether-size

Matches the overall size of the data packet with the resultant size of the Layer 3 packet.

flood

Sends 100 ping requests each second.

interface

Specifies an interface that the device must use as the source address.

interval

Specifies the time in seconds for which the device must wait between ping requests.

mark

Specifies that the device must consider the ping request for special processing.

mtu-discovery
Specifies the path MTU discovery strategy.

no-loopback
Suppresses loop-back of multicast pings.

numeric
Does not resolve domain name system (DNS) names during ping.

pattern
Specifies the hexadecimal digit pattern to fill the packet.

quiet
Prints only the ping summary page.

record-route
Records the route that the packet takes.

size
Specifies the number of bytes to send for a ping request.

timestamp
Displays the timestamp during ping output.

tos
Marks packet with specified type of service (TOS).

ttl
Specifies the maximum packet life-time for a host.

verbose
Displays a detailed output for the ping command.

Modes

Operational mode

Usage Guidelines

The **ping** command tests whether a network host is reachable.

The **ping** command uses the ECHO_REQUEST datagram (ping) of the ICMP protocol to get an ICMP ECHO_RESPONSE from a host or gateway. ECHO_REQUEST datagrams have an IP and an ICMP header, followed by a *struct timeval* data type and then an arbitrary number of pad bytes that are used to fill the packet.

When the **ping** command is interrupted by typing `<Ctrl>+c`, a brief statistical summary is displayed.

Examples

This example shows how to ensure that a ping command provides only numeric output, which means that the router does not look up symbolic names for host addresses.

```
vyatta@vyatta:~$ ping www.google.com numeric.
PING www.google.com (216.58.196.100) 56(84) bytes of data.
64 bytes from 216.58.196.100: icmp_req=1 ttl=54 time=42.1 ms
64 bytes from 216.58.196.100: icmp_req=2 ttl=54 time=44.3 ms
^C
--- www.google.com ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1001ms
rtt min/avg/max/mdev = 42.177/43.278/44.379/1.101 ms
```

ping <host> pattern <hexadecimal-digit> <option>

Specifies a hexadecimal digit pattern to fill the packet.

Syntax

ping { *ipv4_addres* | *ipv6_address* | *hostname* } **pattern** *hexadecimal-digit option*

Parameters

ipv4_address

The IPv4 address of the host.

ipv6_address

The IPv6 address of the host.

hostname

A host being pinged. This keyword is used when the host is specified as a host name rather than as an IP address.

hexadecimal-digit

Hexadecimal digit to fill the packet.

option

Each of the following entries are considered options. These options can be issued consecutively, that is, in the same command line.

adaptive

Adaptively sets interpacket interval.

allow-broadcast

Allows you to ping broadcast address.

audible

Makes a beep sound on every ping, while the device pings for host details.

bypass-route

Bypasses normal routing tables during ping.

count

Specifies the number of ping requests to send.

deadline

Specifies the number of seconds before which ping expires.

ether-size

Matches the overall size of the data packet with the resultant size of the Layer 3 packet.

flood

Sends 100 ping requests each second.

interface

Specifies the interface that the device must use as source address.

interval

Specifies the time in seconds for which the device must wait between ping requests.

mark

Specifies that the device must consider the ping request for special processing.

mtu-discovery
Specifies the path MTU discovery strategy.

no-loopback
Suppresses loop-back of multicast pings.

numeric
Does not resolve domain name system (DNS) names during ping.

pattern
Specifies the hexadecimal digit pattern to fill the packet.

quiet
Prints only the ping summary page.

record-route
Records the route that the packet takes.

size
Specifies the number of bytes to send for a ping request.

timestamp
Displays the timestamp during ping output.

tos
Marks packet with specified type of service (TOS).

ttl
Specifies the maximum packet life-time for a host.

verbose
Displays a detailed output for the ping command.

Modes

Operational mode

Usage Guidelines

The **ping** command tests whether a network host is reachable.

The **ping** command uses the ECHO_REQUEST datagram (ping) of the ICMP protocol to get an ICMP ECHO_RESPONSE from a host or gateway. ECHO_REQUEST datagrams have an IP and an ICMP header, followed by a *struct timeval* data type and then an arbitrary number of pad bytes that are used to fill the packet.

When the **ping** command is interrupted by typing `<Ctrl>+c`, a brief statistical summary is displayed.

Examples

This example shows how to send a packet that contains all 1's. This example helps to diagnose data-dependent problems in a network.

```
vyatta@vyatta:~$ ping www.google.com pattern BCD
PATTERN: 0xbc0d
PING www.google.com (173.194.33.176) 56(84) bytes of data.
64 bytes from sea09s18-in-f16.1e100.net (173.194.33.176): icmp_req=1 ttl=54 time=20.4 ms
64 bytes from sea09s18-in-f16.1e100.net (173.194.33.176): icmp_req=3 ttl=54 time=20.3 ms
From 10.18.170.201 icmp_seq=2 Destination Host Unreachable
From 10.18.170.201 icmp_seq=4 Destination Host Unreachable

--- www.google.com ping statistics ---
205 packets transmitted, 103 received, +102 errors, 49% packet loss, time 204233ms
rtt min/avg/max/mdev = 20.095/20.417/20.861/0.235 ms, pipe 4
vyatta@vyatta:~$ ^C
vyatta@vyatta:~$
```

ping <host> quiet <option>

Prints only the ping summary page.

Syntax

ping { *ipv4_address* | *ipv6_address* | *hostname* } **quiet** *option*

Parameters

ipv4_address

The IPv4 address of the host.

ipv6_address

The IPv6 address of the host.

hostname

A host being pinged. This keyword is used when the host is specified as a host name rather than as an IP address.

option

Each of the following entries are considered options. These options can be issued consecutively, that is, in the same command line.

adaptive

Adaptively sets interpacket interval.

allow-broadcast

Allows you to ping broadcast address.

audible

Makes a beep sound on every ping, while the device pings for host details.

bypass-route

Bypasses normal routing tables during ping.

count

Specifies the number of ping requests to send.

deadline

Specifies the number of seconds before which ping expires.

ether-size

Matches the overall size of the data packet with the resultant size of the Layer 3 packet.

flood

Sends 100 ping requests each second.

interface

Specifies an interface that the device must use as the source address.

interval

Specifies the time in seconds for which the device must wait between ping requests.

mark

Specifies that the device must consider the request for special processing.

mtu-discovery

Specifies the path MTU discovery strategy.

no-loopback
Suppresses loop-back of multicast pings.

numeric
Does not resolve domain name system (DNS) names during ping.

pattern
Specifies the hexadecimal digit pattern to fill the packet.

quiet
Prints only the ping summary page.

record-route
Records the route that the packet takes.

size
Specifies the number of bytes to send for a ping request.

timestamp
Displays the timestamp during ping output.

tos
Marks packet with specified type of service (TOS).

ttl
Specifies the maximum packet life-time for a host.

verbose
Displays a detailed output for the ping command.

Modes

Operational mode

Usage Guidelines

The **ping** command tests whether a network host is reachable.

The **ping** command uses the ECHO_REQUEST datagram (ping) of the ICMP protocol to get an ICMP ECHO_RESPONSE from a host or gateway. ECHO_REQUEST datagrams have an IP and an ICMP header, followed by a *struct timeval* data type and then an arbitrary number of pad bytes that are used to fill the packet.

When the **ping** command is interrupted by typing `<Ctrl>+c`, a brief statistical summary is displayed.

Examples

This example shows how to print only the ping summary page for www.google.com.

```
vyatta@vyatta:~$ ping www.google.com quiet
--- www.google.com ping statistics ---
15 packets transmitted, 1 received, +14 errors, 93% packet loss, time 41999ms
rtt min/avg/max/mdev = 20.264/20.264/20.264/0.000 ms
```

ping <host> record-route <option>

Records the route that a packet takes.

Syntax

ping { *ipv4_address* | *ipv6_address* | *hostname* } **record-route** *option*

Parameters

ipv4_address

Pings the IPv4 address of the host.

ipv6_address

Pings the IPv6 address of the host.

hostname

A host being pinged. This keyword is used when the host is specified as a host name rather than as an IP address.

option

Each of the following entries are considered options. These options can be issued consecutively, that is, in the same command line.

adaptive

Adaptively sets interpacket interval.

allow-broadcast

Allows you to ping broadcast address.

audible

Makes a beep sound on every ping, while the device pings for the host details.

bypass-route

Bypasses normal routing tables during ping.

count

Specifies the number of ping requests to send.

deadline

Specifies the number of seconds before which ping expires.

ether-size

Matches the overall size of the data packet with the resultant size of the Layer 3 packet.

flood

Sends 100 ping requests each second.

interface

Specifies an interface that the device must use as the source address.

interval

Specifies the time in seconds for which the device must wait between ping requests.

mark

Specifies that the device must consider the request for special processing.

mtu-discovery

Specifies the path MTU discovery strategy.

no-loopback
Suppresses loop-back of multicast pings.

numeric
Does not resolve domain name system (DNS) names during ping.

pattern
Specifies the hexadecimal digit pattern to fill the packet.

quiet
Prints only the ping summary page.

record-route
Records the route that the packet takes.

size
Specifies the number of bytes to send for a ping request.

timestamp
Displays the timestamp during ping output.

tos
Marks packet with specified type of service (TOS).

ttl
Specifies the maximum packet life-time for a host.

verbose
Displays a detailed output for the ping command.

Modes

Operational mode

Usage Guidelines

The **ping** command tests whether a network host is reachable.

The **ping** command uses the ECHO_REQUEST datagram (ping) of the ICMP protocol to get an ICMP ECHO_RESPONSE from a host or gateway. ECHO_REQUEST datagrams have an IP and an ICMP header, followed by a *struct timeval* data type and then an arbitrary number of pad bytes that are used to fill the packet.

When the **ping** command is interrupted by typing `<Ctrl>+c`, a brief statistical summary is displayed.

ping <host> size <bytes> <option>

Specifies the number of bytes to send for a ping request.

Syntax

ping { *ipv4_address* | *ipv6_address* | *hostname* } **size** *bytes option*

Parameters

ipv4_address

Pings the IPv4 address of the host.

ipv6_address

Pings the IPv6 address of the host.

hostname

A host being pinged. This keyword is used when the host is specified as a host name rather than as an IP address.

bytes

The number of bytes to send for a ping request.

option

Each of the following entries are considered options. These options can be issued consecutively, that is, in the same command line.

adaptive

Adaptively sets interpacket interval.

allow-broadcast

Allows you to ping broadcast address.

audible

Makes a beep sound during every ping, while the device pings for the host details.

bypass-route

Bypasses normal routing tables during ping.

count

Specifies the number of ping requests to send.

deadline

Specifies the number of seconds before which ping expires.

ether-size

Matches the overall size of the data packet with the resultant size of the Layer 3 packet.

flood

Sends 100 ping requests each second.

interface

Specifies an interface that the device must use as the source address.

interval

Specifies the time in seconds for which the device must wait between ping requests.

mark

Specifies that the device must consider the request for special processing.

mtu-discovery
Specifies the path MTU discovery strategy.

no-loopback
Suppresses loop-back of multicast pings.

numeric
Does not resolve domain name system (DNS) names during ping.

pattern
Specifies the hexadecimal digit pattern to fill the packet.

quiet
Prints only the ping summary page.

record-route
Records the route that the packet takes.

size
Specifies the number of bytes to send for a ping request.

timestamp
Displays the timestamp during ping output.

tos
Marks packet with specified type of service (TOS).

ttl
Specifies the maximum packet life-time for a host.

verbose
Displays a detailed output for the ping command.

Modes

Operational mode

Usage Guidelines

The **ping** command tests whether a network host is reachable.

The **ping** command uses the ECHO_REQUEST datagram (ping) of the ICMP protocol to get an ICMP ECHO_RESPONSE from a host or gateway. ECHO_REQUEST datagrams have an IP and an ICMP header, followed by a *struct timeval* data type and then an arbitrary number of pad bytes that are used to fill the packet.

When the **ping** command is interrupted by typing `<Ctrl>+c`, a brief statistical summary is displayed.

Examples

This example shows how to specify the number of bytes to send while testing the IP address for network reachability.

```
vyatta@vyatta:~$ ping  2012:dead::1 size 1200
PING 2012:dead::1(2012:dead::1) 1200 data bytes
1208 bytes from 2012:dead::1: icmp_seq=1 ttl=64 time=0.046 ms
1208 bytes from 2012:dead::1: icmp_seq=2 ttl=64 time=0.128 ms
^C
--- 2012:dead::1 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 999ms
rtt min/avg/max/mdev = 0.046/0.087/0.128/0.041 ms
vyatta@VR-1:~$ ping  2012:dead::1
PING 2012:dead::1(2012:dead::1) 56 data bytes
64 bytes from 2012:dead::1: icmp_seq=1 ttl=64 time=0.026 ms
64 bytes from 2012:dead::1: icmp_seq=2 ttl=64 time=0.034 ms
^C
```

ping <host> tos <number> <option>

Marks a packet with a specified time of service (TOS).

Syntax

ping { *ipv4_address* | *ipv6_address* | *hostname* } **tos** *number option*

Parameters

ipv4_address

Pings the IPv4 address of the host.

ipv6_address

Pings the IPv6 address of the host.

hostname

A host being pinged. This keyword is used when the host is specified as a host name rather than as an IP address.

number

The tos number.

option

Each of the following entries are considered options. These options can be issued consecutively, that is, in the same command line.

adaptive

Adaptively sets interpacket interval.

allow-broadcast

Allows you to ping broadcast address.

audible

Makes a beep sound during every ping, while the device pings for the host details.

bypass-route

Bypasses normal routing tables during ping.

count

Specifies the number of ping requests to send.

deadline

Specifies the number of seconds before which ping expires.

ether-size

Matches the overall size of the data packet with the resultant size of the Layer 3 packet.

flood

Sends 100 ping requests each second.

interface

Specifies an interface that the device must use as the source address.

interval

Specifies the time in seconds for which the device must wait between ping requests.

mark

Specifies that the device must consider the ping request for special processing.

mtu-discovery
Specifies the path MTU discovery strategy.

no-loopback
Suppresses loop-back of multicast pings.

numeric
Does not resolve domain name system (DNS) names during ping.

pattern
Specifies the hexadecimal digit pattern to fill the packet.

quiet
Prints only the ping summary page.

record-route
Records the route that the packet takes.

size
Specifies the number of bytes to send for a ping request.

timestamp
Displays the timestamp during ping output.

tos
Marks packet with specified type of service (TOS).

ttl
Specifies the maximum packet life-time for a host.

verbose
Displays a detailed output for the ping command.

Modes

Operational mode

Usage Guidelines

The **ping** command tests whether a network host is reachable.

The **ping** command uses the ECHO_REQUEST datagram (ping) of the ICMP protocol to get an ICMP ECHO_RESPONSE from a host or gateway. ECHO_REQUEST datagrams have an IP and an ICMP header, followed by a *struct timeval* data type and then an arbitrary number of pad bytes that are used to fill the packet.

When the **ping** command is interrupted by typing `<Ctrl>+c`, a brief statistical summary is displayed.

Examples

This example shows how to test a packet for network reachability by defining the time of service as one second.

```
vyatta@vyatta:~$ ping 127.0.0.1 tos 1
PING 127.0.0.1 (127.0.0.1) 56(84) bytes of data.
64 bytes from 127.0.0.1: icmp_req=1 ttl=64 time=0.409 ms
64 bytes from 127.0.0.1: icmp_req=2 ttl=64 time=0.027 ms
^C
--- 127.0.0.1 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 999ms
rtt min/avg/max/mdev = 0.027/0.218/0.409/0.191 ms
```

ping <host> ttl <seconds> <option>

Specifies the maximum packet life-time for a host.

Syntax

ping { *ipv4_address* | *ipv6_address* | *hostname* } **ttl** *seconds option*

Parameters

ipv4_address

The IPv4 address of the host.

ipv6_address

The IPv6 address of the host.

hostname

A host being pinged. This keyword is used when the host is specified as a host name rather than as an IP address.

seconds

The time in milliseconds to specify the maximum packet life-time for a host.

option

Each of the following entries are considered options. These options can be issued consecutively, that is, in the same command line.

adaptive

Adaptively sets interpacket interval.

allow-broadcast

Allows you to ping broadcast address.

audible

Makes a beep sound during every ping, while the device pings for the host details.

bypass-route

Bypasses normal routing tables during ping.

count

Specifies the number of ping requests to send.

deadline

Specifies the number of seconds before which ping expires.

ether-size

Matches the overall size of the data packet with the resultant size of the Layer 3 packet.

flood

Sends 100 ping requests each second.

interface

Specifies an interface that the device must use as the source address.

interval

Specifies the time in seconds for which the device must wait between ping requests.

mark

Specifies that the device must consider the ping request for special processing.

mtu-discovery
Specifies the path MTU discovery strategy.

no-loopback
Supress loop-back of multicast pings.

numeric
Does not resolve domain name system (DNS) names during ping.

pattern
Specifies the hexadecimal digit pattern to fill the packet.

quiet
Prints only the ping summary page.

record-route
Records the route that the packet takes.

size
Specifies the number of bytes to send for a ping request.

timestamp
Displays the timestamp during ping output.

tos
Marks packet with specified type of service (TOS).

ttl
Specifies the maximum packet life-time for a host.

verbose
Displays a detailed output for the ping command.

Modes

Operational mode

Usage Guidelines

The **ping** command tests whether a network host is reachable.

The **ping** command uses the ECHO_REQUEST datagram (ping) of the ICMP protocol to get an ICMP ECHO_RESPONSE from a host or gateway. ECHO_REQUEST datagrams have an IP and an ICMP header, followed by a *struct timeval* data type and then an arbitrary number of pad bytes that are used to fill the packet.

When the **ping** command is interrupted by typing `<Ctrl>+c`, a brief statistical summary is displayed.

Examples

This example shows how to specify the maximum packet life-time for a host while testing the host for network reachability. The life-time defined in this example is 200 seconds.

```
vyatta@vyatta:~$ ping 192.1.2.2 ttl 200
PING 192.1.2.2 (192.1.2.2) 56(84) bytes of data.
64 bytes from 192.1.2.2: icmp_req=1 ttl=64 time=1.41 ms
^C
--- 192.1.2.2 ping statistics ---
1 packets transmitted, 1 received, 0% packet loss, time 0ms
rtt min/avg/max/mdev = 1.412/1.412/1.412/0.000 ms
```

ping <host> verbose <option>

Displays a detailed output for the ping command.

Syntax

ping { *ipv4_address* | *ipv6_address* | *hostname* } **verbose** *option*

Parameters

ipv4_address

Pings the IPv4 address of the host.

ipv6_address

Pings the IPv6 address of the host.

hostname

A host being pinged. This keyword is used when the host is specified as a host name rather than as an IP address.

option

Each of the following entries are considered options. These options can be issued consecutively, that is, in the same command line.

adaptive

Adaptively sets interpacket interval.

allow-broadcast

Allows you to ping broadcast address.

audible

Makes a beep sound during every ping, while the device pings for the host details.

bypass-route

Bypasses normal routing tables during ping.

count

Specifies the number of ping requests to send.

deadline

Specifies the number of seconds before which ping expires.

ether-size

Matches the overall size of the data packet with the resultant size of the Layer-3 packet.

flood

Sends 100 ping requests each second.

interface

Specifies an interface that the device must use as the source address.

interval

Specifies the time in seconds for which the device must wait between ping requests.

mark

Specifies that the device must consider the ping request for special processing.

mtu-discovery

Specifies the path MTU discovery strategy.

no-loopback
Suppresses loop-back of multicast pings.

numeric
Does not resolve domain name system (DNS) names during ping.

pattern
Specifies the hexadecimal digit pattern to fill the packet.

quiet
Prints only the ping summary page.

record-route
Records the route that the packet takes.

size
Specifies the number of bytes to send for a ping request.

timestamp
Displays the timestamp during ping output.

tos
Marks packet with specified type of service (TOS).

ttl
Specifies the maximum packet life-time for a host.

verbose
Displays a detailed output for the ping command.

Modes

Operational mode

Usage Guidelines

The **ping** command tests whether a network host is reachable.

The **ping** command uses the ECHO_REQUEST datagram (ping) of the ICMP protocol to get an ICMP ECHO_RESPONSE from a host or gateway. ECHO_REQUEST datagrams have an IP and an ICMP header, followed by a *struct timeval* data type and then an arbitrary number of pad bytes that are used to fill the packet.

When the **ping** command is interrupted by typing `<Ctrl>+c`, a brief statistical summary is displayed.

protocols nsm log

Enables logging for NSM.

Syntax

set protocols nsm { **all** | **events** | **ha** | **kernel**| **packet** }

delete protocols nsm { **all** | **events** | **ha** | **kernel**| **packet** }

show protocols nsm { **all** | **events** | **ha** | **kernel**| **packet** }

Command Default

None

Parameters

all
Enables all NSM logs.

events
Enables only NSM event logs.

ha
Enables only NSM high availability (HA) logs.

kernel
Enables only NSM kernel logs.

packet
Enables only NSM packet logs.

Modes

Configuration mode

Configuration Statement

```
protocols {
     nsm {
      log {
          all
       events
           ha
       kernel
       packet
           }
        }
    }
```

Usage Guidelines

Use the **set** form of this command to enable NSM logs.

Use the **delete** form of this command to remove NSM logs.

Use the **show** form of this command to view NSM logs.

protocols nsm log ha

Enables logging for NSM HA.

Syntax

set protocols nsm ha { **all** }

delete protocols nsm ha { **all** }

show protocols nsm ha { **all** }

Command Default

None

Parameters

all

Enables all NSM HA logs

Modes

Configuration mode

Configuration Statement

```
protocols {
     nsm {
      log {
        ha {
           all
            }
         }
       }
 }
```

Usage Guidelines

Use the **set** form of this command to enable NSM high availability (HA) logs.

Use the **delete** form of this command to remove NSM HA logs.

Use the **show** form of this command to view NSM HA logs.

reset ip route kernel

Clears all the entries from the IP kernel route.

Syntax

reset ip route kernel

Modes

Operational mode

Usage Guidelines

Use this command to clear the entries from the IP kernel route.

reset ipv6 route kernel

Clears all the entries from the IPv6 kernel route.

Syntax

reset ipv6 route kernel

Modes

Operational mode

Usage Guidelines

Use this command to clear the entries from the IPv6 kernel route.

resources group address-group <group-name>

Defines a group of IP addresses that are referenced in firewall rules.

Syntax

set resources group address-group *group-name* { **address** *address* | **description** *desc* }

delete resources group address-group *group-name* { **address** *address* | **description** *desc* }

show resources group address-group *group-name* { **address** *address* | **description** *desc* }

Parameters

address-group
A group of IPv4 addresses or address ranges.

group-name
The name of a firewall address group.

address *address*
Adds the specified IPv4 address or range of IPv4 addresses to the specified firewall address group. IPv4 address ranges are specified by separating two contiguous IPv4 addresses with a hyphen, for example, 10.0.0.1-10.0.0.50. The maximum number of addresses that you can add to an address group is 32.

description *desc*
Provides a brief description for the firewall address group.

Modes

Configuration mode

Configuration Statement

```
resources {
    group {
        address-group group-name {
            address address
            description desc
        }
          }
}
```

Usage Guidelines

Use this command to specify an address group. A firewall address group is a collection of host IP addresses and address ranges that, once defined, can be collectively referenced within a firewall command.

A firewall address group is considered matched if the packet address matches any address or address range within the group.

Use the **set** form of this command to specify the address group.

Use the **delete** form of this command to remove a firewall address group or its members.

Use the **show** form of this command to view the configuration of a firewall address group.

resources group icmp-group <group-name>

Defines a group of ICMP types that may be referenced in firewall rules, policy-based routing rules or QoS rules.

Syntax

set resources group icmp-group *group-name* { **description** *description* | **name** *name* | **type** *number* [**code** *number*] }

delete resources group icmp-group *group-name* [**description** *description* | **name** *name* | **type** *number* [**code** *number*]]

show resources group icmp-group *group-name* [**description** *description* | **name** *name* | **type** *number* [**code** *number*]]

Parameters

group-name
Name of an IPv4 ICMP group.

description *description*
Describes an IPv4 ICMP group.

name *name*
Specifies the name of an ICMP type.

type *number*
Specifies the numeric identifier of an IPv4 ICMP type. The numeric identifier ranges from 0 through 255.

code *number*
Specifies the numeric identifier of an IPv4 ICMP code. The numeric identifier ranges from 0 through 255.

Modes

Configuration mode

Configuration Statement

```
resources {
    group {
        icmp-group group-name {
            description description
            name name
            type number {
                code number
            }
        }
    }
}
```

Usage Guidelines

Use this command to define an IPv4 Internet Control Message Protocol (ICMP) group. An ICMP group is a collection of ICMP types that, once defined, can be collectively referenced in firewall rules, policy-based routing rules and Quality of Service (QoS) rules.

An ICMP group is considered matched if any ICMP type in the group is matched.

Use the **set** form of this command to define an ICMP group.

Use the **delete** form of this command to remove an ICMP group or its members.

Use the **show** form of this command to display an ICMP group or its members.

resources group icmpv6-group <group-name>

Defines a group of ICMPv6 types that may be referenced in firewall rules, policy-based routing rules or QoS rules.

Syntax

set resources group icmpv6-group *group-name* { **description** *description* | **name** *name* | **type** *number* [**code** *number*] }

delete resources group icmpv6-group *group-name* [**description** *description* | **name** *name* | **type** *number* [**code** *number*]]

show resources group icmpv6-group *group-name* [**description** *description* | **name** *name* | **type** *number* [**code** *number*]]

Parameters

group-name
Name of an ICMPv6 group.

description *description*
Describes an ICMPv6 group.

name *name*
Specifies the name of an ICMPv6 type.

type *number*
Specifies the numeric identifier of an ICMPv6 type. The numeric identifier ranges from 0 through 255.

code *number*
Specifies the numeric identifier of an ICMPv6 code. The numeric identifier ranges from 0 through 255.

Modes

Configuration mode

Configuration Statement

```
resources {
    group {
        icmpv6-group group-name {
            description description
            name name
            type number {
                code number
            }
        }
    }
}
```

Usage Guidelines

Use this command to define an Internet Control Message Protocol Version 6 (ICMPv6) group. An ICMPv6 group is a collection of ICMPv6 types that, once defined, can be collectively referenced in firewall rules, policy-based routing rules and Quality of Service (QoS) rules.

An ICMPv6 group is considered matched if any ICMPv6 type in the group is matched.

Use the **set** form of this command to define an ICMPv6 group.

Use the **delete** form of this command to remove an ICMPv6 group or its members.

Use the **show** form of this command to display an ICMPv6 group or its members.

resources group port-group <group-name>

Defines a group of ports that are referenced in firewall rules.

Syntax

set resources group port-group *port-group-name* { **description** *description* { **port** [*name* | *1-65535* | *start* **-** *end*] }

delete resources group port-group *port-group-name* { **description** *description* | **port** [*name* | *1-65535* | *start* **-** *end*] }

show resources group port-group *port-group-name* { **description** *description* | **port** *name* | *1-65535* | *start* **-** *end* **test**] }

Parameters

port-group *port-group-name*

Matches the destination port packets against the specified port group. The packet is considered a match if it matches any port name or number specified in the group. Only one port group may be specified. The port group must already be defined. A packet is considered a match for an address, a network, or a port group if it matches any host IP address, network address, or port name or number, respectively, in the group. However, if more than one group is specified, the packet must be a match for both groups in order to be considered a match. For example, if an address group and a port group are both specified, the packet's destination must match at least one item in the address group and at least one item in the port group.

description *description*

Provides a brief description for the network group.

port [*name* | *1-65535* | *start* **-** *end*]

Specifies the port group parameters.

port-name

Matches the name of an IP service; for example, http. You can specify any service name in the file `/etc/services`.

port-num

Matches a port number. The range is 1 through 65535.

start-end

Matches the specified range of ports; for example, 1001-1005.

Modes

Configuration mode

Configuration Statement

```
resources {
    group {
        port-group group-name {
            port name
            description desc
        }
    }
}
```

Usage Guidelines

Use this command to define a network group. A network group is a collection of network addresses that, once defined, can be collectively referenced within a firewall command.

A network group is considered matched if the packet address matches any network address or address range within the group.

Use the **set** form of this command to define a network group.

Use the **delete** form of this command to remove a network group or its members.

Use the **show** form of this command to view the configuration of a network group.

show ip forwarding

Displays IP forwarding status.

Syntax

show ip forwarding

Modes

Operational mode

Usage Guidelines

Use this command to display IP forwarding status.

Examples

The following example shows how to display the status of IP forwarding.

```
vyatta@vyatta:~$ show ip forwarding
IP forwarding is on
vyatta@vyatta:~$
```

show ip route

Displays routes stored in the Routing Information Base (RIB) and Forwarding Information Base (FIB).

Syntax

show ip route [*ipv4* | *ipv4net*]

Command Default

Lists all routes stored in the RIB and FIB.

Parameters

ipv4

Optional. An IP address.

ipv4net

Optional. A prefix.

Modes

Operational mode

Usage Guidelines

Use this command to display routes stored in the RIB and FIB.

You can also see the routes shown in the FIB by using show ip route forward on page 90.

Examples

The following example shows how to display routes stored in the RIB and FIB.

```
vyatta@vyatta:~$ show ip route
Codes: K - kernel route, C - connected, S - static, R - RIP, O - OSPF,
       I - ISIS, B - BGP, > - selected route, * - FIB route
S>* 0.0.0.0/0 [1/0] via 10.1.0.1, dp0p0p0
O   10.1.0.0/24 [110/10] is directly connected, dp0p0p0, 05:35:15
C>* 10.1.0.0/24 is directly connected, dp0p0p0
O>* 10.192.32.0/24 [110/20] via 10.1.0.45, dp0p0p0, 05:35:15
O>* 10.192.128.0/24 [110/11] via 10.1.0.66, dp0p0p0, 05:35:15
O>* 10.192.128.1/32 [110/11] via 10.1.0.66, dp0p0p0, 05:35:15
O>* 10.192.129.0/24 [110/11] via 10.1.0.66, dp0p0p0, 05:35:15
O>* 10.192.130.0/24 [110/11] via 10.1.0.66, dp0p0p0, 05:35:15
O>* 10.192.131.0/24 [110/11] via 10.1.0.66, dp0p0p0, 05:35:15
C>* 127.0.0.0/8 is directly connected, lo
O>* 172.16.0.0/24 [110/11] via 10.1.0.4, dp0p0p0, 05:35:15
O>* 172.16.1.0/24 [110/11] via 10.1.0.4, dp0p0p0, 05:35:15
O>* 172.16.2.0/24 [110/11] via 10.1.0.4, dp0p0p0, 05:35:15
O>* 172.16.3.0/24 [110/11] via 10.1.0.4, dp0p0p0, 05:35:15
O>* 172.16.4.0/24 [110/11] via 10.1.0.4, dp0p0p0, 05:35:15
O>* 172.16.5.0/24 [110/11] via 10.1.0.4, dp0p0p0, 05:35:15
O>* 172.16.6.0/24 [110/11] via 10.1.0.4, dp0p0p0, 05:35:15
O>* 172.16.7.0/24 [110/11] via 10.1.0.4, dp0p0p0, 05:35:15
O>* 172.16.8.0/24 [110/11] via 10.1.0.4, dp0p0p0, 05:35:15
O>* 172.16.9.0/24 [110/11] via 10.1.0.4, dp0p0p0, 05:35:15
C>* 172.16.234.0/25 is directly connected, dp0p0p1
S>* 192.94.202.0/24 [1/0] via 172.16.234.27, dp0p0p1
```

The following example shows how to display information for the route to the 10.192.128.1 IP address.

```
vyatta@vyatta:~$ show ip route 10.192.128.1
Routing entry for 10.192.128.1/32
  Known via "ospf", distance 110, metric 11, best
  Last update 09:47:07 ago
  * 10.1.0.66, via dp0p0p0
vyatta@vyatta:~$
```

show ip route <ipv4net> longer-prefixes

Displays prefixes in the Routing Information Base (RIB) that are longer than a specific IP address or prefix.

Syntax

show ip route *ipv4net* **longer-prefixes**

Parameters

ipv4net

Mandatory. An IP address or prefix.

Modes

Operational mode

Usage Guidelines

Use this command to display all prefixes in the RIB that are longer than a specific IP address or prefix.

Examples

The following example shows how to display prefixes that are longer than the 10.192.128.0/24 prefix.

```
vyatta@vyatta:~$ show ip route 10.192.128.0/24 longer-prefixes
Codes: K - kernel route, C - connected, S - static, R - RIP, O - OSPF,
       I - ISIS, B - BGP, > - selected route, * - FIB route
O>* 10.192.128.0/24 [110/11] via 10.1.0.66, dp0p0p0, 09:36:20
O>* 10.192.128.1/32 [110/11] via 10.1.0.66, dp0p0p0, 09:36:20
vyatta@vyatta:~$
```

show ip route connected

Displays directly connected routes.

Syntax

show ip route connected

Modes

Operational mode

Usage Guidelines

Use this command to display routes that are directly connected to the local system.

Examples

The following example shows how to display directly connected routes.

```
vyatta@vyatta:~$ show ip route connected
Codes: K - kernel route, C - connected, S - static, R - RIP, O - OSPF,
       I - ISIS, B - BGP, > - selected route, * - FIB route
C>* 10.1.0.0/24 is directly connected, dp0p0p0
C>* 127.0.0.0/8 is directly connected, lo
C>* 172.16.234.0/25 is directly connected, dp0p0p1
vyatta@vyatta:~$
```

show ip route forward

Displays routes stored in the Forwarding Information Base (FIB).

Syntax

show ip route forward [*ipv4net*]

Command Default

Displays routes stored in the FIB.

Parameters

ipv4net

Optional. A route for which information from the kernel forwarding table is displayed.

Modes

Operational mode

Usage Guidelines

Use this command to display routes that are stored in the FIB.

The FIB contains multiple equal-cost paths, if they exist. Multiple equal-cost paths are needed before equal-cost multipath (ECMP) routing or WAN load balancing is performed.

Examples

The following example shows how to display routes stored in the FIB.

```
vyatta@vyatta:~$ show ip route forward
default via 10.1.0.1 dev dp0p0p0  proto zebra
10.1.0.0/24 dev dp0p0p0  proto kernel  scope link  src 10.1.0.62
10.192.32.0/24 via 10.1.0.45 dev dp0p0p0  proto zebra  metric 20
10.192.128.0/24 via 10.1.0.66 dev dp0p0p0  proto zebra  metric 11
10.192.128.1 via 10.1.0.66 dev dp0p0p0  proto zebra  metric 11
10.192.129.0/24 via 10.1.0.66 dev dp0p0p0  proto zebra  metric 11
10.192.130.0/24 via 10.1.0.66 dev dp0p0p0  proto zebra  metric 11
10.192.131.0/24 via 10.1.0.66 dev dp0p0p0  proto zebra  metric 11
172.16.0.0/24 via 10.1.0.4 dev dp0p0p0  proto zebra  metric 11
172.16.1.0/24 via 10.1.0.4 dev dp0p0p0  proto zebra  metric 11
172.16.2.0/24 via 10.1.0.4 dev dp0p0p0  proto zebra  metric 11
172.16.3.0/24 via 10.1.0.4 dev dp0p0p0  proto zebra  metric 11
172.16.4.0/24 via 10.1.0.4 dev dp0p0p0  proto zebra  metric 11
172.16.5.0/24 via 10.1.0.4 dev dp0p0p0  proto zebra  metric 11
172.16.6.0/24 via 10.1.0.4 dev dp0p0p0  proto zebra  metric 11
172.16.7.0/24 via 10.1.0.4 dev dp0p0p0  proto zebra  metric 11
172.16.8.0/24 via 10.1.0.4 dev dp0p0p0  proto zebra  metric 11
172.16.9.0/24 via 10.1.0.4 dev dp0p0p0  proto zebra  metric 11
172.16.234.0/25 dev dp0p0p1  proto kernel  scope link  src 172.16.234.23
192.94.202.0/24 via 172.16.234.27 dev dp0p0p1  proto zebra
vyatta@vyatta:~$
```

The following example shows how to display information from the FIB about the 10.1.0.0/24 route.

```
vyatta@vyatta:~$ show ip route forward 10.1.0.0/24
10.1.0.0/24 dev dp0p0p0  proto kernel  scope link  src 10.1.0.62
vyatta@vyatta:~$
```

show ip route kernel

Displays kernel routes.

Syntax

show ip route kernel

Modes

Operational mode

Usage Guidelines

Use this command to display kernel routes. Kernel routes are routes that have been added through a means other than by using the Vyatta CLI; for example, by using the operating system **route** command as shown here:

```
route add -net 10.172.24.0 netmask 255.255.255.0 gw 10.1.0.1
```

Examples

The following example shows how to display kernel routes.

```
vyatta@vyatta:~$ show ip route kernel
Codes: K - kernel route, C - connected, S - static, R - RIP, O - OSPF,
        I - ISIS, B - BGP, > - selected route, * - FIB route
K>* 10.172.24.0/24 via 10.1.0.1, dp0p0p0
vyatta@vyatta:~$
```

show ip route static

Displays static routes in the Routing Information Base (RIB).

Syntax

show ip route static

Modes

Operational mode

Usage Guidelines

Use this command to display static routes in the RIB.

Examples

The following example shows how to display static routes in the RIB.

```
vyatta@vyatta:~$ show ip route static
Codes: K - kernel route, C - connected, S - static, R - RIP, O - OSPF,
       I - ISIS, B - BGP, > - selected route, * - FIB route
S>* 0.0.0.0/0 [1/0] via 10.1.0.1, dp0p0p0
S>* 192.94.202.0/24 [1/0] via 172.16.234.27, dp0p0p1
vyatta@vyatta:~$
```

show ip route summary

Displays a summary of routes.

Syntax

show ip route summary

Modes

Operational mode

Usage Guidelines

Use this command to display a summary of the various routes by route source.

Examples

The following example shows how to display a summary of routes.

```
vyatta@vyatta:~$ show ip route summary
Route Source         Routes               FIB
connected            4                    4
static               2                    2
ospf                 1                    0
ebgp                 0                    0
ibgp                 289016               289011
------
Totals               289023               289017
vyatta@vyatta:~$
```

show ip route supernets-only

Displays supernet routes.

Syntax

show ip route supernets-only

Modes

Operational mode

Usage Guidelines

Use this command to display supernet routes.

Supernet routes are routes that have a subnet mask that is less specific than the usual classful mask.

Examples

The following example shows how to display supernet routes.

```
vyatta@vyatta:~$ show ip route supernets-only
Codes: K - kernel route, C - connected, S - static, R - RIP, O - OSPF,
       I - ISIS, B - BGP, > - selected route, * - FIB route
S>* 0.0.0.0/0 [1/0] via 10.1.0.1, dp0p0p0
vyatta@vyatta:~$
```

show ip route table <table>

Displays routes stored in an alternate routing table.

Syntax

show ip route table *table-number*

Parameters

table *table-number*

An alternate routing table.

Modes

Operational mode

Usage Guidelines

Use this command to view routes stored in an alternate routing table. Alternate routing tables are used with policy-based routing. Refer to *Brocade Vyatta Network OS Policy-based Routing Configuration Guide* for information on policy-based routing.

Examples

The following example shows how to display routes in alternate routing table 5.

```
vyatta@vyatta:~$ show ip route table 5
table 5:
Codes: K - kernel route, C - connected, S - static, R - RIP, O - OSPF,
       I - ISIS, B - BGP, > - selected route, * - FIB route
S>* 12.34.56.0/24 [1/0] via 192.168.1.254, dp0p0p0
vyatta@vyatta:~$
```

show ip route variance

Detects the routes that are missing from the RIB, kernel, and data plane table and stores the discrepancy in a file.

Syntax

show ip route variance

Modes

Operational mode

Usage Guidelines

Detects the routes that are missing from the RIB, kernel, and data plane table and stores the discrepancy in the following file: `/home/<username>/vyatta_rtvariance.output`. A missing route is identified by using codes such as R for RIB, K for kernel, and D for data plane. This command verifies only active routes and interfaces and can help during debugging.

NOTE

Brocade recommends that you use the command in a stable environment to ensure that you do not get wrong results. The vRouter may take more time to generate the output if the system has millions of routes.

Examples

The following example shows how to store the discrepancy in the following file: `/home/vyatta/vyatta_rtvariance.output`. The following output indicates that an IPv4 route is missing from the kernel.

```
vyatta@vyatta# show ip route variance
Output is dumped in the file: /home/vyatta/vyatta_rtvariance.output
```

show ip route variance console

Detects the routes that are missing from the RIB, kernel, and data plane table and displays the discrepancy at the console.

