

# Multicast Protocols Feature Guide for the QFX Series

Release  
**15.1**



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*Multicast Protocols Feature Guide for the QFX Series*

15.1

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## Documentation and Release Notes

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To obtain the most current version of all Juniper Networks<sup>®</sup> technical documentation, see the product documentation page on the Juniper Networks website at <http://www.juniper.net/techpubs/>.

If the information in the latest release notes differs from the information in the documentation, follow the product Release Notes.

Juniper Networks Books publishes books by Juniper Networks engineers and subject matter experts. These books go beyond the technical documentation to explore the nuances of network architecture, deployment, and administration. The current list can be viewed at <http://www.juniper.net/books>.

## Supported Platforms

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For the features described in this document, the following platforms are supported:

- [QFX Series](#)

## Using the Examples in This Manual

---

If you want to use the examples in this manual, you can use the **load merge** or the **load merge relative** command. These commands cause the software to merge the incoming configuration into the current candidate configuration. The example does not become active until you commit the candidate configuration.

If the example configuration contains the top level of the hierarchy (or multiple hierarchies), the example is a *full example*. In this case, use the **load merge** command.

If the example configuration does not start at the top level of the hierarchy, the example is a *snippet*. In this case, use the **load merge relative** command. These procedures are described in the following sections.

## Merging a Full Example

To merge a full example, follow these steps:

1. From the HTML or PDF version of the manual, copy a configuration example into a text file, save the file with a name, and copy the file to a directory on your routing platform.

For example, copy the following configuration to a file and name the file **ex-script.conf**. Copy the **ex-script.conf** file to the **/var/tmp** directory on your routing platform.

```
system {
  scripts {
    commit {
      file ex-script.xml;
    }
  }
}
interfaces {
  fxp0 {
    disable;
    unit 0 {
      family inet {
        address 10.0.0.1/24;
      }
    }
  }
}
```

2. Merge the contents of the file into your routing platform configuration by issuing the **load merge** configuration mode command:

```
[edit]
user@host# load merge /var/tmp/ex-script.conf
load complete
```

## Merging a Snippet

To merge a snippet, follow these steps:

1. From the HTML or PDF version of the manual, copy a configuration snippet into a text file, save the file with a name, and copy the file to a directory on your routing platform.

For example, copy the following snippet to a file and name the file **ex-script-snippet.conf**. Copy the **ex-script-snippet.conf** file to the **/var/tmp** directory on your routing platform.

```
commit {
  file ex-script-snippet.xml; }
```

2. Move to the hierarchy level that is relevant for this snippet by issuing the following configuration mode command:

```
[edit]
user@host# edit system scripts
[edit system scripts]
```

3. Merge the contents of the file into your routing platform configuration by issuing the **load merge relative** configuration mode command:

```
[edit system scripts]
user@host# load merge relative /var/tmp/ex-script-snippet.conf
load complete
```

For more information about the **load** command, see [CLI Explorer](#).

## Documentation Conventions

[Table 1 on page xix](#) defines notice icons used in this guide.

Table 1: Notice Icons

Icon	Meaning	Description
	Informational note	Indicates important features or instructions.
	Caution	Indicates a situation that might result in loss of data or hardware damage.
	Warning	Alerts you to the risk of personal injury or death.
	Laser warning	Alerts you to the risk of personal injury from a laser.
	Tip	Indicates helpful information.
	Best practice	Alerts you to a recommended use or implementation.

[Table 2 on page xix](#) defines the text and syntax conventions used in this guide.

Table 2: Text and Syntax Conventions

Convention	Description	Examples
<b>Bold text like this</b>	Represents text that you type.	To enter configuration mode, type the <b>configure</b> command:  user@host> <b>configure</b>

Table 2: Text and Syntax Conventions (*continued*)

Convention	Description	Examples
Fixed-width text like this	Represents output that appears on the terminal screen.	<code>user@host&gt; show chassis alarms</code> <code>No alarms currently active</code>
<i>Italic text like this</i>	<ul style="list-style-type: none"><li>Introduces or emphasizes important new terms.</li><li>Identifies guide names.</li><li>Identifies RFC and Internet draft titles.</li></ul>	<ul style="list-style-type: none"><li>A policy <i>term</i> is a named structure that defines match conditions and actions.</li><li><i>Junos OS CLI User Guide</i></li><li>RFC 1997, <i>BGP Communities Attribute</i></li></ul>
<i>Italic text like this</i>	Represents variables (options for which you substitute a value) in commands or configuration statements.	Configure the machine's domain name:  [edit] root@# <b>set system domain-name</b> <i>domain-name</i>
Text like this	Represents names of configuration statements, commands, files, and directories; configuration hierarchy levels; or labels on routing platform components.	<ul style="list-style-type: none"><li>To configure a stub area, include the <b>stub</b> statement at the [edit protocols ospf area area-id] hierarchy level.</li><li>The console port is labeled <b>CONSOLE</b>.</li></ul>
< > (angle brackets)	Encloses optional keywords or variables.	<b>stub &lt;default-metric <i>metric</i>&gt;;</b>
(pipe symbol)	Indicates a choice between the mutually exclusive keywords or variables on either side of the symbol. The set of choices is often enclosed in parentheses for clarity.	<b>broadcast   multicast</b>  <b>(<i>string1</i>   <i>string2</i>   <i>string3</i>)</b>
# (pound sign)	Indicates a comment specified on the same line as the configuration statement to which it applies.	<b>rsvp { # Required for dynamic MPLS only</b>
[ ] (square brackets)	Encloses a variable for which you can substitute one or more values.	<b>community name members [</b> <b><i>community-ids</i> ]</b>
Indentation and braces ( { } )	Identifies a level in the configuration hierarchy.	[edit] routing-options { static { route default { nexthop <i>address</i> ; retain; } } }
;(semicolon)	Identifies a leaf statement at a configuration hierarchy level.	}
GUI Conventions		
Bold text like this	Represents graphical user interface (GUI) items you click or select.	<ul style="list-style-type: none"><li>In the Logical Interfaces box, select <b>All Interfaces</b>.</li><li>To cancel the configuration, click <b>Cancel</b>.</li></ul>

Table 2: Text and Syntax Conventions (*continued*)

Convention	Description	Examples
> (bold right angle bracket)	Separates levels in a hierarchy of menu selections.	In the configuration editor hierarchy, select <b>Protocols&gt;Ospf</b> .

## Documentation Feedback

We encourage you to provide feedback, comments, and suggestions so that we can improve the documentation. You can provide feedback by using either of the following methods:

- Online feedback rating system—On any page of the Juniper Networks TechLibrary site at <http://www.juniper.net/techpubs/index.html>, simply click the stars to rate the content, and use the pop-up form to provide us with information about your experience. Alternately, you can use the online feedback form at <http://www.juniper.net/techpubs/feedback/>.
- E-mail—Send your comments to [techpubs-comments@juniper.net](mailto:techpubs-comments@juniper.net). Include the document or topic name, URL or page number, and software version (if applicable).

## Requesting Technical Support

Technical product support is available through the Juniper Networks Technical Assistance Center (JTAC). If you are a customer with an active J-Care or Partner Support Service support contract, or are covered under warranty, and need post-sales technical support, you can access our tools and resources online or open a case with JTAC.

- JTAC policies—For a complete understanding of our JTAC procedures and policies, review the *JTAC User Guide* located at <http://www.juniper.net/us/en/local/pdf/resource-guides/7100059-en.pdf>.
- Product warranties—For product warranty information, visit <http://www.juniper.net/support/warranty/>.
- JTAC hours of operation—The JTAC centers have resources available 24 hours a day, 7 days a week, 365 days a year.

## Self-Help Online Tools and Resources

For quick and easy problem resolution, Juniper Networks has designed an online self-service portal called the Customer Support Center (CSC) that provides you with the following features:

- Find CSC offerings: <http://www.juniper.net/customers/support/>
- Search for known bugs: <http://www2.juniper.net/kb/>
- Find product documentation: <http://www.juniper.net/techpubs/>
- Find solutions and answer questions using our Knowledge Base: <http://kb.juniper.net/>

- Download the latest versions of software and review release notes:  
<http://www.juniper.net/customers/csc/software/>
- Search technical bulletins for relevant hardware and software notifications:  
<http://kb.juniper.net/InfoCenter/>
- Join and participate in the Juniper Networks Community Forum:  
<http://www.juniper.net/company/communities/>
- Open a case online in the CSC Case Management tool: <http://www.juniper.net/cm/>

To verify service entitlement by product serial number, use our Serial Number Entitlement (SNE) Tool: <https://tools.juniper.net/SerialNumberEntitlementSearch/>

## Opening a Case with JTAC

You can open a case with JTAC on the Web or by telephone.

