BROCADE

CONFIGURATION GUIDE

Brocade Vyatta Network OS RIPng Configuration Guide, 5.2R1

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

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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.

Format	Description
	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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Router-level Configuration Commands

monitor protocol ripng disable events

Disables the generation of debug messages that are related to RIPng events.

Syntax

monitor protocol ripng disable events

Modes

Operational mode

Usage Guidelines

Use this command to disable the generation of debug (trace-level) messages that are related to RIPng events.

monitor protocol ripng disable packet

Disables the generation of debug messages that are related to all RIPng packet types.

Syntax

monitor protocol ripng disable packet [**recv** | **send**]

Parameters

recv

Disables debugging of all received packets.

send

Disables debugging of all sent packets.

Modes

Operational mode

Usage Guidelines

Use this command to disable the generation of debug (trace-level) messages that are related to RIPng packet types.

monitor protocol ripng disable rib

Disables the generation of debug messages that are related to the RIPng RIB.

Syntax

monitor protocol ripng disable rib

Command Default

Debug messages are disabled for actions that are related to the RIPng RIB.

Modes

Operational mode

Usage Guidelines

Use this command to disable the generation of debug (trace-level) messages that are related to the RIPng RIB.

monitor protocol ripng enable events

Enables the generation of debug messages that are related to RIPng events.

Syntax

monitor protocol ripng enable events

Modes

Operational mode

Usage Guidelines

Use this command to enable the generation of debug (trace-level) messages that are related to RIPng events.

monitor protocol ripng enable packet

Enables the generation of debug messages that are related to all RIPng packet types.

Syntax

monitor protocol ripng enable packet [**recv** | **send**]

Parameters

recv

Enables debugging of all received packets.

send

Enables debugging of all sent packets.

Modes

Operational mode

Usage Guidelines

Use this command to enable the generation of debug (trace-level) messages that are related to all RIPng packet types.

monitor protocol ripng enable rib

Enables the generation of debug messages that are related to the RIPng RIB.

Syntax

monitor protocol ripng enable rib

Command Default

Debug messages are generated for actions that are related to the RIPng RIB.

Modes

Operational mode

Usage Guidelines

Use this command to enable the generation of debug (trace-level) messages that are related to the RIPng RIB.

protocols ripng aggregate-address <ipv6net>

Specifies an aggregate RIPng route announcement.

Syntax

set protocols ripng aggregate-address *ipv6net*

delete protocols ripng aggregate-address *ipv6net*

show protocols ripng aggregate-address [*ipv6net*]

Parameters

ipv6net

An IPv6 network from which routes are to aggregate. The format is *ipv6-address*/*prefix*.

Modes

Configuration mode

Configuration Statement

```
protocols {
    ripng {
        aggregate-address ipv6net
    }
}
```

Usage Guidelines

Use this command for IPv6 address aggregation.

Use the **set** form of this command to specify a contiguous block of IPv6 addresses to aggregate.

Use the **delete** form of this command to delete an aggregate address.

Use the **show** form of this command to display aggregate address configuration settings.

protocols ripng default-information originate

Generates a default route into the RIPng routing domain.

Syntax

set protocols ripng default-information originate

delete protocols ripng default-information originate

show protocols ripng default-information originate

Command Default

A default route into the RIPng routing domain is not generated.

Modes

Configuration mode

Configuration Statement

```
protocols {
    ripng {
        default-information {
            originate
        }
    }
}
```

Usage Guidelines

Use the **set** form of this command to generate a default route into the RIPng routing domain.

Use the **delete** form of this command to restore the default behavior for default route generation into RIPng; that is, a default route is not generated.

Use the **show** form of this command to display the default configuration of route generation into RIPng.

protocols ripng default-metric <metric>

Sets the default metric for external routes that are redistributed into RIPng.

Syntax

set protocols ripng default-metric *metric*

delete protocols ripng default-metric

show protocols ripng default-metric

Command Default

Routes that are imported into RIPng are assigned a metric of 1.

Parameters

metric

Mandatory. A metric assigned to external routes that are imported into RIPng. The metric ranges from 1 through 16. The default metric is 1.

Modes

Configuration mode

Configuration Statement

```
protocols {
    ripng {
        default-metric metric
    }
}
```

Usage Guidelines

Use the **set** form of this command to set the default metric for external routes that are redistributed into RIPng.

Use the **delete** form of this command to restore the default RIPng metric for external routes that are redistributed into RIPng; that is, routes are assigned a metric of 1.

Use the **show** form of this command to display the default metric for external routes that are redistributed into RIPng.

protocols ripng log

Enables logging for RIPng.

Syntax

set protocols ripng log { **all** | **events**| **nsm** | **packet**| **rib**}

delete protocols ripng log { **all** | **events**| **nsm**| **packet** | **rib**}

show protocols ripng log { **all** | **events**| **nsm** | **packet**| **rib**}

Command Default

None

Parameters

all
Enables all RIPng logs.

events
Enables RIPng events logs.

nsm
Enables RIPng NSM logs.

packet
Enables RIPng packet logs.

rib
Enables RIPng RIB logs.

Modes

Configuration mode

Configuration Statement

```
protocols {
       ripng {
               log {
                       all
                       events
                       nsm
                       packet
                       rib
               }
       }
}
```

Usage Guidelines

Use the **set** form of this command to enable routing information protocol (RIP)ng logs.