Syntax

show ip route variance console

Modes

Operational mode

Usage Guidelines

Compares the routes in the RIB, kernel, and data plane table, detects missing routes, and displays the discrepancy at the console . The discrepancy contains IPv4 routes and addresses that are missing from the RIB, kernel, and data plane table. A missing route is identified by using codes such as R for RIB, K for kernel, and D for data plane. This command verifies only active routes and interfaces and can help during debugging.

NOTE

Brocade recommends that you use the command in a stable environment to ensure that you do not get wrong results. The vRouter may take more time to generate the output if the system has millions of routes.

Examples

The following example shows how to display the discrepancy information at the console. The output displays the following information:

- The interface variance table indicates that the **88.88.88.4** address which is configured on the **lo4** interface is missing from the data plane.
- The route variance table indicates that the **200.9.9.0/32** address route with the **12.12.12.20** nexthop is missing from both the kernel and data plane.

```
vyatta@vyatta# show ip route variance console
Codes: R - RIB, K - Kernel, D - Dataplane
(Indicates the table Id in which the address/route is missing)

Interface Variance Table:
D     88.88.88.4 lo4 (present in Kernel)
K     201.202.203.0 dp0s8 (present in RIB)
K     6.6.6.0 dp0s7.1 (present in RIB)
R     12.12.12.0 dp0s7 (present in Kernel)

Route Variance Table:
Table Absence  Route
def   D        100.4.4.4/32 via 12.12.12.18
def   K        100.1.1.1/32 via 12.12.12.19
def   KD       200.9.9.0/24 via 12.12.12.20
def   R        100.1.1.1/32 via 12.12.12.17
def   R        200.1.1.1/32 via 12.12.12.20
def   RK       100.4.4.4/32 via 12.12.12.28
def   RK       200.20.20.20/32 via 12.12.12.30
```

Examples

The following example shows how to display the discrepancy at the console. The output indicates that all tables are synchronized and that no routes and interfaces are missing.

```
vyatta@vyatta# show ip route variance console

No Variance, Inteface addresses and Routes are in sync
```

show ipv6 route

Displays IPv6 routes stored in the Routing Information Base (RIB) and Forwarding Information Base (FIB).

Syntax

show ipv6 route [*ipv6* | *ipv6net*]

Command Default

Displays all IPv6 routes in the RIB and FIB.

Parameters

ipv6

Optional. An IPv6 address.

ipv6net

Optional. An IPv6 prefix.

Modes

Operational mode

Usage Guidelines

Use this command to display IPv6 routes stored in the RIB and FIB.

You can also see the routes shown in the FIB by using show ip route forward on page 90.

show ipv6 route <ipv6net> longer-prefixes

Displays IPv6 prefixes in the Routing Information Base (RIB) that are longer than a specific IPv6 address or prefix.

Syntax

show ipv6 route *ipv6net* **longer-prefixes**

Parameters

ipv6net

Mandatory. An IPv6 address or prefix.

Modes

Operational mode

Usage Guidelines

Use this command to display all prefixes in the RIB that are longer than a specific IPv6 address or prefix.

show ipv6 route bgp

Displays IPv6 Border Gateway Protocol (BGP) routes.

Syntax

show ipv6 route bgp

Modes

Operational mode

Usage Guidelines

Use this command to display IPv6 BGP routes.

show ipv6 route connected

Displays IPv6 connected routes.

Syntax

show ipv6 route connected

Modes

Operational mode

Usage Guidelines

Use this command to display IPv6 routes that are directly connected to the local system.

show ipv6 route forward

Displays IPv6 routes stored in the Forwarding Information Base (FIB).

Syntax

show ipv6 route forward [*ipv6net*]

Command Default

Displays IPv6 routes stored in the FIB.

Parameters

ipv6net

Optional. An IPv6 route for which information from the kernel forwarding table is displayed.

Modes

Operational mode

Usage Guidelines

Use this command to display routes that are stored in the FIB.

The FIB contains multiple equal-cost paths, if they exist. Multiple equal-cost paths are needed before equal-cost multipath (ECMP) routing or WAN load balancing is performed.

show ipv6 route kernel

Displays IPv6 kernel routes.

Syntax

show ipv6 route kernel

Modes

Operational mode

Usage Guidelines

Use this command to display IPv6 kernel routes. Kernel routes are routes that have been added through a means other than by using the Vyatta CLI.

show ipv6 route ripng

Displays IPv6 Routing Information Protocol next generation (RIPng) routes.

Syntax

show ipv6 route ripng

Modes

Operational mode

Usage Guidelines

Use this command to display IPv6 RIPng routes.

show ipv6 route static

Displays IPv6 static routes.

Syntax

show ipv6 route static

Modes

Operational mode

Usage Guidelines

Use this command to display IPv6 static routes.

show ipv6 route variance

Detects the IPv6 routes that are missing from the RIB, kernel, and data plane table and stores the discrepancy in a file.

Syntax

show ipv6 route variance

Modes

Operational mode

Usage Guidelines

Compares the routes in the RIB, kernel, and data plane table, detects missing IPv6 routes, and stores the discrepancy in the following file: `/home/<username>/vyatta_rtvariance.output`. The discrepancy contains IPv6 routes and addresses that are missing from the RIB, kernel, or data plane table. A missing route is identified by using codes such as R for RIB, K for kernel, and D for data plane. This command verifies only active routes and interfaces and can help during debugging.

NOTE
Brocade recommends that you use the command in a stable environment to ensure that you do not get wrong results. The vRouter may take more time to generate the output if the system has millions of routes.

Examples

The following example shows how to store the discrepancy in the following file: `/home/<username>/vyatta_rtvariance.output`.

```
vyatta@vyatta# show ipv6 route variance
Output is dumped in the file: /home/vyatta/vyatta_rtvariance.output
```

show ipv6 route variance console

Detects IPv6 routes that are missing from the RIB, kernel, and data plane table and displays the discrepancy at the console.

Syntax

show ipv6 route variance console

Modes

Operational mode

Usage Guidelines

Detects the IPv6 routes that are missing from the RIB, kernel, and data plane tables and displays the discrepancy at the console. The discrepancy contains IPv6 routes and addresses that are missing from the RIB, kernel, and data plane table. A missing route is identified by using codes such as R for RIB, K for kernel, and D for data plane. This command verifies only active routes and interfaces and can help during debugging.

NOTE
Brocade recommends that you use the command in a stable environment to ensure that you do not get wrong results. The vRouter may take more time to generate the output if the system has millions of routes.

Examples

The following example shows how to display the discrepancy at the console. The following output indicates that **2626:1111:2222:3333:4444:5555:8888:1** address is missing from the data plane. The route variance table indicates that all tables are synchronized and that no IPv6 route is missing.

```
vyatta@vyatta# show ipv6 route variance console

Codes: R - RIB, K - Kernel, D - Dataplane (Indicates the table Id in which the address/route is missing)

Interface Variance Table:

     D    2626:1111:2222:3333:4444:5555:8888:1 dp0s3 (present in Kernel)

Route Variance Table:
Routes are in sync
```

show monitoring protocols rib

Displays Routing Information Base (RIB) debugging flags.

Syntax

show monitoring protocols rib

Modes

Operational mode

Usage Guidelines

Use this command to display RIB debugging flags.

traceroute <host> as-path

Displays the route that packets take to a network host.

Syntax

traceroute [**ipv4** | **ipv6**] *host* **as-path** [**options**]

Parameters

ipv4

Explicitly force IPv4 traceouting. By default, the program will try to resolve the name given, and choose the appropriate protocol automatically. If resolving a host name returns both IPv4 and IPv6 addresses, **traceroute** will use IPv4.

ipv6

Explicitly force IPv6 traceouting. By default, the program will try to resolve the name given, and choose the appropriate protocol automatically. If resolving a host name returns both IPv4 and IPv6 addresses, **traceroute** will use IPv6.

host

A host that is the destination for the trace. The host is specified as a name (if DNS is being used on the network), as an IPv4 or IPv6 address, or as a MAC address (format h:h:h:h:h:h:h:h).

as-path

Performs AS path lookups in routing registries and print results directly after the corresponding addresses.

options

The following entries are options. Multiple options can be included on the same command line.

bypass-routing

Bypasses the normal routing tables and send directly to a host on an attached network. If the host is not on a directly-attached network, an error is returned. This option can be used to ping a local host through an interface that has no route through it.

debug-socket

Enables socket level debugging.

first-ttl *value*

Specifies the first time-to-live value. Defaults to 1.

gateway *address*

Routes the request through a specified gateway.

icmp-echo

Uses ICMP echo for the traceroute probe.

icmp-extensions

Shows ICMP extensions (rfc4884). The general form is *CLASS/TYPE:* followed by a hexadecimal dump.

interface *value*

Specifies the interface that the device must use for traceroute requests.

interval *value*

Specifies the time in seconds between traceroute requests from the device.

max-ttl *value*

Specifies the maximum number of hops for the probe.

no-fragment
Does not fragment the probe packets.

num-queries *number*
Specifies the number of probe packets per hop. The default is 3.

port *number*
For UDP tracing, specifies the destination port base traceroute will use (the destination port number will be incremented by each probe). For ICMP tracing, specifies the initial icmp sequence value (incremented by each probe too). For TCP specifies just the (constant) destination port to connect.

seq-queries *number*
Specifies the number of sequential probe packets.

source-addr *host*
Specifies an alternative source host by hostname, IPv4 address, or MAC address.

tcp-syn
Uses TCP SYN for the probes.

tos *value*
Marks the packets with the specified Type of Service (TOS) value.

version
Displays the timestamp during ping output.

wait-time *value*
Specifies the time (seconds) to wait for a response from the probe. Default is 5 seconds.

Modes

Operational mode

Usage Guidelines

Use this command to perform a "traceroute" operation for a network host. This operation uses the IP protocol time-to-live (TTL) field and attempts to elicit an Internet Control Message Protocol (ICMP) TIME_EXCEEDED response from each gateway along the path to a host to track the route that a set of packets follows. It attempts to trace the route an IP packet follows to an Internet host by launching User Datagram Protocol (UDP) probe packets with a small time to live, then listening for an ICMP "Time exceeded" reply from a gateway.

Examples

The following example illustrates a traceroute to google.com including AS path information.

```
vyatta@vyatta#traceroute google.com as-path
traceroute to google.com (216.58.192.14), 30 hops max, 60 byte packets
 1  10.18.170.1 (10.18.170.1) [*]  0.681 ms  0.529 ms  0.580 ms
 2  10.31.23.6 (10.31.23.6) [*]  0.476 ms  0.433 ms  0.481 ms
 3  10.254.33.1 (10.254.33.1) [*]  0.864 ms  0.831 ms  0.826 ms
 4  144.49.130.145 (144.49.130.145) [AS29791/AS21948]  8.022 ms  1.183 ms  1.295 ms
 5  ae6-395.edge8.sanjose1.level3.net (209.244.104.65) [AS3356]  2.106 ms  2.046 ms  2.006 ms
 6  ae-1-60.edge1.sanjose3.level3.net (4.69.152.16) [AS3356]  2.887 ms * *
 7  72.14.223.91 (72.14.223.91) [AS15169]  2.878 ms  2.972 ms  2.938 ms
 8  209.85.249.3 (209.85.249.3) [AS15169]  3.430 ms  4.754 ms  3.460 ms
 9  74.125.37.41 (74.125.37.41) [AS15169]  4.568 ms  4.516 ms  4.455 ms
10  nuq04s29-in-f14.1e100.net (216.58.192.14) [AS15169]  3.159 ms  3.134 ms  3.097 ms
```

traceroute <host> bypass-routing

Displays the route that packets take to a network host.

Syntax

traceroute [**ipv4** | **ipv6**] *host* **bypass-routing** [**options**]

Parameters

ipv4

Explicitly force IPv4 traceouting. By default, the program will try to resolve the name given, and choose the appropriate protocol automatically. If resolving a host name returns both IPv4 and IPv6 addresses, **traceroute** will use IPv4.

ipv6

Explicitly force IPv6 traceouting. By default, the program will try to resolve the name given, and choose the appropriate protocol automatically. If resolving a host name returns both IPv4 and IPv6 addresses, **traceroute** will use IPv6.

host

A host that is the destination for the trace. The host is specified as a name (if DNS is being used on the network), as an IPv4 or IPv6 address, or as a MAC address (format h:h:h:h:h:h:h:h).

bypass-routing

Bypasses the normal routing tables and send directly to a host on an attached network. If the host is not on a directly-attached network, an error is returned. This option can be used to ping a local host through an interface that has no route through it.

options

The following entries are options. Multiple options can be included on the same command line.

as-path

Performs AS path lookups in routing registries and print results directly after the corresponding addresses.

debug-socket

Enables socket level debugging.

first-ttl *value*

Specifies the first time-to-live value. Defaults to 1.

gateway *address*

Routes the request through a specified gateway.

icmp-echo

Uses ICMP echo for the traceroute probe.

icmp-extensions

Shows ICMP extensions (rfc4884). The general form is *CLASS/TYPE:* followed by a hexadecimal dump.

interface *value*

Specifies the interface that the device must use for traceroute requests.

interval *value*

Specifies the time in seconds between traceroute requests from the device.

max-ttl *value*

Specifies the maximum number of hops for the probe.

no-fragment
Does not fragment the probe packets.

num-queries *number*
Specifies the number of probe packets per hop. The default is 3.

port *number*
For UDP tracing, specifies the destination port base traceroute will use (the destination port number will be incremented by each probe). For ICMP tracing, specifies the initial icmp sequence value (incremented by each probe too). For TCP specifies just the (constant) destination port to connect.

seq-queries *number*
Specifies the number of sequential probe packets.

source-addr *host*
Specifies an alternative source host by hostname, IPv4 address, or MAC address.

tcp-syn
Uses TCP SYN for the probes.

tos *value*
Marks the packets with the specified Type of Service (TOS) value.

version
Displays the timestamp during ping output.

wait-time *value*
Specifies the time (seconds) to wait for a response from the probe. Default is 5 seconds.

Modes

Operational mode

Usage Guidelines

Use this command to perform a "traceroute" operation for a network host. This operation uses the IP protocol time-to-live (TTL) field and attempts to elicit an Internet Control Message Protocol (ICMP) TIME_EXCEEDED response from each gateway along the path to a host to track the route that a set of packets follows. It attempts to trace the route an IP packet follows to an Internet host by launching User Datagram Protocol (UDP) probe packets with a small time to live, then listening for an ICMP "Time exceeded" reply from a gateway.

Examples

The following example illustrates a traceroute to google.com bypassing the normal routing tables. Note that an error message appears because google.com is not on a directly attached network.

```
vyatta@vyatta#traceroute google.com bypass-routing
traceroute to google.com (216.58.192.14), 30 hops max, 60 byte packets
connect:network is unreachable
```

traceroute <host> debug-socket

Displays the route that packets take to a network host.

Syntax

traceroute [**ipv4** | **ipv6**] *host* **debug-socket** [**options**]

Parameters

ipv4

Explicitly force IPv4 traceouting. By default, the program will try to resolve the name given, and choose the appropriate protocol automatically. If resolving a host name returns both IPv4 and IPv6 addresses, **traceroute** will use IPv4.

ipv6

Explicitly force IPv6 traceouting. By default, the program will try to resolve the name given, and choose the appropriate protocol automatically. If resolving a host name returns both IPv4 and IPv6 addresses, **traceroute** will use IPv6.

host

A host that is the destination for the trace. The host is specified as a name (if DNS is being used on the network), as an IPv4 or IPv6 address, or as a MAC address (format h:h:h:h:h:h:h:h).

debug-socket

Enables socket level debugging.

options

The following entries are options. Multiple options can be included on the same command line.

as-path

Performs AS path lookups in routing registries and print results directly after the corresponding addresses.

bypass-routing

Bypasses the normal routing tables and send directly to a host on an attached network. If the host is not on a directly-attached network, an error is returned. This option can be used to ping a local host through an interface that has no route through it.

first-ttl *value*

Specifies the first time-to-live value. Defaults to 1.

gateway *address*

Routes the request through a specified gateway.

icmp-echo

Uses ICMP echo for the traceroute probe.

icmp-extensions

Shows ICMP extensions (rfc4884). The general form is *CLASS/TYPE:* followed by a hexadecimal dump.

interface *value*

Specifies the interface that the device must use for traceroute requests.

interval *value*

Specifies the time in seconds between traceroute requests from the device.

max-ttl *value*

Specifies the maximum number of hops for the probe.

no-fragment
Does not fragment the probe packets.

num-queries *number*
Specifies the number of probe packets per hop. The default is 3.

port *number*
For UDP tracing, specifies the destination port base traceroute will use (the destination port number will be incremented by each probe). For ICMP tracing, specifies the initial icmp sequence value (incremented by each probe too). For TCP specifies just the (constant) destination port to connect.

seq-queries *number*
Specifies the number of sequential probe packets.

source-addr *host*
Specifies an alternative source host by hostname, IPv4 address, or MAC address.

tcp-syn
Uses TCP SYN for the probes.

tos *value*
Marks the packets with the specified Type of Service (TOS) value.

version
Displays the timestamp during ping output.

wait-time *value*
Specifies the time (seconds) to wait for a response from the probe. Default is 5 seconds.

Modes

Operational mode

Usage Guidelines

Use this command to perform a "traceroute" operation for a network host. This operation uses the IP protocol time-to-live (TTL) field and attempts to elicit an Internet Control Message Protocol (ICMP) TIME_EXCEEDED response from each gateway along the path to a host to track the route that a set of packets follows. It attempts to trace the route an IP packet follows to an Internet host by launching User Datagram Protocol (UDP) probe packets with a small time to live, then listening for an ICMP "Time exceeded" reply from a gateway.

Examples

The following example illustrates a traceroute to google.com with socket level debugging enabled.

```
vyatta@vyatta#traceroute google.com debug-socket
traceroute to google.com (216.58.216.14), 30 hops max, 60 byte packets
1  gateway.attlocal.net (10.0.6.1)  0.422 ms  0.399 ms  0.498 ms
2  75-25-153-214.uvs.sntcca.sbcglobal.net (75.25.153.214)  16.520 ms  6.484 ms  6.460 ms
3  76-198-128-2.lightspeed.mtvwca.sbcglobal.net (76.198.128.2)  33.529 ms  36.814 ms  26.584 ms
4  71.145.0.192 (71.145.0.192)  26.546 ms  39.056 ms  38.523 ms
5  12.83.39.189 (12.83.39.189)  39.763 ms  30.819 ms  44.405 ms
6  12.122.136.181 (12.122.136.181)  44.407 ms  43.366 ms  43.334 ms
7  * * *
8  216.239.49.170 (216.239.49.170)  28.635 ms 216.239.49.168 (216.239.49.168)  28.293 ms
                                                    216.239.49.170 (216.239.49.170)  25.805 ms
9  209.85.246.253 (209.85.246.253)  32.914 ms  34.112 ms 209.85.246.20 (209.85.246.20)  30.330 ms
10  64.233.174.204 (64.233.174.204)  36.979 ms  36.492 ms  38.584 ms
11  64.233.175.151 (64.233.175.151)  37.497 ms  37.496 ms 64.233.174.189 (64.233.174.189)  37.503 ms
12  209.85.142.91 (209.85.142.91)  36.126 ms  36.735 ms  36.686 ms
13  lax02s21-in-f14.1e100.net (216.58.216.14)  34.280 ms  32.453 ms  31.764 ms
```

traceroute <host> first-ttl <value>

Displays the route that packets take to a network host.

Syntax

traceroute [**ipv4** | **ipv6**] *host* **first-ttl** *value* [**options**]

Parameters

ipv4

Explicitly force IPv4 traceouting. By default, the program will try to resolve the name given, and choose the appropriate protocol automatically. If resolving a host name returns both IPv4 and IPv6 addresses, **traceroute** will use IPv4.

ipv6

Explicitly force IPv6 traceouting. By default, the program will try to resolve the name given, and choose the appropriate protocol automatically. If resolving a host name returns both IPv4 and IPv6 addresses, **traceroute** will use IPv6.

host

A host that is the destination for the trace. The host is specified as a name (if DNS is being used on the network), as an IPv4 or IPv6 address, or as a MAC address (format h:h:h:h:h:h:h:h).

first-ttl *value*

Specifies the first time-to-live value. Defaults to 1.

options

The following entries are options. Multiple options can be included on the same command line.

as-path

Performs AS path lookups in routing registries and print results directly after the corresponding addresses.

bypass-routing

Bypasses the normal routing tables and send directly to a host on an attached network. If the host is not on a directly-attached network, an error is returned. This option can be used to ping a local host through an interface that has no route through it.

debug-socket

Enables socket level debugging.

gateway *address*

Routes the request through a specified gateway.

icmp-echo

Uses ICMP echo for the traceroute probe.

icmp-extensions

Shows ICMP extensions (rfc4884). The general form is *CLASS/TYPE:* followed by a hexadecimal dump.

interface *value*

Specifies the interface that the device must use for traceroute requests.

interval *value*

Specifies the time in seconds between traceroute requests from the device.

max-ttl *value*

Specifies the maximum number of hops for the probe.

no-fragment
Does not fragment the probe packets.

num-queries *number*
Specifies the number of probe packets per hop. The default is 3.

port *number*
For UDP tracing, specifies the destination port base traceroute will use (the destination port number will be incremented by each probe). For ICMP tracing, specifies the initial icmp sequence value (incremented by each probe too). For TCP specifies just the (constant) destination port to connect.

seq-queries *number*
Specifies the number of sequential probe packets.

source-addr *host*
Specifies an alternative source host by hostname, IPv4 address, or MAC address.

tcp-syn
Uses TCP SYN for the probes.

tos *value*
Marks the packets with the specified Type of Service (TOS) value.

version
Displays the timestamp during ping output.

wait-time *value*
Specifies the time (seconds) to wait for a response from the probe. Default is 5 seconds.

Modes

Operational mode

Usage Guidelines

Use this command to perform a "traceroute" operation for a network host. This operation uses the IP protocol time-to-live (TTL) field and attempts to elicit an Internet Control Message Protocol (ICMP) TIME_EXCEEDED response from each gateway along the path to a host to track the route that a set of packets follows. It attempts to trace the route an IP packet follows to an Internet host by launching User Datagram Protocol (UDP) probe packets with a small time to live, then listening for an ICMP "Time exceeded" reply from a gateway.

Examples

The following example illustrates a traceroute to google.com with the first time-to-live set to 3.

```
vyatta@vyatta#traceroute google.com first-ttl 3
traceroute to google.com (74.125.224.7), 30 hops max, 60 byte packets
3  76-198-128-2.lightspeed.mtvwca.sbcglobal.net (76.198.128.2)  36.929 ms  38.025 ms  38.016 ms
4  71.145.0.192 (71.145.0.192)  37.998 ms  41.153 ms  40.586 ms
5  12.83.39.189 (12.83.39.189)  43.315 ms 12.83.39.185 (12.83.39.185)  39.053 ms
                                                    12.83.39.189 (12.83.39.189)  43.311 ms
6  12.122.136.181 (12.122.136.181)  69.120 ms  69.564 ms  69.086 ms
7  * * *
8  216.239.49.168 (216.239.49.168)  49.860 ms  53.125 ms  39.522 ms
9  72.14.232.33 (72.14.232.33)  35.172 ms  34.588 ms  35.129 ms
10  nuq04s18-in-f7.1e100.net (74.125.224.7)  37.639 ms  36.897 ms  32.858 ms
```

traceroute <host> gateway <address>

Displays the route that packets take to a network host.

Syntax

traceroute [**ipv4** | **ipv6**] *host* **gateway** *address* [**options**]

Parameters

ipv4

Explicitly force IPv4 traceouting. By default, the program will try to resolve the name given, and choose the appropriate protocol automatically. If resolving a host name returns both IPv4 and IPv6 addresses, **traceroute** will use IPv4.

ipv6

Explicitly force IPv6 traceouting. By default, the program will try to resolve the name given, and choose the appropriate protocol automatically. If resolving a host name returns both IPv4 and IPv6 addresses, **traceroute** will use IPv6.

host

A host that is the destination for the trace. The host is specified as a name (if DNS is being used on the network), as an IPv4 or IPv6 address, or as a MAC address (format h:h:h:h:h:h:h:h).

gateway *address*

Routes the request through a specified gateway.

options

The following entries are options. Multiple options can be included on the same command line.

as-path

Performs AS path lookups in routing registries and print results directly after the corresponding addresses.

bypass-routing

Bypasses the normal routing tables and send directly to a host on an attached network. If the host is not on a directly-attached network, an error is returned. This option can be used to ping a local host through an interface that has no route through it.

debug-socket

Enables socket level debugging.

first-ttl *value*

Specifies the first time-to-live value. Defaults to 1.

icmp-echo

Uses ICMP echo for the traceroute probe.

icmp-extensions

Shows ICMP extensions (rfc4884). The general form is *CLASS/TYPE:* followed by a hexadecimal dump.

interface *value*

Specifies the interface that the device must use for traceroute requests.

interval *value*

Specifies the time in seconds between traceroute requests from the device.

max-ttl *value*

Specifies the maximum number of hops for the probe.

no-fragment
Does not fragment the probe packets.

num-queries *number*
Specifies the number of probe packets per hop. The default is 3.

port *number*
For UDP tracing, specifies the destination port base traceroute will use (the destination port number will be incremented by each probe). For ICMP tracing, specifies the initial icmp sequence value (incremented by each probe too). For TCP specifies just the (constant) destination port to connect.

seq-queries *number*
Specifies the number of sequential probe packets.

source-addr *host*
Specifies an alternative source host by hostname, IPv4 address, or MAC address.

tcp-syn
Uses TCP SYN for the probes.

tos *value*
Marks the packets with the specified Type of Service (TOS) value.

version
Displays the timestamp during ping output.

wait-time *value*
Specifies the time (seconds) to wait for a response from the probe. Default is 5 seconds.

Modes

Operational mode

Usage Guidelines

Use this command to perform a "traceroute" operation for a network host. This operation uses the IP protocol time-to-live (TTL) field and attempts to elicit an Internet Control Message Protocol (ICMP) TIME_EXCEEDED response from each gateway along the path to a host to track the route that a set of packets follows. It attempts to trace the route an IP packet follows to an Internet host by launching User Datagram Protocol (UDP) probe packets with a small time to live, then listening for an ICMP "Time exceeded" reply from a gateway.

Examples

The following example illustrates a traceroute to google.com with the gateway set.

```
vyatta@vyatta#traceroute google.com gateway
```

traceroute <host> icmp-echo

Displays the route that packets take to a network host.

Syntax

traceroute [**ipv4** | **ipv6**] *host* **icmp-echo** [**options**]

Parameters

ipv4

Explicitly force IPv4 traceouting. By default, the program will try to resolve the name given, and choose the appropriate protocol automatically. If resolving a host name returns both IPv4 and IPv6 addresses, **traceroute** will use IPv4.

ipv6

Explicitly force IPv6 traceouting. By default, the program will try to resolve the name given, and choose the appropriate protocol automatically. If resolving a host name returns both IPv4 and IPv6 addresses, **traceroute** will use IPv6.

host

A host that is the destination for the trace. The host is specified as a name (if DNS is being used on the network), as an IPv4 or IPv6 address, or as a MAC address (format h:h:h:h:h:h:h:h).

icmp-echo

Uses ICMP echo for the traceroute probe.

options

The following entries are options. Multiple options can be included on the same command line.

as-path

Performs AS path lookups in routing registries and print results directly after the corresponding addresses.

bypass-routing

Bypasses the normal routing tables and send directly to a host on an attached network. If the host is not on a directly-attached network, an error is returned. This option can be used to ping a local host through an interface that has no route through it.

debug-socket

Enables socket level debugging.

first-ttl *value*

Specifies the first time-to-live value. Defaults to 1.

gateway *address*

Routes the request through a specified gateway.

icmp-extensions

Shows ICMP extensions (rfc4884). The general form is *CLASS/TYPE:* followed by a hexadecimal dump.

interface *value*

Specifies the interface that the device must use for traceroute requests.

interval *value*

Specifies the time in seconds between traceroute requests from the device.

max-ttl *value*

Specifies the maximum number of hops for the probe.

no-fragment
Does not fragment the probe packets.

num-queries *number*
Specifies the number of probe packets per hop. The default is 3.

port *number*
For UDP tracing, specifies the destination port base traceroute will use (the destination port number will be incremented by each probe). For ICMP tracing, specifies the initial icmp sequence value (incremented by each probe too). For TCP specifies just the (constant) destination port to connect.

seq-queries *number*
Specifies the number of sequential probe packets.

source-addr *host*
Specifies an alternative source host by hostname, IPv4 address, or MAC address.

tcp-syn
Uses TCP SYN for the probes.

tos *value*
Marks the packets with the specified Type of Service (TOS) value.

version
Displays the timestamp during ping output.

wait-time *value*
Specifies the time (seconds) to wait for a response from the probe. Default is 5 seconds.

Modes

Operational mode

Usage Guidelines

Use this command to perform a "traceroute" operation for a network host. This operation uses the IP protocol time-to-live (TTL) field and attempts to elicit an Internet Control Message Protocol (ICMP) TIME_EXCEEDED response from each gateway along the path to a host to track the route that a set of packets follows. It attempts to trace the route an IP packet follows to an Internet host by launching User Datagram Protocol (UDP) probe packets with a small time to live, then listening for an ICMP "Time exceeded" reply from a gateway.

Examples

The following example illustrates a traceroute to google.com using ICMP echo for the traceroute probe.

```
vyatta@vyatta#traceroute google.com icmp-echo
traceroute to google.com (74.125.224.9), 30 hops max, 60 byte packets
 1  gateway.attlocal.net (10.0.6.1)  0.512 ms  0.510 ms  0.507 ms
 2  75-25-153-214.uvs.sntcca.sbcglobal.net (75.25.153.214)  3.175 ms  3.194 ms  3.194 ms
 3  76-198-128-2.lightspeed.mtvwca.sbcglobal.net (76.198.128.2)  24.351 ms  25.192 ms  25.201 ms
 4  71.145.0.192 (71.145.0.192)  26.644 ms  27.905 ms  27.910 ms
 5  12.83.39.185 (12.83.39.185)  28.728 ms  32.328 ms  32.335 ms
 6  12.122.136.181 (12.122.136.181)  68.186 ms  67.898 ms  67.853 ms
 7  * * *
 8  216.239.49.168 (216.239.49.168)  25.336 ms  26.631 ms  27.460 ms
 9  72.14.232.33 (72.14.232.33)  26.151 ms  26.620 ms  27.186 ms
10  nuq04s18-in-f9.1e100.net (74.125.224.9)  27.531 ms  24.783 ms  24.752 ms
```

traceroute <host> icmp-extensions

Displays the route that packets take to a network host.

Syntax

traceroute [**ipv4** | **ipv6**] *host* **icmp-extensions** [**options**]

Parameters

ipv4

Explicitly force IPv4 traceouting. By default, the program will try to resolve the name given, and choose the appropriate protocol automatically. If resolving a host name returns both IPv4 and IPv6 addresses, **traceroute** will use IPv4.

ipv6

Explicitly force IPv6 traceouting. By default, the program will try to resolve the name given, and choose the appropriate protocol automatically. If resolving a host name returns both IPv4 and IPv6 addresses, **traceroute** will use IPv6.

host

A host that is the destination for the trace. The host is specified as a name (if DNS is being used on the network), as an IPv4 or IPv6 address, or as a MAC address (format h:h:h:h:h:h:h:h).

icmp-extensions

Shows ICMP extensions (rfc4884). The general form is *CLASS/TYPE:* followed by a hexadecimal dump.

options

The following entries are options. Multiple options can be included on the same command line.

as-path

Performs AS path lookups in routing registries and print results directly after the corresponding addresses.

bypass-routing

Bypasses the normal routing tables and send directly to a host on an attached network. If the host is not on a directly-attached network, an error is returned. This option can be used to ping a local host through an interface that has no route through it.

debug-socket

Enables socket level debugging.

first-ttl *value*

Specifies the first time-to-live value. Defaults to 1.

gateway *address*

Routes the request through a specified gateway.

icmp-echo

Uses ICMP echo for the traceroute probe.

interface *value*

Specifies the interface that the device must use for traceroute requests.

interval *value*

Specifies the time in seconds between traceroute requests from the device.

max-ttl *value*

Specifies the maximum number of hops for the probe.

no-fragment
Does not fragment the probe packets.

num-queries *number*
Specifies the number of probe packets per hop. The default is 3.

port *number*
For UDP tracing, specifies the destination port base traceroute will use (the destination port number will be incremented by each probe). For ICMP tracing, specifies the initial icmp sequence value (incremented by each probe too). For TCP specifies just the (constant) destination port to connect.

seq-queries *number*
Specifies the number of sequential probe packets.

source-addr *host*
Specifies an alternative source host by hostname, IPv4 address, or MAC address.

tcp-syn
Uses TCP SYN for the probes.

tos *value*
Marks the packets with the specified Type of Service (TOS) value.

version
Displays the timestamp during ping output.

wait-time *value*
Specifies the time (seconds) to wait for a response from the probe. Default is 5 seconds.

Modes

Operational mode

Usage Guidelines

Use this command to perform a "traceroute" operation for a network host. This operation uses the IP protocol time-to-live (TTL) field and attempts to elicit an Internet Control Message Protocol (ICMP) TIME_EXCEEDED response from each gateway along the path to a host to track the route that a set of packets follows. It attempts to trace the route an IP packet follows to an Internet host by launching User Datagram Protocol (UDP) probe packets with a small time to live, then listening for an ICMP "Time exceeded" reply from a gateway.

Examples

The following example illustrates a traceroute to google.com showing ICMP extensions.

```
vyatta@vyatta#traceroute google.com icmp-extensions
traceroute to google.com (74.125.224.1), 30 hops max, 60 byte packets
1  gateway.attlocal.net (10.0.6.1)  0.482 ms  0.458 ms  0.452 ms
2  75-25-153-214.uvs.sntcca.sbcglobal.net (75.25.153.214)  13.714 ms  13.703 ms  13.673 ms
3  76-198-128-2.lightspeed.mtvwca.sbcglobal.net (76.198.128.2)  35.518 ms  34.284 ms  35.492 ms
4  71.145.0.192 (71.145.0.192)  34.201 ms  35.828 ms  35.385 ms
5  12.83.39.189 (12.83.39.189)  39.513 ms 12.83.39.185 (12.83.39.185)  39.510 ms 12.83.39.189
(12.83.39.189)  44.236 ms
6  12.122.136.181 (12.122.136.181)  47.009 ms  46.105 ms  46.052 ms
7  * * *
8  216.239.49.168 (216.239.49.168)  31.725 ms  28.023 ms  28.467 ms
9  72.14.232.33 (72.14.232.33)  32.480 ms  31.081 ms  31.791 ms
10  nuq04s18-in-f1.1e100.net (74.125.224.1)  32.791 ms  26.412 ms  25.713 ms
```

traceroute <host> interface <value>

Displays the route that packets take to a network host.

Syntax

traceroute [**ipv4** | **ipv6**] *host* **interface** *value* [**options**]

Parameters

ipv4

Explicitly force IPv4 traceouting. By default, the program will try to resolve the name given, and choose the appropriate protocol automatically. If resolving a host name returns both IPv4 and IPv6 addresses, **traceroute** will use IPv4.

ipv6

Explicitly force IPv6 traceouting. By default, the program will try to resolve the name given, and choose the appropriate protocol automatically. If resolving a host name returns both IPv4 and IPv6 addresses, **traceroute** will use IPv6.

host

A host that is the destination for the trace. The host is specified as a name (if DNS is being used on the network), as an IPv4 or IPv6 address, or as a MAC address (format h:h:h:h:h:h:h:h).

interface *value*

Specifies the interface that the device must use for traceroute requests.

options

The following entries are options. Multiple options can be included on the same command line.

as-path

Performs AS path lookups in routing registries and print results directly after the corresponding addresses.

bypass-routing

Bypasses the normal routing tables and send directly to a host on an attached network. If the host is not on a directly-attached network, an error is returned. This option can be used to ping a local host through an interface that has no route through it.

debug-socket

Enables socket level debugging.

first-ttl *value*

Specifies the first time-to-live value. Defaults to 1.

gateway *address*

Routes the request through a specified gateway.

icmp-echo

Uses ICMP echo for the traceroute probe.

icmp-extensions

Shows ICMP extensions (rfc4884). The general form is *CLASS/TYPE:* followed by a hexadecimal dump.

interval *value*

Specifies the time in seconds between traceroute requests from the device.

max-ttl *value*

Specifies the maximum number of hops for the probe.

no-fragment
Does not fragment the probe packets.

num-queries *number*
Specifies the number of probe packets per hop. The default is 3.

port *number*
For UDP tracing, specifies the destination port base traceroute will use (the destination port number will be incremented by each probe). For ICMP tracing, specifies the initial icmp sequence value (incremented by each probe too). For TCP specifies just the (constant) destination port to connect.

seq-queries *number*
Specifies the number of sequential probe packets.

source-addr *host*
Specifies an alternative source host by hostname, IPv4 address, or MAC address.

tcp-syn
Uses TCP SYN for the probes.

tos *value*
Marks the packets with the specified Type of Service (TOS) value.

version
Displays the timestamp during ping output.

wait-time *value*
Specifies the time (seconds) to wait for a response from the probe. Default is 5 seconds.

Modes

Operational mode

Usage Guidelines

Use this command to perform a "traceroute" operation for a network host. This operation uses the IP protocol time-to-live (TTL) field and attempts to elicit an Internet Control Message Protocol (ICMP) TIME_EXCEEDED response from each gateway along the path to a host to track the route that a set of packets follows. It attempts to trace the route an IP packet follows to an Internet host by launching User Datagram Protocol (UDP) probe packets with a small time to live, then listening for an ICMP "Time exceeded" reply from a gateway.

Examples

The following example illustrates a traceroute to google.com through interface dp0p1s2.

```
vyatta@vyatta#traceroute google.com interface dp0p1s2
```

traceroute <host> max-ttl <value>

Displays the route that packets take to a network host.

Syntax

traceroute [**ipv4** | **ipv6**] *host* **max-ttl** *value* [**options**]

Parameters

ipv4

Explicitly force IPv4 traceouting. By default, the program will try to resolve the name given, and choose the appropriate protocol automatically. If resolving a host name returns both IPv4 and IPv6 addresses, **traceroute** will use IPv4.

ipv6

Explicitly force IPv6 traceouting. By default, the program will try to resolve the name given, and choose the appropriate protocol automatically. If resolving a host name returns both IPv4 and IPv6 addresses, **traceroute** will use IPv6.

host

A host that is the destination for the trace. The host is specified as a name (if DNS is being used on the network), as an IPv4 or IPv6 address, or as a MAC address (format h:h:h:h:h:h:h:h).

max-ttl *value*

Specifies the maximum number of hops for the probe.

options

The following entries are options. Multiple options can be included on the same command line.

as-path

Performs AS path lookups in routing registries and print results directly after the corresponding addresses.

bypass-routing

Bypasses the normal routing tables and send directly to a host on an attached network. If the host is not on a directly-attached network, an error is returned. This option can be used to ping a local host through an interface that has no route through it.

debug-socket

Enables socket level debugging.

first-ttl *value*

Specifies the first time-to-live value. Defaults to 1.

gateway *address*

Routes the request through a specified gateway.

icmp-echo

Uses ICMP echo for the traceroute probe.

icmp-extensions

Shows ICMP extensions (rfc4884). The general form is *CLASS/TYPE:* followed by a hexadecimal dump.

interface *value*

Specifies the interface that the device must use for traceroute requests.

interval *value*

Specifies the time in seconds between traceroute requests from the device.

no-fragment
Does not fragment the probe packets.

num-queries *number*
Specifies the number of probe packets per hop. The default is 3.

port *number*
For UDP tracing, specifies the destination port base traceroute will use (the destination port number will be incremented by each probe). For ICMP tracing, specifies the initial icmp sequence value (incremented by each probe too). For TCP specifies just the (constant) destination port to connect.

seq-queries *number*
Specifies the number of sequential probe packets.

source-addr *host*
Specifies an alternative source host by hostname, IPv4 address, or MAC address.

tcp-syn
Uses TCP SYN for the probes.

tos *value*
Marks the packets with the specified Type of Service (TOS) value.

version
Displays the timestamp during ping output.

wait-time *value*
Specifies the time (seconds) to wait for a response from the probe. Default is 5 seconds.