- Use the Case Management tool in the CSC at <http://www.juniper.net/cm/>.
- Call 1-888-314-JTAC (1-888-314-5822 toll-free in the USA, Canada, and Mexico).

For international or direct-dial options in countries without toll-free numbers, see <http://www.juniper.net/support/requesting-support.html>.

## CHAPTER 1

# Overview

- [Multicast Overview on page 23](#)

## Multicast Overview

---

IP has three fundamental types of addresses: unicast, broadcast, and multicast. A *unicast address* is used to send a packet to a single destination. A *broadcast address* is used to send a datagram to an entire subnetwork. A *multicast address* is used to send a datagram to a set of hosts that can be on different subnetworks and that are configured as members of a multicast group.

A multicast datagram is delivered to destination group members with the same best-effort reliability as a standard unicast IP datagram. This means that multicast datagrams are not guaranteed to reach all members of a group or to arrive in the same order in which they were transmitted. The only difference between a multicast IP packet and a unicast IP packet is the presence of a group address in the IP header destination address field. Multicast addresses use the Class D address format.



**NOTE:** On all SRX Series devices, reordering is not supported for multicast fragments. Reordering of unicast fragments is supported.

Individual hosts can join or leave a multicast group at any time. There are no restrictions on the physical location or the number of members in a multicast group. A host can be a member of more than one multicast group at any time. A host does not have to belong to a group to send packets to members of a group.

Routers use a group membership protocol to learn about the presence of group members on directly attached subnetworks. When a host joins a multicast group, it transmits a group membership protocol message for the group or groups that it wants to receive and sets its IP process and network interface card to receive frames addressed to the multicast group.

## Comparing Multicast to Unicast

The Junos<sup>®</sup> operating system (Junos OS) routing protocol process supports a wide variety of routing protocols. These routing protocols carry network information among routing devices not only for *unicast* traffic streams sent between one pair of clients and servers,

but also for *multicast* traffic streams containing video, audio, or both, between a single server source and many client receivers. The routing protocols used for multicast differ in many key ways from unicast routing protocols.

Information is delivered over a network by three basic methods: unicast, broadcast, and multicast.

The differences among unicast, broadcast, and multicast can be summarized as follows:

- Unicast: One-to-one, from one source to one destination.
- Broadcast: One-to-all, from one source to all possible destinations.
- Multicast: One-to-many, from one source to multiple destinations expressing an interest in receiving the traffic.



**NOTE:** This list does not include a special category for many-to-many applications, such as online gaming or videoconferencing, where there are many sources for the same receiver and where receivers often double as sources. Many-to-many is a service model that repeatedly employs one-to-many multicast and therefore requires no unique protocol. The original multicast specification, RFC 1112, supports both the any-source multicast (ASM) many-to-many model and the source-specific multicast (SSM) one-to-many model.

---

With unicast traffic, many streams of IP packets that travel across networks flow from a single source, such as a website server, to a single destination such as a client PC. Unicast traffic is still the most common form of information transfer on networks.

Broadcast traffic flows from a single source to all possible destinations reachable on the network, which is usually a LAN. Broadcasting is the easiest way to make sure traffic reaches its destinations.

Television networks use broadcasting to distribute video and audio. Even if the television network is a cable television (CATV) system, the source signal reaches all possible destinations, which is the main reason that some channels' content is scrambled. Broadcasting is not feasible on the Internet because of the enormous amount of unnecessary information that would constantly arrive at each end user's device, the complexities and impact of scrambling, and related privacy issues.

Multicast traffic lies between the extremes of unicast (one source, one destination) and broadcast (one source, all destinations). Multicast is a "one source, many destinations" method of traffic distribution, meaning only the destinations that explicitly indicate their need to receive the information from a particular source receive the traffic stream.

On an IP network, because destinations (clients) do not often communicate directly with sources (servers), the routing devices between source and destination must be able to determine the topology of the network from the unicast or multicast perspective to avoid routing traffic haphazardly. Multicast routing devices replicate packets received on one input interface and send the copies out on multiple output interfaces.



In IP multicast, the source and destination are almost always hosts and not routing devices. Multicast routing devices distribute the multicast traffic across the network from source to destinations. The multicast routing device must find multicast sources on the network, send out copies of packets on several interfaces, prevent routing loops, connect interested destinations with the proper source, and keep the flow of unwanted packets to a minimum. Standard multicast routing protocols provide most of these capabilities, but some router architectures cannot send multiple copies of packets and so do not support multicasting directly.

## IP Multicast Uses

Multicast allows an IP network to support more than just the unicast model of data delivery that prevailed in the early stages of the Internet. Multicast, originally defined as a host extension in RFC 1112 in 1989, provides an efficient method for delivering traffic flows that can be characterized as one-to-many or many-to-many.

Unicast traffic is not strictly limited to data applications. Telephone conversations, wireless or not, contain digital audio samples and might contain digital photographs or even video and still flow from a single source to a single destination. In the same way, multicast traffic is not strictly limited to multimedia applications. In some data applications, the flow of traffic is from a single source to many destinations that require the packets, as in a news or stock ticker service delivered to many PCs. For this reason, the term *receiver* is preferred to *listener* for multicast destinations, although both terms are common.

Network applications that can function with unicast but are better suited for multicast include collaborative groupware, teleconferencing, periodic or “push” data delivery (stock quotes, sports scores, magazines, newspapers, and advertisements), server or website replication, and distributed interactive simulation (DIS) such as war simulations or virtual reality. Any IP network concerned with reducing network resource overhead for one-to-many or many-to-many data or multimedia applications with multiple receivers benefits from multicast.

If unicast were employed by radio or news ticker services, each radio or PC would have to have a separate traffic session for each listener or viewer at a PC (this is actually the method for some Web-based services). The processing load and bandwidth consumed by the server would increase linearly as more people “tune in” to the server. This is extremely inefficient when dealing with the global scale of the Internet. Unicast places the burden of packet duplication on the server and consumes more and more backbone bandwidth as the number of users grows.

If broadcast were employed instead, the source could generate a single IP packet stream using a broadcast destination address. Although broadcast eliminates the server packet duplication issue, this is not a good solution for IP because IP broadcasts can be sent only to a single subnetwork, and IP routing devices normally isolate IP subnetworks on separate interfaces. Even if an IP packet stream could be addressed to literally go everywhere, and there were no need to “tune” to any source at all, broadcast would be extremely inefficient because of the bandwidth strain and need for uninterested hosts to discard large numbers of packets. Broadcast places the burden of packet rejection on each host and consumes the maximum amount of backbone bandwidth.