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

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

protocols ripng log packet

Enables logging for RIPng packets.

Syntax

set protocols ripng log packet { **all** | **detail**| **rcv** | **send** }

delete protocols ripng log packet { **all** | **detail**| **rcv** | **send** }

show protocols ripng log packet { **all** | **detail**| **rcv** | **send** }

Command Default

None

Parameters

all

Enables all RIPng packet logs.

detail

Enables only RIPng packet detail logs.

rcv

Enables only RIPng packet receive logs.

send

Enables only RIPng packet send logs.

Modes

Configuration mode

Configuration Statement

```
protocols {
       ripng {
               log {
                       packet {
                               all
                               detail
                               rcv
                               send
                       }
               }
       }
}
```

Usage Guidelines

Use the **set** form of this command to enable routing information protocol (RIP)ng packet logs.

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

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

protocols ripng passive-interface <interface-name>

Suppresses updates to RIPng routing on an interface.

Syntax

set protocols ripng passive-interface *interface-name*

delete protocols ripng passive-interface *interface-name*

show protocols ripng passive-interface

Command Default

RIPng routing updates are not suppressed.

Parameters

interface-name

The identifier of an interface. Supported interface types are:

- Data plane
- Loopback

For more information about these interface types, refer to Supported Interface Types on page 61.

You can suppress routing updates on more than one RIPng interface by creating multiple **protocols ripng passive-interface** configuration nodes.

Modes

Configuration mode

Configuration Statement

```
protocols {
    ripng {
        passive-interface interface
    }
}
```

Usage Guidelines

Use the **set** form of this command to suppress updates to RIPng routing on an interface.

Use the **delete** form of this command to disable the suppression of updates to RIPng routing on an interface.

Use the **show** form of this command to display the configuration of RIPng route suppression for an interface.

protocols ripng route <ipv6net>

Sets a static route in RIPng.

Syntax

set protocols ripng route *ipv6net*

delete protocols ripng route *ipv6net*

show protocols ripng route

Parameters

ipv6net

Mandatory. The IPv6 network address defining the RIPng static route.

Modes

Configuration mode

Configuration Statement

```
protocols {
    ripng {
        route ipv6net
    }
}
```

Usage Guidelines

Use this command to set a static route in RIPng.

Use the **set** form of this command to set a static route in RIPng.

Use the **delete** form of this command to remove an RIPng static route.

Use the **show** form of this command to display RIPng static route configuration.

protocols ripng timers garbage-collection <seconds>

Sets the timer for RIPng garbage collection.

Syntax

set protocols ripng timers garbage-collection *seconds*

delete protocols ripng timers garbage-collection [*seconds*]

show protocols ripng timers garbage-collection

Command Default

RIPng garbage collection occurs at 120 seconds.

Parameters

seconds

Mandatory. A timer interval in seconds. The interval ranges from 0 through 65535. The default interval is 120.

Modes

Configuration mode

Configuration Statement

```
protocols {
    ripng {
        timers {
            garbage-collection seconds
        }
    }
}
```

Usage Guidelines

Use the **set** form of this command to set the timer for RIPng garbage collection. When the timer expires, the system scans for stale RIPng resources and releases them for use.

Use the **delete** form of this command to restore the default timer interval for RIPng garbage collection, which is 120 seconds.

Use the **show** form of this command to display the current timer interval for RIPng garbage collection.

protocols ripng timers timeout <seconds>

Sets the interval for RIPng timeouts.

Syntax

set protocols ripng timers timeout *seconds*

delete protocols ripng timers timeout [*seconds*]

show protocols ripng timers timeout

Command Default

RIPng timeouts occur at 180 seconds.

Parameters

seconds

Mandatory. A timer interval in seconds. The interval ranges from 0 through 65535. The default interval is 180.

Modes

Configuration mode

Configuration Statement

```
protocols {
    ripng {
        timers {
            timeout seconds
        }
    }
}
```

Usage Guidelines

Use the **set** form of this command to set the interval for RIPng timeouts.

Use the **delete** form of this command to restore the default interval for RIPng time-outs, which is 180 seconds.

Use the **show** form of this command to display the current interval for RIPng time-outs.

protocols ripng timers update <seconds>

Sets the timer interval for updates to the RIPng routing table.

Syntax

set protocols ripng timers update *seconds*

delete protocols ripng timers update [*seconds*]

show protocols ripng timers update

Command Default

The RIPng routing table is updated every 30 seconds.

Parameters

seconds

Mandatory. An interval, in seconds, at which updates to the RIPng routing table occur. The interval ranges from 0 through 65535. The default interval is 30.

Modes

Configuration mode

Configuration Statement

```
protocols {
    ripng {
        timers {
            update seconds
        }
    }
}
```

Usage Guidelines

Use the **set** form of this command to set the timer interval for updates to the RIPng routing table. When the interval is shorter, the routing information in the tables is more accurate; however, more protocol network traffic occurs.

Use the **delete** form of this command to restore the default interval for RIPng updates, which is 30 seconds.

Use the **show** form of this command to display the current interval for RIPng updates.

reset ipv6 ripng route

Resets data in the RIPng routing table.

