53-1003716-03
14 September 2015

Brocade 5600 vRouter MSDP

Reference Guide

Supporting Brocade 5600 vRouter 3.5R6

BROCADE

Contents

Preface

Document conventions

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

Text formatting conventions

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

Format	Description
bold text	Identifies command names
	Identifies keywords and operands
	Identifies the names of user-manipulated GUI elements
	Identifies text to enter at 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.

Convention	Description
[ ]	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.

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.

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Provide the publication title, part number, and as much detail as possible, including the topic heading and page number if applicable, as well as your suggestions for improvement.

About This Guide

This guide describes how to run MSDP on Brocade vRouter (referred to as virtual router, vRouter, or router in the guide).

MSDP Overview

This chapter provides an overview of Multicast Source Discovery Protocol (MSDP).

MSDP overview

MSDP allows a domain to receive advertised messages of the availability of multicast sources from other domains and to connect with them.

When a rendezvous point (RP) in the Protocol Independent Multicast Sparse Mode (PIM-SM) domain learns of a new source, it constructs a source-active (SA) message and sends it to its MSDP peers. The MSDP peers use a Reverse Path Forwarding (RPF) check mechanism to find an appropriate MSDP peer to receive the SA message. All RPs, which aim to originate or receive SA messages, must establish MSDP peering with other RPs, either directly or through an intermediate MSDP peer.

When an RP receives the advertisements about the required multicast sources, PIM-SM uses a source-tree building mechanism to deliver multicast data over an interdomain distribution tree.

MSDP uses important communication information that is provided by Border Gateway Protocol (BGP) and uses Transmission Control Protocol (TCP) as its transport protocol.

MSDP is defined by *Multicast Source Discovery Protocol (MSDP), RFC 3618* at https://tools.ietf.org/rfc/rfc3618.txt.

NOTE
Note: In MSDP, when the system is running IGP, such as OSPF, the redistribution of BGP and OSPF is required.

Configuration modes

The following table describes the configuration mode types used with MSDP.

TABLE 1 Configuration mode types

Mode Type	Description
Standard mode	When a parameter is applied to a group, it is applied identically to all peers in the group. When a parameter has not been configured for a single peer, the parameter is defined by the parameter that is defined for the group.
Peer mode	A parameter that is configured for a peer takes precedence over a parameter that is configured for the peer group to which the peer belongs. For example, if the keepalive interval parameter has been configured for 60 seconds on a peer and 70 seconds for the group to which it belongs, then the parameter of 60 seconds applies to that peer.

Group types

The following table describes the group types.

TABLE 2 Group types

Group Type	Description
Standard group	A peer that is a member of a group uses the configuration parameters that are configured for the group.
Peer group	MSDP speakers that have fully peered MSDP connectivity among themselves form a peer group. Any SA messages received from a peer in a peer group are not forwarded to other peers in the same peer group. Peer groups can be used to reduce SA message flooding, or to simplify peer-RPF flooding (there is no need to run BGP or MBGP among MSDP peers).

MSDP Configuration

This chapter provides examples of Multicast Source Discovery Protocol (MSDP) configuration.

Configuration

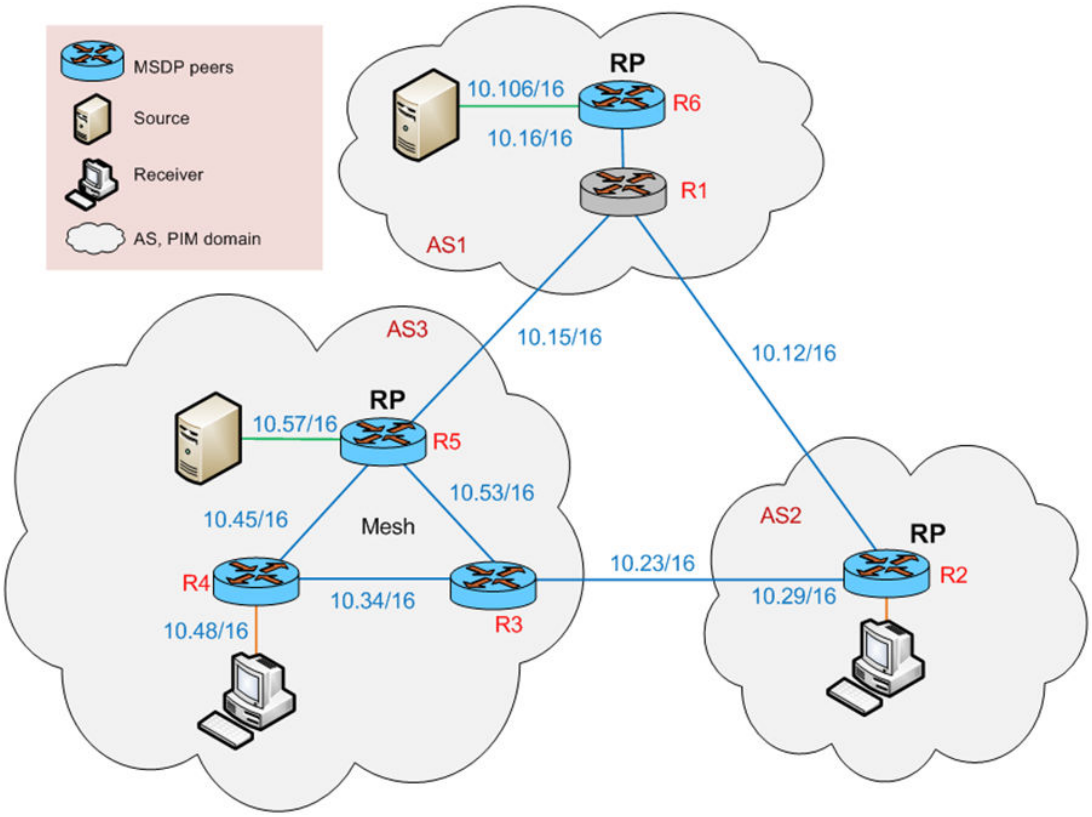
This section presents the following topics:

Figure 1 is a sample of the MSDP topology in three domains, or IPv4 autonomous systems (AS), each with an RP in a different AS configuration. This example shows how to deliver the multicast data to receivers from another multicast domain, for example, for AS2 receivers from AS1 or AS3 senders.

All routers in this scheme are MSDP peers except R1, which is a border router with the R6 MSDP peer situated behind it in the AS1 autonomous system.

To view the steps to achieve this configuration, refer to MSDP configuration example on page 21.

FIGURE 1 Sample MSDP topology



Configuring the PIM domain

The following commands show how to configure the PIM-SM scheme shown in Configuration on page 13.

TABLE 3 Configuring PIM-SM and BGP

Router	Step	Commands

R2	Configure the interfaces on R2 router for sparse mode.	`vyatta@R2# set interfaces dataplane dp0p192p1 ip pim mode sparse`
		`vyatta@R2# set interfaces dataplane dp0p224p1 ip pim mode sparse`
		`vyatta@R2# set interfaces dataplane dp0p256p1 ip pim mode sparse`

R2	Enable multicast routing on R2.	`vyatta@R2# set protocols multicast ip routing`
R2	Configure the RP on R2.	`vyatta@R2# set protocols pim rp-address 10.29.0.2`

R3	Configure the interfaces on R3 router for sparse mode.	`vyatta@R3# set interfaces dataplane dp0p192p1 ip pim mode sparse`
		`vyatta@R3# set interfaces dataplane dp0p224p1 ip pim mode sparse`
		`vyatta@R3# set interfaces dataplane dp0p256p1 ip pim mode sparse`

TABLE 3 Configuring PIM-SM and BGP (Continued)

Router	Step	Commands
R3	Enable multicast on R3.	`vyatta@R3# set protocols multicast ip routing`
R3	Configure the RP for multicast groups on R3.	`vyatta@R3# set protocols pim rp-address 10.34.0.3`

R4	Configure the interfaces on R4 router for sparse mode.	`vyatta@R4# set interfaces dataplane dp0p192p1 ip pim mode sparse`
		`vyatta@R4# set interfaces dataplane dp0p224p1 ip pim mode sparse`
		`vyatta@R4# set interfaces dataplane dp0p256p1 ip pim mode sparse`

R4	Enable multicast on R4.	`vyatta@R4# set protocols multicast ip routing`
R4	Configure the RP for multicast groups on R4.	`vyatta@R4# set protocols pim rp-address 10.48.0.4`

R5	Configure the interfaces on R5 router for sparse mode.	`vyatta@R5# set interfaces dataplane dp0p161p1 ip pim mode sparse`
		`vyatta@R5# set interfaces dataplane dp0p192p1 ip pim mode sparse`
		`vyatta@R5# set interfaces dataplane dp0p224p1 ip pim mode sparse`
		`vyatta@R5# set interfaces dataplane dp0p256p1 ip pim mode sparse`

R5	Enable multicast on R5.	`vyatta@R5# set protocols multicast ip routing`
R5	Configure the RP for multicast groups on R5.	`vyatta@R5# set protocols pim rp-address 10.53.0.5`

R6	Configure the interfaces on R6 router for sparse mode.	`vyatta@R6# set interfaces dataplane dp0p160p1 ip pim mode sparse`
		`vyatta@R6# set interfaces dataplane dp0p192p1 ip pim mode sparse`
		`vyatta@R6# set interfaces dataplane dp0p224p1 ip pim mode sparse`

R6	Enable multicast on R6.	`vyatta@R6# set protocols multicast ip routing`
R6	Configure the RP for multicast groups on R6.	`vyatta@R6# set protocols pim rp-address 10.16.0.6`

Configuring BGP

The following commands show how to configure the BGP scheme shown in Configuration on page 13.