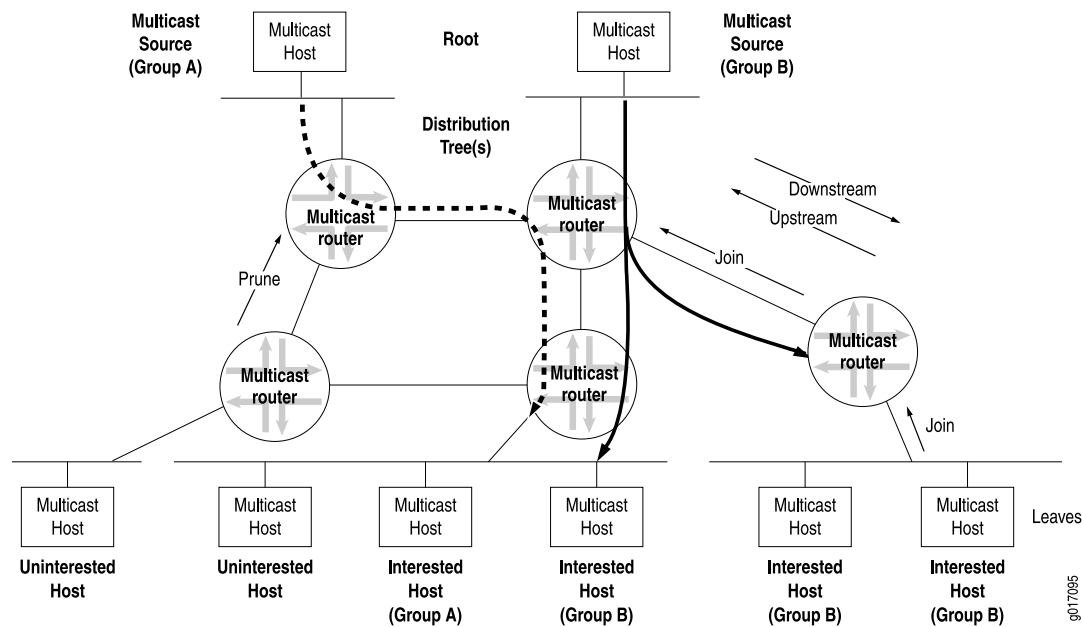
For radio station or news ticker traffic, multicast provides the most efficient and effective outcome, with none of the drawbacks and all of the advantages of the other methods. A single source of multicast packets finds its way to every *interested* receiver. As with broadcast, the transmitting host generates only a single stream of IP packets, so the load remains constant whether there is one receiver or one million. The network routing devices replicate the packets and deliver the packets to the proper receivers, but only the replication role is a new one for routing devices. The links leading to subnets consisting of entirely uninterested receivers carry no multicast traffic. Multicast minimizes the burden placed on sender, network, and receiver.

## IP Multicast Terminology

Multicast has its own particular set of terms and acronyms that apply to IP multicast routing devices and networks. [Figure 1 on page 27](#) depicts some of the terms commonly used in an IP multicast network.

In a multicast network, the key component is the *routing device*, which is able to replicate packets and is therefore multicast-capable. The routing devices in the IP multicast network, which has exactly the same topology as the unicast network it is based on, use a *multicast routing protocol* to build a *distribution tree* that connects receivers (preferred to the multimedia implications of listeners, but listeners is also used) to *sources*. In multicast terminology, the distribution tree is *rooted at the source* (the root of the distribution tree is the source). The interface on the routing device leading toward the source is the *upstream* interface, although the less precise terms *incoming* or *inbound* interface are used as well. To keep bandwidth use to a minimum, it is best for only one upstream interface on the routing device to receive multicast packets. The interface on the routing device leading toward the receivers is the *downstream* interface, although the less precise terms *outgoing* or *outbound* interface are used as well. There can be 0 to  $N-1$  downstream interfaces on a routing device, where  $N$  is the number of logical interfaces on the routing device. To prevent looping, the upstream interface must never receive copies of downstream multicast packets.

Figure 1: Multicast Terminology in an IP Network



Routing loops are disastrous in multicast networks because of the risk of repeatedly replicated packets. One of the complexities of modern multicast routing protocols is the need to avoid routing loops, packet by packet, much more rigorously than in unicast routing protocols.

## Reverse-Path Forwarding for Loop Prevention

The routing device's multicast forwarding state runs more logically based on the reverse path, from the receiver back to the root of the distribution tree. In RPF, every multicast packet received must pass an RPF check before it can be replicated or forwarded on any interface. When it receives a multicast packet on an interface, the routing device verifies that the *source* address in the multicast IP packet is the *destination* address for a unicast IP packet back to the source.

If the outgoing interface found in the unicast routing table is the same interface that the multicast packet was received on, the packet passes the RPF check. Multicast packets that fail the RPF check are dropped, because the incoming interface is not on the shortest path back to the source. routing devices can build and maintain separate tables for RPF purposes.

## Shortest-Path Tree for Loop Prevention

The distribution tree used for multicast is rooted at the source and is the shortest-path tree (SPT), but this path can be long if the source is at the periphery of the network. Providing a *shared tree* on the backbone as the distribution tree locates the multicast source more centrally in the network. Shared distribution trees with roots in the core network are created and maintained by a multicast routing device operating as a rendezvous point (RP), a feature of sparse mode multicast protocols.

## Administrative Scoping for Loop Prevention

Scoping limits the routing devices and interfaces that can forward a multicast packet. Multicast scoping is *administrative* in the sense that a range of multicast addresses is reserved for scoping purposes, as described in RFC 2365, *Administratively Scoped IP Multicast*. routing devices at the boundary must filter multicast packets and ensure that packets do not stray beyond the established limit.

## Multicast Leaf and Branch Terminology

Each subnetwork with hosts on the routing device that has at least one interested receiver is a *leaf* on the distribution tree. routing devices can have multiple leaves on different interfaces and must send a copy of the IP multicast packet out on each interface with a leaf. When a new leaf subnetwork is added to the tree (that is, the interface to the host subnetwork previously received no copies of the multicast packets), a new *branch* is built, the leaf is joined to the tree, and replicated packets are sent out on the interface. The number of leaves on a particular interface does not affect the routing device. The action is the same for one leaf or a hundred.



**NOTE:** On Juniper Networks security devices, if the maximum number of leaves on a multicast distribution tree is exceeded, multicast sessions are created up to the maximum number of leaves, and any multicast sessions that exceed the maximum number of leaves are ignored. The maximum number of leaves on a multicast distribution tree is device specific.

When a branch contains no leaves because there are no interested hosts on the routing device interface leading to that IP subnetwork, the branch is *pruned* from the distribution tree, and no multicast packets are sent out that interface. Packets are replicated and sent out multiple interfaces only where the distribution tree branches at a routing device, and no link ever carries a duplicate flow of packets.

Collections of hosts all receiving the same stream of IP packets, usually from the same multicast source, are called *groups*. In IP multicast networks, traffic is delivered to multicast groups based on an IP multicast address, or *group address*. The groups determine the location of the leaves, and the leaves determine the branches on the multicast network.

## IP Multicast Addressing

Multicast uses the Class D IP address range (224.0.0.0 through 239.255.255.255). Class D addresses are commonly referred to as *multicast addresses* because the entire classful address concept is obsolete. Multicast addresses can never appear as the source address in an IP packet and can only be the destination of a packet.

Multicast addresses usually have a prefix length of /32, although other prefix lengths are allowed. Multicast addresses represent logical groupings of receivers and not physical collections of devices. Blocks of multicast addresses can still be described in terms of prefix length in traditional notation, but only for convenience. For example, the multicast

address range from 232.0.0.0 through 232.255.255.255 can be written as 232.0.0.0/8 or 232/8.

Internet service providers (ISPs) do not typically allocate multicast addresses to their customers because multicast addresses relate to content, not to physical devices. Receivers are not assigned their own multicast addresses, but need to know the multicast address of the content. Sources need to be assigned multicast addresses only to produce the content, not to identify their place in the network. Every source and receiver still needs an ordinary, unicast IP address.

Multicast addressing most often references the receivers, and the source of multicast content is usually not even a member of the multicast group for which it produces content. If the source needs to monitor the packets it produces, monitoring can be done locally, and there is no need to make the packets traverse the network.

Many applications have been assigned a range of multicast addresses for their own use. These applications assign multicast addresses to sessions created by that application. You do not usually need to statically assign a multicast address, but you can do so.

## Multicast Addresses

Multicast host group addresses are defined to be the IP addresses whose high-order four bits are 1110, giving an address range from 224.0.0.0 through 239.255.255.255, or simply 224.0.0.0/4. (These addresses also are referred to as Class D addresses.)

The Internet Assigned Numbers Authority (IANA) maintains a list of registered IP multicast groups. The base address 224.0.0.0 is reserved and cannot be assigned to any group. The block of multicast addresses from 224.0.0.1 through 224.0.0.255 is reserved for local wire use. Groups in this range are assigned for various uses, including routing protocols and local discovery mechanisms.

The range from 239.0.0.0 through 239.255.255.255 is reserved for administratively scoped addresses. Because packets addressed to administratively scoped multicast addresses do not cross configured administrative boundaries, and because administratively scoped multicast addresses are locally assigned, these addresses do not need to be unique across administrative boundaries.

## Layer 2 Frames and IPv4 Multicast Addresses

Multicasting on a LAN is a good place to start an investigation of multicasting at Layer 2. At Layer 2, multicast deals with media access control (MAC) frames and addresses instead of IPv4 or IPv6 packets and addresses. Consider a single LAN, without routing devices, with a multicast source sending to a certain group. The rest of the hosts are receivers interested in the multicast group's content. So the multicast source host generates packets with its unicast IP address as the source, and the multicast group address as the destination.