Syntax

reset ipv6 ripng route [**all** | **bgp** | **connected** | **kernel** | **ospfv6** | **ripng** | **static** | *ip-address*]

Parameters

all
Removes all entries from the RIPng routing table.

bgp
Removes only BGP routes from the RIPng routing table.

connected
Removes entries for connected routes from the RIPng routing table.

kernel
Removes kernel entries from the RIPng routing table.

ospfv6
Removes only OSPFv6 routes from the RIPng routing table.

ripng
Removes only RIPng routes from the RIPng routing table.

static
Removes static entries from the RIPng routing table.

ip-address
Removes entries that match *ip-address* (*x:x::x:x/M*), a destination IPv6 address, from the RIPng routing table.

Modes

Operational mode.

Usage Guidelines

Use the **reset ipv6 ripng route all** command to clear the RIPng routing table.

show ipv6 route ripng

Displays all IPv6 RIPng routes.

Syntax

show ipv6 route ripng

Modes

Operational mode

Usage Guidelines

Use this command to display all RIPng routes that are contained in the RIB.

Examples

The following example shows all RIPng routes from the RIB.

```
vyatta@vyatta:~$show ipv6 route ripng
Codes: K - kernel route, C - connected, S - static, R - RIPng, O - OSPFv3,
       I - ISIS, B - BGP, * - FIB route.

R>* 2001:db8:2::/64 [120/2] via fe80::20c:29ff:fed6:816c, dp0s1, 00:43:00
R>* 2001:db8:3::/64 [120/3] via fe80::20c:29ff:fed6:816c, dp0s1, 00:00:03
vyatta@vyatta:~$
```

show ipv6 ripng

Displays information about RIPng.

Syntax

show ipv6 ripng [**interface** | **status**]

Command Default

Displays all information about RIPng.

Parameters

interface

Optional. Displays information for RIPng interfaces.

status

Optional. Displays only RIPng protocol status information.

Modes

Operational mode

Usage Guidelines

Use this command to display information about RIPng.

Examples

The following example lists RIPng information.

```
vyatta@vyatta:~$ show ipv6 ripng
Codes: R - RIPng, C - connected, S - Static, O - OSPF, B - BGP
Sub-codes:
      (n) - normal, (s) - static, (d) - default, (r) - redistribute,
      (i) - interface, (a/S) - aggregated/Suppressed

   Network      Next Hop                      Via     Metric Tag Time
C(i) 2001:db8:1::/64
                  ::                         self       1    0
R(n) 2001:db8:2::/64
                  fe80::20c:29ff:fed6:816c    dp0s1      2    0  02:56
R(n) 2001:db8:3::/64
                  fe80::20c:29ff:fed6:816c    dp0s1      3    0  02:56
vyatta@vyatta:~$
```

The following example lists RIPng protocol status information.

```
vyatta@vyatta:~$ show ipv6 ripng status
  Routing Protocol is "RIPng"
  Sending updates every 30 seconds with +/-50%, next due in 4 seconds
  Timeout after 180 seconds, garbage collect after 120 seconds
  Outgoing update filter list for all interface is not set
  Incoming update filter list for all interface is not set
  Default redistribution metric is 1
  Redistributing:
        Interface
      dp0s1
```

show monitoring protocols ripng

Displays RIPng protocol debugging flags.

Syntax

show monitoring protocols ripng

Modes

Operational mode

Usage Guidelines

Use this command to display how debugging is set for RIPng.

About This Guide

This guide describes how to configure Routing Information Protocol next generation (RIPng) on the Brocade 5600 vRouter (referred to as a virtual router, vRouter, or router in the guide).

RIPng Configuration

RIPng overview

RIPng is a dynamic routing protocol that is suitable for small, homogenous IPv6 networks. It is classified as an interior gateway protocol (IGP) and employs the distance-vector routing algorithm. RIPng determines the best path by counting the hops to the destination. The maximum hop count is 15 (16 is considered an infinite distance), making RIPng less suitable for large networks. RIPng is an extension of RIP version 2 for IPv6.

Supported standards

The Brocade vRouter implementation of RIPng complies with the following standards:

- RFC 2080: RIPng for IPv6
- RFC 2081: RIPng Protocol Applicability Statement

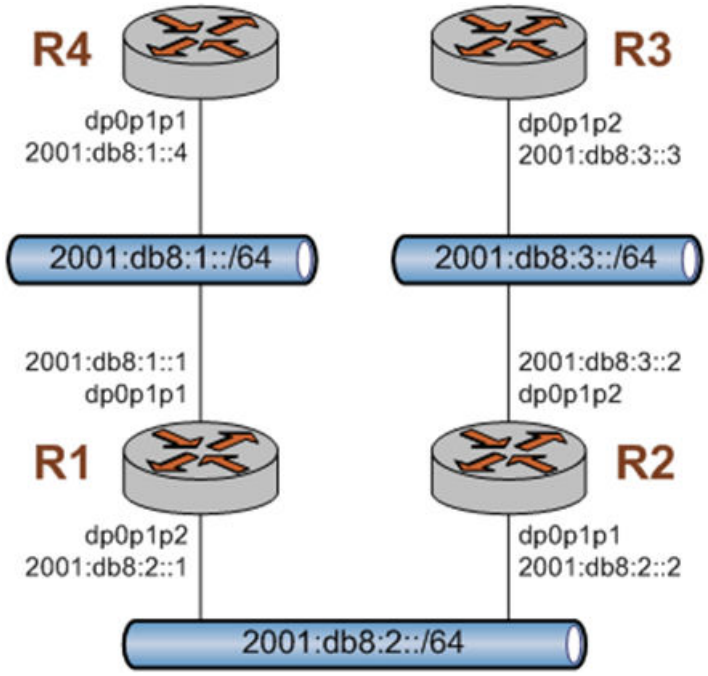
Configuring RIPng

This section presents the following topics:

- Enable forwarding on R1 and R2
- Enable RIPng on an interface
- Advertise connected networks
- Confirm visibility of remote networks

This section presents an example configuration of RIPng. The configuration example is based on the reference diagram in the following figure. This example shows the configuration of the nodes by using dynamic IPv6 routing with RIPng to enable R3 and R4 to communicate through R1 and R2.