TABLE 4 Configuring BGP

Router	Step	Commands

R1	On R1, which belong to AS1, assign the remote AS numbers to its BGP neighbors.	`vyatta@R1# set protocols bgp 1 neighbor 10.12.0.2 remote-as 2`
		`vyatta@R1# set protocols bgp 1 neighbor 10.15.0.5 remote-as 3`
		`vyatta@R1# set protocols bgp 1 neighbor 10.16.0.6 remote-as 1`

R1	On R1, specify the IPv4 address that BGP advertises to its neighbor.	`vyatta@R1# set protocols bgp 1 network 10.12.0.0/16`
		`vyatta@R1# set protocols bgp 1 network 10.15.0.0/16`
		`vyatta@R1# set protocols bgp 1 network 10.16.0.0/16`

R2	On R2, which belong to AS2, assign the remote AS numbers to its BGP neighbors.	`vyatta@R2# set protocols bgp 2 neighbor 10.12.0.1 remote-as 1` `vyatta@R2# set protocols bgp 2 neighbor 10.23.0.3 remote-as 3`

R2	On R2, specify the IPv4 address and prefix of its network address connections.	`vyatta@R2# set protocols bgp 2 network 10.12.0.0/16`
		`vyatta@R2# set protocols bgp 2 network 10.23.0.0/16`
		`vyatta@R2# set protocols bgp 2 network 10.29.0.0/16`

R3	On R3, which belong to AS3, assign the remote AS numbers to its BGP neighbors.	`vyatta@R3# set protocols bgp 3 neighbor 10.23.0.2 remote-as 2`
		`vyatta@R3# set protocols bgp 3 neighbor 10.34.0.4 remote-as 3`
		`vyatta@R3# set protocols bgp 3 neighbor 10.53.0.5 remote-as 3`

R3	On R3, specify the IPv4 address and prefix of its network address connections.	`vyatta@R3# set protocols bgp 3 network 10.23.0.0/16`
		`vyatta@R3# set protocols bgp 3 network 10.34.0.0/16`
		`vyatta@R3# set protocols bgp 3 network 10.53.0.0/16`

R4	On R4, which belong to AS3, assign the remote AS numbers to its BGP neighbors.	`vyatta@R4# set protocols bgp 3 neighbor 10.34.0.3 remote-as 3` `vyatta@R4# set protocols bgp 3 neighbor 10.45.0.5 remote-as 3`

R4	On R4, specify the IPv4 address and prefix of its network address connections.	`vyatta@R4# set protocols bgp 3 network 10.34.0.0/16`
		`vyatta@R4# set protocols bgp 3 network 10.43.0.0/16`
		`vyatta@R4# set protocols bgp 3 network 10.48.0.0/16`

R5	On R5, which belong to AS3, assign the remote AS numbers to its BGP neighbors.	`vyatta@R5# set protocols bgp 3 neighbor 10.15.0.1 remote-as 1`
		`vyatta@R5# set protocols bgp 3 neighbor 10.45.0.4 remote-as 3`
		`vyatta@R5# set protocols bgp 3 neighbor 10.53.0.3 remote-as 3`

TABLE 4 Configuring BGP (Continued)

Router	Step	Commands

R5	On R5, specify the IPv4 address and prefix of its network address connections.	`vyatta@R5# set protocols bgp 3 network 10.15.0.0/16`
		`vyatta@R5# set protocols bgp 3 network 10.45.0.0/16`
		`vyatta@R5# set protocols bgp 3 network 10.53.0.0/16`
		`vyatta@R5# set protocols bgp 3 network 10.57.0.0/16`

R6	On R6, which belong to AS1, assign the remote AS number to its BGP neighbor.	`vyatta@R6# set protocols bgp 1 neighbor 10.16.0.1 remote-as 1`
R6	On R6, specify the IPv4 address and prefix of its network address connections.	`vyatta@R6# set protocols bgp 1 network 10.16.0.0/16` `vyatta@R6# set protocols bgp 1 network 10.106.0.0/16`

Configuring MSDP peers

The following commands shows how to configure MSDP peering between two routers.

TABLE 5 Configuring MSDP peers between two routers

Description	Commands

Use either command to configure MSDP as the protocol between two peers. Use the second command to specify the source IP address for TCP connections to this peer.	`vyatta@R4# set protocols msdp peer remote-ip-peer`
	or
	`vyatta@R4# set protocols msdp peer remote-ip-peer local-address local-ip-peer`

Check the status of the MSDP peer.	`vyatta@R1% show ip msdp peer remote-ip-peer`
Check the configuration.	`vyatta@R4# show protocols msdp`

The following commands show how to configure the MSDP peers for each AS illustrated in the scheme shown in Configuration on page 13.

TABLE 6 Configuring MSDP peers for each AS

Description	Command
Specify the MSDP peers for R2.	`vyatta@R2# set protocols msdp peer 10.12.0.1` `vyatta@R2# set protocols msdp peer 10.23.0.3`

Specify the MSDP peers for R3.	`vyatta@R3# set protocols msdp peer 10.23.0.2`
	`vyatta@R3# set protocols msdp peer 10.34.0.4`
	`vyatta@R3# set protocols msdp peer 10.53.0.5`

Specify the MSDP peers for R4.	`vyatta@R4# set protocols msdp peer 10.45.0.5` `vyatta@R4# set protocols msdp peer 10.34.0.3`

Specify the MSDP peers for R5.	`vyatta@R5# set protocols msdp peer 10.16.0.6`
	`vyatta@R5# set protocols msdp peer 10.53.0.3`
	`vyatta@R5# set protocols msdp peer 10.45.0.4`

TABLE 6 Configuring MSDP peers for each AS (Continued)

Description	Command
Specify the MSDP peers for R6.	`vyatta@R6# set protocols msdp peer 10.15.0.5` `vyatta@R6# set protocols msdp peer 10.12.0.2`

MSDP peers output example

The following example shows the MSDP peer configuration in the scheme illustrated in Configuring MSDP peers on page 17:

Verifying the status of the MSDP peer configuration on R5

```
vyatta@R5:~$ show ip msdp peer
MSDP Peer 10.16.0.6, AS 1 (configured AS)
Description:
    Connection status:
        State: Up, Resets: 1, Connection source: 10.15.0.5 (?)
        Uptime(Downtime): 00:31:35, Messages sent/received: 102/0
        Output messages discarded: 0
        Local role: active
        Connection and counters cleared 01:58:54 ago
    SA Filtering:
Input (S,G) filter: none
Input RP filter: none
Output (S,G) filter: none
Output RP filter: none
    Peer ttl threshold: 16
    SAs learned from this peer: 0, SAs limit: 0
MSDP Peer 10.45.0.4 (?), AS 0 (configured AS)
Description:
    Connection status:
        State: Up, Resets: 1, Connection source: 10.45.0.5 (?)
        Uptime(Downtime): 01:24:14, Messages sent/received: 103/0
        Output messages discarded: 0
        Local role: passive
        Connection and counters cleared 01:58:56 ago
SA Filtering:
    Input (S,G) filter: none
    Input RP filter: none
    Output (S,G) filter: none
    Output RP filter: none
Peer ttl threshold: 16
SAs learned from this peer: 0, SAs limit: 0
```

Configuring an MSDP peer group

Because peers in a group have the same properties as that of an MSDP peer, you can facilitate the MSDP configuration process by configuring a peer group as you would a single peer.

Creating an MSDP peer group

The following commands show how to configure an MSDP peer group.

TABLE 7 Configuring an MSDP peer as a group

Description	Command
Configure a peer to join a group.	`vyatta@R3# set protocols msdp peer-group pgroupR3 peer 10.53.0.5`
Check the configuration.	`vyatta@R3# show protocols msdp peer-group`

Adding MSDP peers to a peer group

Configuration on page 13 shows that AS3 has the R3, R4, and R5 routers as members in a peer group. This group is created by configuring a peer group on each router and adding other members to the group.

The following example shows how to add peers to the MSDP peer groups that are named pgroupR3, pgroupR4, and pgroupR5:

TABLE 8 Adding peers to MSDP peer groups

Router	Description	Commands
R3	Add peers to MSDP peer group pgroupR3.	`vyatta@R3# set protocols msdp peer-group pgroupR3 peer 10.53.0.5` `vyatta@R3# set protocols msdp peer-group pgroupR3 peer 10.34.0.4`
R4	Add peers to MSDP peer group pgroupR4.	`vyatta@R4# set protocols msdp peer-group pgroupR4 peer 10.34.0.3` `vyatta@R4# set protocols msdp peer-group pgroupR4 peer 10.45.0.5`
R5	Add peers to MSDP peer group pgroupR5.	`vyatta@R5# set protocols msdp peer-group pgroupR5 peer 10.53.0.3` `vyatta@R5# set protocols msdp peer-group pgroupR5 peer 10.45.0.4`

Configuring a peer-group as a single peer

The following example shows an example of configuring, as you would a single peer, the hold time for the MSDP peer groups that are named pgroupR3, pgroupR4, and pgroupR5. Holdtime is just an example used in order to show how to configure an entire peer group as you would a single peer.