Which MAC addresses are used on the frame containing this packet? The packet source address—the unicast IP address of the host originating the multicast content—translates easily and directly to the MAC address of the source. But what about the packet's destination address? This is the IP multicast group address. Which destination MAC address for the frame corresponds to the packet's multicast group address?

One option is for LANs simply to use the LAN broadcast MAC address, which guarantees that the frame is processed by every station on the LAN. However, this procedure defeats the whole purpose of multicast, which is to limit the circulation of packets and frames to interested hosts. Also, hosts might have access to many multicast groups, which multiplies the amount of traffic to noninterested destinations. Broadcasting frames at the LAN level to support multicast groups makes no sense.

However, there is an easy way to effectively use Layer 2 frames for multicast purposes. The MAC address has a bit that is set to 0 for unicast (the LAN term is *individual address*) and set to 1 to indicate that this is a multicast address. Some of these addresses are reserved for multicast groups of specific vendors or MAC-level protocols. Internet multicast applications use the range 0x01-00-5E-00-00-00 to 0x01-00-5E-FF-FF-FF. Multicast receivers (hosts running TCP/IP) listen for frames with one of these addresses when the application joins a multicast group. The host stops listening when the application terminates or the host leaves the group at the packet layer (Layer 3).

This means that 3 bytes, or 24 bits, are available to map IPv4 multicast addresses at Layer 3 to MAC multicast addresses at Layer 2. However, all IPv4 addresses, including multicast addresses, are 32 bits long, leaving 8 IP address bits left over. Which method of mapping IPv4 multicast addresses to MAC multicast addresses minimizes the chance of “collisions” (that is, two different IP multicast groups at the packet layer mapping to the same MAC multicast address at the frame layer)?

First, it is important to realize that all IPv4 multicast addresses begin with the same 4 bits (**1110**), so there are really only 4 bits of concern, not 8. A LAN must not drop the last bits of the IPv4 address because these are almost guaranteed to be host bits, depending on the subnet mask. But the high-order bits, the leftmost address bits, are almost always network bits, and there is only one LAN (for now).

One other bit of the remaining 24 MAC address bits is reserved (an initial **0** indicates an Internet multicast address), so the 5 bits following the initial **1110** in the IPv4 address are dropped. The 23 remaining bits are mapped, one for one, into the last 23 bits of the MAC address. An example of this process is shown in [Figure 2 on page 31](#).

Figure 2: Converting MAC Addresses to Multicast Addresses

1	IPv4 header multicast destination address	232.	224.	202.	181	
	Written in hexadecimal	E8	E0	CA	B5	
	Written in binary	1110 1000 1	110 0000	1100 1010	1011 0101	
2	Ignore the first 9 bits and copy the remaining 23 bits	X	110 0000	1100 1010	1011 0101	
3	First bit X = 0 for Internet; X = 1 for other	0	110 0000	1100 1010	1011 0101	
4	Written in hexadecimal		60	CA	B5	
5	MAC address in hexadecimal	01 : 00 : 5E : E0 : CA : B5				
6	Drop last 24 bits	01 : 00 : 5E :				
7	Copy the multicast bits	01 : 00 : 5E : 60 : CA : B5				
8	MAC frame destination address 01:00:5E:60:CA:B5 corresponds to multicast IPv4 address 232.224.202.181					

Note that this process means that there are 32 ( $2^5$ ) IPv4 multicast addresses that could map to the same MAC multicast addresses. For example, multicast IPv4 addresses 224.8.7.6 and 229.136.7.6 translate to the same MAC address (0x01-00-5E-08-07-06). This is a real concern, and because the host could be interested in frames sent to both of those multicast groups, the IP software must reject one or the other.



**NOTE:** This “collision” problem does not exist in IPv6 because of the way IPv6 handles multicast groups, but it is always a concern in IPv4. The procedure for placing IPv6 multicast packets inside multicast frames is nearly identical to that for IPv4, except for the MAC destination address 0x3333 prefix (and the lack of “collisions”).

Once the MAC address for the multicast group is determined, the host's operating system essentially orders the LAN interface card to join or leave the multicast group. Once joined to a multicast group, the host accepts frames sent to the multicast address as well as the host's unicast address and ignores other multicast group's frames. It is possible for a host to join and receive multicast content from more than one group at the same time, of course.

## Multicast Interface Lists

To avoid multicast routing loops, every multicast routing device must always be aware of the interface that leads to the source of that multicast group content by the shortest path. This is the upstream (incoming) interface, and packets are never to be forwarded back toward a multicast source. All other interfaces are potential downstream (outgoing) interfaces, depending on the number of branches on the distribution tree.

routing devices closely monitor the status of the incoming and outgoing interfaces, a process that determines the *multicast forwarding state*. A routing device with a multicast forwarding state for a particular multicast group is essentially “turned on” for that group's

content. Interfaces on the routing device's outgoing interface list send copies of the group's packets received on the incoming interface list for that group. The incoming and outgoing interface lists might be different for different multicast groups.

The multicast forwarding state in a routing device is usually written in either (S,G) or (\*,G) notation. These are pronounced “ess comma gee” and “star comma gee,” respectively. In (S,G), the S refers to the unicast IP address of the source for the multicast traffic, and the G refers to the particular multicast group IP address for which S is the source. All multicast packets sent from this source have S as the source address and G as the destination address.

The asterisk (\*) in the (\*,G) notation is a wildcard indicating that the state applies to any multicast application source sending to group G. So, if two sources are originating exactly the same content for multicast group 224.1.1.2, a routing device could use (\*,224.1.1.2) to represent the state of a routing device forwarding traffic from both sources to the group.

## Multicast Routing Protocols

Multicast routing protocols enable a collection of multicast routing devices to build (join) distribution trees when a host on a directly attached subnet, typically a LAN, wants to receive traffic from a certain multicast group, prune branches, locate sources and groups, and prevent routing loops.

There are several multicast routing protocols:

- **Distance Vector Multicast Routing Protocol (DVMRP)**—The first of the multicast routing protocols and hampered by a number of limitations that make this method unattractive for large-scale Internet use. DVMRP is a dense-mode-only protocol, and uses the flood-and-prune or implicit join method to deliver traffic everywhere and then determine where the uninterested receivers are. DVMRP uses source-based distribution trees in the form (S,G), and builds its own multicast routing tables for RPF checks.
- **Multicast OSPF (MOSPF)**—Extends OSPF for multicast use, but only for dense mode. However, MOSPF has an explicit join message, so routing devices do not have to flood their entire domain with multicast traffic from every source. MOSPF uses source-based distribution trees in the form (S,G).
- ***Bidirectional PIM mode***—A variation of PIM. Bidirectional PIM builds bidirectional shared trees that are rooted at a rendezvous point (RP) address. Bidirectional traffic does not switch to shortest path trees as in PIM-SM and is therefore optimized for routing state size instead of path length. This means that the end-to-end latency might be longer compared to PIM sparse mode. Bidirectional PIM routes are always wildcard-source (\*,G) routes. The protocol eliminates the need for (S,G) routes and data-triggered events. The bidirectional (\*,G) group trees carry traffic both upstream from senders toward the RP, and downstream from the RP to receivers. As a consequence, the strict reverse path forwarding (RPF)-based rules found in other PIM modes do not apply to bidirectional PIM. Instead, bidirectional PIM (\*,G) routes forward traffic from all sources and the RP. Bidirectional PIM routing devices must have the ability to accept traffic on many potential incoming interfaces. Bidirectional PIM scales well because it needs no source-specific (S,G) state. Bidirectional PIM is recommended in deployments with many dispersed sources and many dispersed receivers.