FIGURE 1 Dynamic IPv6 routing example in RIPng



Enabling forwarding on R1 and R2

For R1 to pass data between the dp0p1p1 and dp0p1p3 interfaces and R2 to pass data between the dp0p1p1 and dp0p1p2 interfaces, R1 and R2 must be configured to enable forwarding. To enable forwarding on R1, perform the following step in configuration mode.

TABLE 1 Enabling forwarding on R1

Step	Command
Enable forwarding on R1.	`vyatta@R1# delete system ipv6 disable-forwarding`
Commit the change.	`vyatta@R1# commit`

To enable forwarding on R2, perform the following steps in configuration mode.

TABLE 2 Enabling forwarding on R2

Step	Command
Enable forwarding on R2.	`vyatta@R2# delete system ipv6 disable-forwarding`
Commit the change.	`vyatta@R2# commit`

Enabling RIPng on an interface

To allow dynamic routing by using RIPng, RIPng must be enabled on the interfaces that are to use it. To enable RIPng on R1, perform the following steps in configuration mode.

TABLE 3 Enable RIPng on R1

Step	Command
Enable RIPng on dp0p1p1.	`vyatta@R1# set interfaces dataplane dp0p1p1 ipv6 ripng enable`
Enable RIPng on dp0p1p3.	`vyatta@R1# set interfaces dataplane dp0p1p3 ipv6 ripng enable`
Commit the change.	`vyatta@R1# commit`
Change to operational mode.	`vyatta@R1# exit` `vyatta@R1:~$`

Verify the status of RIPng.	`vyatta@R1:~$ show ipv6 ripng status`
	`  Routing Protocol is "RIPng"`
	`  Sending updates every 30 seconds with +/-50%, next due in 4 seconds`
	`  Timeout after 180 seconds, garbage collect after 120 seconds`
	`  Outgoing update filter list for all interface is not set`
	`  Incoming update filter list for all interface is not set`
	`  Default redistribution metric is 1`
	`  Redistributing:`
	`  Interface`
	`  dp0p1p1`
	`  dp0p1p2`

Display information for RIPng interfaces.	`vyatta@R1:~$ show ipv6 ripng interface`
	`dp0p1p1 is up, line protocol is up`
	`  Routing Protocol: RIPng`
	`  Passive interface: Disabled`
	`  Split horizon: Enabled with Poisoned Reversed`
	`  IPv6 interface address:`
	`  fe80::5054:ff:fe8b:1/64`
	`dp0p1p2 is up, line protocol is up`
	`  Routing Protocol: RIPng`
	`  Passive interface: Disabled`
	`  Split horizon: Enabled with Poisoned Reversed`
	`  IPv6 interface address:`
	`  fe80::5054:ff:fe98:2/64`

Advertising connected networks

The **redistribute** command is then used to advertise the connected networks. To advertise connected networks on R1, perform the following steps in configuration mode.

TABLE 4 Advertising connected networks on R1

Step	Command
Advertise connected networks through RIPng.	`vyatta@R1# set protocols ripng redistribute connected`
Commit the change.	`vyatta@R1# commit`

Verify the redistribution.	`vyatta@R1:~$ show ipv6 ripng status`
	`Routing Protocol is "RIPng"`
	`Sending updates every 30 seconds with +/-50%, next due in`
	`4 seconds`
	`Timeout after 180 seconds, garbage collect after 120 seconds`
	`Outgoing update filter list for all interface is not set`
	`Incoming update filter list for all interface is not set`
	`Default redistribution metric is 1`
	`Redistributing: connected`
	`Interface`
	`dp0p1p1`
	`dp0p1p2`

Confirming visibility of remote networks

After enabling RIPng on the other interfaces of R2, R3, and R4 and advertising connected networks on R2, check the routing table of R4 to verify that it has learned the network. To confirm visibility of remote networks on R4, perform the following step in operational mode.

TABLE 5 Confirming visibility of remote networks on R4

Step	Command

Trace the route from R2 to R4.	`vyatta@R4:~$ show ipv6 route`
	`IPv6 Routing Table`
	`Codes: K - kernel route, C - connected, S - static, R - RIP, O - OSPF,`
	`IA - OSPF inter area, E1 - OSPF external type 1,`
	`E2 - OSPF external type 2, I - IS-IS, B - BGP`
	`> - selected route, * - FIB route, p - stale info`
	`Timers: Uptime`
	`S>* ::/0 [1/0] via 2001:db8:1::1, dp0s1`
	`C>* ::1/128 is directly connected, lo`
	`C>* 2001:db8:1::/64 is directly connected, dp0s1`
	`R>* 2001:db8:2::/64 [120/2] via fe80::20c:29ff:fed6:816c,`
	`dp0s1, 00:43:00`
	`R>* 2001:db8:3::/64 [120/3] via fe80::20c:29ff:fed6:816c,`
	`dp0s1, 00:00:03`
	`C>* fe80::/64 is directly connected, dp0s1`

The R in the first column indicates that two routes have been learned from RIPng. Because a route now exists for 2001:db8:3::/64, R3 can be pinged. To confirm connectivity, perform the following steps in operational mode.