TABLE 9 Configuring MSDP peer groups as you would a single peer

Router	Description	Commands
R3	Configure hold time for all members of the pgroupR3 peer group.	`vyatta@R3# set protocols msdp peer-group pgroupR3 holdtime 3`
R4	Configure hold time for all members of the pgroupR4 peer group.	`vyatta@R4# set protocols msdp peer-group pgroupR4 holdtime 3`
R5	Configure hold time for all members of the pgroupR5 peer group.	`vyatta@R5# set protocols msdp peer-group pgroupR5 holdtime 3`

Configuring MSDP filters

The following example shows how to configure MSDP with an access control list as a filter and applying it to a peer.

TABLE 10 Configuring MSDP filters

Description	Command
Create an access list with the name of acl1.	`vyatta@R2# set protocols msdp export access-list acl1`
Create an RP list with the name of rplist.	`vyatta@R2# set protocols msdp export rp-list rplist1`
Apply the acl1 filter as an outgoing filter on peer1.	`vyatta@R2# set protocols msdp peer peer1 export access-list acl1`
Apply rplist as an outgoing filter on peer2.	`vyatta@R2# set protocols msdp peer peer2 export rp-list rplist1`

The following definitions apply to the preceding commands:

- The global **import** keyword allows MSDP to filter appropriate (S,G) pairs or a specific RP.
- The global **export** keyword enables you to avoid sending originated group messages to peers.
- The peer **import** keyword filters the appropriate (S,G) pair from a remote peer.
- The peer **export** keyword bans the forwarding of the appropriate (S,G) group from a remote peer.

MSDP filter example

To configure MSDP to deny access to the 226.0.100.1/2/3 groups and the 10.57.0.7 source host, add the appropriate ACL list to the router by performing the following steps:

TABLE 11 Configuring an MSDP filter

Description	Command
Configure the policy action to deny access on access list 100 and on rule 1.	`vyatta@R2# set policy route access-list 100 rule 1 action deny`
Configure the destination by using an inverse mask.	`vyatta@R2# set policy route access-list 100 rule 1 destination inverse-mask 0.0.0.3`
Configure the network destination.	`vyatta@R2# set policy route access-list 100 rule 1 destination network 226.0.100.0`
Configure the source host.	`vyatta@R2# set policy route access-list 100 rule 1 source host 10.57.0.7`
Configure the policy action to permit access on access list 100 and on rule 2.	`vyatta@R2# set policy route access-list 100 rule 2 action permit`
Configure the destination on any packets.	`vyatta@R2# set policy route access-list 100 rule 2 destination any`
Configure the source host on any packets.	`vyatta@R2# set policy route access-list 100 rule 2 source any`
On R2, add the ACL list to the appropriate MSDP filter.	`vyatta@R2# set protocols msdp import acl-list 100`

Verifying the status of MSDP-PIM

When MSDP receives a new (S,G) pair from the RP as part of an SA message, if PIM has subscribers for this group, then MSDP sends the (S,G) pair to the PIM. The multicast (S,G) tree is then built as a common PIM SPT-tree towards the source.

For more information, refer to *Protocol Independent Multicast - Sparse Mode (PIM-SM): Protocol Specification (Revised), RFC 4601* at https://tools.ietf.org/html/rfc4601.

The following example shows how to check the status of an (S,G) pair:

Verifying the status of an (S,G) pair using show ip pim mroute

```
vyatta@R1:~$ show ip pim mroute
Multicast Routing Table:
Flags: D - Dense, S - Sparse, C - Connected, P - Pruned, s - SSM group
R - RP-bit set, F - Register flag, T - SPT-bit set, J - Joined to SPT
M - Learned from MSDP, A - Candidate for advertising by MSDP
Timers: uptime, expires
Outgoing interface flags: A - Assert winner
Interface state: Interface, Next-Hop, State
(*, 226.0.100.2) , uptime: 00:00:04, expires: 0 secs, RP: 10.48.0.4, flags: SC
(10.57.0.7, 226.0.100.2), uptime: 00:00:04, expires: 206 secs, flags: SCJTM
```

MSDP configuration example

The following example shows routers being configured for the MSDP configuration that is illustrated in Configuration on page 13.

TABLE 12 Configuring MSDP peer-groups

Description	Command
Configure R1.	vyatta@R1# set interfaces dataplane dp0p160p1 address 10.10.10.1/24 vyatta@R1# set interfaces dataplane dp0p192p1 address 10.12.0.1/16 vyatta@R1# set interfaces dataplane dp0p224p1 address 10.15.0.1/16 vyatta@R1# set interfaces dataplane dp0p256p1 address 10.16.0.1/16 vyatta@R1# set interfaces dataplane dp0p192p1 ip pim mode sparse vyatta@R1# set interfaces dataplane dp0p224p1 ip pim mode sparse vyatta@R1# set interfaces dataplane dp0p256p1 ip pim mode sparse vyatta@R1# set protocols bgp 1 neighbor 10.12.0.2 remote-as 2 vyatta@R1# set protocols bgp 1 neighbor 10.15.0.5 remote-as 3 vyatta@R1# set protocols bgp 1 neighbor 10.16.0.6 remote-as 1 vyatta@R1# set protocols bgp 1 network 10.12.0.0/16 vyatta@R1# set protocols bgp 1 network 10.15.0.0/16 vyatta@R1# set protocols bgp 1 network 10.16.0.0/16 vyatta@R1# set protocols multicast ip routing vyatta@R1# set protocols pim rp-address 10.16.0.6 vyatta@R1# set service ssh vyatta@R1# set system host-name R1

TABLE 12 Configuring MSDP peer-groups (Continued)

Description	Command
Configure R2.	vyatta@R2# set interfaces dataplane dp0p160p1 address 10.10.10.2/24 vyatta@R2# set interfaces dataplane dp0p192p1 address 10.12.0.2/16 vyatta@R2# set interfaces dataplane dp0p224p1 address 10.23.0.2/16 vyatta@R2# set interfaces dataplane dp0p256p1 address 10.29.0.2/16 vyatta@R2# set interfaces dataplane dp0p192p1 ip pim mode sparse vyatta@R2# set interfaces dataplane dp0p224p1 ip pim mode sparse vyatta@R2# set interfaces dataplane dp0p256p1 ip pim mode sparse vyatta@R2# set protocols bgp 2 neighbor 10.12.0.1 remote-as 1 vyatta@R2# set protocols bgp 2 neighbor 10.23.0.3 remote-as 3 vyatta@R2# set protocols bgp 2 network 10.12.0.0/16 vyatta@R2# set protocols bgp 2 network 10.23.0.0/16 vyatta@R2# set protocols bgp 2 network 10.29.0.0/16 vyatta@R2# set protocols msdp peer 10.16.0.6 vyatta@R2# set protocols msdp peer 10.23.0.3 vyatta@R2# set protocols multicast ip routing vyatta@R2# set protocols pim rp-address 10.29.0.2 vyatta@R2# set service ssh vyatta@R2# set system host-name R2
Configure R3.	vyatta@R3# set interfaces dataplane dp0p160p1 address 10.10.10.3/24 vyatta@R3# set interfaces dataplane dp0p192p1 address 10.23.0.3/16 vyatta@R3# set interfaces dataplane dp0p224p1 address 10.34.0.3/16 vyatta@R3# set interfaces dataplane dp0p256p1 address 10.53.0.3/16 vyatta@R3# set interfaces dataplane dp0p192p1 ip pim mode sparse vyatta@R3# set interfaces dataplane dp0p224p1 ip pim mode sparse vyatta@R3# set interfaces dataplane dp0p256p1 ip pim mode sparse vyatta@R3# set protocols bgp 3 neighbor 10.23.0.2 remote-as 2 vyatta@R3# set protocols bgp 3 neighbor 10.34.0.4 remote-as 3 vyatta@R3# set protocols bgp 3 neighbor 10.53.0.5 remote-as 3 vyatta@R3# set protocols bgp 3 network 10.23.0.0/16 vyatta@R3# set protocols bgp 3 network 10.34.0.0/16 vyatta@R3# set protocols bgp 3 network 10.53.0.0/16 vyatta@R3# set protocols msdp peer-group peer1 peer 10.53.0.5 vyatta@R3# set protocols msdp peer-group peer1 peer 10.34.0.4 vyatta@R3# set protocols msdp peer 10.23.0.2 vyatta@R3# set protocols msdp peer 10.34.0.4 vyatta@R3# set protocols msdp peer 10.53.0.5 vyatta@R3# set protocols multicast ip routing vyatta@R3# set protocols pim rp-address 10.34.0.3 vyatta@R3# set service ssh vyatta@R3# set system host-name R3

TABLE 12 Configuring MSDP peer-groups (Continued)