Modes

Operational mode

Usage Guidelines

Use this command to perform a "traceroute" operation for a network host. This operation uses the IP protocol time-to-live (TTL) field and attempts to elicit an Internet Control Message Protocol (ICMP) TIME_EXCEEDED response from each gateway along the path to a host to track the route that a set of packets follows. It attempts to trace the route an IP packet follows to an Internet host by launching User Datagram Protocol (UDP) probe packets with a small time to live, then listening for an ICMP "Time exceeded" reply from a gateway.

Examples

The following example illustrates a traceroute to google.com with a maximum of 4 hops.

```
vyatta@vyatta#traceroute google.com max-ttl 4
traceroute to google.com (74.125.224.8), 4 hops max, 60 byte packets
1  gateway.attlocal.net (10.0.6.1)  0.362 ms  0.333 ms  0.340 ms
2  75-25-153-214.uvs.sntcca.sbcglobal.net (75.25.153.214)  9.559 ms  9.553 ms  9.529 ms
3  76-198-128-2.lightspeed.mtvwca.sbcglobal.net (76.198.128.2)  30.061 ms  31.737 ms  31.773 ms
4  71.145.0.192 (71.145.0.192)  31.776 ms  31.763 ms  31.758 ms
```

traceroute <host> interval <value>

Displays the route that packets take to a network host.

Syntax

traceroute [**ipv4** | **ipv6**] *host* **interval** *value* [**options**]

Parameters

ipv4

Explicitly force IPv4 traceouting. By default, the program will try to resolve the name given, and choose the appropriate protocol automatically. If resolving a host name returns both IPv4 and IPv6 addresses, **traceroute** will use IPv4.

ipv6

Explicitly force IPv6 traceouting. By default, the program will try to resolve the name given, and choose the appropriate protocol automatically. If resolving a host name returns both IPv4 and IPv6 addresses, **traceroute** will use IPv6.

host

A host that is the destination for the trace. The host is specified as a name (if DNS is being used on the network), as an IPv4 or IPv6 address, or as a MAC address (format h:h:h:h:h:h:h:h).

interval *value*

Specifies the time in seconds between traceroute requests from the device.

options

The following entries are options. Multiple options can be included on the same command line.

as-path

Performs AS path lookups in routing registries and print results directly after the corresponding addresses.

bypass-routing

Bypasses the normal routing tables and send directly to a host on an attached network. If the host is not on a directly-attached network, an error is returned. This option can be used to ping a local host through an interface that has no route through it.

debug-socket

Enables socket level debugging.

first-ttl *value*

Specifies the first time-to-live value. Defaults to 1.

gateway *address*

Routes the request through a specified gateway.

icmp-echo

Uses ICMP echo for the traceroute probe.

icmp-extensions

Shows ICMP extensions (rfc4884). The general form is *CLASS/TYPE:* followed by a hexadecimal dump.

interface *value*

Specifies the interface that the device must use for traceroute requests.

max-ttl *value*

Specifies the maximum number of hops for the probe.

no-fragment
Does not fragment the probe packets.

num-queries *number*
Specifies the number of probe packets per hop. The default is 3.

port *number*
For UDP tracing, specifies the destination port base traceroute will use (the destination port number will be incremented by each probe). For ICMP tracing, specifies the initial icmp sequence value (incremented by each probe too). For TCP specifies just the (constant) destination port to connect.

seq-queries *number*
Specifies the number of sequential probe packets.

source-addr *host*
Specifies an alternative source host by hostname, IPv4 address, or MAC address.

tcp-syn
Uses TCP SYN for the probes.

tos *value*
Marks the packets with the specified Type of Service (TOS) value.

version
Displays the timestamp during ping output.

wait-time *value*
Specifies the time (seconds) to wait for a response from the probe. Default is 5 seconds.

Modes

Operational mode

Usage Guidelines

Use this command to perform a "traceroute" operation for a network host. This operation uses the IP protocol time-to-live (TTL) field and attempts to elicit an Internet Control Message Protocol (ICMP) TIME_EXCEEDED response from each gateway along the path to a host to track the route that a set of packets follows. It attempts to trace the route an IP packet follows to an Internet host by launching User Datagram Protocol (UDP) probe packets with a small time to live, then listening for an ICMP "Time exceeded" reply from a gateway.

Examples

The following example illustrates a traceroute to google.com with 3 seconds between traceroute requests.

```
vyatta@vyatta#traceroute google.com interval 3
```

traceroute <host> max-ttl <value>

Displays the route that packets take to a network host.

Syntax

traceroute [**ipv4** | **ipv6**] *host* **max-ttl** *value* [**options**]

Parameters

ipv4

Explicitly force IPv4 traceouting. By default, the program will try to resolve the name given, and choose the appropriate protocol automatically. If resolving a host name returns both IPv4 and IPv6 addresses, **traceroute** will use IPv4.

ipv6

Explicitly force IPv6 traceouting. By default, the program will try to resolve the name given, and choose the appropriate protocol automatically. If resolving a host name returns both IPv4 and IPv6 addresses, **traceroute** will use IPv6.

host

A host that is the destination for the trace. The host is specified as a name (if DNS is being used on the network), as an IPv4 or IPv6 address, or as a MAC address (format h:h:h:h:h:h:h:h).

max-ttl *value*

Specifies the maximum number of hops for the probe.

options

The following entries are options. Multiple options can be included on the same command line.

as-path

Performs AS path lookups in routing registries and print results directly after the corresponding addresses.

bypass-routing

Bypasses the normal routing tables and send directly to a host on an attached network. If the host is not on a directly-attached network, an error is returned. This option can be used to ping a local host through an interface that has no route through it.

debug-socket

Enables socket level debugging.

first-ttl *value*

Specifies the first time-to-live value. Defaults to 1.

gateway *address*

Routes the request through a specified gateway.

icmp-echo

Uses ICMP echo for the traceroute probe.

icmp-extensions

Shows ICMP extensions (rfc4884). The general form is *CLASS/TYPE:* followed by a hexadecimal dump.

interface *value*

Specifies the interface that the device must use for traceroute requests.

interval *value*

Specifies the time in seconds between traceroute requests from the device.

no-fragment
Does not fragment the probe packets.

num-queries *number*
Specifies the number of probe packets per hop. The default is 3.

port *number*
For UDP tracing, specifies the destination port base traceroute will use (the destination port number will be incremented by each probe). For ICMP tracing, specifies the initial icmp sequence value (incremented by each probe too). For TCP specifies just the (constant) destination port to connect.

seq-queries *number*
Specifies the number of sequential probe packets.

source-addr *host*
Specifies an alternative source host by hostname, IPv4 address, or MAC address.

tcp-syn
Uses TCP SYN for the probes.

tos *value*
Marks the packets with the specified Type of Service (TOS) value.

version
Displays the timestamp during ping output.

wait-time *value*
Specifies the time (seconds) to wait for a response from the probe. Default is 5 seconds.

Modes

Operational mode

Usage Guidelines

Use this command to perform a "traceroute" operation for a network host. This operation uses the IP protocol time-to-live (TTL) field and attempts to elicit an Internet Control Message Protocol (ICMP) TIME_EXCEEDED response from each gateway along the path to a host to track the route that a set of packets follows. It attempts to trace the route an IP packet follows to an Internet host by launching User Datagram Protocol (UDP) probe packets with a small time to live, then listening for an ICMP "Time exceeded" reply from a gateway.

Examples

The following example illustrates a traceroute to google.com with a maximum of 4 hops.

```
vyatta@vyatta#traceroute google.com max-ttl 4
traceroute to google.com (74.125.224.8), 4 hops max, 60 byte packets
1  gateway.attlocal.net (10.0.6.1)  0.362 ms  0.333 ms  0.340 ms
2  75-25-153-214.uvs.sntcca.sbcglobal.net (75.25.153.214)  9.559 ms  9.553 ms  9.529 ms
3  76-198-128-2.lightspeed.mtvwca.sbcglobal.net (76.198.128.2)  30.061 ms  31.737 ms  31.773 ms
4  71.145.0.192 (71.145.0.192)  31.776 ms  31.763 ms  31.758 ms
```

traceroute <host> no-fragment

Displays the route that packets take to a network host.

Syntax

traceroute [**ipv4** | **ipv6**] *host* **no-fragment** [**options**]

Parameters

ipv4

Explicitly force IPv4 traceouting. By default, the program will try to resolve the name given, and choose the appropriate protocol automatically. If resolving a host name returns both IPv4 and IPv6 addresses, **traceroute** will use IPv4.

ipv6

Explicitly force IPv6 traceouting. By default, the program will try to resolve the name given, and choose the appropriate protocol automatically. If resolving a host name returns both IPv4 and IPv6 addresses, **traceroute** will use IPv6.

host

A host that is the destination for the trace. The host is specified as a name (if DNS is being used on the network), as an IPv4 or IPv6 address, or as a MAC address (format h:h:h:h:h:h:h:h).

no-fragment

Does not fragment the probe packets.

options

The following entries are options. Multiple options can be included on the same command line.

as-path

Performs AS path lookups in routing registries and print results directly after the corresponding addresses.

bypass-routing

Bypasses the normal routing tables and send directly to a host on an attached network. If the host is not on a directly-attached network, an error is returned. This option can be used to ping a local host through an interface that has no route through it.

debug-socket

Enables socket level debugging.

first-ttl *value*

Specifies the first time-to-live value. Defaults to 1.

gateway *address*

Routes the request through a specified gateway.

icmp-echo

Uses ICMP echo for the traceroute probe.

icmp-extensions

Shows ICMP extensions (rfc4884). The general form is *CLASS/TYPE:* followed by a hexadecimal dump.

interface *value*

Specifies the interface that the device must use for traceroute requests.

interval *value*

Specifies the time in seconds between traceroute requests from the device.

max-ttl *value*
Specifies the maximum number of hops for the probe.

num-queries *number*
Specifies the number of probe packets per hop. The default is 3.

port *number*
For UDP tracing, specifies the destination port base traceroute will use (the destination port number will be incremented by each probe). For ICMP tracing, specifies the initial icmp sequence value (incremented by each probe too). For TCP specifies just the (constant) destination port to connect.

seq-queries *number*
Specifies the number of sequential probe packets.

source-addr *host*
Specifies an alternative source host by hostname, IPv4 address, or MAC address.

tcp-syn
Uses TCP SYN for the probes.

tos *value*
Marks the packets with the specified Type of Service (TOS) value.

version
Displays the timestamp during ping output.

wait-time *value*
Specifies the time (seconds) to wait for a response from the probe. Default is 5 seconds.

Modes

Operational mode

Usage Guidelines

Use this command to perform a "traceroute" operation for a network host. This operation uses the IP protocol time-to-live (TTL) field and attempts to elicit an Internet Control Message Protocol (ICMP) TIME_EXCEEDED response from each gateway along the path to a host to track the route that a set of packets follows. It attempts to trace the route an IP packet follows to an Internet host by launching User Datagram Protocol (UDP) probe packets with a small time to live, then listening for an ICMP "Time exceeded" reply from a gateway.

Examples

The following example illustrates a traceroute to google.com with no fragmented probe packets.

```
vyatta@vyatta#traceroute google.com no-fragment
traceroute to google.com (74.125.224.0), 30 hops max, 60 byte packets
1  pipsqueak.attlocal.net (10.0.6.1)  0.394 ms  0.564 ms  0.356 ms
2  75-25-153-214.uvs.sntcca.sbcglobal.net (75.25.153.214)  9.799 ms  9.771 ms  9.748 ms
3  76-198-128-2.lightspeed.mtvwca.sbcglobal.net (76.198.128.2)  31.504 ms  30.107 ms  36.088 ms
4  71.145.0.192 (71.145.0.192)  36.139 ms  31.473 ms  31.441 ms
5  12.83.39.189 (12.83.39.189)  38.391 ms  37.441 ms 12.83.39.185 (12.83.39.185)  36.589 ms
6  12.122.136.181 (12.122.136.181)  83.786 ms  82.908 ms  82.880 ms
7  * * *
8  216.239.49.168 (216.239.49.168)  27.049 ms  36.183 ms  33.859 ms
9  72.14.232.33 (72.14.232.33)  33.652 ms  33.064 ms  33.645 ms
10  nuq04s18-in-f0.1e100.net (74.125.224.0)  36.182 ms  36.165 ms  36.142 ms
```

traceroute <host> num-queries <num>

Displays the route that packets take to a network host.

Syntax

traceroute [**ipv4** | **ipv6**] *host* **num-queries** *number* [**options**]

Parameters

ipv4

Explicitly force IPv4 traceouting. By default, the program will try to resolve the name given, and choose the appropriate protocol automatically. If resolving a host name returns both IPv4 and IPv6 addresses, **traceroute** will use IPv4.

ipv6

Explicitly force IPv6 traceouting. By default, the program will try to resolve the name given, and choose the appropriate protocol automatically. If resolving a host name returns both IPv4 and IPv6 addresses, **traceroute** will use IPv6.

host

A host that is the destination for the trace. The host is specified as a name (if DNS is being used on the network), as an IPv4 or IPv6 address, or as a MAC address (format h:h:h:h:h:h:h:h).

num-queries *number*

Specifies the number of probe packets per hop. The default is 3.

options

The following entries are options. Multiple options can be included on the same command line.

as-path

Performs AS path lookups in routing registries and print results directly after the corresponding addresses.

bypass-routing

Bypasses the normal routing tables and send directly to a host on an attached network. If the host is not on a directly-attached network, an error is returned. This option can be used to ping a local host through an interface that has no route through it.

debug-socket

Enables socket level debugging.

first-ttl *value*

Specifies the first time-to-live value. Defaults to 1.

gateway *address*

Routes the request through a specified gateway.

icmp-echo

Uses ICMP echo for the traceroute probe.

icmp-extensions

Shows ICMP extensions (rfc4884). The general form is *CLASS/TYPE:* followed by a hexadecimal dump.

interface *value*

Specifies the interface that the device must use for traceroute requests.

interval *value*

Specifies the time in seconds between traceroute requests from the device.

max-ttl *value*
Specifies the maximum number of hops for the probe.

no-fragment
Does not fragment the probe packets.

port *number*
For UDP tracing, specifies the destination port base traceroute will use (the destination port number will be incremented by each probe). For ICMP tracing, specifies the initial icmp sequence value (incremented by each probe too). For TCP specifies just the (constant) destination port to connect.

seq-queries *number*
Specifies the number of sequential probe packets.

source-addr *host*
Specifies an alternative source host by hostname, IPv4 address, or MAC address.

tcp-syn
Uses TCP SYN for the probes.

tos *value*
Marks the packets with the specified Type of Service (TOS) value.

version
Displays the timestamp during ping output.

wait-time *value*
Specifies the time (seconds) to wait for a response from the probe. Default is 5 seconds.

Modes

Operational mode

Usage Guidelines

Use this command to perform a "traceroute" operation for a network host. This operation uses the IP protocol time-to-live (TTL) field and attempts to elicit an Internet Control Message Protocol (ICMP) TIME_EXCEEDED response from each gateway along the path to a host to track the route that a set of packets follows. It attempts to trace the route an IP packet follows to an Internet host by launching User Datagram Protocol (UDP) probe packets with a small time to live, then listening for an ICMP "Time exceeded" reply from a gateway.

Examples

The following example illustrates a traceroute to google.com with 4 probes per hop.

```
vyatta@vyatta#traceroute google.com num-queries 2
traceroute to google.com (74.125.224.9), 30 hops max, 60 byte packets
1  gateway.attlocal.net (10.0.6.1)  0.411 ms  0.387 ms
2  75-25-153-214.uvs.sntcca.sbcglobal.net (75.25.153.214)  14.167 ms  14.145 ms
3  76-198-128-2.lightspeed.mtvwca.sbcglobal.net (76.198.128.2)  36.338 ms  35.080 ms
4  71.145.0.192 (71.145.0.192)  36.862 ms  36.338 ms
5  12.83.39.189 (12.83.39.189)  49.387 ms 12.83.39.185 (12.83.39.185)  49.374 ms
6  12.122.136.181 (12.122.136.181)  41.428 ms  41.419 ms
7  * *
8  216.239.49.168 (216.239.49.168)  41.356 ms  49.198 ms
9  72.14.232.33 (72.14.232.33)  39.738 ms  39.720 ms
10  nuq04s18-in-f9.1e100.net (74.125.224.9)  34.504 ms  34.474 ms
```

traceroute <host> port <number>

Displays the route that packets take to a network host.

Syntax

traceroute [**ipv4** | **ipv6**] *host* **port** *number* [**options**]

Parameters

ipv4

Explicitly force IPv4 traceouting. By default, the program will try to resolve the name given, and choose the appropriate protocol automatically. If resolving a host name returns both IPv4 and IPv6 addresses, **traceroute** will use IPv4.

ipv6

Explicitly force IPv6 traceouting. By default, the program will try to resolve the name given, and choose the appropriate protocol automatically. If resolving a host name returns both IPv4 and IPv6 addresses, **traceroute** will use IPv6.

host

A host that is the destination for the trace. The host is specified as a name (if DNS is being used on the network), as an IPv4 or IPv6 address, or as a MAC address (format h:h:h:h:h:h:h:h).

port *number*

For UDP tracing, specifies the destination port base traceroute will use (the destination port number will be incremented by each probe). For ICMP tracing, specifies the initial icmp sequence value (incremented by each probe too). For TCP specifies just the (constant) destination port to connect.

options

The following entries are options. Multiple options can be included on the same command line.

as-path

Performs AS path lookups in routing registries and print results directly after the corresponding addresses.

bypass-routing

Bypasses the normal routing tables and send directly to a host on an attached network. If the host is not on a directly-attached network, an error is returned. This option can be used to ping a local host through an interface that has no route through it.

debug-socket

Enables socket level debugging.

first-ttl *value*

Specifies the first time-to-live value. Defaults to 1.

gateway *address*

Routes the request through a specified gateway.

icmp-echo

Uses ICMP echo for the traceroute probe.

icmp-extensions

Shows ICMP extensions (rfc4884). The general form is *CLASS/TYPE:* followed by a hexadecimal dump.

interface *value*

Specifies the interface that the device must use for traceroute requests.

interval *value*
Specifies the time in seconds between traceroute requests from the device.

max-ttl *value*
Specifies the maximum number of hops for the probe.

no-fragment
Does not fragment the probe packets.

num-queries *number*
Specifies the number of probe packets per hop. The default is 3.

seq-queries *number*
Specifies the number of sequential probe packets.

source-addr *host*
Specifies an alternative source host by hostname, IPv4 address, or MAC address.

tcp-syn
Uses TCP SYN for the probes.

tos *value*
Marks the packets with the specified Type of Service (TOS) value.

version
Displays the timestamp during ping output.

wait-time *value*
Specifies the time (seconds) to wait for a response from the probe. Default is 5 seconds.

Modes

Operational mode

Usage Guidelines

Use this command to perform a "traceroute" operation for a network host. This operation uses the IP protocol time-to-live (TTL) field and attempts to elicit an Internet Control Message Protocol (ICMP) TIME_EXCEEDED response from each gateway along the path to a host to track the route that a set of packets follows. It attempts to trace the route an IP packet follows to an Internet host by launching User Datagram Protocol (UDP) probe packets with a small time to live, then listening for an ICMP "Time exceeded" reply from a gateway.

Examples

The following example illustrates a traceroute to google.com through port 80.

```
vyatta@vyatta#traceroute google.com port 80
traceroute to google.com (74.125.224.1), 30 hops max, 60 byte packets
1  gateway.attlocal.net (10.0.6.1)  0.383 ms  0.337 ms  0.327 ms
2  75-25-153-214.uvs.sntcca.sbcglobal.net (75.25.153.214)  1.689 ms  1.582 ms  1.461 ms
3  76-198-128-2.lightspeed.mtvwca.sbcglobal.net (76.198.128.2)  22.674 ms  21.656 ms  21.901 ms
4  71.145.0.192 (71.145.0.192)  26.552 ms  21.609 ms  21.732 ms
5  12.83.39.185 (12.83.39.185)  23.492 ms 12.83.39.189 (12.83.39.189)  24.755 ms 12.83.39.185
(12.83.39.185) 23.333 ms
6  12.122.136.181 (12.122.136.181)  23.033 ms  22.736 ms  23.119 ms
7  * * *
8  216.239.49.168 (216.239.49.168)  25.157 ms  24.775 ms  24.790 ms
9  72.14.232.33 (72.14.232.33)  25.859 ms  25.051 ms  25.207 ms
10  nuq04s18-in-f1.1e100.net (74.125.224.1)  25.102 ms  24.958 ms  25.077 ms
```

traceroute <host> seq-queries <number>

Displays the route that packets take to a network host.

Syntax

traceroute [**ipv4** | **ipv6**] *host* **seq-queries** *number* [**options**]

Parameters

ipv4

Explicitly force IPv4 traceouting. By default, the program will try to resolve the name given, and choose the appropriate protocol automatically. If resolving a host name returns both IPv4 and IPv6 addresses, **traceroute** will use IPv4.

ipv6

Explicitly force IPv6 traceouting. By default, the program will try to resolve the name given, and choose the appropriate protocol automatically. If resolving a host name returns both IPv4 and IPv6 addresses, **traceroute** will use IPv6.

host

A host that is the destination for the trace. The host is specified as a name (if DNS is being used on the network), as an IPv4 or IPv6 address, or as a MAC address (format h:h:h:h:h:h:h:h).

seq-queries *number*

Specifies the number of sequential probe packets.

options

The following entries are options. Multiple options can be included on the same command line.

as-path

Performs AS path lookups in routing registries and print results directly after the corresponding addresses.

bypass-routing

Bypasses the normal routing tables and send directly to a host on an attached network. If the host is not on a directly-attached network, an error is returned. This option can be used to ping a local host through an interface that has no route through it.

debug-socket

Enables socket level debugging.

first-ttl *value*

Specifies the first time-to-live value. Defaults to 1.

gateway *address*

Routes the request through a specified gateway.

icmp-echo

Uses ICMP echo for the traceroute probe.

icmp-extensions

Shows ICMP extensions (rfc4884). The general form is *CLASS/TYPE:* followed by a hexadecimal dump.

interface *value*

Specifies the interface that the device must use for traceroute requests.

interval *value*

Specifies the time in seconds between traceroute requests from the device.

max-ttl *value*
Specifies the maximum number of hops for the probe.

no-fragment
Does not fragment the probe packets.

num-queries *number*
Specifies the number of probe packets per hop. The default is 3.

port *number*
For UDP tracing, specifies the destination port base traceroute will use (the destination port number will be incremented by each probe). For ICMP tracing, specifies the initial icmp sequence value (incremented by each probe too). For TCP specifies just the (constant) destination port to connect.

source-addr *host*
Specifies an alternative source host by hostname, IPv4 address, or MAC address.

tcp-syn
Uses TCP SYN for the probes.

tos *value*
Marks the packets with the specified Type of Service (TOS) value.

version
Displays the timestamp during ping output.

wait-time *value*
Specifies the time (seconds) to wait for a response from the probe. Default is 5 seconds.

Modes

Operational mode

Usage Guidelines

Use this command to perform a "traceroute" operation for a network host. This operation uses the IP protocol time-to-live (TTL) field and attempts to elicit an Internet Control Message Protocol (ICMP) TIME_EXCEEDED response from each gateway along the path to a host to track the route that a set of packets follows. It attempts to trace the route an IP packet follows to an Internet host by launching User Datagram Protocol (UDP) probe packets with a small time to live, then listening for an ICMP "Time exceeded" reply from a gateway.

Examples

The following example illustrates a traceroute to google.com with 2 sequential probe packets.

```
vyatta@vyatta#traceroute google.com seq-queries 2
traceroute to google.com (74.125.224.0), 30 hops max, 60 byte packets
1  pipsqueak.attlocal.net (10.0.6.1)  0.441 ms  0.416 ms  0.357 ms
2  75-25-153-214.uvs.sntcca.sbcglobal.net (75.25.153.214)  1.762 ms  2.295 ms  1.497 ms
3  76-198-128-2.lightspeed.mtvwca.sbcglobal.net (76.198.128.2)  23.357 ms  22.565 ms  22.219 ms
4  71.145.0.192 (71.145.0.192)  23.964 ms  22.780 ms  21.566 ms
5  12.83.39.185 (12.83.39.185)  27.362 ms 12.83.39.189 (12.83.39.189)  26.326 ms 12.83.39.185
(12.83.39.185) 25.436 ms
6  12.122.136.181 (12.122.136.181)  113.918 ms  88.183 ms  49.824 ms
7  * * *
8  216.239.49.168 (216.239.49.168)  26.184 ms  24.964 ms  24.673 ms
9  72.14.232.33 (72.14.232.33)  25.629 ms  25.079 ms  25.069 ms
10  nuq04s18-in-f0.1e100.net (74.125.224.0)  25.164 ms  25.286 ms  24.878 ms
```

traceroute <host> source-addr <host>

Displays the route that packets take to a network host.

Syntax

traceroute [**ipv4** | **ipv6**] *host* **source-addr** *host* [**options**]

Parameters

ipv4

Explicitly force IPv4 traceouting. By default, the program will try to resolve the name given, and choose the appropriate protocol automatically. If resolving a host name returns both IPv4 and IPv6 addresses, **traceroute** will use IPv4.

ipv6

Explicitly force IPv6 traceouting. By default, the program will try to resolve the name given, and choose the appropriate protocol automatically. If resolving a host name returns both IPv4 and IPv6 addresses, **traceroute** will use IPv6.

host

A host that is the destination for the trace. The host is specified as a name (if DNS is being used on the network), as an IPv4 or IPv6 address, or as a MAC address (format h:h:h:h:h:h:h:h).

source-addr *host*

Specifies an alternative source host by hostname, IPv4 address, or MAC address.

options

The following entries are options. Multiple options can be included on the same command line.

as-path

Performs AS path lookups in routing registries and print results directly after the corresponding addresses.

bypass-routing

Bypasses the normal routing tables and send directly to a host on an attached network. If the host is not on a directly-attached network, an error is returned. This option can be used to ping a local host through an interface that has no route through it.

debug-socket

Enables socket level debugging.

first-ttl *value*

Specifies the first time-to-live value. Defaults to 1.

gateway *address*

Routes the request through a specified gateway.

icmp-echo

Uses ICMP echo for the traceroute probe.

icmp-extensions

Shows ICMP extensions (rfc4884). The general form is *CLASS/TYPE:* followed by a hexadecimal dump.

interface *value*

Specifies the interface that the device must use for traceroute requests.

interval *value*

Specifies the time in seconds between traceroute requests from the device.

max-ttl *value*
Specifies the maximum number of hops for the probe.

no-fragment
Does not fragment the probe packets.

num-queries *number*
Specifies the number of probe packets per hop. The default is 3.

port *number*
For UDP tracing, specifies the destination port base traceroute will use (the destination port number will be incremented by each probe). For ICMP tracing, specifies the initial icmp sequence value (incremented by each probe too). For TCP specifies just the (constant) destination port to connect.

seq-queries *number*
Specifies the number of sequential probe packets.

tcp-syn
Uses TCP SYN for the probes.

tos *value*
Marks the packets with the specified Type of Service (TOS) value.

version
Displays the timestamp during ping output.

wait-time *value*
Specifies the time (seconds) to wait for a response from the probe. Default is 5 seconds.

Modes

Operational mode

Usage Guidelines

Use this command to perform a "traceroute" operation for a network host. This operation uses the IP protocol time-to-live (TTL) field and attempts to elicit an Internet Control Message Protocol (ICMP) TIME_EXCEEDED response from each gateway along the path to a host to track the route that a set of packets follows. It attempts to trace the route an IP packet follows to an Internet host by launching User Datagram Protocol (UDP) probe packets with a small time to live, then listening for an ICMP "Time exceeded" reply from a gateway.

Examples

The following example illustrates a traceroute to google.com with source address *client1.attlocal.net*.

```
vyatta@vyatta#traceroute google.com source-addr client.attlocal.net
```

traceroute <host> tcp-syn

Displays the route that packets take to a network host.

Syntax

traceroute [**ipv4** | **ipv6**] *host* **tcp-syn** [**options**]

Parameters

ipv4

Explicitly force IPv4 traceouting. By default, the program will try to resolve the name given, and choose the appropriate protocol automatically. If resolving a host name returns both IPv4 and IPv6 addresses, **traceroute** will use IPv4.

ipv6

Explicitly force IPv6 traceouting. By default, the program will try to resolve the name given, and choose the appropriate protocol automatically. If resolving a host name returns both IPv4 and IPv6 addresses, **traceroute** will use IPv6.

host

A host that is the destination for the trace. The host is specified as a name (if DNS is being used on the network), as an IPv4 or IPv6 address, or as a MAC address (format h:h:h:h:h:h:h:h).

tcp-syn

Uses TCP SYN for the probes.

options

The following entries are options. Multiple options can be included on the same command line.

as-path

Performs AS path lookups in routing registries and print results directly after the corresponding addresses.

bypass-routing

Bypasses the normal routing tables and send directly to a host on an attached network. If the host is not on a directly-attached network, an error is returned. This option can be used to ping a local host through an interface that has no route through it.

debug-socket

Enables socket level debugging.

first-ttl *value*

Specifies the first time-to-live value. Defaults to 1.

gateway *address*

Routes the request through a specified gateway.

icmp-echo

Uses ICMP echo for the traceroute probe.

icmp-extensions

Shows ICMP extensions (rfc4884). The general form is *CLASS/TYPE:* followed by a hexadecimal dump.

interface *value*

Specifies the interface that the device must use for traceroute requests.

interval *value*

Specifies the time in seconds between traceroute requests from the device.

max-ttl *value*
Specifies the maximum number of hops for the probe.

no-fragment
Does not fragment the probe packets.

num-queries *number*
Specifies the number of probe packets per hop. The default is 3.

port *number*
For UDP tracing, specifies the destination port base traceroute will use (the destination port number will be incremented by each probe). For ICMP tracing, specifies the initial icmp sequence value (incremented by each probe too). For TCP specifies just the (constant) destination port to connect.

seq-queries *number*
Specifies the number of sequential probe packets.

source-addr *host*
Specifies an alternative source host by hostname, IPv4 address, or MAC address.

tos *value*
Marks the packets with the specified Type of Service (TOS) value.

version
Displays the timestamp during ping output.

wait-time *value*
Specifies the time (seconds) to wait for a response from the probe. Default is 5 seconds.

Modes

Operational mode

Usage Guidelines

Use this command to perform a "traceroute" operation for a network host. This operation uses the IP protocol time-to-live (TTL) field and attempts to elicit an Internet Control Message Protocol (ICMP) TIME_EXCEEDED response from each gateway along the path to a host to track the route that a set of packets follows. It attempts to trace the route an IP packet follows to an Internet host by launching User Datagram Protocol (UDP) probe packets with a small time to live, then listening for an ICMP "Time exceeded" reply from a gateway.

Examples

The following example illustrates a traceroute to google.com using tcp-syn for probes.

```
vyatta@vyatta#traceroute google.com tcp-syn
traceroute to google.com (74.125.224.6), 30 hops max, 60 byte packets
1  gateway.attlocal.net (10.0.6.1)  0.389 ms  0.341 ms  0.316 ms
2  75-25-153-214.uvs.sntcca.sbcglobal.net (75.25.153.214)  12.784 ms  12.767 ms  12.771 ms
3  76-198-128-2.lightspeed.mtvwca.sbcglobal.net (76.198.128.2)  35.539 ms  35.529 ms  35.517 ms
4  71.145.0.192 (71.145.0.192)  35.512 ms  35.503 ms  33.653 ms
5  12.83.39.189 (12.83.39.189)  38.888 ms  36.371 ms  37.952 ms
6  12.122.136.181 (12.122.136.181)  63.947 ms  63.087 ms  63.045 ms
7  * * *
8  216.239.49.168 (216.239.49.168)  28.752 ms  29.378 ms  29.368 ms
9  * * *
10  nuq04s18-in-f6.1e100.net (74.125.224.6)  29.669 ms  27.836 ms  29.669 ms
```

traceroute <host> tos <value>

Displays the route that packets take to a network host.

Syntax

traceroute [**ipv4** | **ipv6**] *host* **tos** *value* [**options**]

Parameters

ipv4

Explicitly force IPv4 traceouting. By default, the program will try to resolve the name given, and choose the appropriate protocol automatically. If resolving a host name returns both IPv4 and IPv6 addresses, **traceroute** will use IPv4.

ipv6

Explicitly force IPv6 traceouting. By default, the program will try to resolve the name given, and choose the appropriate protocol automatically. If resolving a host name returns both IPv4 and IPv6 addresses, **traceroute** will use IPv6.

host

A host that is the destination for the trace. The host is specified as a name (if DNS is being used on the network), as an IPv4 or IPv6 address, or as a MAC address (format h:h:h:h:h:h:h:h).

tos *value*

Marks the packets with the specified Type of Service (TOS) value.

options

The following entries are options. Multiple options can be included on the same command line.

as-path

Performs AS path lookups in routing registries and print results directly after the corresponding addresses.

bypass-routing

Bypasses the normal routing tables and send directly to a host on an attached network. If the host is not on a directly-attached network, an error is returned. This option can be used to ping a local host through an interface that has no route through it.

debug-socket

Enables socket level debugging.

first-ttl *value*

Specifies the first time-to-live value. Defaults to 1.

gateway *address*

Routes the request through a specified gateway.

icmp-echo

Uses ICMP echo for the traceroute probe.

icmp-extensions

Shows ICMP extensions (rfc4884). The general form is *CLASS/TYPE:* followed by a hexadecimal dump.

interface *value*

Specifies the interface that the device must use for traceroute requests.

interval *value*

Specifies the time in seconds between traceroute requests from the device.

max-ttl *value*
Specifies the maximum number of hops for the probe.

no-fragment
Does not fragment the probe packets.

num-queries *number*
Specifies the number of probe packets per hop. The default is 3.

port *number*
For UDP tracing, specifies the destination port base traceroute will use (the destination port number will be incremented by each probe). For ICMP tracing, specifies the initial icmp sequence value (incremented by each probe too). For TCP specifies just the (constant) destination port to connect.

seq-queries *number*
Specifies the number of sequential probe packets.

source-addr *host*
Specifies an alternative source host by hostname, IPv4 address, or MAC address.

tcp-syn
Uses TCP SYN for the probes.

version
Displays the timestamp during ping output.

wait-time *value*
Specifies the time (seconds) to wait for a response from the probe. Default is 5 seconds.

Modes

Operational mode

Usage Guidelines

Use this command to perform a "traceroute" operation for a network host. This operation uses the IP protocol time-to-live (TTL) field and attempts to elicit an Internet Control Message Protocol (ICMP) TIME_EXCEEDED response from each gateway along the path to a host to track the route that a set of packets follows. It attempts to trace the route an IP packet follows to an Internet host by launching User Datagram Protocol (UDP) probe packets with a small time to live, then listening for an ICMP "Time exceeded" reply from a gateway.

Examples

The following example illustrates a traceroute to google.com with packets marked with tos equal to 3.

```
vyatta@vyatta#traceroute google.com tos 3
traceroute to google.com (74.125.224.2), 30 hops max, 60 byte packets
1  gateway.attlocal.net (10.0.6.1)  0.374 ms  0.550 ms  0.353 ms
2  75-25-153-214.uvs.sntcca.sbcglobal.net (75.25.153.214)  7.270 ms  15.975 ms  7.238 ms
3  76-198-128-2.lightspeed.mtvwca.sbcglobal.net (76.198.128.2)  29.199 ms  38.969 ms  28.635 ms
4  71.145.0.192 (71.145.0.192)  35.803 ms  36.212 ms  28.590 ms
5  12.83.39.189 (12.83.39.189)  34.061 ms  32.033 ms  42.496 ms
6  12.122.136.181 (12.122.136.181)  39.973 ms  41.665 ms  41.608 ms
7  * * *
8  216.239.49.168 (216.239.49.168)  29.549 ms  26.607 ms  26.583 ms
9  72.14.232.33 (72.14.232.33)  28.133 ms  27.602 ms  29.294 ms
10  nuq04s18-in-f2.1e100.net (74.125.224.2)  28.553 ms  30.071 ms  28.028 ms
```

traceroute <host> version

Displays the route that packets take to a network host.

Syntax

traceroute [**ipv4** | **ipv6**] *host* **version** [**options**]

Parameters

ipv4

Explicitly force IPv4 traceouting. By default, the program will try to resolve the name given, and choose the appropriate protocol automatically. If resolving a host name returns both IPv4 and IPv6 addresses, **traceroute** will use IPv4.

ipv6

Explicitly force IPv6 traceouting. By default, the program will try to resolve the name given, and choose the appropriate protocol automatically. If resolving a host name returns both IPv4 and IPv6 addresses, **traceroute** will use IPv6.

host

A host that is the destination for the trace. The host is specified as a name (if DNS is being used on the network), as an IPv4 or IPv6 address, or as a MAC address (format h:h:h:h:h:h:h:h).

version

Displays the timestamp during ping output.

options

The following entries are options. Multiple options can be included on the same command line.

as-path

Performs AS path lookups in routing registries and print results directly after the corresponding addresses.

bypass-routing

Bypasses the normal routing tables and send directly to a host on an attached network. If the host is not on a directly-attached network, an error is returned. This option can be used to ping a local host through an interface that has no route through it.

debug-socket

Enables socket level debugging.

first-ttl *value*

Specifies the first time-to-live value. Defaults to 1.

gateway *address*

Routes the request through a specified gateway.

icmp-echo

Uses ICMP echo for the traceroute probe.

icmp-extensions

Shows ICMP extensions (rfc4884). The general form is *CLASS/TYPE:* followed by a hexadecimal dump.

interface *value*

Specifies the interface that the device must use for traceroute requests.

interval *value*

Specifies the time in seconds between traceroute requests from the device.

max-ttl *value*
Specifies the maximum number of hops for the probe.

no-fragment
Does not fragment the probe packets.

num-queries *number*
Specifies the number of probe packets per hop. The default is 3.

port *number*
For UDP tracing, specifies the destination port base traceroute will use (the destination port number will be incremented by each probe). For ICMP tracing, specifies the initial icmp sequence value (incremented by each probe too). For TCP specifies just the (constant) destination port to connect.

seq-queries *number*
Specifies the number of sequential probe packets.

source-addr *host*
Specifies an alternative source host by hostname, IPv4 address, or MAC address.

tcp-syn
Uses TCP SYN for the probes.

tos *value*
Marks the packets with the specified Type of Service (TOS) value.

wait-time *value*
Specifies the time (seconds) to wait for a response from the probe. Default is 5 seconds.

Modes

Operational mode

Usage Guidelines

Use this command to perform a "traceroute" operation for a network host. This operation uses the IP protocol time-to-live (TTL) field and attempts to elicit an Internet Control Message Protocol (ICMP) TIME_EXCEEDED response from each gateway along the path to a host to track the route that a set of packets follows. It attempts to trace the route an IP packet follows to an Internet host by launching User Datagram Protocol (UDP) probe packets with a small time to live, then listening for an ICMP "Time exceeded" reply from a gateway.

Examples

The following example illustrates a traceroute to google.com showing timestamp during ping output.

```
vyatta@vyatta#traceroute google.com version
```

traceroute <host> wait-time <value>

Displays the route that packets take to a network host.

Syntax

traceroute [**ipv4** | **ipv6**] *host* **wait-time** *value* [**options**]

Parameters

ipv4

Explicitly force IPv4 traceouting. By default, the program will try to resolve the name given, and choose the appropriate protocol automatically. If resolving a host name returns both IPv4 and IPv6 addresses, **traceroute** will use IPv4.

ipv6

Explicitly force IPv6 traceouting. By default, the program will try to resolve the name given, and choose the appropriate protocol automatically. If resolving a host name returns both IPv4 and IPv6 addresses, **traceroute** will use IPv6.

host

A host that is the destination for the trace. The host is specified as a name (if DNS is being used on the network), as an IPv4 or IPv6 address, or as a MAC address (format h:h:h:h:h:h:h:h).

wait-time *value*

Specifies the time (seconds) to wait for a response from the probe. Default is 5 seconds.

options

The following entries are options. Multiple options can be included on the same command line.

as-path

Performs AS path lookups in routing registries and print results directly after the corresponding addresses.

bypass-routing

Bypasses the normal routing tables and send directly to a host on an attached network. If the host is not on a directly-attached network, an error is returned. This option can be used to ping a local host through an interface that has no route through it.

debug-socket

Enables socket level debugging.

first-ttl *value*

Specifies the first time-to-live value. Defaults to 1.

gateway *address*

Routes the request through a specified gateway.

icmp-echo

Uses ICMP echo for the traceroute probe.

icmp-extensions

Shows ICMP extensions (rfc4884). The general form is *CLASS/TYPE:* followed by a hexadecimal dump.

interface *value*

Specifies the interface that the device must use for traceroute requests.

interval *value*

Specifies the time in seconds between traceroute requests from the device.

max-ttl *value*
Specifies the maximum number of hops for the probe.

no-fragment
Does not fragment the probe packets.

num-queries *number*
Specifies the number of probe packets per hop. The default is 3.

port *number*
For UDP tracing, specifies the destination port base traceroute will use (the destination port number will be incremented by each probe). For ICMP tracing, specifies the initial icmp sequence value (incremented by each probe too). For TCP specifies just the (constant) destination port to connect.

seq-queries *number*
Specifies the number of sequential probe packets.

source-addr *host*
Specifies an alternative source host by hostname, IPv4 address, or MAC address.

tcp-syn
Uses TCP SYN for the probes.

tos *value*
Marks the packets with the specified Type of Service (TOS) value.

version
Displays the timestamp during ping output.