TABLE 6 Confirming connectivity between R4 and R3

Step	Command

Ping R3 from R4.	`vyatta@R4:~$ ping 2001:db8:3::3`
	`PING 2001:db8:3::3(2001:db8:3::3) 56 data bytes`
	`64 bytes from 2001:db8:3::3: icmp_seq=1 ttl=62 time=5.98 ms`
	`64 bytes from 2001:db8:3::3: icmp_seq=2 ttl=62 time=0.603 ms`
	`^C`
	`--- 2001:db8:3::3 ping statistics ---`
	`2 packets transmitted, 2 received, 0% packet loss, time 1011ms`
	`rtt min/avg/max/mdev = 0.603/3.294/5.986/2.692 ms`

Display the RIPng status.	`vyatta@R4:~$ show ipv6 ripng`
	`Codes: R - RIP, Rc - RIP connected, Rs - RIP static, Ra - RIP aggregated,`
	`Rcx - RIP connect suppressed, Rsx - RIP static suppressed,`
	`K - Kernel, C - Connected, S - Static, O - OSPF, I - IS-IS, B - BGP`
	`Network Next Hop If Met Tag Time`
	`C 2001:db8:1::/64 :: dp0p1p1 1 0`
	`R 2001:db8:2::/64 2001:db8:1::1 dp0p1p1 1 0`
	`R 2001:db8:3::/64 2001:db8:1::1 dp0p1p1 1 0`

Route Redistribution Commands

protocols ripng redistribute bgp

Redistributes BGP routes into RIPng routing tables.

Syntax

set protocols ripng redistribute bgp [**metric** *metric* | **route-map** *map-name*]

delete protocols ripng redistribute bgp [**metric** | **route-map**]

show protocols ripng redistribute bgp [**metric** | **route-map**]

Command Default

BGP routes that are redistributed into RIPng are assigned a routing metric of 1. By default, no route map is applied to redistributed BGP routes.

Parameters

metric

Applies a metric to BGP routes that are imported into RIPng routing tables. The metric ranges from 1 through 16. The default metric is 1.

route-map *map-name*

Applies a route map to BGP routes that are imported into RIPng routing tables.

Modes

Configuration mode

Configuration Statement

```
protocols {
    ripng {
        redistribute {
            bgp {
                metric metric
                route-map map-name
            }
        }
    }
}
```

Usage Guidelines

Use the **set** form of this command to redistribute BGP routes into RIPng routing tables. You can set the routing metric for or specify a route map to apply to redistributed BGP routes.

Use the **delete** form of this command to remove the current configuration of BGP route redistribution.

Use the **show** form of this command to display the current configuration of BGP route redistribution.

protocols ripng redistribute connected

Redistributes directly connected routes into RIPng routing tables.

Syntax

set protocols ripng redistribute connected [**metric** *metric* | **route-map** *map-name*]

delete protocols ripng redistribute connected [**metric** | **route-map**]

show protocols ripng redistribute connected [**metric** | **route-map**]

Command Default

Connected routes that are redistributed into RIPng are assigned a routing metric of 1. By default, no route map is applied to redistributed connected routes.

Parameters

metric

Optional. The routing metric to be applied to connected routes being imported into RIPng routing tables. The range is 1 to 16. The default is 1.

map-name

Optional. Applies the specified route map to connected routes being imported into RIPng routing tables.

Modes

Configuration mode

Configuration Statement

```
protocols {
    ripng {
        redistribute {
            connected {
                metric metric
                route-map map-name
            }
        }
    }
}
```

Usage Guidelines

Use the **set** form of this command to redistribute directly connected routes into RIPng routing tables. You can set the routing metric for or specify a route map to apply to directly connected BGP routes.

Use the **delete** form of this command to remove the current configuration of directly connected route redistribution.

Use the **show** form of this command to display the current configuration of directly connected route redistribution.

protocols ripng redistribute kernel

Redistributes kernel routes into RIPng routing tables.

Syntax

set protocols ripng redistribute kernel [**metric** *metric* | **route-map** *map-name*]

delete protocols ripng redistribute kernel [**metric** | **route-map**]

show protocols ripng redistribute kernel [**metric** | **route-map**]

Command Default

Kernel routes that are redistributed into RIPng are assigned a routing metric of 1. By default, no route map is applied to redistributed kernel routes.

Parameters

metric

Optional. The routing metric to be applied to kernel routes being imported into RIPng routing tables. The range is 1 to 16. The default is 1.

map-name

Optional. Applies the specified route map to kernel routes being imported into RIPng routing tables.

Modes

Configuration mode

Configuration Statement

```
protocols {
    ripng {
        redistribute {
            kernel {
                metric metric
                route-map map-name
            }
        }
    }
}
```

Usage Guidelines

Use the **set** form of this command to redistribute kernel routes into RIPng routing tables. You can set the routing metric for or specify a route map to apply to redistributed kernel routes.