Description	Command
Configure R4.	vyatta@R4# set interfaces dataplane dp0p160p1 address 10.10.10.4/24 vyatta@R4# set interfaces dataplane dp0p192p1 address 10.34.0.4/16 vyatta@R4# set interfaces dataplane dp0p224p1 address 10.45.0.4/16 vyatta@R4# set interfaces dataplane dp0p256p1 address 10.48.0.4/16 vyatta@R4# set interfaces dataplane dp0p192p1 ip pim mode sparse vyatta@R4# set interfaces dataplane dp0p224p1 ip pim mode sparse vyatta@R4# set interfaces dataplane dp0p256p1 ip pim mode sparse vyatta@R4# set protocols bgp 3 neighbor 10.34.0.3 remote-as 3 vyatta@R4# set protocols bgp 3 neighbor 10.45.0.5 remote-as 3 vyatta@R4# set protocols bgp 3 network 10.34.0.0/16 vyatta@R4# set protocols bgp 3 network 10.43.0.0/16 vyatta@R4# set protocols bgp 3 network 10.48.0.0/16 vyatta@R4# set protocols msdp peer-group peer1 peer 10.34.0.3 vyatta@R4# set protocols msdp peer-group peer1 peer 10.45.0.5 vyatta@R4# set protocols msdp peer 10.34.0.3 vyatta@R4# set protocols msdp peer 10.45.0.5 vyatta@R4# set protocols multicast ip routing vyatta@R4# set protocols pim rp-address 10.48.0.4 vyatta@R4# set service ssh vyatta@R4# set system host-name R4

TABLE 12 Configuring MSDP peer-groups (Continued)

Description	Command
Configure R5.	vyatta@R5# set interfaces dataplane dp0p160p1 address 10.10.10.5/14 vyatta@R5# set interfaces dataplane dp0p161p1 address 10.57.0.5/16 vyatta@R5# set interfaces dataplane dp0p192p1 address 10.15.0.5/16 vyatta@R5# set interfaces dataplane dp0p224p1 address 10.45.0.5/16 vyatta@R5# set interfaces dataplane dp0p256p1 address 10.53.0.5/16 vyatta@R5# set interfaces dataplane dp0p161p1 ip pim mode sparse vyatta@R5# set interfaces dataplane dp0p192p1 ip pim mode sparse vyatta@R5# set interfaces dataplane dp0p224p1 ip pim mode sparse vyatta@R5# set interfaces dataplane dp0p256p1 ip pim mode sparse vyatta@R5# set protocols bgp 3 neighbor 10.15.0.1 remote-as 1 vyatta@R5# set protocols bgp 3 neighbor 10.45.0.4 remote-as 3 vyatta@R5# set protocols bgp 3 neighbor 10.53.0.3 remote-as 3 vyatta@R5# set protocols bgp 3 network 10.15.0.0/16 vyatta@R5# set protocols bgp 3 network 10.45.0.0/16 vyatta@R5# set protocols bgp 3 network 10.53.0.0/16 vyatta@R5# set protocols bgp 3 network 10.57.0.0/16 vyatta@R5# set protocols msdp peer-group peer1 peer 10.53.0.3 vyatta@R5# set protocols msdp peer-group peer1 peer 10.45.0.4 vyatta@R5# set protocols msdp peer 10.16.0.6 vyatta@R5# set protocols msdp peer 10.45.0.4 vyatta@R5# set protocols msdp peer 10.53.0.3 vyatta@R5# set protocols multicast ip routing vyatta@R5# set protocols pim rp-address 10.53.0.5 vyatta@R5# set service ssh vyatta@R5# set system host-name R5

TABLE 12 Configuring MSDP peer-groups (Continued)

Description	Command
Configure R6.	vyatta@R6# set interfaces dataplane dp0p160p1 address '10.10.10.6/24' vyatta@R6# set interfaces dataplane dp0p192p1 address '10.16.0.6/16' vyatta@R6# set interfaces dataplane dp0p224p1 address '10.106.0.6/16' vyatta@R6# set interfaces dataplane dp0p160p1 ip pim mode 'sparse' vyatta@R6# set interfaces dataplane dp0p192p1 ip pim mode 'sparse' vyatta@R6# set interfaces dataplane dp0p224p1 ip pim mode 'sparse' vyatta@R6# set protocols bgp 1 neighbor 10.16.0.1 remote-as '1' vyatta@R6# set protocols bgp 1 network '10.16.0.0/16' vyatta@R6# set protocols bgp 1 network '10.106.0.0/16' vyatta@R6# set protocols msdp peer 10.12.0.2 vyatta@R6# set protocols msdp peer 10.15.0.5 vyatta@R6# set protocols multicast ip routing vyatta@R6# set protocols pim rp-address 10.16.0.6 vyatta@R6# set service ssh vyatta@R6# set system host-name R6

MSDP Commands

monitor protocol multicast msdp <state>

Starts or stops background monitoring of all enabled MSDP monitoring features.

Syntax **monitor protocol multicast msdp** { **enable** | **disable** }

Command Default Background monitoring is enabled for all MSDP events.

Parameters

enable

Turns on background monitoring.

disable

Turns off background monitoring.

Modes Operational mode

Configuration Statement

```
{
monitor {
    protocol multicast {
        msdp
            enable
            disable
        }
    }
}
```

Usage Guidelines Use this command to start or stop background monitoring of all enabled MSDP monitor commands.

protocols msdp export access-list <access-list-name>

Restricts which (S,G) pairs from the multicast routing table are advertised.

Syntax

set protocols msdp export access-list *access-list-name*

delete protocols msdp export access-list [*access-list-name*]

show protocols msdp export access-list

Command Default

All (S,G) sources are advertised.

Parameters

access-list-name

The name of the access list. The global (common) (S,G) entry filter specifies which entries should be advertised.

If a list is not specified, all multicast (S,G) entries are advertised.

This parameter is a numeric identifier of a previously defined access list and can be a number from either of the following ranges:

100 through 199: IP standard access list.

2000 through 2699: IP standard access list (expanded range).

Note that the Vyatta CLI access list does not allow you to add an empty list.

Modes

Configuration mode

Configuration Statement

```
protocols {
    msdp {
        export {
            access-list access-list-name
        }
    }
}
```

Usage Guidelines

This command controls which (S,G) pairs from the multicast routing table that the router advertises. It also defines to which groups these pairs are sent. This command applies to the SA message origination, and not to SA-message forwarding.

Use the **set** form of this command to configure which (S,G) pairs from the multicast routing table are advertised.

Use the **delete** form of this command to delete the configuration of which (S,G) pairs from the multicast routing table are advertised.

Use the **show** form of this command to display the configuration of which (S,G) pairs from the multicast routing table are advertised.

protocols msdp export rp-list <prefix-list-name>

Restricts which (S,G) pairs from the multicast routing table are advertised.

Syntax **set protocols msdp export rp-list** *prefix-list-name*

delete protocols msdp export rp-list [*prefix-list-name*]

show protocols msdp export rp-list

Command Default All (S,G) sources are advertised.

Parameters *prefix-list-name*

The name of a previously defined prefix list. This list is the global RP-address filter that specifies RP addresses for which the MSDP speaker accepts (that is, caches). The RP address is gained from the RP Address field of an MSDP SA packet.

Modes Configuration mode

Configuration Statement

```
protocols {
    msdp {
        export {
            rp-list prefix-list-name
        }
    }
}
```

Usage Guidelines This command controls which (S,G) pairs from the multicast routing table that the router advertises. It also defines to which groups these pairs are sent. This command applies to the SA message origination, and not to SA-message forwarding.

Use the **set** form of this command to configure which (S,G) pairs from the multicast routing table are advertised.

Use the **delete** form of this command to delete the configuration of which (S,G) pairs from the multicast routing table are advertised.

Use the **show** form of this command to display the configuration of which (S,G) pairs from the multicast routing table are advertised.

protocols msdp import access-list <access-list-name>

Restricts (S,G) pairs that are received from peers.

Syntax **set protocols msdp import access-list** *access-list-name*

delete protocols msdp import access-list [*access-list-name*]

show protocols msdp import access-list

Command Default All (S,G) pairs are accepted.

Parameters *access-list-name*

The name of the access list. The global (common) (S,G) entry filter specifies which entries should be advertised.

If a list is not specified, all multicast (S,G) entries are advertised.

This parameter is a numeric identifier of a previously defined access list and can be a number from either of the following ranges:

100 through 199: IP standard access list.

2000 through 2699: IP standard access list (expanded range).

Note that the Vyatta CLI access list does not allow you to add an empty list.

Modes Configuration mode

Configuration Statement

```
protocols {
    msdp {
        import {
            access-list access-list-name
        }
    }
}
```

Usage Guidelines This command controls which (S,G) pairs from the multicast routing table that the router advertises. It also defines to which groups these pairs are sent. This command applies to the SA message origination, and not to SA-message forwarding.

Use the **set** form of this command to configure which (S,G) pairs from the multicast routing table are advertised.

Use the **delete** form of this command to delete the configuration of which (S,G) pairs from the multicast routing table are advertised.

Use the **show** form of this command to display the configuration of which (S,G) pairs from the multicast routing table are advertised.

protocols msdp import rp-list <prefix-list-name>

Restricts the (S,G) pairs that are received from peers.

Syntax **set protocols msdp import rp-list** *prefix-list-name*

delete protocols msdp import rp-list [*prefix-list-name*]

show protocols msdp import rp-list

Command Default All (S,G) pairs are accepted.