Modes

Operational mode

Usage Guidelines

Use this command to perform a "traceroute" operation for a network host. This operation uses the IP protocol time-to-live (TTL) field and attempts to elicit an Internet Control Message Protocol (ICMP) TIME_EXCEEDED response from each gateway along the path to a host to track the route that a set of packets follows. It attempts to trace the route an IP packet follows to an Internet host by launching User Datagram Protocol (UDP) probe packets with a small time to live, then listening for an ICMP "Time exceeded" reply from a gateway.

Examples

The following example illustrates a traceroute to google.com waiting 2 seconds between probes.

```
vyatta@vyatta#traceroute google.com wait-time 2
traceroute to google.com (74.125.224.2), 30 hops max, 60 byte packets
1  pipsqueak.attlocal.net (10.0.6.1)  0.409 ms  0.452 ms  0.346 ms
2  75-25-153-214.uvs.sntcca.sbcglobal.net (75.25.153.214)  13.497 ms  13.517 ms  13.509 ms
3  76-198-128-2.lightspeed.mtvwca.sbcglobal.net (76.198.128.2)  35.910 ms  34.763 ms  35.876 ms
4  71.145.0.192 (71.145.0.192)  35.981 ms  35.979 ms  34.775 ms
5  12.83.39.189 (12.83.39.189)  39.654 ms  39.662 ms  44.599 ms
6  12.122.136.181 (12.122.136.181)  85.423 ms  84.396 ms  84.358 ms
7  * * *
8  216.239.49.168 (216.239.49.168)  33.291 ms  27.613 ms  28.017 ms
9  72.14.232.33 (72.14.232.33)  45.214 ms  45.849 ms  44.999 ms
10  nuq04s18-in-f2.1e100.net (74.125.224.2)  30.505 ms  29.739 ms  30.298 ms
```

traceroute <protocol> <host>

Displays the route that packets take to a network host.

Syntax

traceroute [**ipv4** | **ipv6**] *host* [*option*]

Parameters

ipv4

Displays the route that packets take to the IPv4 address of the host. This keyword is used when the host is specified as a host name rather than as an IP address.

ipv6

Displays the route that packets take to the IPv6 address of the host. This keyword is used when the host is specified as a host name rather than as an IP address.

host

A host that is the destination for the trace. The host is specified as a name (if DNS is being used on the network), as an IPv4 or IPv6 address, or as a MAC address (format <h:h:h:h:h:h:h:h>).

option

Displays the route that packets take to the host. This keyword is used when the host is specified as a host name rather than as an IP address.

Modes

Operational mode

Usage Guidelines

Use this command to perform a "traceroute" operation for a network host. This operation uses the IP protocol time-to-live (TTL) field and attempts to elicit an Internet Control Message Protocol (ICMP) TIME_EXCEEDED response from each gateway along the path to a host to track the route that a set of packets follows. It attempts to trace the route an IP packet follows to an Internet host by launching User Datagram Protocol (UDP) probe packets with a small time to live, then listening for an ICMP "Time exceeded" reply from a gateway.

traceroute <host>

Displays the route that packets take to a network host.

Syntax

traceroute [**ipv4** | **ipv6**] *host*

Parameters

ipv4

Displays the route that packets take to the IPv4 address of the host. This keyword is used when the host is specified as a host name rather than as an IP address.

ipv6

Displays the route that packets take to the IPv6 address of the host. This keyword is used when the host is specified as a host name rather than as an IP address.

host

A host that is the destination for the trace. The host is specified as a name (if DNS is being used on the network), an IPv4 or IPv6 address, or MAC address.

Modes

Operational mode

Usage Guidelines

Use this command to perform a “traceroute” operation for a network host. This operation uses the IP protocol time-to-live (TTL) field and attempts to elicit an Internet Control Message Protocol (ICMP) TIME_EXCEEDED response from each gateway along the path to a host to track the route that a set of packets follows. It attempts to trace the route an IP packet follows to an Internet host by launching User Datagram Protocol (UDP) probe packets with a small time to live, then listening for an ICMP “Time exceeded” reply from a gateway.

ECMP

ECMP overview

ECMP is a technique that routes packets along multiple paths of equal cost. ECMP provides a load-balancing mechanism to ensure optimum usage of a routing path.

The Brocade vRouter supports the following load-balancing mechanisms:

- Modulo-n-hash
- Hash-threshold
- Highest Random Weight (HRW)

The Brocade vRouter calculates the key of the packet flow for every ECMP selection algorithm. The next-hop selection algorithm calculates the key of the flow and chooses the next hop.

The Brocade vRouter supports the HRW load-balancing mechanism by default. You can change the ECMP mode, if required.

ECMP is enabled on Border Gateway Protocol (BGP) by configuring the maximum number of ECMP routes for External BGP (eBGP) or Internal BGP (iBGP).

ECMP Commands

protocols ecmp disable

Disables ECMP routing.

Syntax

set protocols ecmp disable

Command Default

None.

Modes

Configuration mode.

Configuration Statement

```
protocols {
    ecmp {
        disable {}
    }
}
```

protocols ecmp maximum-paths

Sets the maximum number of next hops for ECMP routing.

Syntax

set protocols ecmp maximum-paths *number*

delete protocols ecmp maximum-paths

Command Default

None

Parameters

maximum-paths *number*

Sets the maximum number of next hops for ECMP routing.

Modes

Configuration mode.

Configuration Statement

```
protocols {
   ecmp {
      maximum-paths number{}
   }
}
```

Usage Guidelines

Use the **set** form of this command to set the maximum number of next hops for ECMP routing.

Use the **delete** form of this command to remove the maximum number of next hops for ECMP routing.

protocols ecmp mode <mode>

Sets the load-balancing mechanism for ECMP.

Syntax

set protocols ecmp mode *hash-threshold* | *hrw* | *modulo-n*

delete protocols ecmp mode *hash-threshold* | *hrw* | *modulo-n*

show protocols ecmp mode *hash-threshold* | *hrw* | *modulo-n*

Command Default

None

Parameters

hash-threshold

Sets the hash-threshold ECMP routing mode.

hrw

Sets the highest random weight ECMP routing mode. This mode is the default.

modulo-n

Sets the modulo-n-hash ECMP routing mode.

Modes

Configuration mode.

Configuration Statement

```
protocols {
   ecmp {
      mode {
         hash-threshold
         hrw
         modulo-n
         }
   }
}
```

Usage Guidelines

Use the **set** form of this command to set the load-balancing mechanism for ECMP.

Use the **delete** form of this command to remove the load-balancing mechanism. The ECMP load-balancing mechanism returns to its default setting, which is HRW.

Use the **show** form of this command to display the current load-balancing mechanism for ECMP.

Examples

The following example shows how to set the hash-threshold mode with maximum number of next hops as 34 for ECMP routing.

```
vyatta@vyatta# set protocols ecmp maximum-paths 34
[edit]
vyatta@vyatta# set protocols ecmp mode hash-threshold
[edit]
vyatta@vyatta# commit
```

The output for the ECMP configuration is as follows.

```
vyatta@vyatta# show protocols ecmp
 ecmp {
        maximum-paths 34
        mode hash-threshold
 }
[edit]
```

show dataplane route

Displays forward information base (FIB) table that contain all routes including ECMP routes.

Syntax

show dataplane route

Parameters

None.

Modes

Operational mode.

Usage Guidelines

Use this command to display the FIB table.

NOTE
FIB table is stored in the data plane.

show dataplane route6

Displays FIB table that contain all IPv6 routes including ECMP routes.

Syntax

show dataplane route6

Parameters

None

Modes

Operational mode.

Usage Guidelines

Use this command to display IPv6 FIB table.

Static Routes

Static route configuration

This section presents the following topics:

Static routes overview

A static route is a manually configured route, which, in general, cannot be updated dynamically from information about the network topology learned by the Brocade vRouter. However, if a link fails, the router removes the routes, including static routes, from the Routing Information Base (RIB) that use this interface to reach the next hop.

Usually, static routes should be used only 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 learns from its configuration, or from its dynamic routing protocols, is stored in its RIB.

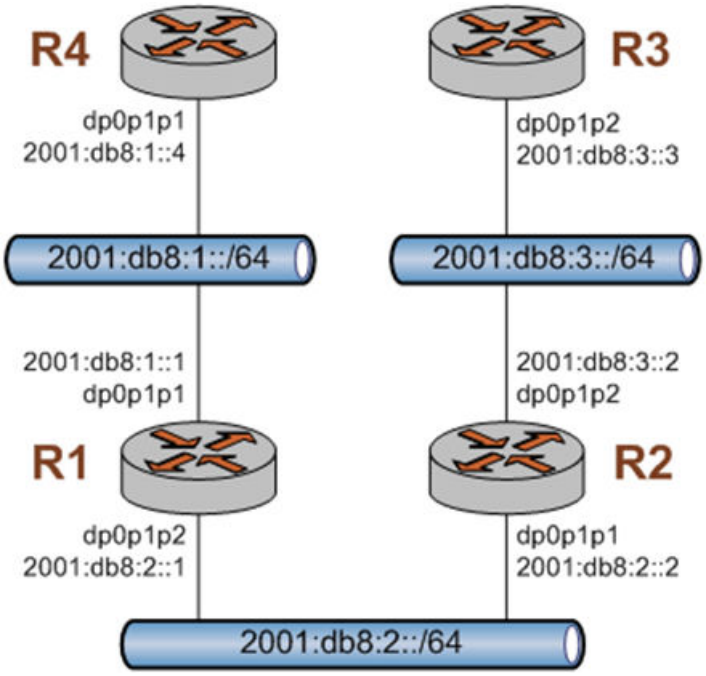
Unicast routes are directly used to determine the forwarding table for unicast packet forwarding.

Blackhole routes are static unreachable routes that can be configured to send ICMP unreachable responses on packets.

Configuring static routes

Figure 1 presents sample configurations of basic static routes. When you are finished with Configuring static routes, the system is configured as shown in the figure. In the example, a static route is created that says, in effect, "any packets destined for the 11.0.0.0/8 network should be forwarded to 172.16.0.26."

FIGURE 1 Static routes



This section includes the following example:

- Configuring static routes

Table 1 shows how to create a static route to the 11.0.0.0/8 network that is directed toward 172.16.0.26.

To create a static route, perform the following steps in configuration mode.

TABLE 1 Creating a static route

Step	Command
Create a static route to R2.	`vyatta@R1# set protocols static route 11.0.0.0/8 next-hop 172.16.0.26`
Commit the configuration.	`vyatta@R1# commit`

View the configuration.	`vyatta@R1# show protocols static route`
	` route 11.0.0.0/8 {`
	`  next-hop 172.16.0.26 {`
	`  }`
	`}`

Creating floating static routes

Usually, static routes have a relatively short administrative distance—typically 1, and normally shorter than the administrative distances for dynamic (learned) routes. A "floating" static route is a static route with an administrative distance greater than the administrative distance for dynamic routes.

You can configure a static route to be a floating route by setting the administrative distance higher than the distance applied to the routes in your dynamic routing protocol. This higher distance renders the static route less desirable than a dynamic route. At the same time, if

the dynamic route is lost, the static route is available to take over traffic, which can be forwarded through the static route as an alternate path.

NOTE
When configuring the administrative distance (AD) of a protocol, keep in mind when you specify the distance value of 255, the router will disbelieve the source and will not add the route to the routing table.

Showing static routes in the routing table

To display route information, use the **show ip route** command. To show just static routes, use the **show ip route static** command, as shown in the following example.

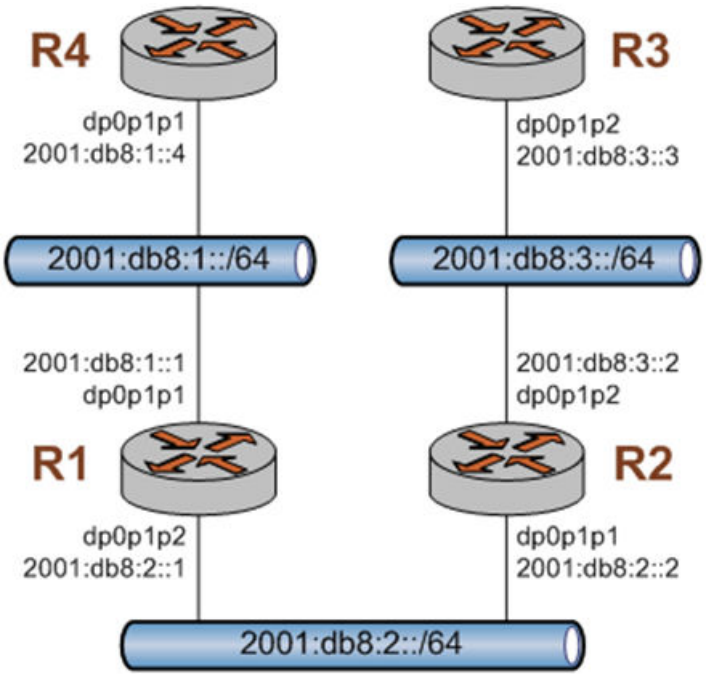
Showing static routes in the routing table

```
vyatta@R1:~$ show ip route static
Codes: K - kernel route, C - connected, S - static, R - RIP, O - OSPF,
       I - ISIS, B - BGP, > - selected route, * - FIB route
S>* 11.0.0.0/8 [1/0] via 172.16.0.26, dp0p0p0
vyatta@R1:~$
```

Static IPv6 route configuration

Figure 2 shows an IPv6 network with three nodes. Verify that IPv6 forwarding is enabled on page 166 shows how to configure nodes that use static routes to enable R2 and R4 to communicate through R1.

FIGURE 2 Static IPv6 routing example



Verify that IPv6 forwarding is enabled

For R1 to be able to pass data between the dp0p0p0 and dp0p0p2 interfaces (that is, between R4 and R2), R1 must be configured to enable forwarding. To determine if forwarding is enabled, perform the following step in operational mode.

TABLE 2 Determining if forwarding is enabled on R1

Step	Command
Display the state of IPv6 forwarding on R1.	`vyatta@R1:~$ show ipv6 forwarding` `ipv6 forwarding is off`

If forwarding is not enabled, as in the example below, the system must be configured to enable forwarding. To enable forwarding, perform the following steps in configuration mode.

TABLE 3 Enable forwarding on R1

Step	Command
Enable forwarding on R1.	`vyatta@R1# set system ipv6 disable-forwarding`
Commit the change.	`vyatta@R1# commit`

Change to operational mode.	`vyatta@R1# exit`
	`exit`
	`vyatta@R1:~$`

Display the state of IPv6 forwarding on R1.	`vyatta@R1:~$ show ipv6 forwarding` `ipv6 forwarding is on`

Add the default IPv6 route

On R4, all traffic that is not routed elsewhere is sent to R1. To configure the default route, perform the following steps in configuration mode.

TABLE 4 Adding the default route on R4

Step	Command
Add the default route on R4.	`vyatta@R4# set protocols static route6 ::/0 next-hop 2001:db8:1::1`
Commit the change.	`vyatta@R4# commit`

Change to operational mode.	`vyatta@R4# exit`
	`exit`
	`vyatta@R4:~$`

Verify the default route in the routing table.	`vyatta@R4:~$ show ipv6 route`
	`Codes: K - kernel route, C - connected, S - static, R - RIPng, O - OSPFv3,`
	`I - ISIS, B - BGP, * - FIB route.`
	`S>* ::/0 [1/0] via 2001:db8:1::1, dp0p0p0`
	`C>* ::1/128 is directly connected, lo`
	`C>* 2001:db8:1::/64 is directly connected, dp0p0p0`
	`C * fe80::/64 is directly connected, dp0p0p1`

TABLE 4 Adding the default route on R4 (continued)

Step	Command
	C>* fe80::/64 is directly connected, dp0p0p0 K>* ff00::/8 is directly connected, dp0p0p0

Add a static IPv6 route

As an alternative to the default route created on R4, create a static route on R2. To configure a static route to the 2001:db8:1::/64 network, perform the following steps in configuration mode.

TABLE 5 Adding a static IPv6 route

Step	Command
Add a static route on R2.	vyatta@R1# set protocols static route6 2001:db8:1::/64 next-hop 2001:db8:2::1
Commit the change.	vyatta@R1# commit
Change to operational mode.	vyatta@R1# exit exit vyatta@R2:~$
Verify the static route in the routing table.	vyatta@R2:~$ show ipv6 route Codes: K - kernel route, C - connected, S - static, R - RIPng, O - OSPFv3, I - ISIS, B - BGP, * - FIB route. C>* ::1/128 is directly connected, lo S>* 2001:db8:1::/64 [1/0] via 2001:db8:2::1, dp0p0p0 C>* 2001:db8:2::/64 is directly connected, dp0p0p0 C * fe80::/64 is directly connected, dp0p0p1 C>* fe80::/64 is directly connected, dp0p0p0 K>* ff00::/8 is directly connected, dp0p0p0

Confirm connectivity

To confirm that R2 and R4 can communicate, use the **ping** command. To confirm connectivity between R2 and R4, perform the following step in operational mode.

TABLE 6 Confirming connectivity between R2 and R4

Step	Command
Ping R4 from R2.	vyatta@R2:~$ ping 2001:db8:1::4 PING 2001:db8:1::4(2001:db8:1::4) 56 data bytes 64 bytes from 2001:db8:1::4: icmp_seq=1 ttl=63 time=5.65 ms 64 bytes from 2001:db8:1::4: icmp_seq=2 ttl=63 time=0.382 ms ^C --- 2001:db8:1::4 ping statistics --- 2 packets transmitted, 2 received, 0% packet loss, time 1011ms rtt min/avg/max/mdev = 0.382/3.016/5.650/2.634 ms

As an alternative, use the **traceroute** command to verify that the route goes from R2 to R1 to R4. To confirm connectivity between R2 and R4 through R1 by using the **traceroute** command, perform the following step in operational mode.

TABLE 7 Confirming connectivity between R2 and R4 through R1

Step	Command

Trace the route from R2 to R4.	`vyatta@R2:~$ traceroute 2001:db8:1::4`
	`traceroute to 2001:db8:1::4 (2001:db8:1::4), 30 hops max, 40 byte packets`
	` 1  (2001:db8:2::1)  4.448 ms  4.148 ms  4.092 ms`
	` 2  (2001:db8:1::4)  4.297 ms  4.306 ms  4.308 ms`

Static Route Commands

protocols static interface-route <subnet> next-hop-interface <interface>

Configures the next-hop interface for an interface-based static route.

Syntax

set protocols static interface-route *subnet* **next-hop-interface** *interface* [**disable** | **distance** *distance*]

delete protocols static interface-route *subnet* **next-hop-interface** *interface* [**disable** | **distance**]

show protocols static interface-route *subnet* **next-hop-interface** *interface* [**disable** | **distance**]

Parameters

interface-route *subnet*

Multi-node. An interface-based static route. The format is a destination subnet of the form *address*/*prefix* (*h*:*h*:*h*:*h*:*h*:*h*:*h*:*h*/*x*).

You can define multiple interface-based routes by creating multiple **interface-route** configuration nodes.

next-hop-interface *interface*

The next-hop interface.

disable

Disables the interface-based static route.

distance *distance*

The next-hop distance for this route. Routes with a smaller distance are selected before those with a larger distance. The distance ranges from 1 through 255. The default distance is 1.

Modes

Configuration mode

Configuration Statement

```
protocols {
    static {
        interface-route subnet {
            next-hop-interface interface {
                disable
                distance distance
            }
        }
    }

}
```

Usage Guidelines

Use the **set** form of this command to configure the next-hop interface for a static route.

Use the **delete** form of this command to remove the next-hop interface from a static route.

Use the **show** form of this command to view the next-hop interface for a static route.

protocols static interface-route6 <subnet> next-hop-interface <interface>

Configures the next-hop interface for an interface-based IPv6 static route.

Syntax

set protocols static interface-route6 *subnet* **next-hop-interface** *interface* [**disable** | **distance** *distance*]

delete protocols static interface-route6 *subnet* **next-hop-interface** *interface* [**disable** | **distance**]

show protocols static interface-route6 *subnet* **next-hop-interface** *interface* [**disable** | **distance**]

Parameters

interface-route6 *subnet*

Multi-node. An interface-based static route. The format is a destination subnet of the form *address*/*prefix* (*h*:*h*:*h*:*h*:*h*:*h*:*h*:*h*/*x*).

You can define multiple interface-based routes by creating multiple **interface-route** configuration nodes.

next-hop-interface *interface*

The next-hop interface.

disable

Disables the interface-based IPv6 static route.

distance

The next-hop distance for this route. Routes with a smaller distance are selected before those with a larger distance.

Modes

Configuration mode

Configuration Statement

```
protocols {
    static {
        interface-route6 subnet {
            next-hop-interface interface {
                disable
                distance distance
            }
        }
    }

}
```

Usage Guidelines

Use the **set** form of this command to configure the next-hop interface for an IPv6 static route.

Use the **delete** form of this command to remove the next-hop interface from an IPv6 static route.

Use the **show** form of this command to view the next-hop interface for an IPv6 static route.

protocols static route <subnet> blackhole <distance>

Configures a black hole static route.

Syntax

set protocols static route *subnet* **blackhole** [**distance** *distance*]

delete protocols static route *subnet* **blackhole** [**distance**]

show protocols static route *subnet* **blackhole** [**distance**]

Parameters

route *subnet*

Multi-node. A static route. The format is a destination subnet of the form *address*/*prefix* (*x.x.x.x*/*x*). You can define multiple static routes by creating multiple **route** configuration nodes.

blackhole

A destination router that is offline and cannot receive traffic or provide messages to the source of the traffic.

distance *distance*

The black hole distance for this route. Routes with a smaller distance are selected before those with a larger distance. The distance ranges from 1 through 255. The default distance is 1.

Modes

Configuration mode

Configuration Statement

```
protocols {
    static {
        route subnet {
            blackhole {
                distance distance
            }
        }
    }

}
```

Usage Guidelines

A black hole static route is a route for which the system silently discards packets that are matched.

Use the **set** form of this command to configure a black hole static route.

Use the **delete** form of this command to remove a black hole static route.

Use the **show** form of this command to view a black hole static route.

protocols static route <subnet> next-hop <address>

Configures the next hop for a static route.

Syntax

set protocols static route *subnet* **next-hop** *address* [**disable** | **distance** *distance*]

delete protocols static route *subnet* **next-hop** *address* [**disable** | **distance**]

show protocols static route *subnet* **next-hop** *address* [**disable** | **distance**]

Parameters

route *subnet*

Multi-node. A static route. The format is a destination subnet of the form *address*/*prefix* (*x.x.x.x/x*). You can define multiple static routes by creating multiple **route** configuration nodes.

address

The address of the next-hop router.

disable

Disables the static route.

distance

The next-hop distance for this route. Routes with a smaller distance are selected before those with a larger distance. The distance ranges from 1 through 255. The default distance is 1.

Modes

Configuration mode

Configuration Statement

```
protocols {
    static {
        route subnet {
            next-hop address {
                disable
                distance distance
            }
        }
    }

}
```

Usage Guidelines

Use the **set** form of this command to configure the next hop for a static route.

Use the **delete** form of this command to remove the next hop from a static route.

Use the **show** form of this command to view the next hop for a static route.

protocols static route6 <subnet> blackhole

Configures a black hole IPv6 static route.

Syntax

set protocols static route6 *subnet* **blackhole** [**distance** *number*]

delete protocols static route6 *subnet* **blackhole** [**distance** *number*]

show protocols static route6 *subnet* **blackhole** [**distance** *number*]

Parameters

route6 *subnet*

Multi-node. An IPv6 static route. The format is a destination subnet of the form IPv6- *address*/*prefix* (*h*:*h*:*h*:*h*:*h*:*h*:*h*:*h*/*x*). You can define multiple static routes by creating multiple **route** configuration nodes.

blackhole *distance*

The black hole distance for this route. Routes with a smaller distance are selected before those with a larger distance.

Modes

Configuration mode

Configuration Statement

```
protocols {
    static {
        route6 subnet {
            blackhole {
                distance distance
            }
        }
    }

}
```

Usage Guidelines

A black hole static route silently discards packets that are matched.

Use the **set** form of this command to configure a black hole IPv6 static route.

Use the **delete** form of this command to remove a black hole IPv6 static route.

Use the **show** form of this command to view a black hole IPv6 static route.

protocols static route6 <subnet> next-hop <address>

Configures the next hop for an IPv6 static route.

Syntax

set protocols static route6 *subnet* **next-hop** *address* [**disable** | **distance** *distance* | **interface** *interface*]

delete protocols static route6 *subnet* **next-hop** *address* [**disable** | **distance** | **interface**]

show protocols static route6 *subnet* **next-hop** *address* [**disable** | **distance** | **interface**]

Parameters

route6 *subnet*

Multi-node. An IPv6 static route. The format is a destination subnet of the form IPv6- *address*/*prefix* (*h*:*h*:*h*:*h*:*h*:*h*:*h*:*h*/*x*). You can define multiple static routes by creating multiple **route6** configuration nodes.

next-hop *address*

The IPv6 address of the next hop router.

disable

Disables the IPv6 static route.

distance *distance*

The next-hop distance for this route. Routes with a smaller distance are selected before those with a larger distance.

interface

The outgoing interface used to reach the next-hop address. This interface is needed when the next-hop address is a link-local address (that is, it has a fe80::/64 prefix).

Modes

Configuration mode

Configuration Statement

```
protocols {
    static {
        route6 subnet {
            next-hop address {
                disable
                distance distance
                interface interface
            }
        }
    }

}
```

Usage Guidelines

Use this command to configure IPv6 static routes on the router.

Use the **set** form of this command to configure the next hop for an IPv6 static route.

Use the **delete** form of this command to remove the next hop from an IPv6 static route.

Use the **show** form of this command to view the next hop for an IPv6 static route.

protocols static table <table> interface-route <subnet> next-hop-interface <interface>

Configures the next-hop interface for an interface-based static route in an alternate routing table.

Syntax

set protocols static table *table* **interface-route** *subnet* **next-hop-interface** *interface* [**disable** | **distance** *distance*]

delete protocols static table *table* **interface-route** *subnet* **next-hop-interface** *interface* [**disable** | **distance**]

show protocols static table *table* **interface-route** *subnet* **next-hop-interface** *interface* [**disable** | **distance**]

Parameters

static
A static route in an alternate routing table.

table *table*
Multi-node. An alternate routing table to be used by policy-based routing rules.

interface-route *subnet*
Multi-node. An interface-based static route. The format is a destination subnet of the form *address*/*prefix* (*x.x.x.x*/*x*). You can define multiple interface-based routes by creating multiple **interface-route** configuration nodes.

next-hop-interface *interface*
The next-hop interface.

disable
Disables the interface-based static route.

distance *distance*
The next-hop distance for this route. Routes with a smaller distance are selected before those with a larger distance. The distance ranges from 1 through 255. The default distance is 1.

Modes

Configuration mode

Configuration Statement

```
protocols {
    static {
        table 1
            interface-route subnet {
                next-hop-interface interface {
                    disable
                    distance distance
                }
            }
        }
    }

}
```

Usage Guidelines

Use this command to configure interface-based static routes in an alternate routing table. The alternate routing tables are used with policy-based routing. Refer to *Brocade Vyatta Network OS Policy-based Routing Configuration Guide* for information on policy-based routing.

Use the **set** form of this command to configure a next-hop interface.

Use the **delete** form of this command to remove a next-hop interface.

Use the **show** form of this command to view a next-hop interface.

protocols static table <table> route <subnet> blackhole <distance>

Configures a a black hole static route in an alternate routing table.

Syntax

set protocols static table *table* **route** *subnet* **blackhole** [**distance** *distance*]

delete protocols static table *table* **route** *subnet* **blackhole** [**distance**]

show protocols static table *table* **route** *subnet* **blackhole** [**distance**]

Parameters

table *table*

Multi-node. An alternate routing table to be used by policy-based routing rules.

route *subnet*

Multi-node. Defines a static route. The format is a destination subnet of the form *address*/*prefix* (*x.x.x.x*/*x*). You can define multiple static routes by creating multiple **route** configuration nodes.

distance *distance*

The black hole distance for this route. Routes with a smaller distance are selected before those with a larger distance. The distance ranges from 1 through 255. The default distance is 1.

Modes

Configuration mode

Configuration Statement

```
protocols {
    static {
        table table {
            route subnet {
                blackhole {
                    distance distance
                }
            }
        }
    }

}
```

Usage Guidelines

Use this command to configure a black hole static route in an alternate policy route table. A black hole route is a route for which the system silently discards packets that are matched.

The alternate routing tables are used with policy-based routing. Refer to *Brocade Vyatta Network OS Policy-based Routing Configuration Guide* for information on policy-based routing.

Use the **set** form of this command to configure a black hole static route.

Use the **delete** form of this command to remove a black hole static route.

Use the **show** form of this command to view a black hole static route.

protocols static table <table> route <subnet> next-hop <address>

Configures the next hop for a static route in an alternate routing table.

Syntax

set protocols static table *table* **route** *subnet* **next-hop** *address* [**disable** | **distance** *distance*]

delete protocols static table *table* **route** *subnet* **next-hop** *address* [**disable** | **distance** [*distance*]]

show protocols static table *table* **route** *subnet* **next-hop** *address* [**disable** | **distance** [*distance*]]

Parameters

table *table*

Multi-node. An alternate routing table to be used by policy-based routing rules.

route *subnet*

Multi-node. Defines a static route. The format is a destination subnet of the form *address*/*prefix* (*x.x.x.x*/*x*). You can define multiple static routes by creating multiple **route** configuration nodes.

next-hop *address*

The address of the next-hop router.

disable

Disables the static route.

distance *distance*

The next-hop distance for this route. Routes with a smaller distance are selected before those with a larger distance. The distance ranges from 1 through 255. The default distance is 1.

Modes

Configuration mode

Configuration Statement

```
protocols {
    static {
        table table {
            route subnet {
                next-hop address {
                    disable
                    distance distance
                }
            }
        }
    }

}
```

Usage Guidelines

Use this command to configure static routes in an alternate routing table. The alternate routing tables are used with policy-based routing. Refer to *Brocade Vyatta Network OS Policy-based Routing Configuration Guide* for information on policy-based routing.

Use the **set** form of this command to configure the next hop for a route in an alternate routing table.

Use the **delete** form of this command to remove the next hop from a static route in an alternate routing table.

Use the **show** form of this command to view the next hop for a static route in an alternate routing table.

protocols static table <table> route6 <subnet> next-hop <address>

Configures the next hop for an IPv6 static route in an alternate routing table.

Syntax

set protocols static table *table* **route6** *subnet* **next-hop** *address* [**disable** | **distance** *distance*]

delete protocols static table *table* **route6** *subnet* **next-hop** *address* [**disable** | **distance**]

show protocols static table *table* **route6** *subnet* **next-hop** *address* [**disable** | **distance**]

Parameters

table *table*

Multi-node. An alternate routing table to be used by policy-based routing rules.

route6 *subnet*

Multi-node. An IPv6 static route. The format is a destination subnet of the form IPv6- *address*/*prefix* (*h*:*h*:*h*:*h*:*h*:*h*:*h*:*h*/*x*). You can define multiple static routes by creating multiple **route6** configuration nodes.

disable

Disables the IPv6 static route.

distance *distance*

The next-hop distance for this route. Routes with a smaller distance are selected before those with a larger distance.

Modes

Configuration mode

Configuration Statement

```
protocols {
    static {
        table table {
            route6 subnet {
                next-hop address {
                    disable
                    distance distance
                    interface interface
                }
            }
        }
    }

}
```

Usage Guidelines

Use this command to configure IPv6 static routes on the system in an alternate routing table. The alternate routing tables are used with policy-based routing. Refer to *Brocade Vyatta Network OS Policy-based Routing Configuration Guide* for information on policy-based routing.

Use the **set** form of this command to configure the next hop for an IPv6 static route in an alternate routing table.

Use the **delete** form of this command to remove the next hop for an IPv6 static route in an alternate routing table.

Use the **show** form of this command to view the next hop for an IPv6 static route in an alternate routing table.

protocols static table <table> route6 <subnet> blackhole [distance]

Configures a black hole static route in an alternate routing table.

Syntax

set protocols static table *table* **route6** *subnet* **blackhole distance** [*distance*]

delete protocols static table *table* **route6** *subnet* **blackhole distance**

show protocols static table *table* **route6** *subnet* **blackhole distance**

Parameters

table *table*

Multi-node. An alternate routing table to be used by policy-based routing rules.

route6 *subnet*

Multi-node. An IPv6 static route. The format is a destination subnet of the form IPv6-*address*/*prefix* (*h*:*h*:*h*:*h*:*h*:*h*:*h*:*h*/*x*). You can define multiple static routes by creating multiple **route** configuration nodes.

blackhole

A destination router that is offline and cannot receive traffic or provide messages to the source of the traffic.

distance *distance*

The black hole distance for this route. Routes with a smaller distance are selected before those with a larger distance.

Modes

Configuration mode

Configuration Statement

```
protocols {
    static {
        table table {
            route6 subnet{
                blackhole {
                    distance distance
                }
            }
        }
    }

}
```

Usage Guidelines

Use this command to configure a black hole IPv6 static route in an alternate routing table. A black hole route silently discards packets that are matched.

The alternate routing tables are used with policy-based routing. Refer to *Brocade Vyatta Network OS Policy-based Routing Configuration Guide* for information on policy-based routing.

Use the **set** form of this command to configure a black hole IPv6 static route.

Use the **delete** form of this command to remove a black hole IPv6 static route.

Use the **show** form of this command to view a black hole IPv6 static route.

VRF

VRF overview

Several technologies exist to allow multiple scopes, or routing instances, within a single router. For example, some hardware-based routers can be divided into independent virtual routers in which each instance operates as a complete router that uses some of the physical interfaces of the router.

Virtual Routing and Forwarding (VRF) is a technology that controls information flow within a network by partitioning the network and separating Layer 3 traffic into different logical VRF domains. For each VRF domain, the router maintains a separate routing table and Layer 3 forwarding tables and can run separate instances of routing protocols. The separation creates isolated Layer 3 forwarding and routing instances that can support overlapping address spaces without contention. The isolation applies only to Layer 3 routing and forwarding. Layer 2 forwarding is unaffected, and from a device management perspective, the router continues to be a single entity.

To forward traffic, the router selects a VRF routing instance that is based on the input interface (and possibly on policy configuration). Because the interface and Layer 2 information are not strictly partitioned, it is possible to use technologies such as MPLS VPN to multiplex route signaling and traffic for multiple routing instances over the same physical connections or Layer 3 interfaces.

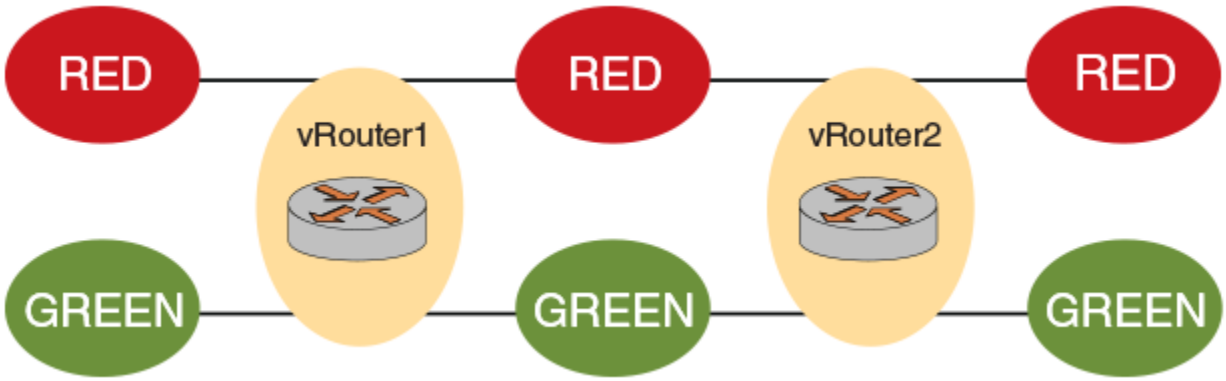
VRF-lite refers to VRF without technologies like MPLS VPN. With VRF-lite, Layer 3 traffic is isolated into separate routing instances. However, connecting routing instances across multiple routers requires a separate physical link for each instance, or the use of Layer 2 trunking technologies, such as VLANs (802.1q), to create separate Layer 2 links over the same physical link.

NOTE

In this release of the Brocade 5600 vRouter documentation, VRF refers to VRF-lite, unless otherwise specified, and routing instance refers to VRF routing instance.

The following figure shows a basic VRF-lite configuration with routing instances that are labeled RED and GREEN. The RED and GREEN traffic is completely separated over different interfaces, with no common processing or signaling within the vRouters. The vRouters are aware of both routing instances, but each interface carries traffic for only one routing instance.

FIGURE 3 Basic VRF-lite configuration



The following guidelines apply to VRF-lite deployments:

- The VRF-capable routers must be reachable at Layer 3, deploying BGP, OSPF, RIP, or static routes.
- Each routing instance maintains unique routing and forwarding tables.
- One or more Layer 3 interfaces on a router can be assigned to be part of a routing instance.
- Each routing instance can be configured with an IPv4 address family, an IPv6 address family, or both. The routing instance for a received packet is determined based on the VRF index of the interface on which the packet is received.
- Separate routing protocol instances are required for each routing instance.
- Overlapping address spaces can be configured on different routing instances.

A VRF-lite instance can be configured on any interface that is configured for Layer 3. For example, a bridge interface that is associated with a bridge group can have a routing instance because the bridge group is a Layer 3 interface. However, you cannot use VRF-lite with data plane interfaces that are configured as part of a bridge group because they forward traffic only at the Layer 2 level.

Management services

The Brocade 5600 vRouter supports significant flexibility in configuring management services. Unlike many other VRF implementations, the vRouter does not require that you separate management functions on a dedicated VRF routing instance. Instead, the vRouter offers the ability to enable and disable management services in the context of a particular routing instance (or in some cases, instances).

This approach can be used to restrict management service access to a specific routing instance, if desired, or to create a more-complex access structure, subject to the following restrictions.

The following services must run on a single routing instance:

- SNMP
- RADIUS
- TACACS+
- NTP

The following services can run on a single routing instance and multiple routing instances:

- DNS
- DHCP
- SSH

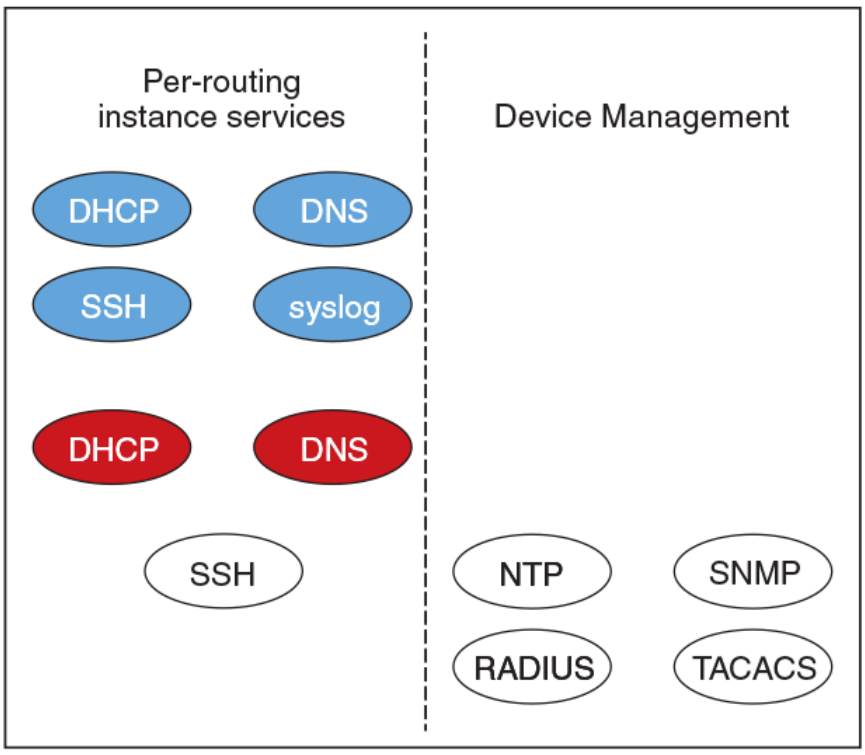
- syslog
- Telnet

Services like LLDP, which operate at Layer 2, must be configured on a systemwide basis (not bound to a particular routing instance).