- *PIM dense mode*—In this mode of PIM, the assumption is that almost all possible subnets have at least one receiver wanting to receive the multicast traffic from a source, so the network is *flooded* with traffic on all possible branches, then pruned back when branches do not express an interest in receiving the packets, explicitly (by message) or implicitly (time-out silence). This is the *dense mode* of multicast operation. LANs are appropriate networks for dense-mode operation. Some multicast routing protocols, especially older ones, support only dense-mode operation, which makes them inappropriate for use on the Internet. In contrast to DVMRP and MOSPF, PIM dense mode allows a routing device to use any unicast routing protocol and performs RPF checks using the unicast routing table. PIM dense mode has an implicit join message, so routing devices use the flood-and-prune method to deliver traffic everywhere and then determine where the uninterested receivers are. PIM dense mode uses source-based distribution trees in the form (S,G), as do all dense-mode protocols. PIM also supports sparse-dense mode, with mixed sparse and dense groups, but there is no special notation for that operational mode. If *sparse-dense mode* is supported, the multicast routing protocol allows some multicast groups to be sparse and other groups to be dense.
- *PIM sparse mode*—In this mode of PIM, the assumption is that very few of the possible receivers want packets from each source, so the network establishes and sends packets only on branches that have at least one leaf indicating (by message) an interest in the traffic. This multicast protocol allows a routing device to use any unicast routing protocol and performs reverse-path forwarding (RPF) checks using the unicast routing table. PIM sparse mode has an *explicit* join message, so routing devices determine where the interested receivers are and send join messages upstream to their neighbors, building trees from receivers to the rendezvous point (RP). PIM sparse mode uses an RP routing device as the initial source of multicast group traffic and therefore builds distribution trees in the form (\*,G), as do all sparse-mode protocols. PIM sparse mode migrates to an (S,G) source-based tree if that path is shorter than through the RP for a particular multicast group's traffic. WANs are appropriate networks for sparse-mode operation, and indeed a common multicast guideline is not to run dense mode on a WAN under any circumstances.
- *Core Based Trees (CBT)*—Shares all of the characteristics of PIM sparse mode (sparse mode, explicit join, and shared (\*,G) trees), but is said to be more efficient at finding sources than PIM sparse mode. CBT is rarely encountered outside academic discussions. There are no large-scale deployments of CBT, commercial or otherwise.
- *PIM source-specific multicast (SSM)*—Enhancement to PIM sparse mode that allows a client to receive multicast traffic directly from the source, without the help of an RP. Used with IGMPv3 to create a shortest-path tree between receiver and source.
- *IGMPv1*—The original protocol defined in RFC 1112, *Host Extensions for IP Multicasting*. IGMPv1 sends an explicit join message to the routing device, but uses a timeout to determine when hosts leave a group. Three versions of the Internet Group Management Protocol (IGMP) run between receiver hosts and routing devices.
- *IGMPv2*—Defined in RFC 2236, *Internet Group Management Protocol, Version 2*. Among other features, IGMPv2 adds an explicit leave message to the join message.
- *IGMPv3*—Defined in RFC 3376, *Internet Group Management Protocol, Version 3*. Among other features, IGMPv3 optimizes support for a single source of content for a multicast

group, or source-specific multicast (SSM). Used with PIM SSM to create a shortest-path tree between receiver and source.

- Bootstrap Router (BSR) and Auto-Rendezvous Point (RP)—Allow sparse-mode routing protocols to find RPs within the routing domain (autonomous system, or AS). RP addresses can also be statically configured.
- Multicast Source Discovery Protocol (MSDP)—Allows groups located in one multicast routing domain to find RPs in other routing domains. MSDP is not used on an RP if all receivers and sources are located in the same routing domain. Typically runs on the same routing device as PIM sparse mode RP. Not appropriate if all receivers and sources are located in the same routing domain.
- Session Announcement Protocol (SAP) and Session Description Protocol (SDP)—Display multicast session names and correlate the names with multicast traffic. SDP is a session directory protocol that advertises multimedia conference sessions and communicates setup information to participants who want to join the session. A client commonly uses SDP to announce a conference session by periodically multicasting an announcement packet to a well-known multicast address and port using SAP.
- Pragmatic General Multicast (PGM)—Special protocol layer for multicast traffic that can be used between the IP layer and the multicast application to add reliability to multicast traffic. PGM allows a receiver to detect missing information in all cases and request replacement information if the receiver application requires it.

The differences among the multicast routing protocols are summarized in [Table 3 on page 34](#).

**Table 3: Multicast Routing Protocols Compared**

Multicast Routing Protocol	Dense Mode	Sparse Mode	Implicit Join	Explicit Join	(S,G) SBT	(*G) Shared Tree
DVMRP	Yes	No	Yes	No	Yes	No
MOSPF	Yes	No	No	Yes	Yes	No
PIM dense mode	Yes	No	Yes	No	Yes	No
PIM sparse mode	No	Yes	No	Yes	Yes, maybe	Yes, initially
Bidirectional PIM	No	No	No	Yes	No	Yes
CBT	No	Yes	No	Yes	No	Yes
SSM	No	Yes	No	Yes	Yes, maybe	Yes, initially
IGMPv1	No	Yes	No	Yes	Yes, maybe	Yes, initially
IGMPv2	No	Yes	No	Yes	Yes, maybe	Yes, initially
IGMPv3	No	Yes	No	Yes	Yes, maybe	Yes, initially

Table 3: Multicast Routing Protocols Compared (*continued*)

Multicast Routing Protocol	Dense Mode	Sparse Mode	Implicit Join	Explicit Join	(S,G) SBT	(*G) Shared Tree
BSR and Auto-RP	No	Yes	No	Yes	Yes, maybe	Yes, initially
MSDP	No	Yes	No	Yes	Yes, maybe	Yes, initially

It is important to realize that retransmissions due to a high bit-error rate on a link or overloaded routing device can make multicast as inefficient as repeated unicast. Therefore, there is a trade-off in many multicast applications regarding the session support provided by the Transmission Control Protocol (TCP) (but TCP always resends missing segments), or the simple drop-and-continue strategy of the User Datagram Protocol (UDP) datagram service (but reordering can become an issue). Modern multicast uses UDP almost exclusively.

### T Series Router Multicast Performance

The Juniper Networks T Series Core Routers handle extreme multicast packet replication requirements with a minimum of router load. Each memory component replicates a multicast packet twice at most. Even in the worst-case scenario involving maximum fan-out, when 1 input port and 63 output ports need a copy of the packet, the T Series routing platform copies a multicast packet only six times. Most multicast distribution trees are much sparser, so in many cases only two or three replications are necessary. In no case does the T Series architecture have an impact on multicast performance, even with the largest multicast fan-out requirements.



## PART 1

# Managing Group Membership

- [Using IGMP on page 39](#)
- [Using IGMP Snooping on page 65](#)
- [Using MLD on page 75](#)



## CHAPTER 2

# Using IGMP

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- [Filtering Unwanted IGMP Reports at the IGMP Interface Level on page 48](#)
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- [Tracing IGMP Protocol Traffic on page 61](#)
- [Disabling IGMP on page 63](#)

## Understanding Group Membership Protocols

There is a big difference between the multicast protocols used between host and routing device and between the multicast routing devices themselves. Hosts on a given subnetwork need to inform their routing device only whether or not they are interested in receiving packets from a certain multicast group. The source host needs to inform its routing devices only that it is the source of traffic for a particular multicast group. In other words, no detailed knowledge of the distribution tree is needed by any hosts; only a group membership protocol is needed to inform routing devices of their participation in a multicast group. Between adjacent routing devices, on the other hand, the multicast routing protocols must avoid loops as they build a detailed sense of the network topology

and distribution tree from source to leaf. So, different multicast protocols are used for the host-router portion and the router-router portion of the multicast network.

Multicast group membership protocols enable a routing device to detect when a host on a directly attached subnet, typically a LAN, wants to receive traffic from a certain multicast group. Even if more than one host on the LAN wants to receive traffic for that multicast group, the routing device sends only one copy of each packet for that multicast group out on that interface, because of the inherent broadcast nature of LANs. When the multicast group membership protocol informs the routing device that there are no interested hosts on the subnet, the packets are withheld and that leaf is pruned from the distribution tree.

The Internet Group Management Protocol (IGMP) and the Multicast Listener Discovery (MLD) Protocol are the standard IP multicast group membership protocols: IGMP and MLD have several versions that are supported by hosts and routing devices:

- IGMPv1—The original protocol defined in RFC 1112. An explicit join message is sent to the routing device, but a timeout is used to determine when hosts leave a group. This process wastes processing cycles on the routing device, especially on older or smaller routing devices.
- IGMPv2—Defined in RFC 2236. Among other features, IGMPv2 adds an explicit leave message to the join message so that routing devices can more easily determine when a group has no interested listeners on a LAN.
- IGMPv3—Defined in RFC 3376. Among other features, IGMPv3 optimizes support for a single source of content for a multicast group, or *source-specific multicast (SSM)*.
- MLDv1—Defined in RFC 2710. MLDv1 is similar to IGMPv2.
- MLDv2—Defined in RFC 3810. MLDv2 similar to IGMPv3.