Parameters *prefix-list-name*

The name of a previously defined prefix list. This list is the global RP-address filter that specifies the RP addresses for which the MSDP speaker accepts (that is, caches). The RP address is gained from the RP Address field of an MSDP SA packet.

Modes Configuration mode

Configuration Statement

```
protocols {
    msdp {
        import {
            rp-list prefix-list-name
        }
    }
}
```

Usage Guidelines The prefix list applies to incoming SA messages. This attribute is not defined by default. All source and groups are cached. Only specified pairs, source address, and mask or group address, and mask are cached.

Use the **set** form of this command to create an SA state (to cache source and group pairs).

Use the **delete** form of this command to delete an SA state (to cache source and group pairs).

Use the **show** form of this command to display an SA state.

protocols msdp mesh-group <mesh-group-name>

Creates an MSDP mesh group.

Syntax **set protocols msdp mesh-group** *mesh-group-name*

delete protocols msdp mesh-group [*mesh-group-name*]

show protocols msdp mesh-group

Parameters *mesh-group-name*

The name of a mesh group.

Modes Configuration mode

Configuration Statement

```
protocols {
    msdp {
        mesh-group mesh-group-name {
        }
    }
}
```

Usage Guidelines Using mesh groups reduces SA message flooding or simplifies peer-RPF flooding and eliminates the need to run BGP or Multiprotocol BGP (MBGP) among MSDP peers.

A mesh group is a group of MSDP speakers that have fully meshed MSDP connectivity among themselves. No SA messages received from a peer in a mesh group are forwarded to other peers in the same mesh group.

Use the **set** form of this command to create an MSDP mesh group.

Use the **delete** form of this command to delete an MSDP mesh group.

Use the **show** form of this command to display a list of MSDP mesh group names.

protocols msdp mesh-group <mesh-group-name> peer <peer-address>

Configures a peer as a member of a mesh group.

Syntax

set protocols msdp mesh-group *mesh-group-name* **peer** *peer-address*

delete protocols msdp mesh-group *mesh-group-name* **peer** [*peer-address*]

show protocols msdp mesh-group *mesh-group-name* **peer**

Parameters

mesh-group-name

The name of a mesh group.

peer-address

An IPv4 peer address.

Modes

Configuration mode

Configuration Statement

```
protocols {
    msdp {
        mesh-group mesh-group-name {
            peer peer-address1
            peer peer-address2
            peer peer-address3
        }
    }
}
```

Usage Guidelines

Using mesh groups reduces SA message flooding or simplifies peer-RPF flooding and eliminates the need to run BGP or Multiprotocol BGP (MBGP) among MSDP peers.

A mesh group is a group of MSDP speakers that have fully meshed MSDP connectivity among themselves. No SA messages received from a peer belonging to a mesh group are forwarded to other peers from that mesh group.

Use the **set** form of this command to configure a peer as a member of a mesh group.

Use the **delete** form of this command to delete a peer from a mesh group.

Use the **show** form of this command to display the current members of a mesh group.

protocols msdp originated-id <address>

Configures the RP address to be placed in the RP address field of an MSDP SA packet that is originated by an MSDP speaker.

Syntax **set protocols msdp originated-id** *address*

delete protocols msdp originated-id [*address*]

show protocols msdp originated-id

Command Default SA messages use the IP address of the RP.

Parameters *address*

An IPv4 address in the format *x.x.x.x*. The IP address allows an MSDP speaker that originates an SA message to use the address as the RP address in the SA message.

Modes Configuration mode

Configuration Statement

```
protocols {
    msdp {
        originated-id address
    }
}
```

Usage Guidelines This command replaces the accepted RP address for (S,G) entries with one of the interface addresses of the MSDP speaker. In normal mode, MSDP typically advertises the multicast group and uses the IP address of the RP found in the packets. This command enables MSDP to specify another IP address instead of actual IP address of the RP.

Use the **set** form of this command to configure an MSDP speaker, which originates an SA message, to use an IP address as the RP address in the message.

Use the **delete** form of this command to delete the IP address from the SA message.

Use the **show** form of this command to display the current IP address in the SA message.

protocols msdp peer <peer-address>

Configures the MSDP peer address.

Syntax **set protocols msdp peer** *peer-address*

delete protocols msdp peer *peer-address*

show protocols msdp peer *peer-address*

Parameters *peer-address*

An IPv4 MSDP peer address.

Modes Configuration mode

Configuration Statement

```
protocols {
    msdp {
        peer peer-address {
        }
    }
}
```

Usage Guidelines Use the **set** form of this command to configure the MSDP peer address.

Use the **delete** form of this command to delete the MSDP peer address.

Use the **show** form of this command to display the MSDP peer address.

protocols msdp peer <peer-address> connect-retry <time-interval>

Adjusts the connect retry time interval.

Syntax

set protocols msdp peer *peer-address* **connect-retry** *time-interval*

delete protocols msdp peer *peer-address* **connect-retry** [*time-interval*]

show protocols msdp peer *peer-address* **connect-retry**

Command Default

The time interval is 30 seconds.

Parameters

peer-address

An IPv4 MSDP peer address.

time-interval

A time interval in seconds interval. The interval ranges from 1 through 60 seconds.

Modes

Configuration mode

Configuration Statement

```
protocols {
    msdp {
        peer peer-address {
            connect-retry time-interval
        }
    }
}
```

Usage Guidelines

Use the **set** form of this command to adjust the interval for which a peer waits after peering sessions are reset before attempting to re-establish the peering sessions.

Use the **delete** form of this command to restore the default reconnect time interval of 30 seconds.

Use the **show** form of this command to display the current reconnect time interval.

protocols msdp peer <peer-address> default-peer prefix-list <prefix-list-name>

Defines a default peer from which to accept all SA messages.

Syntax

set protocols msdp peer *peer-address* **default-peer prefix-list** *prefix-list-name*

delete protocols msdp peer *peer-address* **default-peer prefix-list** [*prefix-list-name*]

show protocols msdp peer *peer-address* **default-peer prefix-list**

Parameters

peer-address

The IPv4 address of an MSDP peer.

prefix-list-name

The name of a previously defined prefix list. This list is the per-peer RP-address filter that specifies RP addresses for which the MSDP speaker accepts (that is, caches). The RP address is gained from the RP Address field of an MSDP SA packet.

Modes

Configuration mode

Configuration Statement

```
protocols {
    msdp {
        peer peer-address {
            default-peer {
                prefix-list prefix-list-name
            }
        }
    }
}
```

Usage Guidelines

Choose a name for the prefix list that reflects the default peer. Configuring multiple default peers with the same prefix list name enables you to use all the default peers simultaneously for multiple RP prefixes. Configuring multiple default peers without specifying a prefix list name means that all SA messages are accepted by active peers. If a default peer fails, the next configured default peer accepts the SA messages.

Use the **set** form of this command to define a default peer from which to accept all SA messages. The RPF check is not applied to the SA messages that are received from the default peer.

Use the **delete** form of this command to delete a default peer from which to accept all SA messages.

Use the **show** form of this command to display the default peers from which to accept all SA messages.

protocols msdp peer <peer-address> default-peer priority <number>

Defines a priority value for a default peer.

Syntax

set protocols msdp peer *peer-address* **default-peer priority** *number*

delete protocols msdp peer *peer-address* **default-peer priority** [*number*]

show protocols msdp peer *peer-address* **default-peer priority**

Command Default

When no priority is specified, the default is set at zero.

Parameters

peer-address

An IPv4 MSDP peer address.

number

The priority number. The numbers range from 1 through 2000.

Modes

Configuration mode

Configuration Statement

```
protocols {
    msdp {
        peer peer-address {
            default-peer {
                priority number
            }
        }
    }
}
```

Usage Guidelines

Use this command to specify a priority value for a default peer. The user can specify several peers with, or without, prefix-lists of which there can be common or identical occurrences of peers. In such cases, the MSDP daemon chooses only one of the specified peers with which to work. For this purpose, MSDP chooses the peer with the highest priority (the lowest number) to be used as the default. You must specify one default peer with a specific priority or MSDP returns an error message.

Use the **set** form of this command to specify a priority value for the default peer.

Use the **delete** form of this command to delete the priority value of the default peer.

Use the **show** form of this command to display the priority value of the default peer.

protocols msdp peer <peer-address> export access-list <access-list-name>

Applies an filter to outgoing SA messages that are sent to an MSDP peer.

Syntax

set protocols msdp peer *peer-address* **export access-list** *access-list-name*

delete protocols msdp peer *peer-address* **export access-list** [*access-list-name*]

show protocols msdp peer *peer-address* **export access-list**

Command Default

No pairs are filtered.

Parameters

peer-address

An IPv4 MSDP peer address.

access-list-name

The name of the access list. The per-peer (S,G) entry filter specifies which entries should be advertised.

If a list is not specified, all multicast (S,G) entries are advertised.

This parameter is a numeric identifier of a previously defined access list and can be a number from either of the following ranges:

100 through 199: IP standard access list.

2000 through 2699: IP standard access list (expanded range).

Note that the Vyatta CLI access list does not allow you to add an empty list.

Modes

Configuration mode

Configuration Statement

```
protocols {
    msdp {
        peer peer-address {
            export {
                access-list access-list-name
            }
        }
    }
}
```

Usage Guidelines

Use the **set** form of this command to apply an outgoing filter to SA messages that are sent to an MSDP peer.