When determining how to set up management services, consider the interfaces you want to use, the functions you want to perform, and whether the service can be applied to individual routing instances. For example, the following figure shows a sample division of management functions in a vRouter with three routing instances:

- BLUE: Configured for DHCP, DNS, SSH, and syslog.
- RED: Configured for DHCP and DNS.
- WHITE: Configured for SSH, RADIUS, TACACS+, SNMP, and NTP.

FIGURE 4 Per-routing instance services and device management



Feature-specific VRF support

The following sections describe the VRF support for specific Brocade 5600 vRouter features.

VRF support for DNS

The Brocade 5600 vRouter uses DNS in both the client (resolver) and server (proxy) roles. You can configure DNS for individual routing instances. If you configure DNS without specifying a routing instance, the default routing instance is used.

For DNS client (resolver) operations, configure DNS name servers when creating a new routing instance to support DNS clients and dynamic synchronization. As a client, a set of name server addresses is used to resolve queried domain names and update DNS records dynamically.

The following example shows how to configure the 10.70.20.23 DNS name server for the default routing instance.

```
vyatta@R1# set system name-server 10.70.20.23
vyatta@R1# commit
vyatta@R1# run show configuration
system {
    name-server 10.70.20.23
}
```

The following example shows the same configuration sequence for the BLUE routing instance.

```
vyatta@R1# set routing routing-instance BLUE system name-server 10.70.20.23
vyatta@R1# commit
vyatta@R1# run show configuration
routing {
        routing-instance BLUE {
                system {
                        name-server 10.70.20.23
                }
        }
}
```

For server (proxy) operations, if the queried record is not in the cache, the Brocade 5600 vRouter sends the query to DNS servers that are listed in the name server list for the specified routing instance. This name server list can apply to each DNS forwarding instance when configuring DNS forwarding. If not configured, the routing-instance-specific name servers that are configured are used.

The following example shows how to configure proxy settings (listen-on interface dp0s4 and cache size 1024) for the default routing instance.

```
vyatta@R1# set service dns forwarding listen-on dp0s4
vyatta@R1# set service dns forwarding cache-size 1024
vyatta@R1# commit
vyatta@R1# run show configuration
service {
        dns {
                forwarding {
                        cache-size 1024
                        listen-on dp0s3
                }
        }
}
```

The following example shows the same configuration sequence for the BLUE routing instance.

```
vyatta@R1# set routing routing-instance BLUE service dns forwarding listen-on dp0s4
vyatta@R1# set routing routing-instance BLUE service dns forwarding cache-size 1024
vyatta@R1# commit
vyatta@R1# run show configuration
routing {
        routing-instance BLUE {
                service {
                        dns {
                                forwarding {
                                        cache-size 1024
                                        listen-on dp0s4
                                }
                        }
                }
           }
}
```

For more information about DNS and configuring DNS, see *Brocade Vyatta Network OS Basic System Configuration Guide*.

VRF support for DHCP

The implementation of VRF on the Brocade 5600 vRouter supports DHCPv4 server, DHCPv6 server, DHCPv4 relay, DHCPv6 relay, DHCPv4 client, and DHCPv6 client configurations.

You can configure DHCP on individual routing instances. If you configure DHCP without specifying a routing instance, the default routing instance is used.

The DHCP server recognizes which address pool belongs to which routing instance. You can switch configurations between routing instances. However, you cannot create a DHCP relay that involves interfaces from different routing instances.

The following examples show DHCP configurations that use these values:

- routing instance = BLUE
- ipAddress = 42.42.42.42

The following example shows how to configure DHCP for the default routing instance.

```
vyatta@R1# set service dhcp-server listento interface 'dp0s3'
vyatta@R1# set service dhcp-server shared-network-name CORP subnet 42.42.42.0/24 start 42.42.42.1 stop
'42.42.42.253'
vyatta@R1# commit
vyatta@R1# run show configuration
service {
        dhcp-server {
                listento {
                        interface dp0s3
                }
                shared-network-name CORP {
                        subnet 42.42.42.0/24 {
                                start 42.42.42.1 {
                                        stop 42.42.42.253
                                }
                        }
                }
        }
}
```

The following example shows the same configuration sequence for the BLUE routing instance.

```
vyatta@R1# set routing routing-instance BLUE service dhcp-server listento interface 'dp0s4'
vyatta@R1# set routing routing-instance BLUE service dhcp-server shared-network-name CORP subnet
42.42.42.0/24 start 42.42.42.1 stop '42.42.42.253'
vyatta@R1# commit
vyatta@R1# run show configuration
routing {
        routing-instance BLUE {
                interface dp0s4
                service {
                        dhcp-server {
                                listento {
                                        interface dp0s4
                                }
                                shared-network-name CORP {
                                        subnet 42.42.42.0/24 {
                                                start 42.42.42.1 {
                                                        stop 42.42.42.253
                                                }
                                        }
                                }
                        }
                }
        }
}}
```

For more information about DHCP and configuring DHCP, see *Brocade Vyatta Network OS Basic System Configuration Guide*.

VRF support for NAT

NAT is independent of routing instances. However, because interfaces can be bound to a routing instance, if you want a VRF NAT, you must assign NAT rules to the interfaces that make up the routing instance.

VRF support for NTP

NTP must run on a single routing instance. If you configure NTP without specifying a routing instance, the default routing instance is used. You must configure multiple NTP servers one at a time.

The following examples show NTP configurations that use these values:

- routing instance = BLUE
- IP address of the NTP server = 10.0.0.1

The following example shows how to configure NTP for the default routing instance.

```
vyatta@R1# set system ntp server 10.0.0.1
vyatta@R1# commit
vyatta@R1# run show configuration
system {
        ntp {
                server 10.0.0.1
        }
}
```

The following example shows the same configuration sequence for the BLUE routing instance.

```
vyatta@R1# set routing routing-instance BLUE system ntp server 10.0.0.1
vyatta@R1# commit
vyatta@R1# run show configuration
routing {
        routing-instance BLUE {
                system {
                        ntp {
                                server 10.0.0.1
                        }
                }
        }
}
```

For more information about NTP and configuring NTP, refer to *Brocade Vyatta Network OS Basic System Configuration Guide*.

VRF support for firewall

Firewall configuration is independent of routing instances. However, because interfaces can be bound to a routing instance, if you want to configure a firewall, you must assign firewall rules to the interfaces that make up the routing instance.

VRF support for RADIUS authentication

RADIUS must run on a single routing instance. If you configure a RADIUS server without specifying the routing instance, the RADIUS server starts in the default routing instance. If you specify a nondefault routing instance, you must verify that all servers configured for AAA with the RADIUS server are accessible by way of the same routing instance.

The following examples show excerpts of RADIUS configurations that use these values:

- routing instance = BLUE
- radius-server-address = 42.42.42.42
- secret-code = secured

- port-no = 1820
- timeout = 2

The following example shows how to configure RADIUS for the default routing instance.

```
vyatta@R1# set system login radius-server 42.42.42.42
vyatta@R1# set system login radius-server 42.42.42.42 secret secured
vyatta@R1# set system login radius-server 42.42.42.42 port 1820
vyatta@R1# set system login radius-server 42.42.42.42 timeout 2
vyatta@R1# commit
vyatta@R1# run show configuration
system {
        login {
                radius-server 42.42.42.42 {
                        secret secured
                        port 1820
                        timeout 2
                }
        }
}
```

The following example shows the same configuration sequence for the BLUE routing instance.

```
vyatta@R1# set routing routing-instance BLUE system login radius-server 42.42.42.42
vyatta@R1# set routing routing-instance BLUE system login radius-server 42.42.42.42 secret secured
vyatta@R1# set routing routing-instance BLUE system login radius-server 42.42.42.42 port 1820
vyatta@R1# set routing routing-instance BLUE system login radius-server 42.42.42.42 timeout 2
vyatta@R1# commit
vyatta@R1# run show configuration
vyatta@R1# routing {
        routing-instance BLUE {
                system {
                        login {
                                radius-server 42.42.42.42 {
                                        secret secured
                                        port 1820
                                        timeout 2
                                }
                        }
                }
        }
}
```

For more information about RADIUS and configuring RADIUS, see *Brocade Vyatta Network OS Basic System Configuration Guide*.

VRF support for TACACS+

TACACS+ must run on a single routing instance. When you configure TACACS+ without specifying an instance, the TACACS+ servers start in the default routing instance. If you specify a nondefault routing instance, you must verify that all TACACS+ servers configured for AAA are reachable from the same routing instance.

The following examples show excerpts of TACACS+ configurations that use these values:

- routing instance = BLUE
- TACACS+ servers 10.10.30.24 (TAC-1) and 10.10.30.25 (TAC-2)
- secret = secured

In the following example, the TACACS+ servers start in the default routing instance.

```
vyatta@R1# set system login tacplus-server 10.10.30.24 secret secured
vyatta@R1# set system login tacplus-server 10.10.30.25 secret secured
vyatta@R1# commit
vyatta@R1# run show configuration
system {
        login {
```

```
                tacplus-server 10.10.30.24 {
                        secret "********"
                tacplus-server 10.10.30.25 {
                        secret "********"
                }
                user vyatta {
                        authentication {
                                encrypted-password "********"
                        }
                        level superuser
                }
        }
}
```

The following example shows how to configure the same servers to run in the BLUE routing instance.

```
vyatta@R1# set routing routing-instance BLUE system login tacplus-server 10.10.30.24 secret secured
vyatta@R1# set routing routing-instance BLUE system login tacplus-server 10.10.30.25 secret secured
#commit
#run sh configuration
routing {
        routing-instance BLUE {
                system {
                        login {
                                tacplus-server 10.10.30.24 {
                                        secret "********"
                                tacplus-server 10.10.30.25 {
                                        secret "********"
                                }
                        }
                }
        }
}
```

For more information about TACACS+ and configuring TACACS+, see *Brocade Vyatta Network OS Basic System Configuration Guide*.

VRF support for SNMP

The Brocade 5600 vRouter supports the implementation of SNMP on a routing instance, which allows the following associations and configurations:

- An SNMP client to be associated with a specific routing instance and handle context-based access to MIBs.
- An SNMP trap target to be associated with a routing instance for sending SNMP notifications that are specific to the routing instance.
- An SNMP agent to be configured to listen for incoming requests from a specific routing instance.

The SNMP V2 clients are associated with a routing instance by mapping the SNMP community strings with a routing instance, as shown in the following command:

- `set service snmp community <comm-string> [context <routing-instance>]`

When a V2 request with a community string that is mapped to a routing instance is received, an SNMP agent retrieves MIB information that is specific to the routing instance.

The SNMP V3 clients are associated with a routing instance by specifying the routing instance as context in their requests. An SNMP agent returns context-based MIB information for these requests.

The SNMP V2 and V3 trap targets can be configured to receive routing instance-specific SNMP notifications. Traps to these targets are sent out on the configured routing instance, as shown in the following sample:

- `set service snmp trap-target <ip-addr> [routing-instance <name>]`
- `set service snmp v3 trap-target <ip-addr> [routing-instance <name>]`

When no routing instance is configured for a trap target, traps are sent over a default routing instance.

An SNMP agent can be configured to accept client requests from a specific routing instance:

- `set service snmp [routing-instance <name>]`

When no routing instance is configured, an SNMP agent listens for client requests on a default routing instance.

VRF support for SSH

You can configure SSH on any routing instance. If you configure SSH without specifying a routing instance, the default routing instance is used.

The following example shows how to configure SSH for the default routing instance.

```
vyatta@R1# set service ssh listen-address 10.0.0.1
vyatta@R1# set service ssh port 21
vyatta@R1# run show configuration
service {
    ssh {
        listen-address 10.0.0.1
        port 21
                    }
}
```

The following example shows the same configuration sequence for the BLUE routing instance.

```
vyatta@R1# set routing routing-instance BLUE service ssh listen-address 10.0.0.1
vyatta@R1# set routing routing-instance BLUE service ssh port 21
vyatta@R1# commit
vyatta@R1# run show configuration
routing {
        routing-instance BLUE {
                service {
                        ssh {
                           listen-address 10.0.0.1
                           port 21
                        }

                }
        }
}
```

For more information about SSH and configuring SSH, see *Brocade Vyatta Network OS Basic System Configuration Guide*.

VRF support for Telnet

You can configure Telnet on any routing instance. If you configure Telnet without specifying a routing instance, the default routing instance is used.

When you configure Telnet service in a routing instance, the external user can connect to the vRouter through a Telnet session by using the configuration parameters for that instance.

The Telnet service can be started with parameters that are specified in the configuration. If parameters are not specified, Telnet service starts on the default port (port 23).

The following example shows how to configure Telnet for the default routing instance.

```
vyatta@R1# set service telnet listen-address 42.42.42.42
vyatta@R1# set service telnet port 1234
vyatta@R1# commit
vyatta@R1# run show configuration
service {
        telnet {
                listen-address 42.42.42.42
                port 1234
```

```
        }
}
```

The following example shows the same configuration sequence for the BLUE routing instance.

```
vyatta@R1# set routing routing-instance BLUE service telnet listen-address 42.42.42.42
vyatta@R1# set routing routing-instance BLUE service telnet port 1234
vyatta@R1# commit
vyatta@R1# run show configuration
routing {
        routing-instance BLUE {
                service {
                        telnet {
                                listen-address 42.42.42.42
                                port 1234
                        }
                }
        }
}
```

VRF support for syslog

You can configure syslog on any routing instance. If a routing instance is not specified for logging, the default routing instance is used to access the remote host. You can also configure a facility override value that replaces the facility fields in all log entries that are sent to a remote host. For example, you can specify multiple facility values for a set of log entries that are sent by the Brocade 5600 vRouter to a log remote host. Before sending the entries to the remote host, the facility values are replaced with the override value.

The following examples show syslog configurations that use these values:

- Routing instance = BLUE
- IP address of the host = 10.10.10.10
- Facility value = auth (Authentication and authorization)
- Level = crit (Critical)

The following example shows how to configure syslog for the default routing instance.

```
vyatta@R1# set system syslog host 10.10.10.10 facility auth level crit
vyatta@R1# commit
vyatta@R1# run show configuration
system {
        syslog {
                host 10.10.10.10 {
                        facility auth {
                                level crit
                        }
                }
        }
}
```

The following example shows the same configuration sequence for the BLUE routing instance.

```
vyatta@R1# set routing routing-instance BLUE system syslog host 10.10.10.10 facility auth level crit
vyatta@R1# commit
vyatta@R1# run show configuration
routing {
        routing-instance BLUE {
                system {
                        syslog {
                                host 10.10.10.10 {
                                        facility auth {
                                           level crit
                                        }
                                }
                        }
                }
```

```
        }
}
```

For more information on logging and configuring logging, refer to *Brocade Vyatta Network OS Basic System Configuration Guide*.

VRF support for IPsec and GRE

The Brocade 5600 vRouter provides the following support for IPsec and GRE tunnels.

- The inner or encapsulated address is configurable for each routing instance, provided that the tunnel interface is bound to a routing instance. Assign the IPsec or GRE configuration to the interface or interfaces that make up the routing instance.
- The outer or transport address is configurable only on the default routing instance.

VRF support for ALG

You can configure ALG on any routing instance. If you configure ALG without specifying a routing instance, the default routing instance is used. You can commit the configuration before configuring a routing instance to an interface.

The following example shows how to configure ALG for the BLUE routing instance.

```
vyatta@R1# set routing routing-instance BLUE system alg ...
```

The following example shows how to configure ALG for the default routing instance.

```
vyatta@R1# set system alg ...
```

VRF support for BGP

The implementation of VRF on the Brocade 5600 vRouter supports BGP.

If you configure BGP on the vRouter without specifying a VRF instance, the router uses the default routing table. BGP supports route-leaking between VRF's by using route target. To configure BGP for a particular VRF routing instance, specify the instance in the command syntax.

> NOTE
> You must configure a unique route distinguisher, before you configure BGP with a VRF routing instance. You cannot further modify the route distinguisher configuration if BGP is already configured within a routing instance. Use the following command to configure a route distinguisher:
>
> ```
> vyatta@R1# set routing routing-instance VRF-NAME route-distinguisher RDVALUE
> ```

BGP monitor commands log messages from the default VRF, unless the name of the VRF is specified in the configuration of the routing instance.

The following BGP features are supported only on the default routing instance:

- Extended ASN capability
- Graceful restart
- BGP scan timer
- Cluster ID
- Confederation identifier
- Maximum AS limit

VRF support for OSPF and OSPFv3

The Brocade 5600 vRouter supports the implementation of OSPF and OSPFv3 on routing instances.

If you configure OSPF or OSPFv3 on the Brocade 5600 vRouter without specifying a routing instance, the router uses the default routing instance. When configuring OSPF or OSPFv3 for a particular routing instance, you must associate the instance with an OSPF process, and the process ID must be specified in the configuration command.

OSPF configuration

All OSPF configuration commands are supported on routing instances.

In the following example, OSPF area 0 is defined for the default routing instance.

```
vyatta@R1# set protocols ospf area 0
```

In the following example, OSPF area 1 is defined for the RED routing instance, which is associated with OSPF process 1.

```
vyatta@R1# set routing routing-instance RED protocols ospf process 1 area 1
```

OSPFv3 configuration

All OSPFv3 configuration commands are supported on routing instances.

> NOTE
> In the default routing instance, OSPFv3 supports the default process (configuration without including a process ID) and non-default process (configuration with a process ID). In non-default routing instances, OSPFv3 supports only non-default processes (configuration with a process ID).

The following examples show the syntax for an individual configuration command. For an example of how to configure OSPFv3 processes on routing instances, refer to the section on configuring OSPFv3 on routing instances in *Brocade Vyatta Network OS Basic Routing Configuration Guide*.

In the following example, OSPFv3 access list 15 is specified for the default routing instance to filter networks in routing updates.

```
vyatta@R1# set protocols ospfv3 distribute-list 15
```

The following example shows how to apply the same configuration to the RED routing instance, which is associated with OSPFv3 process 10.

```
vyatta@R1# set routing routing-instance RED protocols ospfv3 process 10 distribute-list 15
```

VRF support for RIP and RIPng

This section describes VRF support for RIP and RIPng configuration- and operational-mode commands. This section also describes VRF support for monitoring and logging commands.

VRF support for router-mode commands

You can run RIP and RIPng router-mode configuration commands in the context of a routing instance by using the optional **routing routing-instance** *instance-name* keywords and variable. The following examples show how to configure RIP and RIPng in the context of the RED routing instance.

```
routing routing-instance RED protocols rip …
routing routing-instance RED protocols ripng …
```

If you do not specify a routing instance, the vRouter applies the configuration to the default routing instance.

NOTE
An interface belongs to only one routing instance.

VRF support for interface-mode commands

The RIP and RIPng interface-mode configuration commands do not support the **routing routing-instance** *instance-name* keywords and variable because these commands run in the context of the routing instance to which the interfaces belong.

```
interfaces <intf_type> <intf_name> ip rip …
interfaces <intf_type> <intf_name> ipv6 ripng …
```

VRF support for operational commands

You can use the optional **routing-instance** *instance-name* keyword and variable with the RIP and RIPng operational commands. If you do not use this optional keyword and variable, the commands run in the context of the default routing instance.

```
show ip rip [routing-instance <instance_name>] …
reset ip rip [routing-instance <instance_name>] route …
show ipv6 ripng [routing-instance <instance_name>] …
reset ipv6 ripng [routing-instance <interface_name>] route …
```

VRF support for monitoring and logging commands

You can run the RIP and RIPng monitoring and logging commands in the context of a routing instance with the exception of the commands that enable RIB and NSM logging. If you do not use the **routing-instance** *instance-name* keyword and variable, the commands run in the context of the default routing instance.

```
monitor protocol rip [routing-instance <instance_name>]…
[routing routing-instance <instance_name>] protocols rip log …

monitor protocol ripng [routing-instance <instance_name>] …
[routing routing-instance <instance_name>] protocols ripng log …
```

The **rib** and **nsm** logging options are global options and apply to all routing instances. The **rib** and **nsm** logging options cannot be enabled or disabled on a routing instance basis. The following commands apply to all routing instances.

```
monitor protocol rip … nsm
monitor protocol rip … rib
protocols rip log nsm
protocols rip log rib
monitor protocol ripng … nsm
monitor protocol ripng … rib
protocols ripng log nsm
protocols ripng log rib
```

The output of the following commands displays routing instance information, if relevant.

```
show monitoring protocols rip
show monitoring protocols ripng
```

VRF support for multicast

You can configure multicast within a routing instance by using the CLI, NetConf, or SNMP. When you configure multicast on the vRouter without specifying a routing instance, the configuration applies to the default routing instance. To configure multicast for a particular routing instance, specify the instance.

All protocol-specific multicast commands can be applied to specific routing instances. For example, the following commands apply the indicated protocols to the RED routing instance.

```
vyatta@R1# set routing routing-instance RED protocols multicast ...
vyatta@R1# set routing routing-instance RED protocols pim ...
```

```
vyatta@R1# set routing routing-instance RED protocols pim6 ...
vyatta@R1# set routing routing-instance RED protocols igmp ...
vyatta@R1# set routing routing-instance RED protocols mld ...
vyatta@R1# set routing routing-instance RED protocols msdp ...
```

Any multicast configuration that is applied to an interface can be referred to under a routing instance to bind it to that instance, as in the following examples. In these examples, the dp0p161p1 interface is bound to the RED routing instance.

```
vyatta@R1# set routing routing-instance RED interfaces dp0p161p1 ip pim
vyatta@R1# set routing routing-instance RED interfaces dp0p161p1 ip igmp
vyatta@R1# set routing routing-instance RED interfaces dp0p161p1 ip multicast
vyatta@R1# set routing routing-instance RED interfaces dp0p161p1 ipv6 pim
vyatta@R1# set routing routing-instance RED interfaces dp0p161p1 ipv6 mld
```

You can apply routing instances to **show** commands for supported protocols. The following example shows details about IPv6 MLD groups for the RED routing instance. If no routing instance is specified, the command applies to the default routing instance.

```
vyatta@vyatta:~$ show ipv6 mld groups routing-instance RED detail
```

You can apply routing instances to **reset** commands. The following example shows how to clear IP BGP addresses for routing instance RED. If no routing instance is specified, the command applies to the default routing instance.

```
vyatta@vyatta:~$ reset ip bgp routing-instance RED detail
```

Logging by multicast protocols is configured on a per routing instance basis. If no routing instance is specified, the command applies to the default routing instance. The following example shows how to enable all PIM logs in the RED routing instance.

```
vyatta@vyatta:~$ monitor protocol multicast routing-instance RED pim enable
```

VRF support for BFD

All BFD configuration commands are supported on routing instances.

The following example shows how to configure the BFD source and destination for the default routing instance.

```
vyatta@R1# set protocols bfd destination 10.16.1.12 source 10.14.10.3
```

The following example shows how to apply the same configuration to the GREEN routing instance.

```
vyatta@R1# set routing routing-instance GREEN protocols bfd destination 10.16.1.12 source 10.14.10.3
```

VRF support for VRRP

VRF allows a Brocade 5600 vRouter to support multiple routing tables, one for each VRF routing instance. Virtual Router Redundancy Protocol (VRRP) operates within the context of a single Layer 3 IP subnet, so its operation is not affected by VRF routing instances. Note that VRRP operates appropriately for directly connected interfaces in different routing instances with overlapping address spaces.

The following example shows that the dp0s11 interface is bound to the BLUE routing instance and the dp0s4 interface is bound to the RED routing instance.

```
routing {
    routing-instance BLUE {
        instance-type vrf
        interface dp0s11
    }
    routing-instance RED {
        instance-type vrf
        interface dp0s4
    }
}
```

The following example shows that VRRP for IPv4 is configured with overlapping addresses for the interfaces that were created previously in the RED and BLUE routing instances.

```
dataplane dp0s4 {
    address 11.0.0.2/24
    vrrp{
        vrrp-group 1 {
            priority 254
            version 3
            virtual-address 11.0.0.10
        }
}
dataplane dp0s11 {
    address 11.0.0.2/24
    vrrp{
        vrrp-group 1 {
        priority 254
        version 3
        virtual-address 11.0.0.10
    }
}
```

The following example command sequence shows that VRRP for IPv6 is configured with overlapping addresses for the interfaces that were created previously in the RED and BLUE routing instances.

```
dataplane dp0s4 {
    address 2001::2/64
vrrp{
    vrrp-group 3 {
            priority 254
            version 3
            virtual-address 2001::10
            virtual-address fe80::10
        }
    }
}
dataplane dp0s11 {
    address 2001::2/64
    vrrp{
        vrrp-group 3 {
            priority 254
            version 3
            virtual-address 2001::10
            virtual-address fe80::10
        }
    }
}
```

For more information about VRRP, see *Brocade Vyatta Network OS Basic System Configuration Guide*.

VRF support for file transfer client connections

The Brocade 5600 vRouter uses FTP that contains several commands. If the network configuration supports VRF, the syntax for each command includes optional VRF parameters. The optional VRF parameters specify the non-default VRF that is used when running the command.

FTPs used in commands that support non-default VRFs must access servers on non-default VRFs. Therefore, commands that support non-default VRF also must also be aware of the VRF parameter that is used in the configuration.

For example, a customer may have vRouter images stored on a server in the non-default VRF; so, the `add system image` command must be able to download from that server. The `add system image` command sytax consists of the routing instance parameter that specifies the non-default VRF that is used. The command follows:

```
vyatta@R1# add system image { iso-filename | [routing-instance <ri-name>] iso-URL [ username username
password password ] }
```

An example of a routing instance follows:

```
vyatta@R1# add system image routing-instance red http://1.2.3.4/images/vrouter.iso
```

VRF support for TWAMP

The vRouter supports the configuration of a TWAMP service for individual routing instances and the operation of the twping TWAMP client in the context of a specified routing instance.

To specify the routing instance in which a TWAMP server runs, use the optional **routing routing-instance** *routing-instance* keywords and variable. For example, the following command configures a TWAMP server to run in the BLUE routing instance.

```
$ set routing routing-instance BLUE service twamp server
```

If you do not specify a routing instance, the TWAMP server runs in the context of the default routing instance.

TWAMP message logging

TWAMP messages that are logged by twampd in the context of a user-configured routing instance are prepended with the name of the instance, as shown in the following example. In this example, the log message was logged in the context of the GREEN routing instance.

```
Apr 08 07:31:24 vm-next-1 twampd[22829]: [twampd@green.service] StartSessions 1 sessions
```

TWAMP messages that are logged by twampd in the context of the default routing instance do not specify the name of the instance, as shown in the following example.

```
Apr 05 15:32:47 vm-torrance-1 twampd[5149]: StartSessions 1 sessions
```

twping RPC VRF support

When making twping RPC calls, you can specify a routing instance, as specified by the leaf definition of the routing instance in the YANG model.

```
leaf routing-instance {
     description "The routing instance context for this session";
     type routing:routing-instance-name;
     default "default";
}
```

The following is an example of a twping RPC call.

```
<rpc xmlns="urn:ietf:params:xml:ns:netconf:base:1.0" message-id="3">
  <twping xmlns="urn:vyatta.com:mgmt:vyatta-service-twamp:1">
    <host>10.10.3.2</host>
    <routing-instance>blue</routing-instance>
  </twping>
</rpc>]]>]]>
```

VRF configuration examples

This section presents the following topics:

Binding interfaces to routing instances

This example shows how to specify interfaces and bind them to the RED and BLUE routing instances.

FIGURE 5 RED and BLUE routing instances

TABLE 8 Binding interfaces to routing instances

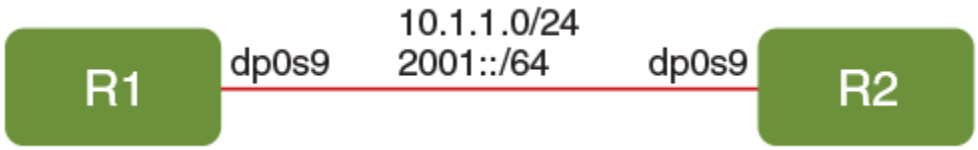
Step	Command
Define the dp0s1 and dp0s2 data plane interfaces.	`vyatta@R1# set interfaces dataplane dp0s1` `vyatta@R1# set interfaces dataplane dp0s2`
Bind dp0s1 to the BLUE routing instance and dp0s2 to the RED routing instance.	`vyatta@R1# set routing routing-instance BLUE interface dp0s1` `vyatta@R1# set routing routing-instance RED interface dp0s2`

View the configuration.	`vyatta@R1# show interfaces`
	`interfaces {`
	`  dataplane dp0s1`
	`  dataplane dp0s2`
	`  }`
	`routing {`
	`  routing-instance BLUE {`
	`  interface dp0s1`
	`  }`
	`  routing-instance RED {`
	`  interface dp0s2`
	`  }`
	`}`

Configuring static routes on a routing instance

In this example, the R1 vRouter is connected to the R2 vRouter through the dp0s9 interface that is bound to the RED routing instance.

FIGURE 6 Configuring static routes on a routing instance



The following steps create static routes for the RED routing instance.

TABLE 9 Configuring static routes on a routing instance

Step	Command
Define the dp0s9 interface and bind it to the RED routing instance.	`vyatta@R1# set interfaces dataplane dp0s9` `vyatta@R1# set routing routing-instance RED interface dp0s9`

TABLE 9 Configuring static routes on a routing instance (continued)

Step	Command
Create IPv4 and IPv6 static routes under the RED routing instance.	`vyatta@R1# set routing routing-instance RED protocols static route 100.1.1.0/24 next-hop 10.1.1.9` `vyatta@R1# set routing routing-instance RED protocols static route6 2001::/64 next-hop 3001::2`
Create IPv4 and IPv6 interface static routes under the RED routing instance.	`vyatta@R1# set routing routing-instance RED protocols static interface-route 100.1.2.0/24 next-hop-interface dp0s9` `vyatta@R1# set routing routing-instance RED protocols static interface-route6 2002::/64 next-hop-interface dp0s9`
Create IPv4 and IPv6 blackhole static route configurations under routing instance RED.	`vyatta@R1# set routing routing-instance RED protocols static route 100.1.3.0/24 blackhole` `vyatta@R1# set routing routing-instance RED protocols static route6 2003::/64 blackhole`
Create unreachable IPv4 and IPv6 static routes under routing instance RED.	`vyatta@R1# set routing routing-instance RED protocols static route 100.1.4.0/24 unreachable` `vyatta@R1# set routing routing-instance RED protocols static route6 2004::/64 unreachable`

View the configuration.	`vyatta@R1# show routing`
	`routing {`
	`  routing-instance RED {`
	`  interface dp0s9`
	`  protocols {`
	`  static {`
	`  route 100.1.1.0/24 {`
	`  next-hop 10.1.1.9`
	`  }`
	`  route6 2001::/64 {`
	`  next-hop 3001::2`
	`  }`
	`  interface-route 100.1.2.0/24 {`
	`  next-hop-interface dp0s9`
	`  }`
	`  interface-route6 2002::/64 {`
	`  next-hop-interface dp0s9`
	`  }`
	`  route 10.1.3.0/24 {`
	`  blackhole`
	`  }`
	`  route 100.1.4.0/24 {`
	`  unreachable`
	`  }`
	`  route6 2003::/64 {`
	`  blackhole`
	`  }`
	`  route6 2004::/64`
	`{`
	`  unreachable`
	`  }`
	`  }`
	`  }`
	`  }`
	`}`

The following example shows how to add route leaking between the RED and BLUE routing instances.

Each routing instance operates independently and without knowledge of other routing instances, unless the routes are imported or exported to one another by using inter-VRF route leaking. Inter-VRF route leaking allows leaking of route prefixes from one routing

instance to another on the same vRouter. Both dynamic and static route leaking are supported; this example shows how to configure static route leaking.

In the following figure, the R1 vRouter has the dp0s9 interface bound to the RED routing instance and the 10.1.1.0/24 IPv4 and 2001::/64 IPv6 connected networks configured on RED. The example shows how to install a route in RED with the next hop pointing to the BLUE routing instance.

FIGURE 7 Route leaking between routing instances

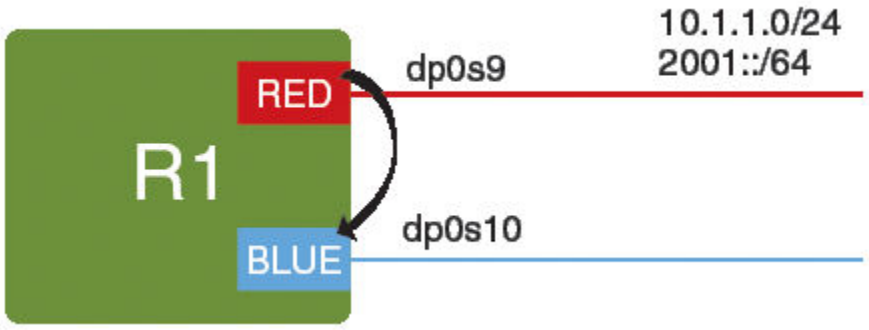


TABLE 10 Route leaking between routing instances

Step	Command
Configure route leaking for IPv4 and IPv6 routes by installing a route in RED with the next hop pointing to BLUE.	`vyatta@R1# set routing routing-instance RED protocols static route 20.1.1.0/24 next-hop -routing-instance BLUE  next-hop 10.1.1.2` `vyatta@R1# set routing routing-instance RED protocols static route6 2009::/64 next-hop-routing-instance BLUE next-hop 2001::2`

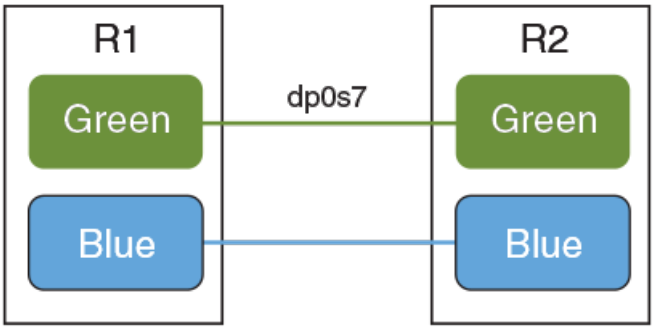
View the configuration.	`vyatta@R1# show routing`
	`routing {`
	`routing-instance RED {`
	`interface dp0s9`
	`protocols {`
	`static {`
	`route 20.1.1.0/24 {`
	`next-hop-routing-instance BLUE {`
	`next-hop 10.1.1.2`
	`}`
	`}`
	`route6 2009::/64 {`
	`next-hop-routing-instance-v6 BLUE {`
	`next-hop 2001::2`
	`}`
	`}`
	`}`
	`}`
	`}`
	`}`

Configuring policy-based routing on a routing instance

In this example, the R1 vRouter is connected to the R2 vRouter through the dp0s7 interface that is bound to the GREEN routing instance.

The following steps show how to create an alternate routing table in the GREEN routing instance on dp0s7.

FIGURE 8 Configuring policy-based routing on a routing instance



To configure policy-based routing on a vRouter perform the following configuration and then reproduce the configuration as described in *Brocade Vyatta Network OS Basic Routing Configuration Guide*.

TABLE 11 Configuring policy-based static routes on a routing instance

Step	Command
Define the dp0s7 interface and bind it to the GREEN routing instance.	`vyatta@R1# set interfaces dataplane dp0s7` `vyatta@R1# set routing routing-instance GREEN interface dp0s7`
Define an interface based static route.	`vyatta@R1# set routing routing-instance GREEN protocols static table 10 interface-route 20.1.1.0/24 next-hop-interface dp0s7` `vyatta@R1# set routing routing-instance GREEN protocols static table 10 interface-route6 2010::/64 next-hop-interface dp0s7`

Create IPv4 and IPv6 PBR static routes under the GREEN routing instance.	`vyatta@R1# set routing routing-instance GREEN protocols static table 10 route 20.1.1.0/24 next-hop 10.1.1.2 interface dp0s7`
	
	`vyatta@R1# set routing routing-instance GREEN protocols static table 10 route6 2010::/64 next-hop 1010::2 interface dp0s7`

Create the IPv4 and IPv6 static routes with distance in the GREEN routing instance in the 10 PBR table.	`vyatta@R1# set routing routing-instance GREEN protocols static table 10 route 20.1.1.0/24 next-hop 10.1.1.2 distance 8` `vyatta@R1# set routing routing-instance GREEN protocols static table 10 route6 2010::/64 next-hop 1010::2 distance 8`
Create IPv4 and IPv6 black hole PBR static route configurations under the GREEN routing instance.	`vyatta@R1# set routing routing-instance GREEN protocols static table 10 route 20.1.1.0/24 blackhole` `vyatta@R1# set routing routing-instance GREEN protocols static table 10 route6 2010::/64 blackhole`
Create unreachable IPv4 and IPv6 PBR static routes under the GREEN routing instance.	`vyatta@R1# set routing routing-instance GREEN protocols static route table 10 route 20.1.1.0/24 unreachable` `vyatta@R1# set routing routing-instance GREEN protocols static route6 table 10 route6 2010::/64 unreachable`

View the configuration.	`vyatta@R1# show routing`
	`routing {`
	`routing-instance GREEN {`
	`interface dp0s7`
	`protocols {`
	`static {`
	`table 10 {`
	`interface-route 20.1.1.0/24 {`

TABLE 11 Configuring policy-based static routes on a routing instance (continued)

Step	Command

	next-hop-interface dp0s7
	}
	interface-route6 2010::/64 {
	next-hop-interface dp0s7
	}
	route 20.1.1.0/24 {
	blackhole
	next-hop 10.1.1.2 {
	distance 10
	interface dp0s7
	}
	unreachable
	}
	route6 2010::/64 {
	blackhole
	next-hop 1010::2 {
	distance 10
	interface dp0s5
	}
	unreachable
	
	}
	
	}
	}
	}
	}

Configuring OSPFv3 on routing instances

This example shows how to configure OSPFv3 on routing instances.

Initially all of the interfaces for the R1 vRouter (dp0s9, dp0s10, and dp0s11) are bound to the default routing instance. This example shows how to modify the configuration as illustrated in the following figure. In the figure, dp0s9 is bound the default routing instance, dp0s10 is bound to the RED routing instance, and dp0s11 is bound to the BLUE routing instance.