Use the **delete** form of this command to remove the current configuration of kernel route redistribution.

Use the **show** form of this command to display the current configuration of kernel route redistribution.

protocols ripng redistribute ospfv3

Redistributes OSPFv3 routes into RIPng routing tables.

Syntax

set protocols ripng redistribute ospfv3 [**metric** *metric* | **route-map** *map-name*]

delete protocols ripng redistribute ospfv3 [**metric** | **route-map**]

show protocols ripng redistribute ospfv3 [**metric** | **route-map**]

Command Default

OSPFv3 routes that are redistributed into RIPng are assigned a routing metric of 1. By default, no route map is applied to redistributed OSPFv3 routes.

Parameters

metric

Optional. The routing metric to be applied to OSPFv3 routes being imported into RIPng routing tables. The range is 1 to 16. The default is 1.

map-name

Optional. Applies the specified route map to OSPFv3 routes being imported into RIPng routing tables.

Modes

Configuration mode

Configuration Statement

```
protocols {
    ripng {
        redistribute {
            ospfv3 {
                metric metric
                route-map map-name
            }
        }
    }
}
```

Usage Guidelines

Use the **set** form of this command to redistribute OSPFv3 routes into RIPng routing tables. You can set the routing metric for or specify a route map to apply to redistributed OSPFv3 routes.

Use the **delete** form of this command to remove the current configuration of OSPFv3 route redistribution.

Use the **show** form of this command to display the current configuration of OSPFv3 route redistribution.

protocols ripng redistribute static

Redistributes static routes into RIPng routing tables.

Syntax

set protocols ripng redistribute static [**metric** *metric* | **route-map** *map-name*]

delete protocols ripng redistribute static [**metric** | **route-map**]

show protocols ripng redistribute static [**metric** | **route-map**]

Command Default

Static routes that are redistributed into RIPng are assigned a routing metric of 1. By default, no route map is applied to redistributed static routes.

Parameters

metric

Optional. The routing metric to be applied to static routes being imported into RIPng routing tables. The range is 1 to 16. The default is 1.

map-name

Optional. Applies the specified route map to static routes being imported into RIPng routing tables.

Modes

Configuration mode

Configuration Statement

```
protocols {
    ripng {
        redistribute {
            static {
                metric metric
                route-map map-name
            }
        }
    }
}
```

Usage Guidelines

Use the **set** form of this command to redistribute static routes into RIPng routing tables. You can set the routing metric for or specify a route map to apply to redistributed static routes.

Use the **delete** form of this command to remove the current configuration of static route redistribution.

Use the **show** form of this command to display the current configuration of static route redistribution.

Route Filtering Commands

protocols ripng distribute-list access-list

Applies an access list to filter inbound or outbound RIPng packets.

Syntax

set protocols ripng distribute-list access-list { **in** *in-list* | **out** *out-list* }

delete protocols ripng distribute-list access-list { **in** | **out** }

show protocols ripng distribute-list access-list { **in** | **out** }

Parameters

in-list

Specifies the identifier of a defined access list. The access list filters inbound RIPng packets.

out-list

Specifies the identifier of a defined access list. The access list filters outbound RIPng packets.

Modes

Configuration mode

Configuration Statement

```
protocols {
    ripng {
        distribute-list {
            access-list {
                in in-list
                out out-list
            }
        }
    }
}
```

Usage Guidelines

Use the **set** form of this command to apply an access list to filter inbound or outbound RIPng packets.

Use the **delete** form of this command to remove the filtering of RIPng inbound or outbound packets by an access list.

Use the **show** form of this command to display RIPng access list filtering configuration.

protocols ripng distribute-list interface <interface-name> access-list

Applies an access list to an interface to filter inbound or outbound RIPng packets.

Syntax

set protocols ripng distribute-list interface *interface-name* **access-list** { **in** *in-list* | **out** *out-list* }

delete protocols ripng distribute-list interface *interface-name* **access-list** { **in** | **out** }

show protocols ripng distribute-list interface *interface-name* **access-list** { **in** | **out** }

Parameters

interface-name
The identifier of an interface. Supported interface types are:

- Data plane
- Loopback

For more information about these interface types, refer to Supported Interface Types on page 61.

in *in-list*
Specifies the identifier of a defined access list. The access list applies to the specified interface to filter inbound RIPng packets.

out *out-list*
Specifies the identifier of a defined access list. The access list applies to the specified interface to filter outbound RIPng packets.

Modes

Configuration mode

Configuration Statement

```
protocols {
    ripng {
        distribute-list {
            interface interface-name {
                access-list {
                    in in-list
                    out out-list
                }
            }
        }
    }
}
```

Usage Guidelines

Use the **set** form of this command to apply an access list to a specific interface to filter inbound or outbound RIPng packets.

Use the **delete** form of this command to remove the filtering of RIPng inbound or outbound packets on an interface by an access list.

Use the **show** form of this command to display RIPng access list filtering configuration for an interface.

protocols ripng distribute-list interface <interface-name> prefix-list

Applies a prefix list to an interface to filter inbound or outbound RIPng packets.