Use the **delete** form of this command to delete a filter from the SA messages that are sent to an MSDP peer.

Use the **show** form of this command to display all current filters that are sent to MSDP peers.

protocols msdp peer <peer-address> export rp-list <prefix-list-name>

Applies an outgoing filter to SA messages that are sent to an MSDP peer.

Syntax

set protocols msdp peer *peer-address* **export rp-list** *prefix-list-name*

delete protocols msdp peer *peer-address* **export rp-list** [*prefix-list-name*]

show protocols msdp peer *peer-address* **export rp-list**

Command Default

No pairs are filtered.

Parameters

peer-address

An IPv4 MSDP peer address.

prefix-list-name

The name of a previously defined prefix list. This list is the per-peer RP-address filter that specifies RP addresses for which the MSDP speaker accepts (that is, caches). The RP address is gained from the RP Address field of an MSDP SA packet.

Modes

Configuration mode

Configuration Statement

```
protocols {
    msdp {
        peer peer-address {
            export {
                rp-list prefix-list-name
            }
        }
    }
}
```

Usage Guidelines

Use the **set** form of this command to apply an outgoing filter to SA messages that are sent to an MSDP peer.

Use the **delete** form of this command to delete the filter from the SA messages.

Use the **show** form of this command to display filters applied to outgoing SA messages.

protocols msdp peer <peer-address> holdtime <holdtime-interval>

Adjusts the holdtime time interval.

Syntax **set protocols msdp peer** *peer-address* **holdtime** *holdtime-interval*

delete protocols msdp peer *peer-address* **holdtime** [*holdtime-interval*]

show protocols msdp peer *peer-address* **holdtime**

Command Default The time interval is 75 seconds.

Parameters *peer-address*

The IP address of a peer.

holdtime-interval

A time interval in seconds. The interval ranges from 3 through 75 seconds. The holdtime interval should be greater than the keepalive interval.

Modes Configuration mode

Configuration Statement

```
protocols {
    msdp {
        peer peer-address {
            holdtime holdtime-interval
        }
    }
}
```

Usage Guidelines The holdtime time interval is the time to which a peer waits for keepalive messages from other peers before declaring them down.

Use the **set** form of this command to adjust the holdtime time interval for which a peer waits for keepalive messages from other peers before declaring them down.

Use the **delete** form of this command to restore the default holdtime time interval of 75 seconds.

Use the **show** form of this command to display the current holdtime time interval.

protocols msdp peer <peer-address> import access-list <access-list-name>

Applies a filter to incoming SA messages that are received from an MSDP peer.

Syntax

set protocols msdp peer *peer-address* **import access-list** *access-list-name*

delete protocols msdp peer *peer-address* **import access-list** [*access-list-name*]

show protocols msdp peer *peer-address* **import access-list**

Command Default

No advertised pairs are filtered.

Parameters

peer-address

An IPv4 MSDP peer address.

access-list-name

The name of the access list. The per-peer (common) (S,G) entry filter specifies which entries should be advertised.

If a list is not specified, all multicast (S,G) entries are advertised.

This parameter is a numeric identifier of a previously defined access list and can be a number from either of the following ranges:

100 through 199: IP standard access list.

2000 through 2699: IP standard access list (expanded range).

Note that the Vyatta CLI access list does not allow you to add an empty list.

Modes

Configuration mode

Configuration Statement

```
protocols {
    msdp {
        peer peer-address {
            import {
                access-list access-list-name
            }
        }
    }
}
```

Usage Guidelines

A filter that helps define what local sources are advertised and tells the router to what group they can send traffic. The list specifies a source address and mask, or group address and mask. If a list is empty, no multicast sources are advertised. All pairs are cached when this attribute is not configured.

Use the **set** form of this command to apply an incoming filter to SA messages that are received from an MSDP peer.

Use the **delete** form of this command to delete a filter on SA messages that are received from an MSDP peer.

Use the **show** form of this command to display all current filters applied to SA messages that are received from an MSDP peer.

protocols msdp peer <peer-address> import rp-list <prefix-list-name>

Applies an incoming filter to SA messages that are received from an MSDP peer.

Syntax

set protocols msdp peer *peer-address* **import rp-list** *prefix-list-name*

delete protocols msdp peer *peer-address* **import rp-list** [*prefix-list-name*]

show protocols msdp peer *peer-address* **import rp-list**

Command Default

No advertised pairs are filtered.

Parameters

peer-address

An IPv4 MSDP peer address.

prefix-list-name

The name of a previously defined prefix list. This list is the per-peer RP-address filter that specifies RP addresses for which the MSDP speaker accepts (that is, caches). The RP address is gained from the RP Address field of an MSDP SA packet.

Modes

Configuration mode

Configuration Statement

```
protocols {
    msdp {
        peer peer-address {
            import {
                rp-list prefix-list-name
            }
        }
    }
}
```

Usage Guidelines

A filter that helps define what local sources are advertised and tells the router to what group they can send traffic. The list specifies a source address and mask, or group address and mask. If a list is empty, no multicast sources are advertised. All pairs are cached when this attribute is not configured.

Use the **set** form of this command to apply an incoming filter to SA messages that are received from an MSDP peer.

Use the **delete** form of this command to delete a filter to SA messages that are received from an MSDP peer.

Use the **show** form of this command to display filters applied to SA messages that are received from an MSDP peer.

protocols msdp peer <peer-address> keepalive <keepalive-interval>

Adjusts the keepalive time interval at which a peer sends keepalive messages.

Syntax

set protocols msdp peer *peer-address* **keepalive** *keepalive-interval*

delete protocols msdp peer *peer-address* **keepalive** [*keepalive-interval*]

show protocols msdp peer *peer-address* **keepalive**

Command Default

The time interval is 60 seconds.

Parameters

peer-address

An IPv4 MSDP peer address.

keepalive-interval

A time interval in seconds. The interval ranges from 1 through 60 seconds. The keepalive interval must be less than the holdtime interval.

Modes

Configuration mode

Configuration Statement

```
protocols {
    msdp {
        peer peer-address {
            keepalive keepalive-interval
        }
    }
}
```

Usage Guidelines

The keepalive time interval is the time to which a peer sends keepalive messages.

Use the **set** form of this command to adjust the keepalive time interval to which a peer sends keepalive messages.

Use the **delete** form of this command to restore the default keepalive time interval of 60 seconds.

Use the **show** form of this command to display the current keepalive time interval.

protocols msdp peer <peer-address> local-address <local-ip>

Configures an MSDP peer IP address and a local IP address of the router.

Syntax

set protocols msdp peer *peer-address* **local-address** *local-ip*

delete protocols msdp peer *peer-address* **local-address** [*local-ip*]

show protocols msdp peer [*peer-address* **local-address**]

Parameters

peer-address

An IPv4 MSDP (remote) peer address.

local-ip

An IPv4 address of the router, which is used as a source IP address for the TCP connection with the MSDP peer. By default, this address is the most appropriate one to use to connect to an MSDP peer address.

Modes

Configuration mode

Configuration Statement

```
protocols {
    msdp {
        peer peer-address {
            local-address local-ip
        }
    }
}
```

Usage Guidelines

Use the **set** form of this command to configure an MSDP peer with an IPv4 MSDP (remote) peer address.

Use the **delete** form of this command to delete a remote peer address.

Use the **show** form of this command to display the peer IP address and the local IP address of the router.

protocols msdp peer <peer-address> password <password>

Assigns a password for a peer connection.

Syntax **set protocols msdp peer** *peer-address* **password** *password*

Parameters *peer-address*

The IPv4 address of an MSDP peer.

password

A password for the peer.

Modes Configuration mode

Configuration Statement

```
protocols {
    msdp {
        peer peer-address {
            password password
        }
    }
}
```

Usage Guidelines The password must match on both the local and remote peers.

protocols msdp peer <peer-address> shutdown

Shuts down a configured MSDP peer.

Syntax **set protocols msdp peer** *peer-address* **shutdown**

delete protocols msdp peer *peer-address* [**shutdown**]

show protocol msdp peer *peer-address*

Parameters *peer-address*

An IPv4 MSDP peer address

Modes Configuration mode

Configuration Statement

```
protocols {
    msdp {
        peer peer-address {
            shutdown
        }
    }
}
```

Usage Guidelines Use the **set** form of this command to administratively shut down a configured MSDP peer. When an MSDP peer is administratively shut down, this command clears all SA cache entries received from the peer and disables the TCP connection.

Use the **delete** form of this command to enable an MSDP peer.

Use the **show** form of this command to display the configured action for shutting down an MSDP peer.

protocols msdp peer-group <group-name>

Creates a peer group and configures its name.

Syntax **set protocols msdp peer-group** *group-name*

delete protocols msdp peer-group *group-name*

show protocols msdp peer-group

Command Default The mode is standard.

Parameters *group-name*

A name for the peer group.

Modes Configuration mode

Configuration Statement

```
protocols {
    msdp {
        peer-group group-name {
        }
    }
}
```

Usage Guidelines A peer group should be configured explicitly. A peer group enables you to assign the same configuration parameter to all peers that belong to it. A parameter that has not been configured for a single group member is defined by how the parameter is defined by the group configuration.