FIGURE 9 Configuring OSPFv3 on routing instances

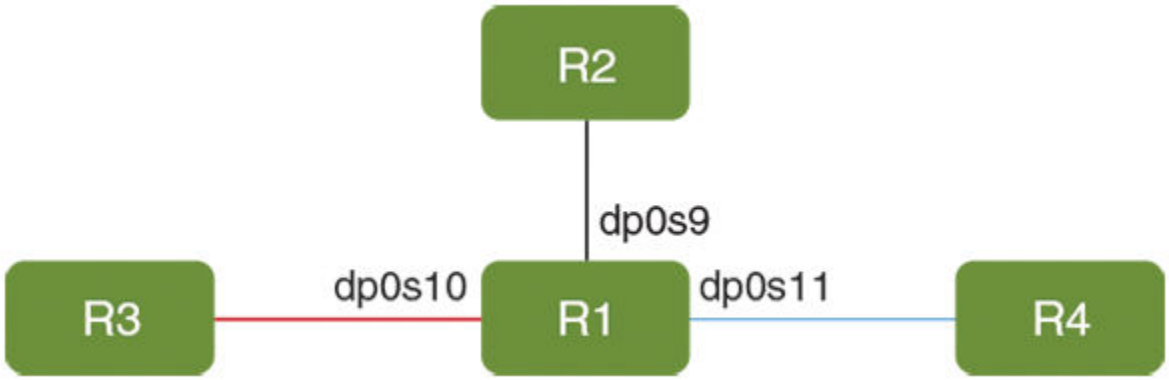


TABLE 12 Configuring OSPFv3 on routing instances

Step	Command

View the configuration before reassigning routing instances.	`vyatta@R1:~$ show interfaces routing-instance all`
	`Codes: S - State, L - Link, u - Up, D - Down, A - Admin Down`
	`Interface IP Address S/L Description`
	`--------- ---------- --- -----------`
	`dp0s3 192.168.122.204/24 u/u`
	`dp0s9 10.1.1.1/24 u/u`
	`dp0s10 20.1.1.1/24 u/u`
	`dp0s11 30.1.1.1/24 u/u`

Move dp0s10 to the RED routing instance and dp0s11 to the BLUE routing instance.	`vyatta@R1# set routing routing-instance RED interface dp0s10` `vyatta@R1# set routing routing-instance BLUE interface dp0s11`
Commit the changes and go to Operational mode.	`vyatta@R1# commit` `vyatta@R1#exit`

View the changes.	`vyatta@R1:~$ show interfaces routing-instance all`
	`Codes: S - State, L - Link, u - Up, D - Down, A - Admin Down`
	`Interface IP Address S/L Description`
	`--------- ---------- --- -----------`
	`dp0s3 192.168.122.204/24 u/u`
	`dp0s9 10.1.1.1/24 u/u`
	
	`Routing Instance BLUE`
	`--------------------`
	`dp0s11 30.1.1.1/24 u/u`
	
	`Routing Instance RED`
	`--------------------`
	`dp0s10 20.1.1.1/24 u/u`

Create OSPFv3 processes:
• Under the default routing instance toward R2 (as a non-default OSPFv3 process in the default routing instance).
• Under the RED routing instance toward R3.
• Under the BLUE routing instance toward R4.
	`vyatta@R1# set protocols ospfv3 process 1 router-id 1.1.1.1`
	`vyatta@R1# set routing routing-instance RED protocols ospfv3 process 2 router-id 2.2.2.2`
	`vyatta@R1# set routing routing-instance BLUE protocols ospfv3 process 3 router-id 3.3.3.3`

Enable OSPFv3 on dp0s9, dp0s10, and dp0s11.	`vyatta@R1# set interfaces dataplane dp0s9 ipv6 ospfv3 process 1 instance-id 0 area 0`
	`vyatta@R1# set interfaces dataplane dp0s10 ipv6 ospfv3 process 2 instance-id 0 area 0`
	`vyatta@R1# set interfaces dataplane dp0s11 ipv6 ospfv3 process 3 instance-id 0 area 0`

View the candidate configuration.	`vyatta@R1# show interfaces`
	`dataplane dp0s9 {`
	`address 10.1.1.1/24`
	`ipv6 {`
	`ospfv3 {`
	`process 1 {`
	`instance-id 0 {`
	`area 0`
	`}`
	`}`
	`}`
	`}`
	`}`

TABLE 12 Configuring OSPFv3 on routing instances (continued)

Step	Command

	dataplane dp0s10 {
	address 20.1.1.1/24
	ipv6 {
	ospfv3 {
	process 2 {
	instance-id 0 {
	area 0
	}
	}
	}
	}
	}
	dataplane dp0s11 {
	address 30.1.1.1/24
	ipv6 {
	ospfv3 {
	process 3 {
	instance-id 0 {
	area 0
	}
	}
	}
	}
	}
	}

Configuring SNMP on a routing instance

The following sections provide examples of configuration mode commands.

Associating an SNMP client on a routing instance

The following configuration associates the commA community string with the RED routing instance and the commB community string with the BLUE routing instance. Only one context name can be mapped to a community, but multiple communities can be mapped to the same context name. A community string that is mapped to a context must have a defined view.

TABLE 13 Associating an SNMP client on a routing instance

Step	Command
Set the SNMP version 1 and version 2 community as commA and context as RED.	vyatta@R1# set service snmp community commA context red
Set the SNMP version 1 and version 2 community as commB and context as BLUE.	vyatta@R1# set service snmp community commB context blue vyatta@R1# set service snmp view all oid 1
Associate all views with the commA SNMP community.	vyatta@R1# set service snmp community commA view all
Associate all views with the commB SNMP community.	vyatta@R1# set service snmp community commB view all
View the configuration.	vyatta@R1# show service snmp community community commA { context red view all

TABLE 13 Associating an SNMP client on a routing instance (continued)

Step	Command

	}
	community commB {
	context blue
	view all
	}
	vyatta@vyatta#

Associating a trap target with a routing instance

The following configuration associates an SNMPv2 trap target with the 1.1.1.1 IP address on the RED routing instance.

TABLE 14 Associating SNMPv2 trap targets on a routing instance

Step	Command
Set the SNMPv2 trap target with the 1.1.1.1 IP address on the RED routing instance.	vyatta@R1# set service snmp v2 trap-target 1.1.1.1 routing-instance red
Define the test community configuration node.	vyatta@R1# set service snmp v2 trap-target 1.1.1.1 community test
Commit the configuration.	vyatta@R1# commit

View the configuration.	vyatta@R1# show service snmp v2 trap-target
	trap-target 1.1.1.1 {
	community test
	routing-instance red
	}
	vyatta@vyatta#

The following configuration associates an SNMPv3 trap target with IP address 2.2.2.2 on the RED routing instance.

TABLE 15 Associating an SNMPv3 trap target on a routing instance

Step	Command
Set the SNMPv3 trap target with the 2.2.2.2 IP address on the RED routing instance.	vyatta@R1# set service snmp v3 trap-target 2.2.2.2 routing-instance red
Define the usr2 SNMPv3 user.	vyatta@R1# set service snmp v3 trap-target 2.2.2.2 user usr2
Define a cleartext password to authenticate a user.	set service snmp v3 trap-target 2.2.2.2 auth plaintext-key "usr2usr2"
Commit the configuration.	vyatta@R1# commit

View the configuration.	vyatta@R1# show service snmp v3 trap-target
	trap-target 2.2.2.2 {
	auth {
	plaintext-key "********"
	}
	user usr2
	routing-instance red

TABLE 15 Associating an SNMPv3 trap target on a routing instance (continued)

Step	Command
	} vyatta@vyatta#

Configuring an SNMP agent to listen on a routing instance

The following configuration shows how to configure an SNMP agent to listen for incoming requests from the RED routing instance.

TABLE 16 Configuring an SNMP agent on a routing instance

Step	Command
Set an SNMP agent to listen for incoming requests from the RED routing instance.	vyatta@R1# set service snmp routing-instance red
View the configuration.	vyatta@R1# show service snmp routing-instance routing-instance red vyatta@vyatta#

Command support for VRF routing instances

VRF allows a Brocade 5600 vRouter to support multiple routing tables, one for each VRF routing instance. Some commands in this guide support VRF and can be applied to particular routing instances.

Use the guidelines in this section to determine correct syntax when adding VRF routing instances to commands.

Adding a VRF routing instance to a Configuration mode command

For most Configuration mode commands, specify the VRF routing instance at the beginning of a command. Add the appropriate VRF keywords and variable to follow the initial action (**set**, **show**, or **delete**) and before the other keywords and variables in the command.

Configuration mode example: syslog

The following command configures the syslog logging level for the specified syslog host. The command does not include a VRF routing instance, so the command applies to the default routing instance.

```
vyatta@R1# set system syslog host 10.10.10.1 facility all level debug
vyatta@R1# show system syslog
syslog {
    host 10.10.10.1 {
            facility all {
                    level debug
            }
    }
}
```

The following example shows the same command with the VRF routing instance (GREEN) added. Notice that **routing routing-instance GREEN** has been inserted between the basic action (**set** in the example) and the rest of the command. Most Configuration mode commands follow this convention.

```
vyatta@R1# set routing routing-instance GREEN system syslog host 10.10.10.1 facility all level debug
vyatta@R1# show routing
routing {
     routing-instance GREEN {
             system {
                     syslog {
                            host 11.12.13.2:514 {
                                     facility all {
                                             level debug
                                     }
                             }
                     }
             }
     }
}
```

Configuration mode example: SNMP

Some features, such as SNMP, are not available on a per-routing instance basis but can be bound to a specific routing instance. For these features, the command syntax is an exception to the convention of specifying the routing instance at the beginning of Configuration mode commands.

The following example shows how to configure the SNMPv1 or SNMPv2c community and context for the RED and BLUE routing instances. The first two commands specify the RED routing instance as the context for community A and BLUE routing instance as the context for community B. The subsequent commands complete the configuration.

For more information about configuring SNMP, refer to *Brocade Vyatta Network OS Remote Management Configuration Guide*.

```
vyatta@R1# set service snmp community commA context RED
vyatta@R1# set service snmp community commB context BLUE
vyatta@R1# set service snmp view all oid 1
vyatta@R1# set service snmp community commA view all
vyatta@R1# set service snmp community commB view all
vyatta@R1# show service snmp community
 community commA {
        context RED
        view all
 }
 community commB {
        context BLUE
        view all
 }
[edit]
vyatta@vyatta#
```

Adding a VRF routing instance to an Operational mode command

The syntax for adding a VRF routing instance to an Operational mode command varies according to the type of command parameters:

- If the command does not have optional parameters, specify the routing instance at the end of the command.
- If the command has optional parameters, specify the routing instance after the required parameters and before the optional parameters.

Operational mode examples without optional parameters

The following command displays dynamic DNS information for the default routing instance.

```
vyatta@vyatta:~$ show dns dynamic status
```

The following command displays the same information for the specified routing instance (GREEN). The command does not have any optional parameters, so the routing instance is specified at the end of the command.

```
vyatta@vyatta:~$ show dns dynamic status routing-instance GREEN
```

Operational mode example with optional parameters

The following command obtains multicast path information for the specified host (10.33.2.5). A routing instance is not specified, so the command applies to the default routing instance.

```
vyatta@vyatta:~$ mtrace 10.33.2.5 detail
```

The following command obtains multicast path information for the specified host (10.33.2.5) and routing instance (GREEN). Notice that the routing instance is specified before the optional **detail** keyword.

```
vyatta@vyatta:~$ mtrace 10.33.2.5 routing-instance GREEN detail
```

Operational mode example output: SNMP

The following SNMP **show** commands display output for routing instances.

```
vyatta@vyatta:~$ show snmp routing-instance
Routing Instance SNMP Agent is Listening on for Incoming Requests:
Routing-Instance            RDID
-----------------           ----
RED                         5

vyatta@vyatta:~$ show snmp community-mapping
SNMPv1/v2c Community/Context Mapping:
Community                   Context
---------                   -------
commA                       'RED'
commB                       'BLUE'
deva                        'default'


vyatta@vyatta:~$ show snmp trap-target
SNMPv1/v2c Trap-targets:
Trap-target                   Port   Routing-Instance Community
-----------                   ----   ---------------- ---------
1.1.1.1                             'RED'           'test'


vyatta@vyatta:~$ show snmp v3 trap-target
SNMPv3 Trap-targets:
Trap-target                   Port   Protocol Auth Priv Type   EngineID              Routing-Instance User
-----------                   ----   -------- ---- ---- ----   --------              ---------------- ----
2.2.2.2                       '162'  'udp'    'md5'      'infor                      'BLUE'           'test'
```

List of commands that support VRF

List of configuration commands

```
policy route pbr <pbr-group> rule <rule-number> routing-instance <value>
protocols static route <prefix> next-hop-routing-instance <routing-instance>
protocols static route <prefix> next-hop-routing-instance <routing-instance> next-hop <address>
protocols static route <prefix> next-hop-routing-instance <routing-instance> next-hop <address> disable
protocols static route <prefix> next-hop-routing-instance <routing-instance> next-hop <address> distance
<value>
protocols static route <prefix> next-hop-routing-instance <routing-instance> next-hop <address> interface
<value>
protocols static route6 <prefix> next-hop-routing-instance <routing-instance>
protocols static route6 <prefix> next-hop-routing-instance <routing-instance> next-hop <address>
protocols static route6 <prefix> next-hop-routing-instance <routing-instance> next-hop <address> disable
protocols static route6 <prefix> next-hop-routing-instance <routing-instance> next-hop <address> distance
<value>
protocols static route6 <prefix> next-hop-routing-instance <routing-instance> next-hop <address> interface
<value>
routing routing-instance <instance-name>
routing routing-instance <instance-name> description <value>
routing routing-instance <instance-name> instance-type <value>
routing routing-instance <instance-name> interface <name>
routing routing-instance <instance-name> protocols bfd destination <address>
routing routing-instance <instance-name> protocols bfd destination <address> source <address>
routing routing-instance <instance-name> protocols bfd destination <address> source <address> helper-session
routing routing-instance <instance-name> protocols bfd destination <address> source <address> template
<value>
routing routing-instance <instance-name> protocols bfd log all
routing routing-instance <instance-name> protocols bfd log event
routing routing-instance <instance-name> protocols bfd log ipc-error
routing routing-instance <instance-name> protocols bfd log ipc-event
routing routing-instance <instance-name> protocols bfd log packet
routing routing-instance <instance-name> protocols bfd log session
routing routing-instance <instance-name> protocols bgp <as-number>
routing routing-instance <instance-name> protocols bgp <as-number> address-family
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv4-unicast
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv4-unicast aggregate-
address <address>
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv4-unicast aggregate-
address <address> as-set
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv4-unicast aggregate-
address <address> summary-only
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv4-unicast auto-summary
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv4-unicast network
<address>
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv4-unicast network
<address> backdoor
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv4-unicast network
<address> route-map <value>
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv4-unicast nexthop
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv4-unicast nexthop
route-map <value>
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv4-unicast parameters
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv4-unicast parameters
dampening
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv4-unicast parameters
dampening half-life <value>
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv4-unicast parameters
dampening max-suppress-time <value>
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv4-unicast parameters
dampening re-use <value>
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv4-unicast parameters
dampening start-suppress <value>
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv4-unicast parameters
dampening un-reachability-half-life <value>
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv4-unicast parameters
distance
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv4-unicast parameters
```

```
distance global
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv4-unicast parameters
distance global external <value>
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv4-unicast parameters
distance global internal <value>
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv4-unicast parameters
distance global local <value>
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv4-unicast parameters
network-synchronization
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv4-unicast parameters
synchronization
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv4-unicast redistribute
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv4-unicast redistribute
connected
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv4-unicast redistribute
connected route-map <value>
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv4-unicast redistribute
kernel
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv4-unicast redistribute
kernel route-map <value>
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv4-unicast redistribute
ospf
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv4-unicast redistribute
ospf route-map <value>
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv4-unicast redistribute
rip
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv4-unicast redistribute
rip route-map <value>
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv4-unicast redistribute
static
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv4-unicast redistribute
static route-map <value>
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv6-unicast
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv6-unicast aggregate-
address <address>
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv6-unicast aggregate-
address <address> as-set
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv6-unicast aggregate-
address <address> summary-only
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv6-unicast auto-summary
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv6-unicast network
<address>
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv6-unicast network
<address> backdoor
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv6-unicast network
<address> route-map <value>
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv6-unicast nexthop
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv6-unicast nexthop
route-map <value>
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv6-unicast parameters
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv6-unicast parameters
dampening
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv6-unicast parameters
dampening half-life <value>
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv6-unicast parameters
dampening max-suppress-time <value>
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv6-unicast parameters
dampening re-use <value>
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv6-unicast parameters
dampening start-suppress <value>
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv6-unicast parameters
dampening un-reachability-half-life <value>
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv6-unicast parameters
distance
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv6-unicast parameters
distance global
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv6-unicast parameters
distance global external <value>
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv6-unicast parameters
distance global internal <value>
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv6-unicast parameters
distance global local <value>
```

```
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv6-unicast parameters
network-synchronization
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv6-unicast parameters
synchronization
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv6-unicast redistribute
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv6-unicast redistribute
connected
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv6-unicast redistribute
connected route-map <value>
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv6-unicast redistribute
kernel
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv6-unicast redistribute
kernel route-map <value>
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv6-unicast redistribute
ospfv3
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv6-unicast redistribute
ospfv3 route-map <value>
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv6-unicast redistribute
ripng
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv6-unicast redistribute
ripng route-map <value>
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv6-unicast redistribute
static
routing routing-instance <instance-name> protocols bgp <as-number> address-family ipv6-unicast redistribute
static route-map <value>
routing routing-instance <instance-name> protocols bgp <as-number> log all
routing routing-instance <instance-name> protocols bgp <as-number> log bfd
routing routing-instance <instance-name> protocols bgp <as-number> log dampening
routing routing-instance <instance-name> protocols bgp <as-number> log events
routing routing-instance <instance-name> protocols bgp <as-number> log filters
routing routing-instance <instance-name> protocols bgp <as-number> log fsm
routing routing-instance <instance-name> protocols bgp <as-number> log keepalive
routing routing-instance <instance-name> protocols bgp <as-number> log msdp
routing routing-instance <instance-name> protocols bgp <as-number> log update all
routing routing-instance <instance-name> protocols bgp <as-number> log update in
routing routing-instance <instance-name> protocols bgp <as-number> log update out
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address>
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv4-
unicast
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv4-
unicast allowas-in
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv4-
unicast allowas-in number <value>
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv4-
unicast attribute-unchanged as-path
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv4-
unicast attribute-unchanged med
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv4-
unicast attribute-unchanged next-hop
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv4-
unicast capability
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv4-
unicast capability graceful-restart
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv4-
unicast capability graceful-restart disable
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv4-
unicast capability orf
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv4-
unicast capability orf prefix-list
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv4-
unicast capability orf prefix-list receive
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv4-
unicast capability orf prefix-list send
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv4-
unicast default-originate
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv4-
unicast default-originate route-map <value>
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv4-
unicast disable-send-community extended
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv4-
unicast disable-send-community standard
```

```
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv4-
unicast distribute-list export <value>
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv4-
unicast distribute-list import <value>
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv4-
unicast filter-list
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv4-
unicast filter-list export <value>
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv4-
unicast filter-list import <value>
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv4-
unicast maximum-prefix <address>
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv4-
unicast maximum-prefix <address> threshold <percentage>
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv4-
unicast maximum-prefix <address> threshold <percentage> warning-only
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv4-
unicast maximum-prefix <address> warning-only
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv4-
unicast nexthop-self
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv4-
unicast peer-group <value>
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv4-
unicast prefix-list export <value>
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv4-
unicast prefix-list import <value>
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv4-
unicast remove-private-as
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv4-
unicast route-map export <value>
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv4-
unicast route-map import <value>
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv4-
unicast route-reflector-client
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv4-
unicast route-server-client
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv4-
unicast soft-reconfiguration inbound
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv4-
unicast unsuppress-map <value>
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv4-
unicast weight <value>
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv6-
unicast
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv6-
unicast allowas-in
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv6-
unicast allowas-in number <value>
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv6-
unicast attribute-unchanged as-path
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv6-
unicast attribute-unchanged med
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv6-
unicast attribute-unchanged next-hop
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv6-
unicast capability
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv6-
unicast capability graceful-restart
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv6-
unicast capability graceful-restart disable
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv6-
unicast capability orf
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv6-
unicast capability orf prefix-list
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv6-
unicast capability orf prefix-list receive
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv6-
unicast capability orf prefix-list send
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv6-
unicast default-originate
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv6-
unicast default-originate route-map <value>
```

```
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv6-
unicast disable-send-community extended
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv6-
unicast disable-send-community standard
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv6-
unicast distribute-list
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv6-
unicast distribute-list export <value>
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv6-
unicast distribute-list import <value>
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv6-
unicast filter-list
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv6-
unicast filter-list export <value>
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv6-
unicast filter-list import <value>
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv6-
unicast maximum-prefix <address>
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv6-
unicast maximum-prefix <address> threshold <percentage>
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv6-
unicast maximum-prefix <address> threshold <percentage> warning-only
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv6-
unicast maximum-prefix <address> warning-only
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv6-
unicast nexthop-self
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv6-
unicast peer-group <value>
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv6-
unicast prefix-list
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv6-
unicast prefix-list export <value>
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv6-
unicast prefix-list import <value>
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv6-
unicast remove-private-as
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv6-
unicast route-map export <value>
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv6-
unicast route-map import <value>
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv6-
unicast route-reflector-client
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv6-
unicast route-server-client
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv6-
unicast soft-reconfiguration inbound
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv6-
unicast unsuppress-map <value>
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> address-family ipv6-
unicast weight <value>
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> advertisement-
interval <value>
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> as-origination-
interval <value>
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> capability
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> capability dynamic
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> capability route-
refresh
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> cluster-id <value>
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> description <value>
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> disable-capability-
negotiation
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> ebgp-multihop <value>
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> enforce-multihop
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> fall-over bfd
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> interface <ifname>
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> interface <ifname>
vrrp-failover
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> interface <ifname>
vrrp-failover vrrp-group <groupid>
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> interface <ifname>
vrrp-failover vrrp-group <groupid> med <value>
```

```
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> interface <ifname>
vrrp-failover vrrp-group <groupid> prepend-as <value>
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> interface <ifname>
vrrp-failover vrrp-group <groupid> route-map <value>
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> local-as <as-number>
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> med-out igp
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> med-out igp delay-
updates
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> med-out minimum-igp
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> override-capability
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> passive
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> password <value>
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> port <value>
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> remote-as <value>
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> route-map export
<value>
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> route-map import
<value>
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> shutdown
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> strict-capability-
match
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> timers
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> timers connect <value>
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> timers holdtime
<value>
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> timers keepalive
<value>
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> ttl-security
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> ttl-security hops
<value>
routing routing-instance <instance-name> protocols bgp <as-number> neighbor <address> update-source <value>
routing routing-instance <instance-name> protocols bgp <as-number> parameters
routing routing-instance <instance-name> protocols bgp <as-number> parameters always-compare-med
routing routing-instance <instance-name> protocols bgp <as-number> parameters bestpath
routing routing-instance <instance-name> protocols bgp <as-number> parameters bestpath as-path
routing routing-instance <instance-name> protocols bgp <as-number> parameters bestpath as-path confed
routing routing-instance <instance-name> protocols bgp <as-number> parameters bestpath as-path ignore
routing routing-instance <instance-name> protocols bgp <as-number> parameters bestpath compare-routerid
routing routing-instance <instance-name> protocols bgp <as-number> parameters bestpath igp-metric-ignore
routing routing-instance <instance-name> protocols bgp <as-number> parameters bestpath med
routing routing-instance <instance-name> protocols bgp <as-number> parameters bestpath med confed
routing routing-instance <instance-name> protocols bgp <as-number> parameters bestpath med confed missing-
as-worst
routing routing-instance <instance-name> protocols bgp <as-number> parameters bestpath med missing-as-worst
routing routing-instance <instance-name> protocols bgp <as-number> parameters confederation
routing routing-instance <instance-name> protocols bgp <as-number> parameters confederation peers <value>
routing routing-instance <instance-name> protocols bgp <as-number> parameters default
routing routing-instance <instance-name> protocols bgp <as-number> parameters default local-pref <value>
routing routing-instance <instance-name> protocols bgp <as-number> parameters deterministic-med
routing routing-instance <instance-name> protocols bgp <as-number> parameters enforce-first-as
routing routing-instance <instance-name> protocols bgp <as-number> parameters log-neighbor-changes
routing routing-instance <instance-name> protocols bgp <as-number> parameters maximum-paths ebgp <value>
routing routing-instance <instance-name> protocols bgp <as-number> parameters maximum-paths ibgp <value>
routing routing-instance <instance-name> protocols bgp <as-number> parameters med-out-delay <value>
routing routing-instance <instance-name> protocols bgp <as-number> parameters no-client-to-client-
reflection all
routing routing-instance <instance-name> protocols bgp <as-number> parameters no-client-to-client-
reflection cluster-id <value>
routing routing-instance <instance-name> protocols bgp <as-number> parameters no-fast-external-failover
routing routing-instance <instance-name> protocols bgp <as-number> parameters no-rtm
routing routing-instance <instance-name> protocols bgp <as-number> parameters router-id <value>
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name>
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv4-unicast
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv4-unicast allowas-in
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv4-unicast allowas-in number <value>
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv4-unicast attribute-unchanged as-path
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
```

```
ipv4-unicast attribute-unchanged med
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv4-unicast attribute-unchanged next-hop
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv4-unicast capability
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv4-unicast capability graceful-restart
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv4-unicast capability graceful-restart disable
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv4-unicast capability orf
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv4-unicast capability orf prefix-list
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv4-unicast capability orf prefix-list receive
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv4-unicast capability orf prefix-list send
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv4-unicast default-originate
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv4-unicast default-originate route-map <value>
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv4-unicast disable-send-community extended
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv4-unicast disable-send-community standard
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv4-unicast distribute-list export <value>
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv4-unicast distribute-list import <value>
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv4-unicast filter-list
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv4-unicast filter-list export <value>
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv4-unicast filter-list import <value>
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv4-unicast maximum-prefix <address>
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv4-unicast maximum-prefix <address> threshold <percentage>
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv4-unicast maximum-prefix <address> threshold <percentage> warning-only
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv4-unicast maximum-prefix <address> warning-only
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv4-unicast nexthop-self
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv4-unicast prefix-list export <value>
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv4-unicast prefix-list import <value>
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv4-unicast remove-private-as
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv4-unicast route-map export <value>
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv4-unicast route-map import <value>
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv4-unicast route-reflector-client
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv4-unicast route-server-client
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv4-unicast soft-reconfiguration inbound
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv4-unicast unsuppress-map <value>
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv4-unicast weight <value>
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv6-unicast
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv6-unicast allowas-in
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv6-unicast allowas-in number <value>
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
```

```
ipv6-unicast attribute-unchanged as-path
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv6-unicast attribute-unchanged med
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv6-unicast attribute-unchanged next-hop
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv6-unicast capability
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv6-unicast capability graceful-restart
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv6-unicast capability graceful-restart disable
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv6-unicast capability orf
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv6-unicast capability orf prefix-list
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv6-unicast capability orf prefix-list receive
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv6-unicast capability orf prefix-list send
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv6-unicast default-originate
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv6-unicast default-originate route-map <value>
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv6-unicast disable-send-community extended
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv6-unicast disable-send-community standard
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv6-unicast distribute-list
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv6-unicast distribute-list export <value>
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv6-unicast distribute-list import <value>
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv6-unicast filter-list
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
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ipv6-unicast filter-list import <value>
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ipv6-unicast maximum-prefix <address>
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv6-unicast maximum-prefix <address> threshold <percentage>
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv6-unicast maximum-prefix <address> threshold <percentage> warning-only
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv6-unicast maximum-prefix <address> warning-only
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv6-unicast nexthop-self
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv6-unicast prefix-list
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv6-unicast prefix-list export <value>
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv6-unicast prefix-list import <value>
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv6-unicast remove-private-as
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv6-unicast route-map export <value>
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv6-unicast route-map import <value>
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ipv6-unicast route-reflector-client
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv6-unicast route-server-client
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv6-unicast soft-reconfiguration inbound
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv6-unicast unsuppress-map <value>
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> address-family
ipv6-unicast weight <value>
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> advertisement-
```

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interval <value>
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> as-origination-
interval <value>
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> capability
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> capability
dynamic
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> capability route-
refresh
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> cluster-id
<value>
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> description
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routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> disable-
capability-negotiation
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> ebgp-multihop
<value>
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routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> interface
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routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> interface
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routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> interface
<ifname> vrrp-failover vrrp-group <groupid> med <value>
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> interface
<ifname> vrrp-failover vrrp-group <groupid> prepend-as <value>
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> interface
<ifname> vrrp-failover vrrp-group <groupid> route-map <value>
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> local-as <as-
number>
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> med-out igp
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> med-out igp
delay-updates
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> med-out minimum-
igp
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> override-
capability
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> passive
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> password <value>
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> port <value>
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> remote-as <value>
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> shutdown
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> strict-
capability-match
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> timers
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> timers connect
<value>
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> timers holdtime
<value>
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> timers keepalive
<value>
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> ttl-security
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> ttl-security
hops <value>
routing routing-instance <instance-name> protocols bgp <as-number> peer-group <group-name> update-source
<value>
routing routing-instance <instance-name> protocols ecmp disable
routing routing-instance <instance-name> protocols ecmp maximum-paths <value>
routing routing-instance <instance-name> protocols igmp limit <value>
routing routing-instance <instance-name> protocols igmp limit-exception <value>
routing routing-instance <instance-name> protocols igmp log all
routing routing-instance <instance-name> protocols igmp log decode
routing routing-instance <instance-name> protocols igmp log encode
routing routing-instance <instance-name> protocols igmp log events
routing routing-instance <instance-name> protocols igmp log fsm
routing routing-instance <instance-name> protocols igmp log tib
routing routing-instance <instance-name> protocols igmp ssm-map
routing routing-instance <instance-name> protocols igmp ssm-map static access-list <access-list-number>
routing routing-instance <instance-name> protocols igmp ssm-map static access-list <access-list-number>
source <value>
routing routing-instance <instance-name> protocols mld limit <value>
```

```
routing routing-instance <instance-name> protocols mld limit-exception <value>
routing routing-instance <instance-name> protocols mld log all
routing routing-instance <instance-name> protocols mld log decode
routing routing-instance <instance-name> protocols mld log encode
routing routing-instance <instance-name> protocols mld log events
routing routing-instance <instance-name> protocols mld log fsm
routing routing-instance <instance-name> protocols mld log tib
routing routing-instance <instance-name> protocols mld ssm-map
routing routing-instance <instance-name> protocols mld ssm-map static access-list <access-list-number>
routing routing-instance <instance-name> protocols mld ssm-map static access-list <access-list-number>
source <value>
routing routing-instance <instance-name> protocols msdp export access-list <value>
routing routing-instance <instance-name> protocols msdp export rp-list <value>
routing routing-instance <instance-name> protocols msdp import access-list <value>
routing routing-instance <instance-name> protocols msdp import rp-list <value>
routing routing-instance <instance-name> protocols msdp log <value>
routing routing-instance <instance-name> protocols msdp mesh-group <name>
routing routing-instance <instance-name> protocols msdp mesh-group <name> peer <value>
routing routing-instance <instance-name> protocols msdp originated-id <value>
routing routing-instance <instance-name> protocols msdp peer <address>
routing routing-instance <instance-name> protocols msdp peer <address> connect-retry <value>
routing routing-instance <instance-name> protocols msdp peer <address> default-peer
routing routing-instance <instance-name> protocols msdp peer <address> default-peer prefix-list <value>
routing routing-instance <instance-name> protocols msdp peer <address> default-peer priority <value>
routing routing-instance <instance-name> protocols msdp peer <address> export access-list <value>
routing routing-instance <instance-name> protocols msdp peer <address> export rp-list <value>
routing routing-instance <instance-name> protocols msdp peer <address> holdtime <value>
routing routing-instance <instance-name> protocols msdp peer <address> import access-list <value>
routing routing-instance <instance-name> protocols msdp peer <address> import rp-list <value>
routing routing-instance <instance-name> protocols msdp peer <address> keepalive <value>
routing routing-instance <instance-name> protocols msdp peer <address> local-address <value>
routing routing-instance <instance-name> protocols msdp peer <address> password <value>
routing routing-instance <instance-name> protocols msdp peer <address> shutdown
routing routing-instance <instance-name> protocols msdp peer-group <name>
routing routing-instance <instance-name> protocols msdp peer-group <name> connect-retry <value>
routing routing-instance <instance-name> protocols msdp peer-group <name> export access-list <value>
routing routing-instance <instance-name> protocols msdp peer-group <name> export rp-list <value>
routing routing-instance <instance-name> protocols msdp peer-group <name> holdtime <value>
routing routing-instance <instance-name> protocols msdp peer-group <name> import access-list <value>
routing routing-instance <instance-name> protocols msdp peer-group <name> import rp-list <value>
routing routing-instance <instance-name> protocols msdp peer-group <name> keepalive <value>
routing routing-instance <instance-name> protocols msdp peer-group <name> peer <value>
routing routing-instance <instance-name> protocols msdp peer-group <name> shutdown
routing routing-instance <instance-name> protocols multicast ip log all
routing routing-instance <instance-name> protocols multicast ip log event
routing routing-instance <instance-name> protocols multicast ip log fib-msg
routing routing-instance <instance-name> protocols multicast ip log mrib-msg
routing routing-instance <instance-name> protocols multicast ip log mrt
routing routing-instance <instance-name> protocols multicast ip log mtrace
routing routing-instance <instance-name> protocols multicast ip log mtrace-detail
routing routing-instance <instance-name> protocols multicast ip log nsm-msg
routing routing-instance <instance-name> protocols multicast ip log register-msg
routing routing-instance <instance-name> protocols multicast ip log stats
routing routing-instance <instance-name> protocols multicast ip log vif
routing routing-instance <instance-name> protocols multicast ip log-warning <value>
routing routing-instance <instance-name> protocols multicast ip route-limit <value>
routing routing-instance <instance-name> protocols multicast ip routing
routing routing-instance <instance-name> protocols multicast ipv6 log all
routing routing-instance <instance-name> protocols multicast ipv6 log event
routing routing-instance <instance-name> protocols multicast ipv6 log fib-msg
routing routing-instance <instance-name> protocols multicast ipv6 log mrib-msg
routing routing-instance <instance-name> protocols multicast ipv6 log mrt
routing routing-instance <instance-name> protocols multicast ipv6 log mtrace
routing routing-instance <instance-name> protocols multicast ipv6 log mtrace-detail
routing routing-instance <instance-name> protocols multicast ipv6 log nsm-msg
routing routing-instance <instance-name> protocols multicast ipv6 log register-msg
routing routing-instance <instance-name> protocols multicast ipv6 log stats
routing routing-instance <instance-name> protocols multicast ipv6 log vif
routing routing-instance <instance-name> protocols multicast ipv6 log-warning <value>
routing routing-instance <instance-name> protocols multicast ipv6 route-limit <value>
routing routing-instance <instance-name> protocols multicast ipv6 routing
routing routing-instance <instance-name> protocols nsm log all
```

```
routing routing-instance <instance-name> protocols nsm log events
routing routing-instance <instance-name> protocols nsm log kernel
routing routing-instance <instance-name> protocols ospf process <instance>
routing routing-instance <instance-name> protocols ospf process <instance> area <area-identifier>
routing routing-instance <instance-name> protocols ospf process <instance> area <area-identifier> area-type
routing routing-instance <instance-name> protocols ospf process <instance> area <area-identifier> area-type
nssa
routing routing-instance <instance-name> protocols ospf process <instance> area <area-identifier> area-type
nssa default-cost <value>
routing routing-instance <instance-name> protocols ospf process <instance> area <area-identifier> area-type
nssa default-information-originate
routing routing-instance <instance-name> protocols ospf process <instance> area <area-identifier> area-type
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routing routing-instance <instance-name> protocols ospf process <instance> area <area-identifier> area-type
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stub
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stub no-summary
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authentication <value>
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link <address>
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link <address> authentication
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link <address> dead-interval <value>
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link <address> fall-over bfd
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link <address> hello-interval <value>
routing routing-instance <instance-name> protocols ospf process <instance> area <area-identifier> virtual-
link <address> retransmit-interval <value>
routing routing-instance <instance-name> protocols ospf process <instance> area <area-identifier> virtual-
link <address> transmit-delay <value>
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routing routing-instance <instance-name> protocols ospf process <instance> auto-cost reference-bandwidth
<value>
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routing routing-instance <instance-name> protocols ospf process <instance> default-information originate
always
routing routing-instance <instance-name> protocols ospf process <instance> default-information originate
metric <value>
routing routing-instance <instance-name> protocols ospf process <instance> default-information originate
metric-type <value>
routing routing-instance <instance-name> protocols ospf process <instance> default-information originate
```

```
route-map <value>
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routing routing-instance <instance-name> protocols ospf process <instance> distance global <value>
routing routing-instance <instance-name> protocols ospf process <instance> distance ospf
routing routing-instance <instance-name> protocols ospf process <instance> distance ospf external <value>
routing routing-instance <instance-name> protocols ospf process <instance> distance ospf inter-area <value>
routing routing-instance <instance-name> protocols ospf process <instance> distance ospf intra-area <value>
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name>
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name> export <value>
routing routing-instance <instance-name> protocols ospf process <instance> distribute-list <access-list-
name> import
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routing routing-instance <instance-name> protocols ospf process <instance> log events all
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routing routing-instance <instance-name> protocols ospf process <instance> log events lsa
routing routing-instance <instance-name> protocols ospf process <instance> log events nssa
routing routing-instance <instance-name> protocols ospf process <instance> log events os
routing routing-instance <instance-name> protocols ospf process <instance> log events router
routing routing-instance <instance-name> protocols ospf process <instance> log events vlink
routing routing-instance <instance-name> protocols ospf process <instance> log ifsm all
routing routing-instance <instance-name> protocols ospf process <instance> log ifsm events
routing routing-instance <instance-name> protocols ospf process <instance> log ifsm status
routing routing-instance <instance-name> protocols ospf process <instance> log ifsm timers
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routing routing-instance <instance-name> protocols ospf process <instance> log lsa generate
routing routing-instance <instance-name> protocols ospf process <instance> log lsa install
routing routing-instance <instance-name> protocols ospf process <instance> log lsa maxage
routing routing-instance <instance-name> protocols ospf process <instance> log lsa refresh
routing routing-instance <instance-name> protocols ospf process <instance> log nfsm all
routing routing-instance <instance-name> protocols ospf process <instance> log nfsm events
routing routing-instance <instance-name> protocols ospf process <instance> log nfsm status
routing routing-instance <instance-name> protocols ospf process <instance> log nfsm timers
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routing routing-instance <instance-name> protocols ospf process <instance> log nsm redistribute
routing routing-instance <instance-name> protocols ospf process <instance> log packet all
routing routing-instance <instance-name> protocols ospf process <instance> log packet dd
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routing routing-instance <instance-name> protocols ospf process <instance> log packet ls-ack
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routing routing-instance <instance-name> protocols ospf process <instance> log packet ls-update
routing routing-instance <instance-name> protocols ospf process <instance> log packet recv
routing routing-instance <instance-name> protocols ospf process <instance> log packet send
routing routing-instance <instance-name> protocols ospf process <instance> log rib all
routing routing-instance <instance-name> protocols ospf process <instance> log rib interface
routing routing-instance <instance-name> protocols ospf process <instance> log rib redistribute
routing routing-instance <instance-name> protocols ospf process <instance> log route all
routing routing-instance <instance-name> protocols ospf process <instance> log route ase
routing routing-instance <instance-name> protocols ospf process <instance> log route ia
routing routing-instance <instance-name> protocols ospf process <instance> log route install
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<number> recovery <value>
routing routing-instance <instance-name> protocols ospf process <instance> overflow database hard limit
<value>
routing routing-instance <instance-name> protocols ospf process <instance> overflow database soft limit
<value>
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routing routing-instance <instance-name> protocols ospf process <instance> parameters rfc1583-compatibility
routing routing-instance <instance-name> protocols ospf process <instance> parameters router-id <value>
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routing routing-instance <instance-name> protocols ospf process <instance> passive-interface-exclude <value>
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routing routing-instance <instance-name> protocols ospf process <instance> redistribute bgp metric <value>
routing routing-instance <instance-name> protocols ospf process <instance> redistribute bgp metric-type
<value>
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routing routing-instance <instance-name> protocols ospf process <instance> redistribute bgp tag <value>
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type <value>
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routing routing-instance <instance-name> protocols ospf process <instance> redistribute connected tag
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advertise
routing routing-instance <instance-name> protocols ospf process <instance> summary-address <address>
advertise tag <value>
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advertise
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routing routing-instance <instance-name> protocols ospfv3 process <process-name> address-family ipv4
routing routing-instance <instance-name> protocols ospfv3 process <process-name> address-family ipv4 unicast
routing routing-instance <instance-name> protocols ospfv3 process <process-name> address-family ipv4
unicast area <area-identifier>
routing routing-instance <instance-name> protocols ospfv3 process <process-name> address-family ipv4
unicast area <area-identifier> range <prefix>
routing routing-instance <instance-name> protocols ospfv3 process <process-name> address-family ipv4
unicast area <area-identifier> range <prefix> advertise
routing routing-instance <instance-name> protocols ospfv3 process <process-name> address-family ipv4
unicast area <area-identifier> range <prefix> not-advertise
routing routing-instance <instance-name> protocols ospfv3 process <process-name> address-family ipv4
unicast default-information
routing routing-instance <instance-name> protocols ospfv3 process <process-name> address-family ipv4
unicast default-information originate
routing routing-instance <instance-name> protocols ospfv3 process <process-name> address-family ipv4
```