Syntax

set protocols ripng distribute-list interface *interface-name* **prefix-list** { **in** *in-list* | **out** *out-list* }

delete protocols ripng distribute-list interface *interface-name* **prefix-list** { **in** | **out** }

show protocols ripng distribute-list interface *interface-name* **prefix-list** { **in** | **out** }

Parameters

interface-name
The identifier of an interface. Supported interface types are:

- Data plane
- Loopback

For more information about these interface types, refer to Supported Interface Types on page 61.

in *in-list*
Specifies the identifier of a defined prefix list. The prefix list applies to the specified interface to filter inbound RIPng packets.

out *out-list*
Specifies the identifier of a defined prefix list. The prefix list applies to the specified interface to filter outbound RIPng packets.

Modes

Configuration mode

Configuration Statement

```
protocols {
    ripng {
        distribute-list {
            interface interface-name {
                prefix-list {
                    in in-list
                    out out-list
                }
            }
        }
    }
}
```

Usage Guidelines

Use the **set** form of this command to apply a prefix list to an interface to filter inbound or outbound RIPng packets.

Use the **delete** form of this command to remove the filtering of RIPng inbound or outbound packets on an interface by a prefix list.

Use the **show** form of this command to display RIPng prefix list filtering configuration for an interface.

protocols ripng distribute-list prefix-list

Applies a prefix list to filter inbound or outbound RIPng packets.

Syntax

set protocols ripng distribute-list prefix-list { **in** *in-list* | **out** *out-list* }

delete protocols ripng distribute-list prefix-list { **in** | **out** }

show protocols ripng distribute-list prefix-list { **in** | **out** }

Parameters

in *in-list*

Specifies the identifier of a defined prefix list. The prefix list filters inbound RIPng packets.

out *out-list*

Specifies the identifier of a defined prefix list. The prefix list filters outbound RIPng packets.

Modes

Configuration mode

Configuration Statement

```
protocols {
    ripng {
        distribute-list {
            prefix-list {
                in in-list
                out out-list
            }
        }
    }
}
```

Usage Guidelines

Use the **set** form of this command to apply a prefix list to filter inbound or outbound RIPng packets.

Use the **delete** form of this command to remove the filtering of RIPng inbound or outbound packets by a prefix list.

Use the **show** form of this command to display RIPng prefix list filtering configuration.

RIPng Interface Commands

interfaces <interface> ipv6 ripng enable

Enables RIPng on an interface.

Syntax

set interfaces *interface* **ipv6 ripng enable**

delete interfaces *interface* **ipv6 ripng enable**

show interfaces *interface* **ipv6 ripng**

Parameters

interface

Mandatory. A type of interface. For detailed keywords and arguments that can be specified as interface types, refer to Supported Interface Types on page 61.

Modes

Configuration mode

Configuration Statement

```
interfaces interface {
    ipv6 {
        ripng
    }
}
```

Usage Guidelines

Use this command to enable RIPng.

Use the **set** form of this command to enable RIPng on an interface.

Use the **delete** form of this command to remove all RIPng configuration and disable RIPng on the interface.

Use the **show** form of this command to display the current RIPng configuration on an interface.

interfaces <interface> ipv6 ripng metric-offset

Sets a metric to add to routes that are received from RIPng on an interface.

Syntax

set interfaces *interface* **ipv6 ripng metric-offset** *metric*

show interfaces *interface* **ipv6 ripng metric-offset**

Parameters

interface

Mandatory. A type of interface. For detailed keywords and arguments that can be specified as interface types, refer to Supported Interface Types on page 61.

metric

Mandatory. A metric to be added to the routes over the interface. The metric ranges from 1 through 16.

Modes

Configuration mode

Configuration Statement

```
interfaces interface {
    ipv6 {
        ripng {
            metric-offset metric
        }
    }
}
```

Usage Guidelines

Use this command to set the metric for inbound and outbound routes on an interface that are beyond the normal operation of RIPng.

Use the **set** form of this command to set a metric to add to routes that are received from RIPng on an interface.

Use the **show** form of this command to display the current metric that is added to routes that are received from RIPng on an interface.

interfaces <interface> ipv6 ripng split-horizon

Configures split-horizon and split-horizon poison-reverse on an interface that is running RIPng.

Syntax

set interfaces *interface* **ipv6 ripng split-horizon** [**disable** | **poison-reverse**]

show interfaces *interface* **ipv6 ripng split-horizon**

Command Default

Split-horizon is enabled.

Parameters

interface

Mandatory. A type of interface. For detailed keywords and arguments that can be specified as interface types, refer to Supported Interface Types on page 61.

disable

Disables split-horizon on the specified interface.

poison-reverse

Enables poison-reverse on the specified interface.

Modes

Configuration mode

Configuration Statement

```
interfaces interface {
    ipv6 {
        ripng {
            split-horizon {
                disable
                poison-reverse
            }
        }
    }
}
```

Usage Guidelines

Use this command to disable split-horizon or enable split-horizon poison-reverse on an interface that is running RIPng.

Split-horizon is a stability feature that reduces the possibility of network loops, particularly when links become disconnected. It stops an interface from including in its network updates to any routes that it learned from that interface. Split-horizon is effective at preventing loops between routers that are directly connected to each other, and it speeds convergence when network conditions change. Split-horizon is the default setting in RIPng.