A parameter that is configured for a peer takes precedence over a parameter that is configured for a peer group. For example, if the keepalive time interval has been configured for 60 seconds on a peer and 70 seconds for the peer group to which it belongs, then the parameter of 60 seconds applies to that peer.

Use the **set** form of this command to create a group with a name.

Use the **delete** form of this command to delete a group.

Use the **show** form of this command to display the current groups.

protocols msdp peer-group <group-name> connect-retry <time-interval>

Configures the connect-retry time interval.

Syntax

set protocols msdp peer-group *group-name* **connect-retry** *time-interval*

delete protocols msdp peer-group *group-name* **connect-retry** [*time-interval*]

show protocols msdp peer-group *group-name* **connect-retry**

Command Default

The time interval is 30 seconds.

Parameters

group-name

The name of a peer group.

time-interval

A time interval in seconds. The interval ranges from 1 through 60 seconds.

Modes

Configuration mode

Configuration Statement

```
protocols {
    msdp {
        peer-group group-name {
            connect-retry time-interval
        }
    }
}
```

Usage Guidelines

Use the **set** form of this command to configure the connect-retry time interval and adjust the interval for which peers, belonging to a peer group, wait after peering sessions are reset before attempting to re-establish the peering sessions.

Use the **delete** form of this command to restore the default connect-retry time interval, which is 30 seconds.

Use the **show** form of this command to display the current connect-retry time interval.

protocols msdp peer-group <group-name> export access-list <access-list-name>

Configures a filter for outgoing SA messages sent by peers that belong to a peer group.

Syntax

set protocols msdp peer-group *group-name* **export access-list** *access-list-name*

delete protocols msdp peer-group *group-name* **export access-list** [*access-list-name*]

show protocols msdp peer-group *group-name* **export access-list**

Parameters

group-name

The name of a peer group.

access-list-name

The name of the access list. The per-peer-group (S,G) entry filter specifies which entries should be advertised.

If a list is not specified, all multicast (S,G) entries are advertised.

This parameter is a numeric identifier of a previously defined access list and can be a number from either of the following ranges:

100 through 199: IP standard access list.

2000 through 2699: IP standard access list (expanded range).

Note that the Vyatta CLI access list does not allow you to add an empty list.

Modes

Configuration mode

Configuration Statement

```
protocols {
    msdp {
        peer-group group-name {
            export access-list-name
        }
    }
}
```

Usage Guidelines

This filter helps define which local sources are advertised and to what group they send toward a peer. This filter specifies a source address and mask, or group address and mask. If not configured, no pairs are filtered and no pairs are advertised to a peer.

Use the **set** form of this command to configure a filter for outgoing SA messages configured for members of a group.

Use the **delete** form of this command to delete the filter for outgoing SA messages configured for members of a group.

Use the **show** form of this command to display the filter for outgoing SA messages configured for members of a group.

protocols msdp peer-group <group-name> export rp-list <prefix-list-name>

Configures a filter for outgoing SA messages sent by peers that belong to a peer group.

Syntax

set protocols msdp peer-group *group-name* **export rp-list** *prefix-list-name*

delete protocols msdp peer-group *group-name* **export rp-list** [*prefix-list-name*]

show protocols msdp peer-group *group-name* **export rp-list**

Parameters

group-name

The name of a peer group.

prefix-list-name

The name of a previously defined prefix list. This list is the per-peer-group RP-address filter that specifies RP addresses for which the MSDP speaker accepts (that is, caches). The RP address is gained from the RP Address field of an MSDP SA packet.

Modes

Configuration mode

Configuration Statement

```
protocols {
    msdp {
        peer-group group-name {
            export rp-list
                prefix-list-name
        }
    }
}
```

Usage Guidelines

This filter helps define which local sources are advertised and to what group they send toward a peer. This filter specifies a source address and mask, or group address and mask. If not configured, no pairs are filtered and no pairs are advertised to a peer.

Use the **set** form of this command to configure a filter for outgoing SA messages sent by peers that belong to a peer group.

Use the **delete** form of this command to delete a filter for outgoing SA messages sent by peers that belong to a peer group.

Use the **show** form of this command to display the filters for outgoing SA messages sent by peers that belong to a peer group.

protocols msdp peer-group <group-name> holdtime <holdtime-interval>

Configures the holdtime time interval for a member of a group.

Syntax **set protocols msdp peer-group** *group-name* **holdtime** *holdtime-interval*

delete protocols msdp peer-group *group-name* **holdtime** [*holdtime-interval*]

show protocols msdp peer-group *group-name* **holdtime**

Command Default The default interval is 75 seconds.

Parameters *group-name*

The name of a peer group.

holdtime-interval

A time interval in seconds. The interval ranges from 3 through 75 seconds. The holdtime interval should be greater than the keepalive interval.

Modes Configuration mode

Configuration Statement

```
protocols {
    msdp {
        peer-group group-name {
            holdtime holdtime-interval
        }
    }
}
```

Usage Guidelines Use the **set** form of this command to configure the holdtime time interval in seconds for which a member of a peer group waits for keepalive messages from other peers before declaring the other peers down.

Use the **delete** form of this command to restore the default holdtime time interval, which is 75 seconds.

Use the **show** form of this command to display the current holdtime time interval.

protocols msdp peer-group <group-name> import access-list <access-list-name>

Configures a filter for incoming SA messages received by the peers that belong to a peer group.

Syntax

set protocols msdp peer-group *group-name* **import access-list** *access-list-name*

delete protocols msdp peer-group *group-name* **import access-list** *access-list-name*

show protocols msdp peer-group *group-name* **import access-list**

Parameters

group-name

The name of a peer group.

access-list-name

The name of the access list. The per-peer-group (S,G) entry filter specifies which entries should be advertised.

If a list is not specified, all multicast (S,G) entries are advertised.

This parameter is a numeric identifier of a previously defined access list and can be a number from either of the following ranges:

100 through 199: IP standard access list.

2000 through 2699: IP standard access list (expanded range).

Note that the Vyatta CLI access list does not allow you to add an empty list.

Modes

Configuration mode

Configuration Statement

```
protocols {
    msdp {
        peer-group group-name {
            import access-list {
                access-list-name
            }
        }
    }
}
```

Usage Guidelines

This filter helps define which local sources are advertised and to what group they send toward a peer. This filter specifies a source address and mask or group address and mask. If not configured, no pairs are filtered and no pairs are advertised to a peer.

Use the **set** form of this command to configure a filter for incoming SA messages received by the peers that belong to a peer group.

Use the **delete** form of this command to delete a filter for incoming SA messages received by the peers that belong to a peer group.

Use the **show** form of this command to display the current filters for incoming SA messages received by the peers that belong to a peer group.

protocols msdp peer-group <group-name> import rp-list <prefix-list-name>

Configures a filter for incoming SA messages that belong to a peer group.

Syntax

set protocols msdp peer-group *group-name* **import rp-list** *prefix-list-name*

delete protocols msdp peer-group *group-name* **import rp-list** [*prefix-list-name*]

show protocols msdp peer-group *group-name* **import rp-list**

Parameters

group-name

The name of a peer group.

prefix-list-name

The name of a previously defined prefix list. This list is the per-peer-group RP-address filter that specifies RP addresses for which the MSDP speaker accepts (that is, caches). The RP address is gained from the RP Address field of an MSDP SA packet.

Modes

Configuration mode

Configuration Statement

```
protocols {
    msdp {
        peer-group group-name {
            import prefix-list-name
        }
    }
}
```

Usage Guidelines

This filter helps define which local sources are advertised and to what group they send toward a peer. This filter specifies a source address and mask or group address and mask. If not configured, no pairs are filtered and no pairs are advertised to a peer.

Use the **set** form of this command to configure a filter for incoming SA messages received by the peers that belong to a peer group.

Use the **delete** form of this command to delete a filter for incoming SA messages received by the peers that belong to a peer group.

Use the **show** form of this command to display the current filters for incoming SA messages received by the peers that belong to a peer group.

protocols msdp peer-group <group-name> keepalive <keepalive-interval>

Configures the keepalive message interval for a peer.

Syntax **set protocols msdp peer-group** *group-name* **keepalive** *keepalive-interval*

delete protocols msdp peer-group *group-name* **keepalive** [*keepalive-interval*]

show protocols msdp peer-group *group-name* **keepalive**

Command Default The default interval is 60 seconds.

Parameters *group-name*

The name of a peer group.

keepalive-interval

The time interval in seconds at which a keepalive message is sent. The interval ranges from 1 through 60 seconds.

Modes Configuration mode

Configuration Statement

```
protocols {
    msdp {
        peer-group group-name {
            keepalive keepalive-interval
        }
    }
}
```

Usage Guidelines This configuration parameter must be less than the configured holdtime time interval.

Use the **set** form of this command to adjust the interval (in seconds) at which a peer (belonging to a group) sends keepalive messages.

Use the **delete** form of this command to delete the keepalive message interval for a peer. This form of the command can be used to set the default interval to 60 seconds.

Use the **show** form of this command to display the keepalive message interval for a peer.

protocols msdp peer-group <group-name> peer <peer-address>

Adds a peer to a peer group.