```
unicast default-information originate always
routing routing-instance <instance-name> protocols ospfv3 process <process-name> address-family ipv4
unicast default-information originate metric <value>
routing routing-instance <instance-name> protocols ospfv3 process <process-name> address-family ipv4
unicast default-information originate metric-type <value>
routing routing-instance <instance-name> protocols ospfv3 process <process-name> address-family ipv4
unicast default-information originate route-map <value>
routing routing-instance <instance-name> protocols ospfv3 process <process-name> address-family ipv4
unicast redistribute
routing routing-instance <instance-name> protocols ospfv3 process <process-name> address-family ipv4
unicast redistribute bgp
routing routing-instance <instance-name> protocols ospfv3 process <process-name> address-family ipv4
unicast redistribute bgp metric <value>
routing routing-instance <instance-name> protocols ospfv3 process <process-name> address-family ipv4
unicast redistribute bgp metric-type <value>
routing routing-instance <instance-name> protocols ospfv3 process <process-name> address-family ipv4
unicast redistribute bgp route-map <value>
routing routing-instance <instance-name> protocols ospfv3 process <process-name> address-family ipv4
unicast redistribute bgp tag <value>
routing routing-instance <instance-name> protocols ospfv3 process <process-name> address-family ipv4
unicast redistribute connected
routing routing-instance <instance-name> protocols ospfv3 process <process-name> address-family ipv4
unicast redistribute connected metric <value>
routing routing-instance <instance-name> protocols ospfv3 process <process-name> address-family ipv4
unicast redistribute connected metric-type <value>
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unicast redistribute connected route-map <value>
routing routing-instance <instance-name> protocols ospfv3 process <process-name> address-family ipv4
unicast redistribute connected tag <value>
routing routing-instance <instance-name> protocols ospfv3 process <process-name> address-family ipv4
unicast redistribute kernel
routing routing-instance <instance-name> protocols ospfv3 process <process-name> address-family ipv4
unicast redistribute kernel metric <value>
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unicast redistribute kernel metric-type <value>
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unicast redistribute kernel tag <value>
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unicast redistribute ospf
routing routing-instance <instance-name> protocols ospfv3 process <process-name> address-family ipv4
unicast redistribute ospf metric <value>
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unicast redistribute ospf metric-type <value>
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unicast redistribute ospf route-map <value>
routing routing-instance <instance-name> protocols ospfv3 process <process-name> address-family ipv4
unicast redistribute ospf tag <value>
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unicast redistribute rip
routing routing-instance <instance-name> protocols ospfv3 process <process-name> address-family ipv4
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unicast redistribute rip tag <value>
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unicast redistribute static
routing routing-instance <instance-name> protocols ospfv3 process <process-name> address-family ipv4
unicast redistribute static metric <value>
routing routing-instance <instance-name> protocols ospfv3 process <process-name> address-family ipv4
unicast redistribute static metric-type <value>
routing routing-instance <instance-name> protocols ospfv3 process <process-name> address-family ipv4
unicast redistribute static route-map <value>
routing routing-instance <instance-name> protocols ospfv3 process <process-name> address-family ipv4
unicast redistribute static tag <value>
routing routing-instance <instance-name> protocols ospfv3 process <process-name> address-family ipv4
unicast summary-address <address>
routing routing-instance <instance-name> protocols ospfv3 process <process-name> address-family ipv4
```

```
unicast summary-address <address> advertise
routing routing-instance <instance-name> protocols ospfv3 process <process-name> address-family ipv4
unicast summary-address <address> advertise tag <value>
routing routing-instance <instance-name> protocols ospfv3 process <process-name> address-family ipv4
unicast summary-address <address> not-advertise
routing routing-instance <instance-name> protocols ospfv3 process <process-name> area <area-identifier>
routing routing-instance <instance-name> protocols ospfv3 process <process-name> area <area-identifier> nssa
routing routing-instance <instance-name> protocols ospfv3 process <process-name> area <area-identifier>
nssa default-cost <value>
routing routing-instance <instance-name> protocols ospfv3 process <process-name> area <area-identifier>
nssa default-information-originate
routing routing-instance <instance-name> protocols ospfv3 process <process-name> area <area-identifier>
nssa default-information-originate metric <value>
routing routing-instance <instance-name> protocols ospfv3 process <process-name> area <area-identifier>
nssa default-information-originate metric-type <value>
routing routing-instance <instance-name> protocols ospfv3 process <process-name> area <area-identifier>
nssa no-redistribution
routing routing-instance <instance-name> protocols ospfv3 process <process-name> area <area-identifier>
nssa no-summary
routing routing-instance <instance-name> protocols ospfv3 process <process-name> area <area-identifier>
nssa stability-interval <value>
routing routing-instance <instance-name> protocols ospfv3 process <process-name> area <area-identifier>
nssa translator-role <value>
routing routing-instance <instance-name> protocols ospfv3 process <process-name> area <area-identifier>
range <prefix>
routing routing-instance <instance-name> protocols ospfv3 process <process-name> area <area-identifier>
range <prefix> advertise
routing routing-instance <instance-name> protocols ospfv3 process <process-name> area <area-identifier>
range <prefix> not-advertise
routing routing-instance <instance-name> protocols ospfv3 process <process-name> area <area-identifier> stub
routing routing-instance <instance-name> protocols ospfv3 process <process-name> area <area-identifier>
stub default-cost <value>
routing routing-instance <instance-name> protocols ospfv3 process <process-name> area <area-identifier>
stub no-summary
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virtual-link <address>
routing routing-instance <instance-name> protocols ospfv3 process <process-name> area <area-identifier>
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routing routing-instance <instance-name> protocols ospfv3 process <process-name> area <area-identifier>
virtual-link <address> fall-over bfd
routing routing-instance <instance-name> protocols ospfv3 process <process-name> area <area-identifier>
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routing routing-instance <instance-name> protocols ospfv3 process <process-name> area <area-identifier>
virtual-link <address> retransmit-interval <value>
routing routing-instance <instance-name> protocols ospfv3 process <process-name> area <area-identifier>
virtual-link <address> transmit-delay <value>
routing routing-instance <instance-name> protocols ospfv3 process <process-name> auto-cost
routing routing-instance <instance-name> protocols ospfv3 process <process-name> auto-cost reference-
bandwidth <value>
routing routing-instance <instance-name> protocols ospfv3 process <process-name> default-information
routing routing-instance <instance-name> protocols ospfv3 process <process-name> default-information
originate
routing routing-instance <instance-name> protocols ospfv3 process <process-name> default-information
originate always
routing routing-instance <instance-name> protocols ospfv3 process <process-name> default-information
originate metric <value>
routing routing-instance <instance-name> protocols ospfv3 process <process-name> default-information
originate metric-type <value>
routing routing-instance <instance-name> protocols ospfv3 process <process-name> default-information
originate route-map <value>
routing routing-instance <instance-name> protocols ospfv3 process <process-name> default-metric <value>
routing routing-instance <instance-name> protocols ospfv3 process <process-name> distance
routing routing-instance <instance-name> protocols ospfv3 process <process-name> distance global <value>
routing routing-instance <instance-name> protocols ospfv3 process <process-name> distance ospfv3
routing routing-instance <instance-name> protocols ospfv3 process <process-name> distance ospfv3 external
<value>
routing routing-instance <instance-name> protocols ospfv3 process <process-name> distance ospfv3 inter-area
<value>
routing routing-instance <instance-name> protocols ospfv3 process <process-name> distance ospfv3 intra-area
<value>
routing routing-instance <instance-name> protocols ospfv3 process <process-name> distribute-list <access-
list-name>
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```
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list-name> export <value>
routing routing-instance <instance-name> protocols ospfv3 process <process-name> distribute-list <access-
list-name> import
routing routing-instance <instance-name> protocols ospfv3 process <process-name> log all
routing routing-instance <instance-name> protocols ospfv3 process <process-name> log bfd
routing routing-instance <instance-name> protocols ospfv3 process <process-name> log events abr
routing routing-instance <instance-name> protocols ospfv3 process <process-name> log events all
routing routing-instance <instance-name> protocols ospfv3 process <process-name> log events asbr
routing routing-instance <instance-name> protocols ospfv3 process <process-name> log events lsa
routing routing-instance <instance-name> protocols ospfv3 process <process-name> log events nssa
routing routing-instance <instance-name> protocols ospfv3 process <process-name> log events os
routing routing-instance <instance-name> protocols ospfv3 process <process-name> log events router
routing routing-instance <instance-name> protocols ospfv3 process <process-name> log events vlink
routing routing-instance <instance-name> protocols ospfv3 process <process-name> log ifsm all
routing routing-instance <instance-name> protocols ospfv3 process <process-name> log ifsm events
routing routing-instance <instance-name> protocols ospfv3 process <process-name> log ifsm status
routing routing-instance <instance-name> protocols ospfv3 process <process-name> log ifsm timers
routing routing-instance <instance-name> protocols ospfv3 process <process-name> log lsa all
routing routing-instance <instance-name> protocols ospfv3 process <process-name> log lsa flooding
routing routing-instance <instance-name> protocols ospfv3 process <process-name> log lsa generate
routing routing-instance <instance-name> protocols ospfv3 process <process-name> log lsa install
routing routing-instance <instance-name> protocols ospfv3 process <process-name> log lsa maxage
routing routing-instance <instance-name> protocols ospfv3 process <process-name> log lsa refresh
routing routing-instance <instance-name> protocols ospfv3 process <process-name> log nfsm all
routing routing-instance <instance-name> protocols ospfv3 process <process-name> log nfsm events
routing routing-instance <instance-name> protocols ospfv3 process <process-name> log nfsm status
routing routing-instance <instance-name> protocols ospfv3 process <process-name> log nfsm timers
routing routing-instance <instance-name> protocols ospfv3 process <process-name> log nsm all
routing routing-instance <instance-name> protocols ospfv3 process <process-name> log nsm interface
routing routing-instance <instance-name> protocols ospfv3 process <process-name> log nsm redistribute
routing routing-instance <instance-name> protocols ospfv3 process <process-name> log packet all
routing routing-instance <instance-name> protocols ospfv3 process <process-name> log packet dd
routing routing-instance <instance-name> protocols ospfv3 process <process-name> log packet detail
routing routing-instance <instance-name> protocols ospfv3 process <process-name> log packet hello
routing routing-instance <instance-name> protocols ospfv3 process <process-name> log packet ls-ack
routing routing-instance <instance-name> protocols ospfv3 process <process-name> log packet ls-request
routing routing-instance <instance-name> protocols ospfv3 process <process-name> log packet ls-update
routing routing-instance <instance-name> protocols ospfv3 process <process-name> log packet recv
routing routing-instance <instance-name> protocols ospfv3 process <process-name> log packet send
routing routing-instance <instance-name> protocols ospfv3 process <process-name> log retransmission
routing routing-instance <instance-name> protocols ospfv3 process <process-name> log rib all
routing routing-instance <instance-name> protocols ospfv3 process <process-name> log rib interface
routing routing-instance <instance-name> protocols ospfv3 process <process-name> log rib redistribute
routing routing-instance <instance-name> protocols ospfv3 process <process-name> log route all
routing routing-instance <instance-name> protocols ospfv3 process <process-name> log route ase
routing routing-instance <instance-name> protocols ospfv3 process <process-name> log route ia
routing routing-instance <instance-name> protocols ospfv3 process <process-name> log route install
routing routing-instance <instance-name> protocols ospfv3 process <process-name> log route spf
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routing routing-instance <instance-name> protocols ospfv3 process <process-name> passive-interface-exclude
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type <value>
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<value>
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routing routing-instance <instance-name> protocols ospfv3 process <process-name> redistribute connected
metric <value>
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metric-type <value>
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route-map <value>
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type <value>
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map <value>
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routing routing-instance <instance-name> protocols ospfv3 process <process-name> redistribute rip metric
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routing routing-instance <instance-name> protocols ospfv3 process <process-name> redistribute rip route-map
<value>
routing routing-instance <instance-name> protocols ospfv3 process <process-name> redistribute rip tag
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routing routing-instance <instance-name> protocols ospfv3 process <process-name> redistribute static metric
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map <value>
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<value>
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routing routing-instance <instance-name> protocols ospfv3 process <process-name> summary-address <address>
advertise tag <value>
routing routing-instance <instance-name> protocols ospfv3 process <process-name> summary-address <address>
not-advertise
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routing routing-instance <instance-name> protocols ospfv3 process <process-name> timers spf exp
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routing routing-instance <instance-name> protocols pim anycast-rp <address>
routing routing-instance <instance-name> protocols pim anycast-rp <address> anycast-rp-peer <value>
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routing routing-instance <instance-name> protocols pim bsr-candidate hash-mask <value>
routing routing-instance <instance-name> protocols pim bsr-candidate interface <value>
routing routing-instance <instance-name> protocols pim bsr-candidate priority <value>
routing routing-instance <instance-name> protocols pim ignore-rp-set-priority
routing routing-instance <instance-name> protocols pim join-prune-timer <value>
routing routing-instance <instance-name> protocols pim legacy-register-checksum
routing routing-instance <instance-name> protocols pim legacy-register-checksum group-list <value>
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routing routing-instance <instance-name> protocols pim log events
routing routing-instance <instance-name> protocols pim log mfc
routing routing-instance <instance-name> protocols pim log mib
routing routing-instance <instance-name> protocols pim log msdp
routing routing-instance <instance-name> protocols pim log mtrace
routing routing-instance <instance-name> protocols pim log nexthop
routing routing-instance <instance-name> protocols pim log nsm
routing routing-instance <instance-name> protocols pim log packet all
routing routing-instance <instance-name> protocols pim log packet recv
routing routing-instance <instance-name> protocols pim log packet send
routing routing-instance <instance-name> protocols pim log state
routing routing-instance <instance-name> protocols pim log timer all
routing routing-instance <instance-name> protocols pim log timer assert all
routing routing-instance <instance-name> protocols pim log timer assert at
routing routing-instance <instance-name> protocols pim log timer bsr all
routing routing-instance <instance-name> protocols pim log timer bsr bst
routing routing-instance <instance-name> protocols pim log timer bsr crp
routing routing-instance <instance-name> protocols pim log timer hello all
routing routing-instance <instance-name> protocols pim log timer hello ht
routing routing-instance <instance-name> protocols pim log timer hello nlt
routing routing-instance <instance-name> protocols pim log timer hello tht
```

```
routing routing-instance <instance-name> protocols pim log timer joinprune all
routing routing-instance <instance-name> protocols pim log timer joinprune et
routing routing-instance <instance-name> protocols pim log timer joinprune jt
routing routing-instance <instance-name> protocols pim log timer joinprune kat
routing routing-instance <instance-name> protocols pim log timer joinprune ot
routing routing-instance <instance-name> protocols pim log timer joinprune ppt
routing routing-instance <instance-name> protocols pim log timer register all
routing routing-instance <instance-name> protocols pim log timer register rst
routing routing-instance <instance-name> protocols pim register-kat <value>
routing routing-instance <instance-name> protocols pim register-rate-limit <value>
routing routing-instance <instance-name> protocols pim register-rp-reachability
routing routing-instance <instance-name> protocols pim register-source address <value>
routing routing-instance <instance-name> protocols pim register-source interface <value>
routing routing-instance <instance-name> protocols pim register-suppression-timer <value>
routing routing-instance <instance-name> protocols pim rp-address <address>
routing routing-instance <instance-name> protocols pim rp-address <address> list <value>
routing routing-instance <instance-name> protocols pim rp-address <address> override
routing routing-instance <instance-name> protocols pim rp-candidate
routing routing-instance <instance-name> protocols pim rp-candidate interface <interface-name>
routing routing-instance <instance-name> protocols pim rp-candidate interface <interface-name> group-list
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routing routing-instance <instance-name> protocols pim ssm range <value>
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routing routing-instance <instance-name> protocols pim6 accept-register list <value>
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routing routing-instance <instance-name> protocols pim6 anycast-rp <address> anycast-rp-peer <value>
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routing routing-instance <instance-name> protocols pim6 bsr-candidate hash-mask <value>
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routing routing-instance <instance-name> protocols pim6 bsr-candidate priority <value>
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routing routing-instance <instance-name> protocols pim6 log mib
routing routing-instance <instance-name> protocols pim6 log msdp
routing routing-instance <instance-name> protocols pim6 log mtrace
routing routing-instance <instance-name> protocols pim6 log nexthop
routing routing-instance <instance-name> protocols pim6 log nsm
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routing routing-instance <instance-name> protocols pim6 log packet send
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routing routing-instance <instance-name> protocols pim6 log timer all
routing routing-instance <instance-name> protocols pim6 log timer assert all
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routing routing-instance <instance-name> protocols pim6 log timer bsr all
routing routing-instance <instance-name> protocols pim6 log timer bsr bst
routing routing-instance <instance-name> protocols pim6 log timer bsr crp
routing routing-instance <instance-name> protocols pim6 log timer hello all
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routing routing-instance <instance-name> protocols pim6 log timer hello nlt
routing routing-instance <instance-name> protocols pim6 log timer hello tht
routing routing-instance <instance-name> protocols pim6 log timer joinprune all
routing routing-instance <instance-name> protocols pim6 log timer joinprune et
routing routing-instance <instance-name> protocols pim6 log timer joinprune jt
routing routing-instance <instance-name> protocols pim6 log timer joinprune kat
routing routing-instance <instance-name> protocols pim6 log timer joinprune ot
routing routing-instance <instance-name> protocols pim6 log timer joinprune ppt
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routing routing-instance <instance-name> protocols pim6 log timer register rst
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routing routing-instance <instance-name> protocols rip log events
routing routing-instance <instance-name> protocols rip log packet all
routing routing-instance <instance-name> protocols rip log packet detail
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routing routing-instance <instance-name> protocols rip redistribute bgp
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routing routing-instance <instance-name> protocols rip redistribute connected metric <value>
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routing routing-instance <instance-name> protocols rip redistribute ospf metric <value>
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routing routing-instance <instance-name> protocols rip redistribute static
routing routing-instance <instance-name> protocols rip redistribute static metric <value>
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routing routing-instance <instance-name> protocols rip timers
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routing routing-instance <instance-name> protocols ripng default-metric <value>
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routing routing-instance <instance-name> protocols ripng distribute-list interface <interface-name> access-
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routing routing-instance <instance-name> protocols ripng log events
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routing routing-instance <instance-name> protocols ripng log packet detail
routing routing-instance <instance-name> protocols ripng log packet recv
routing routing-instance <instance-name> protocols ripng log packet send
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routing routing-instance <instance-name> protocols ripng redistribute bgp
routing routing-instance <instance-name> protocols ripng redistribute bgp metric <value>
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routing routing-instance <instance-name> protocols ripng redistribute ospfv3 route-map <value>
routing routing-instance <instance-name> protocols ripng redistribute static
routing routing-instance <instance-name> protocols ripng redistribute static metric <value>
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routing routing-instance <instance-name> protocols ripng timers garbage-collection <value>
routing routing-instance <instance-name> protocols ripng timers timeout <value>
routing routing-instance <instance-name> protocols ripng timers update <value>
routing routing-instance <instance-name> protocols static
routing routing-instance <instance-name> protocols static arp <address>
routing routing-instance <instance-name> protocols static arp <address> hwaddr <value>
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```
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<interface-name>
routing routing-instance <instance-name> protocols static interface-route <prefix> next-hop-interface
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routing routing-instance <instance-name> protocols static interface-route <prefix> next-hop-interface
<interface-name> distance <value>
routing routing-instance <instance-name> protocols static interface-route6 <prefix>
routing routing-instance <instance-name> protocols static interface-route6 <prefix> next-hop-interface
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routing routing-instance <instance-name> protocols static interface-route6 <prefix> next-hop-interface
<interface-name> distance <value>
routing routing-instance <instance-name> protocols static route <prefix>
routing routing-instance <instance-name> protocols static route <prefix> blackhole
routing routing-instance <instance-name> protocols static route <prefix> blackhole distance <value>
routing routing-instance <instance-name> protocols static route <prefix> next-hop <address>
routing routing-instance <instance-name> protocols static route <prefix> next-hop <address> disable
routing routing-instance <instance-name> protocols static route <prefix> next-hop <address> distance <value>
routing routing-instance <instance-name> protocols static route <prefix> next-hop <address> fall-over bfd
routing routing-instance <instance-name> protocols static route <prefix> next-hop <address> interface
<value>
routing routing-instance <instance-name> protocols static route <prefix> next-hop-routing-instance <routing-
instance>
routing routing-instance <instance-name> protocols static route <prefix> next-hop-routing-instance <routing-
instance> next-hop <address>
routing routing-instance <instance-name> protocols static route <prefix> next-hop-routing-instance <routing-
instance> next-hop <address> disable
routing routing-instance <instance-name> protocols static route <prefix> next-hop-routing-instance <routing-
instance> next-hop <address> distance <value>
routing routing-instance <instance-name> protocols static route <prefix> next-hop-routing-instance <routing-
instance> next-hop <address> interface <value>
routing routing-instance <instance-name> protocols static route <prefix> unreachable
routing routing-instance <instance-name> protocols static route <prefix> unreachable distance <value>
routing routing-instance <instance-name> protocols static route6 <prefix>
routing routing-instance <instance-name> protocols static route6 <prefix> blackhole
routing routing-instance <instance-name> protocols static route6 <prefix> blackhole distance <value>
routing routing-instance <instance-name> protocols static route6 <prefix> next-hop <address>
routing routing-instance <instance-name> protocols static route6 <prefix> next-hop <address> disable
routing routing-instance <instance-name> protocols static route6 <prefix> next-hop <address> distance
<value>
routing routing-instance <instance-name> protocols static route6 <prefix> next-hop <address> fall-over bfd
routing routing-instance <instance-name> protocols static route6 <prefix> next-hop <address> interface
<value>
routing routing-instance <instance-name> protocols static route6 <prefix> next-hop-routing-instance-v6
<routing-instance>
routing routing-instance <instance-name> protocols static route6 <prefix> next-hop-routing-instance-v6
<routing-instance> next-hop <address>
routing routing-instance <instance-name> protocols static route6 <prefix> next-hop-routing-instance-v6
<routing-instance> next-hop <address> disable
routing routing-instance <instance-name> protocols static route6 <prefix> next-hop-routing-instance-v6
<routing-instance> next-hop <address> distance <value>
routing routing-instance <instance-name> protocols static route6 <prefix> next-hop-routing-instance-v6
<routing-instance> next-hop <address> interface <value>
routing routing-instance <instance-name> protocols static route6 <prefix> unreachable
routing routing-instance <instance-name> protocols static route6 <prefix> unreachable distance <value>
routing routing-instance <instance-name> protocols static table <table-number>
routing routing-instance <instance-name> protocols static table <table-number> interface-route <prefix>
routing routing-instance <instance-name> protocols static table <table-number> interface-route <prefix>
next-hop-interface <interface-name>
routing routing-instance <instance-name> protocols static table <table-number> interface-route <prefix>
next-hop-interface <interface-name> disable
routing routing-instance <instance-name> protocols static table <table-number> interface-route <prefix>
next-hop-interface <interface-name> distance <value>
routing routing-instance <instance-name> protocols static table <table-number> interface-route6 <prefix>
routing routing-instance <instance-name> protocols static table <table-number> interface-route6 <prefix>
next-hop-interface <interface-name>
routing routing-instance <instance-name> protocols static table <table-number> interface-route6 <prefix>
next-hop-interface <interface-name> disable
routing routing-instance <instance-name> protocols static table <table-number> interface-route6 <prefix>
```

```
next-hop-interface <interface-name> distance <value>
routing routing-instance <instance-name> protocols static table <table-number> route <prefix>
routing routing-instance <instance-name> protocols static table <table-number> route <prefix> blackhole
routing routing-instance <instance-name> protocols static table <table-number> route <prefix> blackhole
distance <value>
routing routing-instance <instance-name> protocols static table <table-number> route <prefix> next-hop
<address>
routing routing-instance <instance-name> protocols static table <table-number> route <prefix> next-hop
<address> disable
routing routing-instance <instance-name> protocols static table <table-number> route <prefix> next-hop
<address> distance <value>
routing routing-instance <instance-name> protocols static table <table-number> route <prefix> next-hop
<address> interface <value>
routing routing-instance <instance-name> protocols static table <table-number> route <prefix> unreachable
routing routing-instance <instance-name> protocols static table <table-number> route <prefix> unreachable
distance <value>
routing routing-instance <instance-name> protocols static table <table-number> route6 <prefix>
routing routing-instance <instance-name> protocols static table <table-number> route6 <prefix> blackhole
routing routing-instance <instance-name> protocols static table <table-number> route6 <prefix> blackhole
distance <value>
routing routing-instance <instance-name> protocols static table <table-number> route6 <prefix> next-hop
<address>
routing routing-instance <instance-name> protocols static table <table-number> route6 <prefix> next-hop
<address> disable
routing routing-instance <instance-name> protocols static table <table-number> route6 <prefix> next-hop
<address> distance <value>
routing routing-instance <instance-name> protocols static table <table-number> route6 <prefix> next-hop
<address> interface <value>
routing routing-instance <instance-name> protocols static table <table-number> route6 <prefix> unreachable
routing routing-instance <instance-name> protocols static table <table-number> route6 <prefix> unreachable
distance <value>
routing routing-instance <instance-name> route-distinguisher <value>
routing routing-instance <instance-name> route-target <rt>
routing routing-instance <instance-name> route-target <rt> type <value>
routing routing-instance <instance-name> security ssh-known-hosts
routing routing-instance <instance-name> security ssh-known-hosts host <host-name>
routing routing-instance <instance-name> security ssh-known-hosts host <host-name> fetch-from-server
routing routing-instance <instance-name> security ssh-known-hosts host <host-name> key <value>
routing routing-instance <instance-name> security ssh-known-hosts host <host-name> load-from-file <value>
routing routing-instance <instance-name> service dhcp-relay
routing routing-instance <instance-name> service dhcp-relay listen-interface <value>
routing routing-instance <instance-name> service dhcp-relay relay-options
routing routing-instance <instance-name> service dhcp-relay relay-options hop-count <value>
routing routing-instance <instance-name> service dhcp-relay relay-options max-size <value>
routing routing-instance <instance-name> service dhcp-relay relay-options port <value>
routing routing-instance <instance-name> service dhcp-relay relay-options relay-agents-packets <value>
routing routing-instance <instance-name> service dhcp-relay server <value>
routing routing-instance <instance-name> service dhcp-relay upstream-interface <value>
routing routing-instance <instance-name> service dhcp-server
routing routing-instance <instance-name> service dhcp-server disabled <value>
routing routing-instance <instance-name> service dhcp-server dynamic-dns-update
routing routing-instance <instance-name> service dhcp-server dynamic-dns-update enable <value>
routing routing-instance <instance-name> service dhcp-server global-parameters <value>
routing routing-instance <instance-name> service dhcp-server listento
routing routing-instance <instance-name> service dhcp-server listento interface <value>
routing routing-instance <instance-name> service dhcp-server shared-network-name <network-name>
routing routing-instance <instance-name> service dhcp-server shared-network-name <network-name>
authoritative <value>
routing routing-instance <instance-name> service dhcp-server shared-network-name <network-name> description
<value>
routing routing-instance <instance-name> service dhcp-server shared-network-name <network-name> disable
routing routing-instance <instance-name> service dhcp-server shared-network-name <network-name> shared-
network-parameters <value>
routing routing-instance <instance-name> service dhcp-server shared-network-name <network-name> subnet
<subnet-prefix>
routing routing-instance <instance-name> service dhcp-server shared-network-name <network-name> subnet
<subnet-prefix> bootfile-name <value>
routing routing-instance <instance-name> service dhcp-server shared-network-name <network-name> subnet
<subnet-prefix> bootfile-server <value>
routing routing-instance <instance-name> service dhcp-server shared-network-name <network-name> subnet
<subnet-prefix> client-prefix-length <value>
routing routing-instance <instance-name> service dhcp-server shared-network-name <network-name> subnet
```

```
<subnet-prefix> default-router <value>
routing routing-instance <instance-name> service dhcp-server shared-network-name <network-name> subnet
<subnet-prefix> dns-server <value>
routing routing-instance <instance-name> service dhcp-server shared-network-name <network-name> subnet
<subnet-prefix> domain-name <value>
routing routing-instance <instance-name> service dhcp-server shared-network-name <network-name> subnet
<subnet-prefix> exclude <value>
routing routing-instance <instance-name> service dhcp-server shared-network-name <network-name> subnet
<subnet-prefix> failover
routing routing-instance <instance-name> service dhcp-server shared-network-name <network-name> subnet
<subnet-prefix> failover local-address <value>
routing routing-instance <instance-name> service dhcp-server shared-network-name <network-name> subnet
<subnet-prefix> failover name <value>
routing routing-instance <instance-name> service dhcp-server shared-network-name <network-name> subnet
<subnet-prefix> failover peer-address <value>
routing routing-instance <instance-name> service dhcp-server shared-network-name <network-name> subnet
<subnet-prefix> failover status <value>
routing routing-instance <instance-name> service dhcp-server shared-network-name <network-name> subnet
<subnet-prefix> ip-forwarding
routing routing-instance <instance-name> service dhcp-server shared-network-name <network-name> subnet
<subnet-prefix> ip-forwarding enable <value>
routing routing-instance <instance-name> service dhcp-server shared-network-name <network-name> subnet
<subnet-prefix> lease <value>
routing routing-instance <instance-name> service dhcp-server shared-network-name <network-name> subnet
<subnet-prefix> ntp-server <value>
routing routing-instance <instance-name> service dhcp-server shared-network-name <network-name> subnet
<subnet-prefix> ping-check
routing routing-instance <instance-name> service dhcp-server shared-network-name <network-name> subnet
<subnet-prefix> pop-server <value>
routing routing-instance <instance-name> service dhcp-server shared-network-name <network-name> subnet
<subnet-prefix> server-identifier <value>
routing routing-instance <instance-name> service dhcp-server shared-network-name <network-name> subnet
<subnet-prefix> smtp-server <value>
routing routing-instance <instance-name> service dhcp-server shared-network-name <network-name> subnet
<subnet-prefix> start <address>
routing routing-instance <instance-name> service dhcp-server shared-network-name <network-name> subnet
<subnet-prefix> start <address> stop <value>
routing routing-instance <instance-name> service dhcp-server shared-network-name <network-name> subnet
<subnet-prefix> static-route
routing routing-instance <instance-name> service dhcp-server shared-network-name <network-name> subnet
<subnet-prefix> static-route destination-subnet <value>
routing routing-instance <instance-name> service dhcp-server shared-network-name <network-name> subnet
<subnet-prefix> static-route router <value>
routing routing-instance <instance-name> service dhcp-server shared-network-name <network-name> subnet
<subnet-prefix> subnet-parameters <value>
routing routing-instance <instance-name> service dhcp-server shared-network-name <network-name> subnet
<subnet-prefix> tftp-server-name <value>
routing routing-instance <instance-name> service dhcp-server shared-network-name <network-name> subnet
<subnet-prefix> time-offset <value>
routing routing-instance <instance-name> service dhcp-server shared-network-name <network-name> subnet
<subnet-prefix> time-server <value>
routing routing-instance <instance-name> service dhcp-server shared-network-name <network-name> subnet
<subnet-prefix> wins-server <value>
routing routing-instance <instance-name> service dhcp-server shared-network-name <network-name> subnet
<subnet-prefix> wpad-url <value>
routing routing-instance <instance-name> service dhcp-server static-mapping <mapping-name>
routing routing-instance <instance-name> service dhcp-server static-mapping <mapping-name> disable
routing routing-instance <instance-name> service dhcp-server static-mapping <mapping-name> ip-address
<value>
routing routing-instance <instance-name> service dhcp-server static-mapping <mapping-name> mac-address
<value>
routing routing-instance <instance-name> service dhcp-server static-mapping <mapping-name> static-mapping-
parameters <value>
routing routing-instance <instance-name> service dhcpv6-relay
routing routing-instance <instance-name> service dhcpv6-relay listen-interface <interface-name>
routing routing-instance <instance-name> service dhcpv6-relay listen-interface <interface-name> address
<value>
routing routing-instance <instance-name> service dhcpv6-relay listen-port <value>
routing routing-instance <instance-name> service dhcpv6-relay max-hop-count <value>
routing routing-instance <instance-name> service dhcpv6-relay upstream-interface <interface-name>
routing routing-instance <instance-name> service dhcpv6-relay upstream-interface <interface-name> address
<value>
```

```
routing routing-instance <instance-name> service dhcpv6-relay use-interface-id-option
routing routing-instance <instance-name> service dhcpv6-server
routing routing-instance <instance-name> service dhcpv6-server listento interface <value>
routing routing-instance <instance-name> service dhcpv6-server preference <value>
routing routing-instance <instance-name> service dhcpv6-server shared-network-name <network-name>
routing routing-instance <instance-name> service dhcpv6-server shared-network-name <network-name> subnet
<subnet-prefix>
routing routing-instance <instance-name> service dhcpv6-server shared-network-name <network-name> subnet
<subnet-prefix> address-range
routing routing-instance <instance-name> service dhcpv6-server shared-network-name <network-name> subnet
<subnet-prefix> address-range prefix <address>
routing routing-instance <instance-name> service dhcpv6-server shared-network-name <network-name> subnet
<subnet-prefix> address-range prefix <address> temporary
routing routing-instance <instance-name> service dhcpv6-server shared-network-name <network-name> subnet
<subnet-prefix> address-range start <address>
routing routing-instance <instance-name> service dhcpv6-server shared-network-name <network-name> subnet
<subnet-prefix> address-range start <address> stop <value>
routing routing-instance <instance-name> service dhcpv6-server shared-network-name <network-name> subnet
<subnet-prefix> description <value>
routing routing-instance <instance-name> service dhcpv6-server shared-network-name <network-name> subnet
<subnet-prefix> domain-search <value>
routing routing-instance <instance-name> service dhcpv6-server shared-network-name <network-name> subnet
<subnet-prefix> lease-time
routing routing-instance <instance-name> service dhcpv6-server shared-network-name <network-name> subnet
<subnet-prefix> lease-time default <value>
routing routing-instance <instance-name> service dhcpv6-server shared-network-name <network-name> subnet
<subnet-prefix> lease-time maximum <value>
routing routing-instance <instance-name> service dhcpv6-server shared-network-name <network-name> subnet
<subnet-prefix> lease-time minimum <value>
routing routing-instance <instance-name> service dhcpv6-server shared-network-name <network-name> subnet
<subnet-prefix> name-server <value>
routing routing-instance <instance-name> service dhcpv6-server shared-network-name <network-name> subnet
<subnet-prefix> nis-domain <value>
routing routing-instance <instance-name> service dhcpv6-server shared-network-name <network-name> subnet
<subnet-prefix> nis-server <value>
routing routing-instance <instance-name> service dhcpv6-server shared-network-name <network-name> subnet
<subnet-prefix> nisplus-domain <value>
routing routing-instance <instance-name> service dhcpv6-server shared-network-name <network-name> subnet
<subnet-prefix> nisplus-server <value>
routing routing-instance <instance-name> service dhcpv6-server shared-network-name <network-name> subnet
<subnet-prefix> prefix-delegation start <startip>
routing routing-instance <instance-name> service dhcpv6-server shared-network-name <network-name> subnet
<subnet-prefix> prefix-delegation start <startip> prefix-length <value>
routing routing-instance <instance-name> service dhcpv6-server shared-network-name <network-name> subnet
<subnet-prefix> prefix-delegation start <startip> stop <value>
routing routing-instance <instance-name> service dhcpv6-server shared-network-name <network-name> subnet
<subnet-prefix> sip-server-address <value>
routing routing-instance <instance-name> service dhcpv6-server shared-network-name <network-name> subnet
<subnet-prefix> sip-server-name <value>
routing routing-instance <instance-name> service dhcpv6-server shared-network-name <network-name> subnet
<subnet-prefix> sntp-server <value>
routing routing-instance <instance-name> service dhcpv6-server static-mapping <mapping-name>
routing routing-instance <instance-name> service dhcpv6-server static-mapping <mapping-name> identifier
<value>
routing routing-instance <instance-name> service dhcpv6-server static-mapping <mapping-name> ipv6-address
<value>
routing routing-instance <instance-name> service dns
routing routing-instance <instance-name> service dns dynamic
routing routing-instance <instance-name> service dns dynamic interface <interface-name>
routing routing-instance <instance-name> service dns dynamic interface <interface-name> service <service-
name>
routing routing-instance <instance-name> service dns dynamic interface <interface-name> service <service-
name> host-name <value>
routing routing-instance <instance-name> service dns dynamic interface <interface-name> service <service-
name> login <value>
routing routing-instance <instance-name> service dns dynamic interface <interface-name> service <service-
name> password <value>
routing routing-instance <instance-name> service dns dynamic interface <interface-name> service <service-
name> server <value>
routing routing-instance <instance-name> service dns forwarding
routing routing-instance <instance-name> service dns forwarding cache-size <value>
routing routing-instance <instance-name> service dns forwarding dhcp <value>
```

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routing routing-instance <instance-name> service dns forwarding domain <domain-name>
routing routing-instance <instance-name> service dns forwarding domain <domain-name> server <value>
routing routing-instance <instance-name> service dns forwarding listen-on <value>
routing routing-instance <instance-name> service dns forwarding name-server <value>
routing routing-instance <instance-name> service dns forwarding system
routing routing-instance <instance-name> service ssh
routing routing-instance <instance-name> service ssh allow-root
routing routing-instance <instance-name> service ssh authentication-retries <value>
routing routing-instance <instance-name> service ssh disable-host-validation
routing routing-instance <instance-name> service ssh disable-password-authentication
routing routing-instance <instance-name> service ssh disable-tcp-forwarding
routing routing-instance <instance-name> service ssh key-security-strength <value>
routing routing-instance <instance-name> service ssh listen-address <value>
routing routing-instance <instance-name> service ssh port <value>
routing routing-instance <instance-name> service ssh timeout <value>
routing routing-instance <instance-name> service telnet
routing routing-instance <instance-name> service telnet listen-address <value>
routing routing-instance <instance-name> service telnet port <value>
routing routing-instance <instance-name> service twamp server
routing routing-instance <instance-name> service twamp server client-list <value>
routing routing-instance <instance-name> service twamp server dscp-value <value>
routing routing-instance <instance-name> service twamp server maximum-connections <value>
routing routing-instance <instance-name> service twamp server maximum-sessions-per-connection <value>
routing routing-instance <instance-name> service twamp server mode <value>
routing routing-instance <instance-name> service twamp server port <value>
routing routing-instance <instance-name> service twamp server server-inactivity-timeout <value>
routing routing-instance <instance-name> service twamp server test-inactivity-timeout <value>
routing routing-instance <instance-name> service twamp server user <name>
routing routing-instance <instance-name> service twamp server user <name> password <value>
routing routing-instance <instance-name> system alg
routing routing-instance <instance-name> system alg ftp
routing routing-instance <instance-name> system alg ftp disable
routing routing-instance <instance-name> system alg ftp port <value>
routing routing-instance <instance-name> system alg pptp
routing routing-instance <instance-name> system alg pptp disable
routing routing-instance <instance-name> system alg rpc
routing routing-instance <instance-name> system alg rpc disable
routing routing-instance <instance-name> system alg rpc program <value>
routing routing-instance <instance-name> system alg rsh disable
routing routing-instance <instance-name> system alg sip
routing routing-instance <instance-name> system alg sip disable
routing routing-instance <instance-name> system alg sip port <value>
routing routing-instance <instance-name> system alg tftp
routing routing-instance <instance-name> system alg tftp disable
routing routing-instance <instance-name> system alg tftp port <value>
routing routing-instance <instance-name> system config-management commit-archive
routing routing-instance <instance-name> system config-management commit-archive location <value>
routing routing-instance <instance-name> system domain-name <value>
routing routing-instance <instance-name> system domain-search
routing routing-instance <instance-name> system domain-search domain <value>
routing routing-instance <instance-name> system login radius-server <server-address>
routing routing-instance <instance-name> system login radius-server <server-address> port <value>
routing routing-instance <instance-name> system login radius-server <server-address> secret <value>
routing routing-instance <instance-name> system login radius-server <server-address> timeout <value>
routing routing-instance <instance-name> system login tacplus-server <server-address>
routing routing-instance <instance-name> system login tacplus-server <server-address> port <value>
routing routing-instance <instance-name> system login tacplus-server <server-address> secret <value>
routing routing-instance <instance-name> system login tacplus-server <server-address> source-address <value>
routing routing-instance <instance-name> system login tacplus-server <server-address> timeout <value>
routing routing-instance <instance-name> system name-server <value>
routing routing-instance <instance-name> system ntp
routing routing-instance <instance-name> system ntp keyid <id>
routing routing-instance <instance-name> system ntp keyid <id> digest <value>
routing routing-instance <instance-name> system ntp keyid <id> plaintext-password <value>
routing routing-instance <instance-name> system ntp server <name>
routing routing-instance <instance-name> system ntp server <name> address-family <value>
routing routing-instance <instance-name> system ntp server <name> dynamic
routing routing-instance <instance-name> system ntp server <name> keyid <value>
routing routing-instance <instance-name> system ntp server <name> noselect
routing routing-instance <instance-name> system ntp server <name> preempt
routing routing-instance <instance-name> system ntp server <name> prefer
routing routing-instance <instance-name> system ntp statistics
```

```
routing routing-instance <instance-name> system session timeout
routing routing-instance <instance-name> system session timeout custom
routing routing-instance <instance-name> system session timeout custom rule <rule-number>
routing routing-instance <instance-name> system session timeout custom rule <rule-number> destination
routing routing-instance <instance-name> system session timeout custom rule <rule-number> destination
address <value>
routing routing-instance <instance-name> system session timeout custom rule <rule-number> destination port
<value>
routing routing-instance <instance-name> system session timeout custom rule <rule-number> expire <value>
routing routing-instance <instance-name> system session timeout custom rule <rule-number> protocol <value>
routing routing-instance <instance-name> system session timeout custom rule <rule-number> source
routing routing-instance <instance-name> system session timeout custom rule <rule-number> source address
<value>
routing routing-instance <instance-name> system session timeout custom rule <rule-number> source port
<value>
routing routing-instance <instance-name> system session timeout icmp
routing routing-instance <instance-name> system session timeout icmp established <value>
routing routing-instance <instance-name> system session timeout icmp new <value>
routing routing-instance <instance-name> system session timeout other
routing routing-instance <instance-name> system session timeout other established <value>
routing routing-instance <instance-name> system session timeout other new <value>
routing routing-instance <instance-name> system session timeout tcp
routing routing-instance <instance-name> system session timeout tcp close-wait <value>
routing routing-instance <instance-name> system session timeout tcp closed <value>
routing routing-instance <instance-name> system session timeout tcp closing <value>
routing routing-instance <instance-name> system session timeout tcp established <value>
routing routing-instance <instance-name> system session timeout tcp fin-received <value>
routing routing-instance <instance-name> system session timeout tcp fin-sent <value>
routing routing-instance <instance-name> system session timeout tcp fin-wait <value>
routing routing-instance <instance-name> system session timeout tcp last-ack <value>
routing routing-instance <instance-name> system session timeout tcp simsyn-sent <value>
routing routing-instance <instance-name> system session timeout tcp syn-received <value>
routing routing-instance <instance-name> system session timeout tcp syn-sent <value>
routing routing-instance <instance-name> system session timeout tcp time-wait <value>
routing routing-instance <instance-name> system session timeout udp
routing routing-instance <instance-name> system session timeout udp established <value>
routing routing-instance <instance-name> system session timeout udp new <value>
routing routing-instance <instance-name> system static-host-mapping
routing routing-instance <instance-name> system static-host-mapping host-name <name>
routing routing-instance <instance-name> system static-host-mapping host-name <name> alias <value>
routing routing-instance <instance-name> system static-host-mapping host-name <name> inet <value>
routing routing-instance <instance-name> system syslog
routing routing-instance <instance-name> system syslog host <host-address>
routing routing-instance <instance-name> system syslog host <host-address> facility <logging-facility>
routing routing-instance <instance-name> system syslog host <host-address> facility <logging-facility>
level <value>
routing routing-instance <instance-name> system syslog host <host-address> facility-override <value>
service snmp routing-instance <value>
service snmp trap-target <address> routing-instance <value>
service snmp v3 trap-target <address> routing-instance <value>
```