Poison-reverse is a variation of split-horizon. When an interface that has poison-reverse enabled detects a link that is down, it increases the metric for that route to 16 and propagates that information in its next update. Because 15 is the largest number of hops that can be reached on a RIPng network, increasing the metric to 16 renders the route unreachable as far as downstream RIPng routers are concerned. This is called "poisoning" the route. Poison-reverse is useful for propagating information about bad routes to routers that are downstream but not immediate neighbors, where split-horizon is ineffective.

When this option is enabled, the router includes the route in announcements to the neighbor from which it was learned. When this option is disabled, the router omits the route from announcements to the neighbor from which it was learned.

Use the **set** form of this command to configure split-horizon and split-horizon poison-reverse on an interface that is running RIPng.

Use the **show** form of this command to display the current configuration of split-horizon.

interfaces <interface> ipv6 ripng neighbor <ip-address>

Configures the IPv6 link-local address of a neighbor for RIPng.

Syntax

set interfaces *interface* **ipv6 ripng neighbor** *ip-address*

show interface *interface* **ipv6 ripng neighbor**

Parameters

interface

A type of interface. For detailed keywords and arguments that can be specified as interface types, refer to Supported Interface Types on page 61.

ip-address

The IPv6 link-local address of a neighbor.

Modes

Configuration mode.

Configuration Statement

```
interfaces interface {
         address address {
                ipv6 {
                       ripng {
                              neighbor ip-address
                       }
                }
         }
}
```

Usage Guidelines

Use the **set** form of this command to configure the IPv6 link-local address of a neighbor for RIPng.

Use the **show** form of this command to display the IPv6 link-local address of the neighbor.

Supported Interface Types

The following table shows the syntax and parameters of supported interface types. Depending on the command, some of these types may not apply.

Interface Type	Syntax	Parameters
Bridge	**bridge** *brx*	*brx*: The name of a bridge group. The name ranges from br0 through br999.
Data plane	**dataplane** *interface-name*	*interface-name*: The name of a data plane interface. Following are the supported formats of the interface name: • **dp***x***p***y***p***z*—The name of a data plane interface, where — **dp***x* specifies the data plane identifier (ID). Currently, only dp0 is supported. — p*y* specifies a physical or virtual PCI slot index (for example, p129). — **p***z* specifies a port index (for example, p1). For example, dp0p1p2, dp0p160p1, and dp0p192p1. • **dp***x***em***y* —The name of a data plane interface on a LAN-on-motherboard (LOM) device that does not have a PCI slot, where **em***y* specifies an embedded network interface number (typically, a small number). For example, dp0em3. • **dp***x***s***y* —The name of a data plane interface on a device that is installed on a virtual PCI slot, where *x***s***y* specifies an embedded network interface number (typically, a small number). For example, dp0s2. • **dp***x***P***n***p***y***p***z* —The name of a data plane interface on a device that is installed on a secondary PCI bus, where **P***n* specifies the bus number. You can use this format to name data plane interfaces on large physical devices with multiple PCI buses. For these devices, it is possible to have network interface cards installed on different buses with these cards having the same slot ID. The value of *n* must be an integer greater than 0. For example, dp0P1p162p1 and dp0P2p162p1.
Data plane vif	**dataplane** *interface-name* **vif** *vif-id* [**vlan** *vlan-id*]	*interface-name*: Refer to the preceding description. *vif-id*: A virtual interface ID. The ID ranges from 1 through 4094. *vlan-id*: The VLAN ID of a virtual interface. The ID ranges from 1 through 4094.
Loopback	**loopback lo** or **loopback lo***n*	*n*: The name of a loopback interface, where *n* ranges from 1 through 99999.
OpenVPN	**openvpn** *vtunx*	*vtunx*: The identifier of an OpenVPN interface. The identifier ranges from vtun0 through vtun*x*, where *x* is a nonnegative integer.
Tunnel	**tunnel** *tunx* or **tunnel** *tunx* **parameters**	*tunx*: The identifier of a tunnel interface you are defining. The identifier ranges from tun0 through tun*x*, where *x* is a nonnegative integer.
Virtual tunnel	**vti** *vtix*	*vtix*: The identifier of a virtual tunnel interface you are defining. The identifier ranges from vti0 through vti*x*, where *x* is a nonnegative integer.

Interface Type	Syntax	Parameters
		Note: This interface does not support IPv6.
VRRP	*parent-interface* **vrrp vrrp-group** *group*	*parent-interface*: The type and identifier of a parent interface; for example, data plane dp0p1p2 or bridge br999. *group*: A VRRP group identifier. The name of a VRRP interface is not specified. The system internally constructs the interface name from the parent interface identifier plus the VRRP group number; for example, dp0p1p2v99. Note that VRRP interfaces support the same feature set as does the parent interface.

VRF Support

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
```

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. For more information about VRF, refer to *Brocade Vyatta Network OS Basic Routing Configuration Guide*. This guide includes an overview of VRF, VRF configuration examples, information about VRF-specific features, and a list of commands that support VRF routing instances.

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 Acronyms

Acronym	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

Acronym	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
PCI	peripheral component interconnect
PIM	Protocol Independent Multicast
PIM-DM	PIM Dense Mode

Acronym	Description
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
VRRP	Virtual Router Redundancy Protocol

Acronym	Description
WAN	wide area network
WAP	wireless access point
WPA	Wired Protected Access