The various versions of IGMP and MLD are backward compatible. It is common for a routing device to run multiple versions of IGMP and MLD on LAN interfaces. Backward compatibility is achieved by dropping back to the most basic of all versions run on a LAN. For example, if one host is running IGMPv1, any routing device attached to the LAN running IGMPv2 can drop back to IGMPv1 operation, effectively eliminating the IGMPv2 advantages. Running multiple IGMP versions ensures that both IGMPv1 and IGMPv2 hosts find peers for their versions on the routing device.

**Related  
Documentation**

- [Examples: Configuring MLD on page 78](#)

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## Understanding IGMP

The Internet Group Management Protocol (IGMP) manages the membership of hosts and routing devices in multicast groups. IP hosts use IGMP to report their multicast group memberships to any immediately neighboring multicast routing devices. Multicast routing devices use IGMP to learn, for each of their attached physical networks, which groups have members.



IGMP is also used as the transport for several related multicast protocols (for example, Distance Vector Multicast Routing Protocol [DVMRP] and Protocol Independent Multicast version 1 [PIMv1]).

A routing device receives explicit join and prune messages from those neighboring routing devices that have downstream group members. When PIM is the multicast protocol in use, IGMP begins the process as follows:

1. To join a multicast group, G, a host conveys its membership information through IGMP.
2. The routing device then forwards data packets addressed to a multicast group G to only those interfaces on which explicit join messages have been received.
3. A designated router (DR) sends periodic join and prune messages toward a group-specific rendezvous point (RP) for each group for which it has active members. One or more routing devices are automatically or statically designated as the RP, and all routing devices must explicitly join through the RP.
4. Each routing device along the path toward the RP builds a wildcard (any-source) state for the group and sends join and prune messages toward the RP.

The term *route entry* is used to refer to the state maintained in a routing device to represent the distribution tree.

A route entry can include such fields as:

- source address
- group address
- incoming interface from which packets are accepted
- list of outgoing interfaces to which packets are sent
- timers
- flag bits

The wildcard route entry's incoming interface points toward the RP.

The outgoing interfaces point to the neighboring downstream routing devices that have sent join and prune messages toward the RP as well as the directly connected hosts that have requested membership to group G.

5. This state creates a shared, RP-centered, distribution tree that reaches all group members.

IGMP is an integral part of IP and must be enabled on all routing devices and hosts that need to receive IP multicast traffic.

For each attached network, a multicast routing device can be either a querier or a nonquerier. The querier routing device periodically sends general query messages to solicit group membership information. Hosts on the network that are members of a multicast group send report messages. When a host leaves a group, it sends a leave group message.

IGMP version 3 (IGMPv3) supports inclusion and exclusion lists. Inclusion lists enable you to specify which sources can send to a multicast group. This type of multicast group is called a source-specific multicast (SSM) group, and its multicast address is 232/8.

IGMPv3 provides support for source filtering. For example, a routing device can specify particular routing devices from which it accepts or rejects traffic. With IGMPv3, a multicast routing device can learn which sources are of interest to neighboring routing devices.

Exclusion mode works the opposite of an inclusion list. It allows any source but the ones listed to send to the SSM group.

IGMPv3 interoperates with versions 1 and 2 of the protocol. However, to remain compatible with older IGMP hosts and routing devices, IGMPv3 routing devices must also implement versions 1 and 2 of the protocol. IGMPv3 supports the following membership-report record types: mode is allowed, allow new sources, and block old sources.

**Related  
Documentation**

- *Supported IP Multicast Protocol Standards*
- *Configuring IGMP*

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## Configuring IGMP

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Before you begin:

1. Determine whether the router is directly attached to any multicast sources. Receivers must be able to locate these sources.
2. Determine whether the router is directly attached to any multicast group receivers. If receivers are present, IGMP is needed.
3. Determine whether to configure multicast to use sparse, dense, or sparse-dense mode. Each mode has different configuration considerations.
4. Determine the address of the RP if sparse or sparse-dense mode is used.
5. Determine whether to locate the RP with the static configuration, BSR, or auto-RP method.
6. Determine whether to configure multicast to use its own RPF routing table when configuring PIM in sparse, dense, or sparse-dense mode.
7. Configure the SAP and SDP protocols to listen for multicast session announcements. See *Configuring the Session Announcement Protocol*.

To configure the Internet Group Management Protocol (IGMP), include the **igmp** statement:

```
igmp {  
  accounting;  
  interface interface-name {  
    disable;  
    (accounting | no-accounting);  
    group-policy [ policy-names ];  
    immediate-leave;  
    oif-map map-name;
```

```

promiscuous-mode;
ssm-map ssm-map-name;
static {
  group multicast-group-address {
    exclude;
    group-count number;
    group-increment increment;
    source ip-address {
      source-count number;
      source-increment increment;
    }
  }
}
version version;
}
query-interval seconds;
query-last-member-interval seconds;
query-response-interval seconds;
robust-count number;
traceoptions {
  file filename <files number> <size size> <world-readable | no-world-readable>;
  flag flag <flag-modifier> <disable>;
}
}

```

You can include this statement at the following hierarchy levels:

- [edit protocols]
- [edit logical-systems *logical-system-name* protocols]

By default, IGMP is enabled on all interfaces on which you configure Protocol Independent Multicast (PIM), and on all broadcast interfaces on which you configure the Distance Vector Multicast Routing Protocol (DVMRP).



**NOTE:** You can configure IGMP on an interface without configuring PIM. PIM is generally not needed on IGMP downstream interfaces. Therefore, only one “pseudo PIM interface” is created to represent all IGMP downstream (IGMP-only) interfaces on the router. This reduces the amount of router resources, such as memory, that are consumed. You must configure PIM on upstream IGMP interfaces to enable multicast routing, perform reverse-path forwarding for multicast data packets, populate the multicast forwarding table for upstream interfaces, and in the case of bidirectional PIM and PIM sparse mode, to distribute IGMP group memberships into the multicast routing domain.

## Enabling IGMP

The Internet Group Management Protocol (IGMP) manages multicast groups by establishing, maintaining, and removing groups on a subnet. Multicast routing devices use IGMP to learn which groups have members on each of their attached physical

networks. IGMP must be enabled for the router to receive IPv4 multicast packets. IGMP is only needed for IPv4 networks, because multicast is handled differently in IPv6 networks. IGMP is automatically enabled on all IPv4 interfaces on which you configure PIM and on all IPv4 broadcast interfaces when you configure DVMRP.

If IGMP is not running on an interface—either because PIM and DVMRP are not configured on the interface or because IGMP is explicitly disabled on the interface—you can explicitly enable IGMP.

To explicitly enable IGMP:

1. If PIM and DVMRP are not running on the interface, explicitly enable IGMP by including the interface name.

```
[edit protocols igmp]
user@host# set interface fe-0/0/0.0
```

2. See if IGMP is disabled on any interfaces. In the following example, IGMP is disabled on a Gigabit Ethernet interface.

```
[edit protocols igmp]
user@host# show
interface fe-0/0/0.0;
interface ge-1/0/0.0 {
  disable;
}
```

3. Enable IGMP on the interface by deleting the **disable** statement.

```
[edit protocols igmp]
delete interface ge-1/0/0.0 disable
```

4. Verify the configuration.

```
[edit protocols igmp]
user@host# show
interface fe-0/0/0.0;
interface ge-1/0/0.0;
```

5. Verify the operation of IGMP on the interfaces by checking the output of the **show igmp interface** command.

- Related Documentation**
- [Understanding IGMP on page 40](#)
  - [Disabling IGMP on page 63](#)
  - [show igmp interface on page 393](#)

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## Changing the IGMP Version

By default, the routing device runs IGMPv2. Routing devices running different versions of IGMP determine the lowest common version of IGMP that is supported by hosts on their subnet and operate in that version.