List of operational commands

```
add system image routing-instance <text> <text>
add system image routing-instance <text> <text> username <text> password <text>
copy file routing-instance <text> <text> to <text>
monitor ip-traffic routing-instance <text>
monitor ip-traffic routing-instance <text> interface <text>
monitor protocol bfd routing-instance <text>
monitor protocol bfd routing-instance <text> disable all
monitor protocol bfd routing-instance <text> disable event
monitor protocol bfd routing-instance <text> disable ipc-error
monitor protocol bfd routing-instance <text> disable ipc-event
monitor protocol bfd routing-instance <text> disable packet
monitor protocol bfd routing-instance <text> disable session
monitor protocol bfd routing-instance <text> enable all
monitor protocol bfd routing-instance <text> enable event
monitor protocol bfd routing-instance <text> enable ipc-error
monitor protocol bfd routing-instance <text> enable ipc-event
monitor protocol bfd routing-instance <text> enable packet
```

```
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monitor protocol bgp routing-instance <text>
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monitor protocol bgp routing-instance <text> disable bfd
monitor protocol bgp routing-instance <text> disable dampening
monitor protocol bgp routing-instance <text> disable events
monitor protocol bgp routing-instance <text> disable filters
monitor protocol bgp routing-instance <text> disable fsm
monitor protocol bgp routing-instance <text> disable keepalives
monitor protocol bgp routing-instance <text> disable msdp
monitor protocol bgp routing-instance <text> disable updates
monitor protocol bgp routing-instance <text> enable all
monitor protocol bgp routing-instance <text> enable bfd
monitor protocol bgp routing-instance <text> enable dampening
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monitor protocol bgp routing-instance <text> enable updates out
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monitor protocol multicast routing-instance <text> disable ip
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monitor protocol multicast routing-instance <text> disable ip fib-msg
monitor protocol multicast routing-instance <text> disable ip mrib-msg
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monitor protocol multicast routing-instance <text> disable ip register-msg
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monitor protocol multicast routing-instance <text> enable ipv6 stats
monitor protocol multicast routing-instance <text> enable ipv6 vif
```

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monitor protocol multicast routing-instance <text> pim enable ip nsm
```

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show ip bgp routing-instance all ipv4 unicast summary
show ip bgp routing-instance all ipv6 unicast
```

```
show ip bgp routing-instance all ipv6 unicast <text>
show ip bgp routing-instance all ipv6 unicast <text> longer-prefixes
show ip bgp routing-instance all ipv6 unicast community
show ip bgp routing-instance all ipv6 unicast community <text>
show ip bgp routing-instance all ipv6 unicast community <text> <text>
show ip bgp routing-instance all ipv6 unicast community <text> <text> <text>
show ip bgp routing-instance all ipv6 unicast community <text> <text> <text> <text>
show ip bgp routing-instance all ipv6 unicast community <text> <text> <text> <text> exact-match
show ip bgp routing-instance all ipv6 unicast community <text> <text> <text> exact-match
show ip bgp routing-instance all ipv6 unicast community <text> <text> exact-match
show ip bgp routing-instance all ipv6 unicast community <text> exact-match
show ip bgp routing-instance all ipv6 unicast community-list <text>
show ip bgp routing-instance all ipv6 unicast community-list <text> exact-match
show ip bgp routing-instance all ipv6 unicast dampening dampened-paths
show ip bgp routing-instance all ipv6 unicast dampening flap-statistics
show ip bgp routing-instance all ipv6 unicast filter-list <text>
show ip bgp routing-instance all ipv6 unicast neighbors
show ip bgp routing-instance all ipv6 unicast neighbors <text>
show ip bgp routing-instance all ipv6 unicast neighbors <text> advertised-routes
show ip bgp routing-instance all ipv6 unicast neighbors <text> received-routes
show ip bgp routing-instance all ipv6 unicast neighbors <text> routes
show ip bgp routing-instance all ipv6 unicast prefix-list <text>
show ip bgp routing-instance all ipv6 unicast regexp <text>
show ip bgp routing-instance all ipv6 unicast summary
show ip bgp routing-instance all neighbors
show ip bgp routing-instance all neighbors <text>
show ip bgp routing-instance all neighbors <text> received prefix-filter
show ip bgp routing-instance all neighbors <text> routes
show ip bgp routing-instance all prefix-list <text>
show ip bgp routing-instance all regexp <text>
show ip bgp routing-instance all route-map <text>
show ip bgp routing-instance all summary
show ip igmp groups routing-instance <text>
show ip igmp groups routing-instance <text> detail
show ip igmp groups routing-instance <text> group-address <text>
show ip igmp groups routing-instance <text> group-address <text> detail
show ip igmp interface routing-instance <text>
show ip igmp ssm-map routing-instance <text>
show ip igmp ssm-map routing-instance <text> <text>
show ip mroute routing-instance <text>
show ip mroute routing-instance <text> count
show ip mroute routing-instance <text> dense
show ip mroute routing-instance <text> dense count
show ip mroute routing-instance <text> dense summary
show ip mroute routing-instance <text> group <text>
show ip mroute routing-instance <text> group <text> count
show ip mroute routing-instance <text> group <text> dense
show ip mroute routing-instance <text> group <text> dense count
show ip mroute routing-instance <text> group <text> dense summary
show ip mroute routing-instance <text> group <text> source <text>
show ip mroute routing-instance <text> group <text> source <text> count
show ip mroute routing-instance <text> group <text> source <text> dense
show ip mroute routing-instance <text> group <text> source <text> dense count
show ip mroute routing-instance <text> group <text> source <text> dense summary
show ip mroute routing-instance <text> group <text> source <text> sparse
show ip mroute routing-instance <text> group <text> source <text> sparse count
show ip mroute routing-instance <text> group <text> source <text> sparse summary
show ip mroute routing-instance <text> group <text> source <text> summary
show ip mroute routing-instance <text> group <text> sparse
show ip mroute routing-instance <text> group <text> sparse count
show ip mroute routing-instance <text> group <text> sparse summary
show ip mroute routing-instance <text> group <text> summary
show ip mroute routing-instance <text> source <text>
show ip mroute routing-instance <text> source <text> count
show ip mroute routing-instance <text> source <text> dense
show ip mroute routing-instance <text> source <text> dense count
show ip mroute routing-instance <text> source <text> dense summary
show ip mroute routing-instance <text> source <text> sparse
show ip mroute routing-instance <text> source <text> sparse count
show ip mroute routing-instance <text> source <text> sparse summary
show ip mroute routing-instance <text> source <text> summary
show ip mroute routing-instance <text> sparse
```

```
show ip mroute routing-instance <text> sparse count
show ip mroute routing-instance <text> sparse summary
show ip mroute routing-instance <text> summary
show ip msdp peer routing-instance <text>
show ip msdp peer routing-instance <text> <text>
show ip msdp sa-cache routing-instance <text>
show ip msdp sa-cache routing-instance <text> summary
show ip msdp summary routing-instance <text>
show ip multicast interface routing-instance <text>
show ip multicast mrinfo <text> routing-instance <text>
show ip multicast mrinfo <text> routing-instance <text> <text>
show ip ospf routing-instance <text> process <text>
show ip ospf routing-instance <text> process <text> border-routers
show ip ospf routing-instance <text> process <text> database
show ip ospf routing-instance <text> process <text> database adv-router <text>
show ip ospf routing-instance <text> process <text> database asbr-summary
show ip ospf routing-instance <text> process <text> database asbr-summary <text>
show ip ospf routing-instance <text> process <text> database asbr-summary <text> adv-router <text>
show ip ospf routing-instance <text> process <text> database asbr-summary <text> self-originate
show ip ospf routing-instance <text> process <text> database asbr-summary adv-router <text>
show ip ospf routing-instance <text> process <text> database external
show ip ospf routing-instance <text> process <text> database external <text>
show ip ospf routing-instance <text> process <text> database external <text> adv-router <text>
show ip ospf routing-instance <text> process <text> database external <text> self-originate
show ip ospf routing-instance <text> process <text> database external adv-router <text>
show ip ospf routing-instance <text> process <text> database max-age
show ip ospf routing-instance <text> process <text> database network
show ip ospf routing-instance <text> process <text> database network <text>
show ip ospf routing-instance <text> process <text> database network <text> adv-router <text>
show ip ospf routing-instance <text> process <text> database network <text> self-originate
show ip ospf routing-instance <text> process <text> database network adv-router <text>
show ip ospf routing-instance <text> process <text> database nssa-external
show ip ospf routing-instance <text> process <text> database nssa-external <text>
show ip ospf routing-instance <text> process <text> database nssa-external <text> adv-router <text>
show ip ospf routing-instance <text> process <text> database nssa-external <text> self-originate
show ip ospf routing-instance <text> process <text> database nssa-external adv-router <text>
show ip ospf routing-instance <text> process <text> database opaque-area
show ip ospf routing-instance <text> process <text> database opaque-area <text>
show ip ospf routing-instance <text> process <text> database opaque-area <text> adv-router <text>
show ip ospf routing-instance <text> process <text> database opaque-area <text> self-originate
show ip ospf routing-instance <text> process <text> database opaque-area adv-router <text>
show ip ospf routing-instance <text> process <text> database opaque-as
show ip ospf routing-instance <text> process <text> database opaque-as <text>
show ip ospf routing-instance <text> process <text> database opaque-as <text> adv-router <text>
show ip ospf routing-instance <text> process <text> database opaque-as <text> self-originate
show ip ospf routing-instance <text> process <text> database opaque-as adv-router <text>
show ip ospf routing-instance <text> process <text> database opaque-link
show ip ospf routing-instance <text> process <text> database opaque-link <text>
show ip ospf routing-instance <text> process <text> database opaque-link <text> adv-router <text>
show ip ospf routing-instance <text> process <text> database opaque-link <text> self-originate
show ip ospf routing-instance <text> process <text> database opaque-link adv-router <text>
show ip ospf routing-instance <text> process <text> database router
show ip ospf routing-instance <text> process <text> database router <text>
show ip ospf routing-instance <text> process <text> database router <text> adv-router <text>
show ip ospf routing-instance <text> process <text> database router <text> self-originate
show ip ospf routing-instance <text> process <text> database router adv-router <text>
show ip ospf routing-instance <text> process <text> database self-originate
show ip ospf routing-instance <text> process <text> database summary
show ip ospf routing-instance <text> process <text> database summary <text>
show ip ospf routing-instance <text> process <text> database summary <text> adv-router <text>
show ip ospf routing-instance <text> process <text> database summary <text> self-originate
show ip ospf routing-instance <text> process <text> database summary adv-router <text>
show ip ospf routing-instance <text> process <text> database summary self-originate
show ip ospf routing-instance <text> process <text> interface
show ip ospf routing-instance <text> process <text> interface <text>
show ip ospf routing-instance <text> process <text> neighbor
show ip ospf routing-instance <text> process <text> neighbor <text>
show ip ospf routing-instance <text> process <text> neighbor address <text>
show ip ospf routing-instance <text> process <text> neighbor detail
show ip ospf routing-instance <text> process <text> neighbor interface <text>
show ip ospf routing-instance <text> process <text> neighbor summary
show ip ospf routing-instance <text> process <text> opaque-area
```

```
show ip ospf routing-instance <text> process <text> opaque-as
show ip ospf routing-instance <text> process <text> opaque-link
show ip ospf routing-instance <text> process <text> route
show ip ospf routing-instance <text> process <text> virtual-links
show ip pim bsr-router routing-instance <text>
show ip pim interface routing-instance <text>
show ip pim interface routing-instance <text> detail
show ip pim local-members routing-instance <text>
show ip pim mroute routing-instance <text>
show ip pim mroute routing-instance <text> detail
show ip pim mroute routing-instance <text> group <text>
show ip pim mroute routing-instance <text> group <text> detail
show ip pim mroute routing-instance <text> group <text> source <text>
show ip pim mroute routing-instance <text> group <text> source <text> detail
show ip pim mroute routing-instance <text> rfc
show ip pim mroute routing-instance <text> rfc detail
show ip pim mroute routing-instance <text> rfc group <text>
show ip pim mroute routing-instance <text> rfc group <text> detail
show ip pim mroute routing-instance <text> rfc group <text> source <text>
show ip pim mroute routing-instance <text> rfc group <text> source <text> detail
show ip pim mroute routing-instance <text> rfc source <text>
show ip pim mroute routing-instance <text> rfc source <text> detail
show ip pim mroute routing-instance <text> source <text>
show ip pim mroute routing-instance <text> source <text> detail
show ip pim mroute routing-instance <text> summary
show ip pim neighbor routing-instance <text>
show ip pim neighbor routing-instance <text> detail
show ip pim nexthop routing-instance <text>
show ip pim rp-hash <text> routing-instance <text>
show ip pim rp-mapping routing-instance <text>
show ip rip routing-instance <text>
show ip rip routing-instance <text> status
show ip route routing-instance <text>
show ip route routing-instance <text> <text>
show ip route routing-instance <text> bgp
show ip route routing-instance <text> connected
show ip route routing-instance <text> forward
show ip route routing-instance <text> forward <text>
show ip route routing-instance <text> kernel
show ip route routing-instance <text> ospf
show ip route routing-instance <text> rip
show ip route routing-instance <text> static
show ip route routing-instance <text> summary
show ip route routing-instance <text> table <text>
show ip route routing-instance <text> variance
show ip route routing-instance <text> variance <text>
show ip route routing-instance <text> variance console
show ip rpf <text> routing-instance <text>
show ipv6 mld groups routing-instance <text>
show ipv6 mld groups routing-instance <text> detail
show ipv6 mld groups routing-instance <text> group-address <text>
show ipv6 mld groups routing-instance <text> group-address <text> detail
show ipv6 mld interface routing-instance <text>
show ipv6 mld ssm-map routing-instance <text>
show ipv6 mld ssm-map routing-instance <text> <text>
show ipv6 mroute routing-instance <text>
show ipv6 mroute routing-instance <text> count
show ipv6 mroute routing-instance <text> dense
show ipv6 mroute routing-instance <text> dense count
show ipv6 mroute routing-instance <text> dense summary
show ipv6 mroute routing-instance <text> group <text>
show ipv6 mroute routing-instance <text> group <text> count
show ipv6 mroute routing-instance <text> group <text> dense
show ipv6 mroute routing-instance <text> group <text> dense count
show ipv6 mroute routing-instance <text> group <text> dense summary
show ipv6 mroute routing-instance <text> group <text> source <text>
show ipv6 mroute routing-instance <text> group <text> source <text> count
show ipv6 mroute routing-instance <text> group <text> source <text> dense
show ipv6 mroute routing-instance <text> group <text> source <text> dense count
show ipv6 mroute routing-instance <text> group <text> source <text> dense summary
show ipv6 mroute routing-instance <text> group <text> source <text> sparse
show ipv6 mroute routing-instance <text> group <text> source <text> sparse count
```

```
show ipv6 mroute routing-instance <text> group <text> source <text> sparse summary
show ipv6 mroute routing-instance <text> group <text> source <text> summary
show ipv6 mroute routing-instance <text> group <text> sparse
show ipv6 mroute routing-instance <text> group <text> sparse count
show ipv6 mroute routing-instance <text> group <text> sparse summary
show ipv6 mroute routing-instance <text> group <text> summary
show ipv6 mroute routing-instance <text> source <text>
show ipv6 mroute routing-instance <text> source <text> count
show ipv6 mroute routing-instance <text> source <text> dense
show ipv6 mroute routing-instance <text> source <text> dense count
show ipv6 mroute routing-instance <text> source <text> dense summary
show ipv6 mroute routing-instance <text> source <text> sparse
show ipv6 mroute routing-instance <text> source <text> sparse count
show ipv6 mroute routing-instance <text> source <text> sparse summary
show ipv6 mroute routing-instance <text> source <text> summary
show ipv6 mroute routing-instance <text> sparse
show ipv6 mroute routing-instance <text> sparse count
show ipv6 mroute routing-instance <text> sparse summary
show ipv6 mroute routing-instance <text> summary
show ipv6 multicast interface routing-instance <text>
show ipv6 ospfv3 routing-instance <text> process <text>
show ipv6 ospfv3 routing-instance <text> process <text> border-routers
show ipv6 ospfv3 routing-instance <text> process <text> database
show ipv6 ospfv3 routing-instance <text> process <text> database adv-router <text>
show ipv6 ospfv3 routing-instance <text> process <text> database external
show ipv6 ospfv3 routing-instance <text> process <text> database external <text>
show ipv6 ospfv3 routing-instance <text> process <text> database external <text> adv-router <text>
show ipv6 ospfv3 routing-instance <text> process <text> database external <text> self-originate
show ipv6 ospfv3 routing-instance <text> process <text> database external adv-router <text>
show ipv6 ospfv3 routing-instance <text> process <text> database external self-originate
show ipv6 ospfv3 routing-instance <text> process <text> database grace
show ipv6 ospfv3 routing-instance <text> process <text> database grace <text>
show ipv6 ospfv3 routing-instance <text> process <text> database grace <text> adv-router <text>
show ipv6 ospfv3 routing-instance <text> process <text> database grace <text> self-originate
show ipv6 ospfv3 routing-instance <text> process <text> database grace adv-router <text>
show ipv6 ospfv3 routing-instance <text> process <text> database grace self-originate
show ipv6 ospfv3 routing-instance <text> process <text> database inter-prefix
show ipv6 ospfv3 routing-instance <text> process <text> database inter-prefix <text>
show ipv6 ospfv3 routing-instance <text> process <text> database inter-prefix <text> adv-router <text>
show ipv6 ospfv3 routing-instance <text> process <text> database inter-prefix <text> self-originate
show ipv6 ospfv3 routing-instance <text> process <text> database inter-prefix adv-router <text>
show ipv6 ospfv3 routing-instance <text> process <text> database inter-prefix self-originate
show ipv6 ospfv3 routing-instance <text> process <text> database inter-router
show ipv6 ospfv3 routing-instance <text> process <text> database inter-router <text>
show ipv6 ospfv3 routing-instance <text> process <text> database inter-router <text> adv-router <text>
show ipv6 ospfv3 routing-instance <text> process <text> database inter-router <text> self-originate
show ipv6 ospfv3 routing-instance <text> process <text> database inter-router adv-router <text>
show ipv6 ospfv3 routing-instance <text> process <text> database inter-router self-originate
show ipv6 ospfv3 routing-instance <text> process <text> database intra-prefix
show ipv6 ospfv3 routing-instance <text> process <text> database intra-prefix <text>
show ipv6 ospfv3 routing-instance <text> process <text> database intra-prefix <text> adv-router <text>
show ipv6 ospfv3 routing-instance <text> process <text> database intra-prefix <text> self-originate
show ipv6 ospfv3 routing-instance <text> process <text> database intra-prefix adv-router <text>
show ipv6 ospfv3 routing-instance <text> process <text> database intra-prefix self-originate
show ipv6 ospfv3 routing-instance <text> process <text> database link
show ipv6 ospfv3 routing-instance <text> process <text> database link <text>
show ipv6 ospfv3 routing-instance <text> process <text> database link <text> adv-router <text>
show ipv6 ospfv3 routing-instance <text> process <text> database link <text> self-originate
show ipv6 ospfv3 routing-instance <text> process <text> database link adv-router <text>
show ipv6 ospfv3 routing-instance <text> process <text> database link self-originate
show ipv6 ospfv3 routing-instance <text> process <text> database max-age
show ipv6 ospfv3 routing-instance <text> process <text> database network
show ipv6 ospfv3 routing-instance <text> process <text> database network <text>
show ipv6 ospfv3 routing-instance <text> process <text> database network <text> adv-router <text>
show ipv6 ospfv3 routing-instance <text> process <text> database network <text> self-originate
show ipv6 ospfv3 routing-instance <text> process <text> database network adv-router <text>
show ipv6 ospfv3 routing-instance <text> process <text> database network self-originate
show ipv6 ospfv3 routing-instance <text> process <text> database nssa-external
show ipv6 ospfv3 routing-instance <text> process <text> database nssa-external <text>
show ipv6 ospfv3 routing-instance <text> process <text> database nssa-external <text> adv-router <text>
show ipv6 ospfv3 routing-instance <text> process <text> database nssa-external <text> self-originate
show ipv6 ospfv3 routing-instance <text> process <text> database nssa-external adv-router <text>
```

```
show ipv6 ospfv3 routing-instance <text> process <text> database nssa-external self-originate
show ipv6 ospfv3 routing-instance <text> process <text> database router
show ipv6 ospfv3 routing-instance <text> process <text> database router <text>
show ipv6 ospfv3 routing-instance <text> process <text> database router <text> adv-router <text>
show ipv6 ospfv3 routing-instance <text> process <text> database router <text> self-originate
show ipv6 ospfv3 routing-instance <text> process <text> database router adv-router <text>
show ipv6 ospfv3 routing-instance <text> process <text> database router self-originate
show ipv6 ospfv3 routing-instance <text> process <text> database self-originate
show ipv6 ospfv3 routing-instance <text> process <text> interface
show ipv6 ospfv3 routing-instance <text> process <text> interface <text>
show ipv6 ospfv3 routing-instance <text> process <text> neighbor
show ipv6 ospfv3 routing-instance <text> process <text> neighbor <text>
show ipv6 ospfv3 routing-instance <text> process <text> neighbor detail
show ipv6 ospfv3 routing-instance <text> process <text> route
show ipv6 ospfv3 routing-instance <text> process <text> topology
show ipv6 ospfv3 routing-instance <text> process <text> topology area <text>
show ipv6 ospfv3 routing-instance <text> process <text> virtual-links
show ipv6 ospfv3 routing-instance <text> process-mapping
show ipv6 pim bsr-router routing-instance <text>
show ipv6 pim interface routing-instance <text>
show ipv6 pim interface routing-instance <text> detail
show ipv6 pim local-members routing-instance <text>
show ipv6 pim mroute routing-instance <text>
show ipv6 pim mroute routing-instance <text> detail
show ipv6 pim mroute routing-instance <text> group <text>
show ipv6 pim mroute routing-instance <text> group <text> detail
show ipv6 pim mroute routing-instance <text> group <text> source <text>
show ipv6 pim mroute routing-instance <text> group <text> source <text> detail
show ipv6 pim mroute routing-instance <text> rfc
show ipv6 pim mroute routing-instance <text> rfc detail
show ipv6 pim mroute routing-instance <text> rfc group <text>
show ipv6 pim mroute routing-instance <text> rfc group <text> detail
show ipv6 pim mroute routing-instance <text> rfc group <text> source <text>
show ipv6 pim mroute routing-instance <text> rfc group <text> source <text> detail
show ipv6 pim mroute routing-instance <text> rfc source <text>
show ipv6 pim mroute routing-instance <text> rfc source <text> detail
show ipv6 pim mroute routing-instance <text> source <text>
show ipv6 pim mroute routing-instance <text> source <text> detail
show ipv6 pim mroute routing-instance <text> summary
show ipv6 pim neighbor routing-instance <text>
show ipv6 pim neighbor routing-instance <text> detail
show ipv6 pim nexthop routing-instance <text>
show ipv6 pim rp-hash <text> routing-instance <text>
show ipv6 pim rp-mapping routing-instance <text>
show ipv6 ripng routing-instance <text>
show ipv6 ripng routing-instance <text> interface
show ipv6 ripng routing-instance <text> status
show ipv6 route routing-instance <text>
show ipv6 route routing-instance <text> <text>
show ipv6 route routing-instance <text> bgp
show ipv6 route routing-instance <text> connected
show ipv6 route routing-instance <text> forward
show ipv6 route routing-instance <text> forward <text>
show ipv6 route routing-instance <text> kernel
show ipv6 route routing-instance <text> ospfv3
show ipv6 route routing-instance <text> ripng
show ipv6 route routing-instance <text> static
show ipv6 route routing-instance <text> summary
show ipv6 route routing-instance <text> table <text>
show ipv6 route routing-instance <text> variance
show ipv6 route routing-instance <text> variance <text>
show ipv6 route routing-instance <text> variance console
show ipv6 rpf <text> routing-instance <text>
show monitoring protocols bfd routing-instance <text>
show monitoring protocols bgp routing-instance <text>
show monitoring protocols multicast routing-instance <text>
show monitoring protocols multicast routing-instance <text> igmp
show monitoring protocols multicast routing-instance <text> ip
show monitoring protocols multicast routing-instance <text> ipv6
show monitoring protocols multicast routing-instance <text> mld
show monitoring protocols multicast routing-instance <text> msdp
show monitoring protocols multicast routing-instance <text> pim
```

```
show monitoring protocols multicast routing-instance <text> pim6
show monitoring protocols ospf routing-instance <text> process <text>
show monitoring protocols ospfv3 routing-instance <text> process <text>
show service twamp server routing-instance <text> session all
show service twamp server routing-instance <text> session client <text>
show service twamp server routing-instance <text> session summary
show service twamp server routing-instance <text> status
show snmp routing-instance
ssh <text> routing-instance <text>
telnet <text> routing-instance <text>
traceroute <text> routing-instance <text>
twping <text> routing-instance <text>
```

VRF Commands

routing routing-instance instance-name

Many Brocade 5600 vRouter commands can be configured for individual VRF routing instances. Use the following structure when adding routing instances to vRouter commands.

Syntax

set routing routing-instance *instance-name* [*command*]

delete routing routing-instance *instance-name* [*command*]

show routing routing-instance *instance-name* [*command*]

Parameters

instance-name

A VRF routing instance. Alphanumeric string. The leading character cannot be _ or -. You cannot use default as an instance name; it is reserved for the default routing instance.

command

A vRouter command, which comprises the command name and one or more keywords or variables, or both. Refer to the description of a specific command for the command syntax, which includes details about keywords and variables.

Modes

Configuration

Configuration Statement

```
routing {
      routing-instance instance-name {
     command
   }
}
```

Usage Guidelines

When specifying a VRF routing instance for most Configuration mode commands, add the appropriate VRF keywords and variable to follow the initial action (**set**, **delete**, or **show**) and before the other keywords and variables in the command.

Examples

The following command syntax does not specify a VRF routing instance, so the command applies to the default routing instance.

```
set service dns dynamic interface dp0p161p1
```

The following example shows the syntax for the same command with the RED routing instance added. Notice that **routing routing-instance** *instance-name* has been inserted between the basic action (**set** in the example) and the rest of the command. Most Configuration mode commands that support VRF routing instances follow this convention.

```
set routing routing-instance RED service dns dynamic interface dp0p161p1
```

routing routing-instance instance-name interface interface-name

Binds an interface to a routing instance.

Syntax

set routing routing-instance *instance-name* **interface** *interface-name*

delete routing routing-instance *instance-name* **interface** *interface-name*

show routing routing-instance *instance-name* **interface** *interface-name*

Parameters

instance-name

A VRF routing instance. Alphanumeric string. The leading character cannot be _ or -. You cannot use default as an instance name; it is reserved for the default routing instance.

interface-name

The name of an interface. For information about the types of interfaces and the formats of names, refer to *Brocade Vyatta Network OS LAN Interfaces Configuration Guide*.

Modes

Configuration

Configuration Statement

```
routing {
      routing-instance instance-name {
       interface interface-name
   }
}
```

Usage Guidelines

This command binds a routing instance to an interface. You can bind multiple interfaces to a single routing instance by issuing this command separately for each interface. You cannot bind a single interface to multiple routing instances.

The binding configuration is independent of the type of interface, so the interface type is not specified.

command routing-instance instance-name

Use this command structure when adding VRF routing instances to Operational mode commands.

Syntax

command **routing-instance** *instance-name*

Parameters

command

A vRouter command, which comprises the command name and one or more keywords or variables, or both. Refer to the description of a specific command for the command syntax, which includes details about keywords and variables.

instance-name

A VRF routing instance. Alphanumeric string. The leading character cannot be _ or -. You cannot use default as an instance name; it is reserved for the default routing instance.

Modes

Operational

Usage Guidelines

When adding a VRF routing instance to an Operational mode command:

- If the command does not have optional parameters, specify the routing instance at the end of the command.
- If the command has optional parameters, specify the routing instance after the required parameters and before the optional parameters.

Examples

The following example shows how to display the update status for all hosts that are configured for dynamic DNS updates for the default routing instance.

```
vyatta@vyatta:~$ show dns dynamic status
```

The following example shows how to display the same information for the RED routing instance.

```
vyatta@vyatta:~$ show dns dynamic status routing-instance RED
```

Source Routes

Source routing example

This example shows how to configure a simple site using PBR on the Brocade vRouter (R1) to route traffic from two different internal subnets to two Internet links.

In this example:

- All Internet-bound traffic from subnet 192.168.10.0/24 is routed out interface dp0p0p1.
- All Internet-bound traffic from subnet 192.168.20.0/24 is routed out interface dp0p0p2.

To configure this scenario, perform the following steps in configuration mode.

TABLE 17 Source routing using PBR

Step	Command
Create the SRC-ROUTE policy.	`vyatta@R1# set policy route pbr SRC-ROUTE`
Create rule 10 and specify the destination address to match. In this case, any destination address will match.	`vyatta@R1# set policy route pbr SRC-ROUTE rule 10 destination address 0.0.0.0/0`
Specify the address family for rule 10.	`vyatta@R1# set policy route pbr SRC-ROUTE rule 10 address-family ipv4`
Specify the source address to match. In this case, any address on subnet 192.168.10.0/24 will match.	`vyatta@R1# set policy route pbr SRC-ROUTE rule 10 source address 192.168.10.0/24`
Specify the accept action for rule 10.	`vyatta@R1# set policy route pbr SRC-ROUTE rule 10 action accept`
Specify that all packets that match should use alternate routing table 1.	`vyatta@R1# set policy route pbr SRC-ROUTE rule 10 table 1`
Specify the destination address to match any address.	`vyatta@R1# set policy route pbr SRC-ROUTE rule 10 destination address 0.0.0.0/0`
Specify the address family for rule 20.	`vyatta@R1# set policy route pbr SRC-ROUTE rule 20 address-family ipv4`
Specify the accept action for rule 20.	`vyatta@R1# set policy route pbr SRC-ROUTE rule 20 action accept`
Specify the destination address to match any address.	`vyatta@R1# set policy route pbr SRC-ROUTE rule 20 destination address 0.0.0.0/0`
Specify the source address to match. In this case, any address on subnet 192.168.20.0/24 will match.	`vyatta@R1# set policy route pbr SRC-ROUTE rule 20 source address 192.168.20.0/24`
Create the alternative routing table 2 and route default traffic to the second Internet connection.	`vyatta@R1# set policy route pbr SRC-ROUTE rule 20 table 2`
Commit the change.	`vyatta@R1# commit`

TABLE 17 Source routing using PBR (continued)

Step	Command

Show the alternate routing table configuration.	`vyatta@R1# show policy`
	`policy {`
	`route {`
	`pbr SRC-ROUTE {`
	`rule 10 {`
	`action accept`
	`address-family ipv4`
	`destination {`
	`address 0.0.0.0/0`
	`}`
	`source {`
	`address 192.168.10.0/24`
	`}`
	`table 1`
	`}`
	`rule 20 {`
	`action accept`
	`address-family ipv4`
	`destination {`
	`address 0.0.0.0/0`
	`}`
	`source {`
	`address 192.168.20.0/24`
	`}`
	`table 2`
	`}`
	`}`
	`}`
	`}`

Assign an address to dp0p0p1.	`vyatta@R1# set interfaces dataplane dp0p0p1 address 12.34.56.33/24`
Assign an address to dp0p0p2.	`vyatta@R1# set interfaces dataplane dp0p0p2 address 98.76.54.44/24`
Assign an address to dp0p0p3.	`vyatta@R1# set interfaces dataplane dp0p0p3 address 192.168.10.254/24`
Assign the policy to the interface connected to subnet 192.168.10.0/24.	`vyatta@R1# set interfaces dataplane dp0p0p3 policy route pbr SRC-ROUTE`
Assign an address to dp0p0p4.	`vyatta@R1# set interfaces dataplane dp0p0p4 address 192.168.20.254/24`
Assign the policy to the interface connected to subnet 192.168.20.0/24.	`vyatta@R1# set interfaces dataplane dp0p0p4 policy route pbr SRC-ROUTE`
Commit the change.	`vyatta@R1# commit`

Show the dataplane interface configuration.	`vyatta@R1# show interfaces dataplane`
	`dataplane dp0p0p1 {`
	`address 12.34.56.33/24`
	`}`
	`dataplane dp0p0p2 {`
	`address 98.76.54.44/24`
	`}`
	`dataplane dp0p0p3 {`
	`address 192.168.10.254/24`
	`policy {`
	`route SRC-ROUTE`
	`}`
	`}`
	`dataplane dp0p0p4 {`
	`address 192.168.20.254/24`

TABLE 17 Source routing using PBR (continued)

Step	Command

	policy {
	route SRC-ROUTE
	}
	}

List of Acronyms

Item	Description
ACL	access control list
ADSL	Asymmetric Digital Subscriber Line
AH	Authentication Header
AMI	Amazon Machine Image
API	Application Programming Interface
AS	autonomous system
ARP	Address Resolution Protocol
AWS	Amazon Web Services
BGP	Border Gateway Protocol
BIOS	Basic Input Output System
BPDU	Bridge Protocol Data Unit
CA	certificate authority
CCMP	AES in counter mode with CBC-MAC
CHAP	Challenge Handshake Authentication Protocol
CLI	command-line interface
DDNS	dynamic DNS
DHCP	Dynamic Host Configuration Protocol
DHCPv6	Dynamic Host Configuration Protocol version 6
DLCI	data-link connection identifier
DMI	desktop management interface
DMVPN	dynamic multipoint VPN
DMZ	demilitarized zone
DN	distinguished name
DNS	Domain Name System
DSCP	Differentiated Services Code Point
DSL	Digital Subscriber Line
eBGP	external BGP
EBS	Amazon Elastic Block Storage
EC2	Amazon Elastic Compute Cloud
EGP	Exterior Gateway Protocol
ECMP	equal-cost multipath
ESP	Encapsulating Security Payload
FIB	Forwarding Information Base
FTP	File Transfer Protocol
GRE	Generic Routing Encapsulation
HDLC	High-Level Data Link Control
I/O	Input/Output
ICMP	Internet Control Message Protocol

Item	Description
IDS	Intrusion Detection System
IEEE	Institute of Electrical and Electronics Engineers
IGMP	Internet Group Management Protocol
IGP	Interior Gateway Protocol
IPS	Intrusion Protection System
IKE	Internet Key Exchange
IP	Internet Protocol
IPOA	IP over ATM
IPsec	IP Security
IPv4	IP Version 4
IPv6	IP Version 6
ISAKMP	Internet Security Association and Key Management Protocol
ISM	Internet Standard Multicast
ISP	Internet Service Provider
KVM	Kernel-Based Virtual Machine
L2TP	Layer 2 Tunneling Protocol
LACP	Link Aggregation Control Protocol
LAN	local area network
LDAP	Lightweight Directory Access Protocol
LLDP	Link Layer Discovery Protocol
MAC	medium access control
mGRE	multipoint GRE
MIB	Management Information Base
MLD	Multicast Listener Discovery
MLPPP	multilink PPP
MRRU	maximum received reconstructed unit
MTU	maximum transmission unit
NAT	Network Address Translation
NBMA	Non-Broadcast Multi-Access
ND	Neighbor Discovery
NHRP	Next Hop Resolution Protocol
NIC	network interface card
NTP	Network Time Protocol
OSPF	Open Shortest Path First
OSPFv2	OSPF Version 2
OSPFv3	OSPF Version 3
PAM	Pluggable Authentication Module
PAP	Password Authentication Protocol
PAT	Port Address Translation
PBR	Policy Based Routing
PCI	peripheral component interconnect
PIM	Protocol Independent Multicast

Item	Description
PIM-DM	PIM Dense Mode
PIM-SM	PIM Sparse Mode
PKI	Public Key Infrastructure
PPP	Point-to-Point Protocol
PPPoA	PPP over ATM
PPPoE	PPP over Ethernet
PPTP	Point-to-Point Tunneling Protocol
PTMU	Path Maximum Transfer Unit
PVC	permanent virtual circuit
QoS	quality of service
RADIUS	Remote Authentication Dial-In User Service
RHEL	Red Hat Enterprise Linux
RIB	Routing Information Base
RIP	Routing Information Protocol
RIPng	RIP next generation
RP	Rendezvous Point
RPF	Reverse Path Forwarding
RSA	Rivest, Shamir, and Adleman
Rx	receive
S3	Amazon Simple Storage Service
SLAAC	Stateless Address Auto-Configuration
SNMP	Simple Network Management Protocol
SMTP	Simple Mail Transfer Protocol
SONET	Synchronous Optical Network
SPT	Shortest Path Tree
SSH	Secure Shell
SSID	Service Set Identifier
SSM	Source-Specific Multicast
STP	Spanning Tree Protocol
TACACS+	Terminal Access Controller Access Control System Plus
TBF	Token Bucket Filter
TCP	Transmission Control Protocol
TKIP	Temporal Key Integrity Protocol
ToS	Type of Service
TSS	TCP Maximum Segment Size
Tx	transmit
UDP	User Datagram Protocol
VHD	virtual hard disk
vif	virtual interface
VLAN	virtual LAN
VPC	Amazon virtual private cloud
VPN	virtual private network

Item	Description
VRRP	Virtual Router Redundancy Protocol
WAN	wide area network
WAP	wireless access point
WPA	Wired Protected Access