Syntax

set protocols msdp peer-group *group-name* **peer** *peer-address*

delete protocols msdp peer-group *group-name* **peer** [*peer-address*]

show protocols msdp peer-group *group-name* **peer**

Parameters

group-name

The name of a peer group.

peer-address

An IPv4 MSDP peer address.

Modes

Configuration mode

Configuration Statement

```
protocols {
    msdp {
        peer-group group-name {
            peer peer-address
        }
    }
}
```

Usage Guidelines

A peer group should be configured explicitly.

All parameters that are assigned to a peer group are applied to a peer. A peer can be a member of only one group. A peer group configures several peers with the same parameters.

Use the **set** form of this command to add a peer to a peer group.

Use the **delete** form of this command to delete a peer from a peer group.

Use the **show** form of this command to display the current members of a peer group.

protocols msdp peer-group <group-name> shutdown

Shuts down MSDP peers that belong to a peer group.

Syntax **set protocols msdp peer-group** *group-name* **shutdown**

delete protocols msdp peer-group *group-name* **shutdown**

show protocol msdp peer-group *group-name*

Parameters *group-name*

The name of a peer group.

Modes Configuration mode

Configuration Statement

```
protocols {
    msdp {
        peer-group group-name {
            shutdown
        }
    }
}
```

Usage Guidelines Use the **set** form of this command to administratively shut down MSDP peers that belong to a peer.

Use the **delete** form of this command to remove the configuration to administratively shut down MSDP peers that belong to a peer.

Use the **show** form of this command to display the state of the configuration to administratively shut down MSDP peers that belong to a peer.

reset ip msdp peer <peer-address>

Resets the TCP connection to a peer.

Syntax **reset ip msdp peer** *peer-address*

Parameters *peer-address*

An IPv4 MSDP peer address

Modes Operational mode

Usage Guidelines In addition to resetting the TCP connection to a peer, this command clears all peer statistics and the transmission FIFO.

Examples The following example shows how to reset the TCP connection to the 12.12.12.12. peer.

```
vyatta@vyatta:~$ reset ip msdp peer 12.12.12.12
```

reset ip msdp sa-cache <group-address>

Clears all MSDP SA cache entries.

Syntax **reset ip msdp sa-cache** *group-address*

Parameters *group-address*

A multicast group address for which SA entries are cleared from the SA cache.

Modes Operational mode

Usage Guidelines When the *group-address* parameter is defined, the system clears the SA cache entries for only that group.

Examples The following example shows how to clear MSDP SA cache entries for the 192.168.1.1 group.

```
vyatta@vyatta:~$ reset ip msdp sa-cache 192.168.1.1
```

show ip msdp peer <peer-address>

Displays configuration information for one MSDP peer or all MSDP peers.

Syntax **show ip msdp peer** *peer-address*

Parameters *peer-address*

An IPv4 MSDP peer address.

Modes Operational mode

Examples The following example shows how to display configuration information for the 10.2.7.6 MSDP peer.

```
vyatta@R1:~$ show ip msdp peer 10.2.7.6
MSDP Peer 10.2.7.6 , AS 0 (configured AS)
Description:
    Connection status:
        State: Up, Resets: 4, Connection source: 10.2.7.5
        Uptime(Downtime): 00:22:06, Messages sent/received: 28/89
        Output messages discarded: 0
        Local role: active
        Connection and counters cleared 04:45:26 ago
    SA Filtering:
        Input (S,G) filter: 102
        Input RP filter: p1
        Output (S,G) filter: 101
        Output RP filter: p1
Peer ttl threshold: 16
SAs learned from this peer: 0, SAs limit: 0
```

The following example shows the status of an MSDP peer and how to verify the status of that peer.

```
vyatta@r3:~$show ip msdp peer
MSDP Peer 10.23.0.2 (?), AS 0 (configured AS)
Description:
    Connection status:
        State: Listen, Resets: 5, Connection source: 10.23.0.3 (?)
        Uptime(Downtime): 00:36:37, Messages sent/received: 105/0
        Output messages discarded: 0
        Local role: passive
        Connection and counters cleared 02:35:53 ago
    SA Filtering:
        Input (S,G) filter: none
        Input RP filter: none
        Output (S,G) filter: none
        Output RP filter: none
Peer ttl threshold: 16
SAs learned from this peer: 0, SAs limit: 0
...
```

show ip msdp sa-cache

Displays detailed or summary information about the SA cache database.

Syntax **show ip msdp sa-cache** [**summary**]

Parameters **summary**

Shows summary information about the SA cache database, including the number of active sources, RP addresses, and Multiprotocol BGP/autonomous systems (MBGP/AS).

Modes Operational Mode

Examples The following example shows how to display detailed information about the SA cache database:

```
vyatta@R1:~$ show ip msdp sa-cache
MSDP Source-Active Cache - 2398 entries
Active Sources/Group    RP Address MBGP/AS Time in cache/expired
(137.39.41.33, 238.105.148.0), 137.39.3.111, 704, 2d10h/00:05:33
(130.240.112.8, 224.2.0.1), 198.9.200.65, 10888, 00:03:21/00:02:38
(171.69.10.13, 227.37.32.1), 137.39.3.92, 704, 05:22:20/00:03:32
(134.67.66.18, 233.0.0.1), 137.39.3.111, 704, 2d10h/00:05:35
(134.67.66.148, 233.0.0.1), 137.39.3.111, 704, 2d10h/00:05:35
(171.69.10.13, 227.37.32.2), 137.39.3.92, 704, 00:44:30/00:01:31
(128.223.70.203, 224.2.236.2), 128.223.253.7, 3582, 02:34:16/00:05:49
(206.190.42.104, 236.195.56.2), 137.39.3.92, 704, 04:21:13/00:05:22
(171.69.10.13, 227.37.32.3), 137.39.3.92, 704, 00:44:30/00:02:31
(161.44.15.43, 224.0.92.3), 198.9.200.65, 10888, 6d09h/00:05:35
(161.44.15.111, 224.0.92.3), 198.9.200.65, 10888, 16:18:08/00:05:35
(161.44.21.45, 224.0.92.3), 198.9.200.65, 10888, 16:18:08/00:05:35
(161.44.15.75, 224.0.92.3), 198.9.200.65, 10888, 08:40:52/00:05:35
(161.44.15.100, 224.0.92.3), 198.9.200.65, 10888, 08:40:52/00:05:35
(171.69.10.13, 227.37.32.6), 137.39.3.92, 704, 00:45:30/00:05:31
(137.39.41.33, 224.247.228.10), 137.39.3.111, 704, 2d10h/00:05:35
(128.146.222.210, 224.2.224.13), 137.39.3.92, 704, 01:51:53/00:05:22
(137.39.41.33, 229.231.124.13), 137.39.3.111, 704, 2d10h/00:05:33
(128.223.32.138, 224.2.200.23), 128.223.253.7, 3582, 21:33:40/00:05:49
(128.223.75.244, 224.2.200.23), 128.223.253.7, 3582, 21:33:40/00:05:49
```

The following example shows how to check the detailed status of the SA cache database.

```
vyatta@v5:~$show ip msdp sa-cache
MSDP Source-Active Cache - 20 entries
Active Sources/Group          RP Address      Peer      MBGP       Time
                                                        AS     in cache/expires
(10.57.0.7,226.0.10.10)       10.53.0.5       Self      0          01:55:59/--
(10.57.0.7,226.0.10.9)        10.53.0.5       Self      0          01:55:59/--
(10.57.0.7,226.0.10.8)        10.53.0.5       Self      0          01:55:59/--
(10.57.0.7,226.0.10.7)        10.53.0.5       Self      0          01:55:59/--
(10.57.0.7,226.0.10.6)        10.53.0.5       Self      0          01:55:59/--
(10.57.0.7,226.0.10.5)        10.53.0.5       Self      0          01:55:59/--
(10.57.0.7,226.0.10.4)        10.53.0.5       Self      0          01:55:59/--
(10.57.0.7,226.0.10.3)        10.53.0.5       Self      0          01:55:59/--
...
```

TABLE 13 Column headings in the output produced by show ip msdp sa-cache

Column Heading	Description
Active Sources/Group	A source-group pair (S,G).
RP Address	The address of a rendezvous point (RP).
Peer	The remote peer that sent the SA advertisement. **Self** means that the MSDP peer is the originator for this group.
MBGP	The mBGP autonomous system (AS)—the AS number from BGP. If this number is 0, then BGP does not know about the remote AS.
Time	Time until the “Expires time” counter expires for this host system.

The following example shows how to display summary information about the SA cache database.

```
 vyatta@R1:~$ show ip msdp sa-cache summary
SA Cache summary:
Active sources: 125
RP address: 15
MBGP/AS : 12
```

show ip msdp summary

Displays configuration information all the MSDP peers.

Syntax **show ip msdp summary**

Modes Operational mode

Examples The following example shows how to display MSDP configuration information for the peer.

```
vyatta@r3:~$ show ip msdp summary
Peer address  Local address  State    Last up/down  SA Count Peer/Peer(Group)
10.23.0.2     10.23.0.3      Listen      00:37:35   0/105       0/--
10.34.0.4     10.34.0.3      Up          02:24:00   0/0         1/--
10.53.0.5     10.53.0.3      Up          02:36:48   163/0       1/--
```

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

Acronym	Description
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
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

Acronym	Description
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
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

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