To enable source-specific multicast (SSM) functionality, you must configure version 3 on the host and the host's directly connected routing device. If a source address is specified in a multicast group that is statically configured, the version must be set to IGMPv3.

If a static multicast group is configured with the source address defined, and the IGMP version is configured to be version 2, the source is ignored and only the group is added. In this case, the join is treated as an IGMPv2 group join.



**BEST PRACTICE:** If you configure the IGMP version setting at the individual interface hierarchy level, it overrides the interface all statement. That is, the new interface does not inherit the version number that you specified with the `interface all` statement. By default, that new interface is enabled with version 2. You must explicitly specify a version *number* when adding a new interface. For example, if you specified version 3 with `interface all`, you would need to configure the version 3 statement for the new interface. Additionally, if you configure an interface for a multicast group at the `[edit interface interface-name static group multicast-group-address]` hierarchy level, you must specify a version *number* as well as the other group parameters. Otherwise, the interface is enabled with the default version 2.

If you have already configured the routing device to use IGMP version 1 (IGMPv1) and then configure it to use IGMPv2, the routing device continues to use IGMPv1 for up to 6 minutes and then uses IGMPv2.

To change to IGMPv3 for SSM functionality:

1. Configure the IGMP interface.

```
[edit protocols igmp]
user@host# set interface ge-0/0/0 version 3
```

2. Verify the configuration by checking the version field in the output of the `show igmp interfaces` command. The `show igmp statistics` command has version-specific output fields, such as V1 Membership Report, V2 Membership Report, and V3 Membership Report.



**CAUTION:** On MX Series platforms, IGMPv2 and IGMPv3 cannot be configured together on the same interface. Configuring both together causes unexpected behavior in multicast traffic forwarding.

#### Related Documentation

- [Understanding IGMP on page 40](#)
- [show pim interfaces on page 475](#)
- [show igmp statistics on page 397](#)
- RFC 2236, *Internet Group Management Protocol, Version 2*
- RFC 3376, *Internet Group Management Protocol, Version 3*

## Modifying the IGMP Host-Query Message Interval

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The objective of IGMP is to keep routers up to date with group membership of the entire subnet. Routers need not know who all the members are, only that members exist. Each host keeps track of which multicast groups are subscribed to. On each link, one router is elected the querier. The IGMP querier router periodically sends general host-query messages on each attached network to solicit membership information. The messages are sent to the all-systems multicast group address, 224.0.0.1.

The query interval, the response interval, and the robustness variable are related in that they are all variables that are used to calculate the group membership timeout. The group membership timeout is the number of seconds that must pass before a multicast router determines that no more members of a host group exist on a subnet. The group membership timeout is calculated as the (robustness variable x query-interval) + (query-response-interval). If no reports are received for a particular group before the group membership timeout has expired, the routing device stops forwarding remotely-originated multicast packets for that group onto the attached network.

By default, host-query messages are sent every 125 seconds. You can change this interval to change the number of IGMP messages sent on the subnet.

To modify the query interval:

1. Configure the interval.

```
[edit protocols igmp]
user@host# set query-interval 200
```

The value can be from 1 through 1024 seconds.

2. Verify the configuration by checking the IGMP Query Interval field in the output of the **show igmp interface** command.
3. Verify the operation of the query interval by checking the Membership Query field in the output of the **show igmp statistics** command.

### Related Documentation

- [Understanding IGMP on page 40](#)
- [Modifying the IGMP Query Response Interval on page 50](#)
- [Modifying the IGMP Robustness Variable on page 51](#)
- [show igmp interface on page 393](#)
- [show igmp statistics on page 397](#)

## Modifying the IGMP Last-Member Query Interval

---

The last-member query interval is the maximum amount of time between group-specific query messages, including those sent in response to leave-group messages. You can configure this interval to change the amount of time it takes a routing device to detect the loss of the last member of a group.

When the routing device that is serving as the querier receives a leave-group message from a host, the routing device sends multiple group-specific queries to the group being left. The querier sends a specific number of these queries at a specific interval. The number of queries sent is called the last-member query count. The interval at which the queries are sent is called the last-member query interval. Because both settings are configurable, you can adjust the leave latency. The IGMP leave latency is the time between a request to leave a multicast group and the receipt of the last byte of data for the multicast group.

The last-member query count x (times) the last-member query interval = (equals) the amount of time it takes a routing device to determine that the last member of a group has left the group and to stop forwarding group traffic.

The default last-member query interval is 1 second. You can configure a subsecond interval up to one digit to the right of the decimal point. The configurable range is 0.1 through 0.9, then in 1-second intervals 1 through 999,999.

To modify this interval:

1. Configure the time (in seconds) that the routing device waits for a report in response to a group-specific query.

```
[edit protocols igmp]
user@host# set query-last-member-interval 0.1
```

2. Verify the configuration by checking the IGMP Last Member Query Interval field in the output of the **show igmp interfaces** command.



**NOTE:** You can configure the last-member query count by configuring the robustness variable. The two are always equal.

#### Related Documentation

- [Modifying the IGMP Robustness Variable on page 51](#)
- [show pim interfaces on page 475](#)

## Specifying Immediate-Leave Host Removal for IGMP

The immediate leave setting is useful for minimizing the leave latency of IGMP memberships. When this setting is enabled, the routing device leaves the multicast group immediately after the last host leaves the multicast group.

The immediate-leave setting enables host tracking, meaning that the device keeps track of the hosts that send join messages. This allows IGMP to determine when the last host sends a leave message for the multicast group.

When the immediate leave setting is enabled, the device removes an interface from the forwarding-table entry without first sending IGMP group-specific queries to the interface. The interface is pruned from the multicast tree for the multicast group specified in the IGMP leave message. The immediate leave setting ensures optimal bandwidth management for hosts on a switched network, even when multiple multicast groups are being used simultaneously.

When immediate leave is disabled and one host sends a leave group message, the routing device first sends a group query to determine if another receiver responds. If no receiver responds, the routing device removes all hosts on the interface from the multicast group. Immediate leave is disabled by default for both IGMP version 2 and IGMP version 3.



**NOTE:** Although host tracking is enabled for IGMPv2 and MLDv1 when you enable immediate leave, use immediate leave with these versions only when there is one host on the interface. The reason is that IGMPv2 and MLDv1 use a report suppression mechanism whereby only one host on an interface sends a group join report in response to a membership query. The other interested hosts suppress their reports. The purpose of this mechanism is to avoid a flood of reports for the same group. But it also interferes with host tracking, because the router only knows about the one interested host and does not know about the others.

To enable immediate leave on an interface:

1. Configure immediate leave on the IGMP interface.

```
[edit protocols IGMP]
user@host# set interface ge-0/0/0.1 immediate-leave
```

2. Verify the configuration by checking the Immediate Leave field in the output of the `show igmp interface` command.

**Related  
Documentation**

- [Understanding IGMP on page 40](#)
- [show igmp interface on page 393](#)

---

## Filtering Unwanted IGMP Reports at the IGMP Interface Level

---

Suppose you need to limit the subnets that can join a certain multicast group. The **group-policy** statement enables you to filter unwanted IGMP reports at the interface level. When this statement is enabled on a router running IGMP version 2 (IGMPv2) or version 3 (IGMPv3), after the router receives an IGMP report, the router compares the group against the specified group policy and performs the action configured in that policy (for example, rejects the report if the policy matches the defined address or network).

You define the policy to match only IGMP group addresses (for IGMPv2) by using the policy's **route-filter** statement to match the group address. You define the policy to match IGMP (source, group) addresses (for IGMPv3) by using the policy's **route-filter** statement to match the group address and the policy's **source-address-filter** statement to match the source address.



**CAUTION:** On MX Series platforms, IGMPv2 and IGMPv3 cannot be configured together on the same interface. Configuring both together causes unexpected behavior in multicast traffic forwarding.



To filter unwanted IGMP reports:

1. Configure an IGMPv2 policy.

```
[edit policy-statement reject_policy_v2]
user@host# set from route-filter 224.1.1.1/32 exact
user@host# set from route-filter 239.0.0.0/8 orlonger
user@host# set then reject
```

2. Configure an IGMPv3 policy.

```
[edit policy-statement reject_policy_v3]
user@host# set from route-filter 224.1.1.1/32 exact
user@host# set from route-filter 239.0.0.0/8 orlonger
user@host# set from source-address-filter 10.0.0.0/8 orlonger
user@host# set from source-address-filter 127.0.0.0/8 orlonger
user@host# set then reject
```

3. Apply the policies to the IGMP interfaces on which you prefer not to receive specific group or (source, group) reports. In this example, **ge-0/0/0.1** is running IGMPv2, and **ge-0/1/1.0** is running IGMPv3.

```
[edit protocols igmp]
user@host# set interface ge-0/0/0.1 group-policy reject_policy_v2
user@host# set interface ge-0/1/1.0 group-policy reject_policy_v3
```

4. Verify the operation of the filter by checking the Rejected Report field in the output of the **show igmp statistics** command.

#### Related Documentation

- [Understanding IGMP on page 40](#)
- [Example: Configuring Policy Chains and Route Filters](#)
- [show igmp statistics on page 397](#)

## Accepting IGMP Messages from Remote Subnetworks

By default, IGMP interfaces accept IGMP messages only from the same subnet. Including the **promiscuous-mode** statement enables the routing device to accept IGMP messages from indirectly connected subnets.



**NOTE:** When you enable IGMP on an unnumbered Ethernet interface that uses a /32 loopback address as a donor address, you must configure IGMP promiscuous mode to accept the IGMP packets received on this interface.



**NOTE:** When enabling promiscuous-mode, all routers on the ethernet segment must be configured with the promiscuous mode statement. Otherwise, only the interface configured with lowest IPv4 address acts as the querier for IGMP for this Ethernet segment.

To enable IGMP promiscuous mode on an interface:

1. Configure the IGMP interface.

```
[edit protocols igmp]
user@host# set interface ge-0/1/1.0 promiscuous-mode
```

2. Verify the configuration by checking the Promiscuous Mode field in the output of the **show igmp interface** command.
3. Verify the operation of the filter by checking the Rx non-local field in the output of the **show igmp statistics** command.

**Related  
Documentation**

- [Understanding IGMP on page 40](#)
- *Configuring the Loopback Interface* in the *Junos OS Network Interfaces Library for Routing Devices*
- [show igmp interface on page 393](#)
- [show igmp statistics on page 397](#)

---

## Modifying the IGMP Query Response Interval

The query response interval is the maximum amount of time that can elapse between when the querier router sends a host-query message and when it receives a response from a host. Configuring this interval allows you to adjust the burst peaks of IGMP messages on the subnet. Set a larger interval to make the traffic less bursty. Bursty traffic refers to an uneven pattern of data transmission: sometimes a very high data transmission rate, whereas at other times a very low data transmission rate.

The query response interval, the host-query interval, and the robustness variable are related in that they are all variables that are used to calculate the group membership timeout. The group membership timeout is the number of seconds that must pass before a multicast router determines that no more members of a host group exist on a subnet. The group membership timeout is calculated as the (robustness variable x query-interval) + (query-response-interval). If no reports are received for a particular group before the group membership timeout has expired, the routing device stops forwarding remotely originated multicast packets for that group onto the attached network.

The default query response interval is 10 seconds. You can configure a subsecond interval up to one digit to the right of the decimal point. The configurable range is 0.1 through 0.9, then in 1-second intervals 1 through 999,999.

To modify the query response interval:

1. Configure the interval.

```
[edit protocols igmp]
user@host# set query-response-interval 0.4
```

2. Verify the configuration by checking the IGMP Query Response Interval field in the output of the **show igmp interface** command.

3. Verify the operation of the query interval by checking the Membership Query field in the output of the **show igmp statistics** command.

**Related  
Documentation**

- [Understanding IGMP on page 40](#)
- [Modifying the IGMP Host-Query Message Interval on page 46](#)
- [Modifying the IGMP Robustness Variable on page 51](#)
- [show igmp interface on page 393](#)
- [show igmp statistics on page 397](#)

---

## Modifying the IGMP Robustness Variable

Fine-tune the IGMP robustness variable to allow for expected packet loss on a subnet. The robust count automatically changes certain IGMP message intervals for IGMPv2 and IGMPv3. Increasing the robust count allows for more packet loss but increases the leave latency of the subnetwork.

When the query router receives an IGMP leave message on a shared network running IGMPv2, the query router must send an IGMP group query message a specified number of times. The number of IGMP group query messages sent is determined by the robust count.

The value of the robustness variable is also used in calculating the following IGMP message intervals:

- Group member interval—Amount of time that must pass before a multicast router determines that there are no more members of a group on a network. This interval is calculated as follows: (robustness variable x query-interval) + (1 x query-response-interval).
- Other querier present interval—The robust count is used to calculate the amount of time that must pass before a multicast router determines that there is no longer another multicast router that is the querier. This interval is calculated as follows: (robustness variable x query-interval) + (0.5 x query-response-interval).
- Last-member query count—Number of group-specific queries sent before the router assumes there are no local members of a group. The number of queries is equal to the value of the robustness variable.

In IGMPv3, a change of interface state causes the system to immediately transmit a state-change report from that interface. In case the state-change report is missed by one or more multicast routers, it is retransmitted. The number of times it is retransmitted is the robust count minus one. In IGMPv3, the robust count is also a factor in determining the group membership interval, the older version querier interval, and the other querier present interval.

By default, the robustness variable is set to 2. You might want to increase this value if you expect a subnet to lose packets.

The number can be from 2 through 10.

To change the value of the robustness variable:

1. Configure the robust count.

When you set the robust count, you are in effect configuring the number of times the querier retries queries on the connected subnets.

```
[edit protocols igmp]  
user@host# set robust-count 5
```

2. Verify the configuration by checking the IGMP Robustness Count field in the output of the **show igmp interfaces** command.

**Related  
Documentation**

- [Modifying the IGMP Host-Query Message Interval on page 46](#)
- [Modifying the IGMP Query Response Interval on page 50](#)
- [Modifying the IGMP Last-Member Query Interval on page 46](#)
- [show pim interfaces on page 475](#)
- RFC 2236, *Internet Group Management Protocol, Version 2*
- RFC 3376, *Internet Group Management Protocol, Version 3*

---

## Limiting the Maximum IGMP Message Rate

This section describes how to change the limit for the maximum number of IGMP packets transmitted in 1 second by the router.

Increasing the maximum number of IGMP packets transmitted per second might be useful on a router with a large number of interfaces participating in IGMP.

To change the limit for the maximum number of IGMP packets the router can transmit in 1 second, include the **maximum-transmit-rate** statement and specify the maximum number of packets per second to be transmitted.

**Related  
Documentation**

- [maximum-transmit-rate \(Protocols IGMP\) on page 242](#)

---

## Enabling IGMP Static Group Membership

You can create IGMP static group membership to test multicast forwarding without a receiver host. When you enable IGMP static group membership, data is forwarded to an interface without that interface receiving membership reports from downstream hosts. The router on which you enable static IGMP group membership must be the designated router (DR) for the subnet. Otherwise, traffic does not flow downstream.

When enabling IGMP static group membership, you cannot configure multiple groups using the **group-count**, **group-increment**, **source-count**, and **source-increment** statements if the **all** option is specified as the IGMP interface.

Class-of-service (CoS) adjustment is not supported with IGMP static group membership.

In this example, you create static group 225.1.1.1.

1. On the DR, configure the static groups to be created by including the **static** statement and **group** statement and specifying which IP multicast address of the group to be created. When creating groups individually, you must specify a unique address for each group.

```
[edit protocols igmp]
user@host# set interface fe-0/1/2 static group 225.1.1.1
```

2. After you commit the configuration, use the **show configuration protocol igmp** command to verify the IGMP protocol configuration.

```
user@host> show configuration protocol igmp

interface fe-0/1/2.0 {
  static {
    group 225.1.1.1;
  }
}
```

3. After you have committed the configuration and the source is sending traffic, use the **show igmp group** command to verify that static group 225.1.1.1 has been created.

```
user@host> show igmp group
Interface: fe-0/1/2
Group: 225.1.1.1
Source: 10.0.0.2
Last reported by: Local
Timeout: 0 Type: Static
```



**NOTE:** When you configure static IGMP group entries on point-to-point links that connect routing devices to a rendezvous point (RP), the static IGMP group entries do not generate join messages toward the RP.

When you create IGMP static group membership to test multicast forwarding on an interface on which you want to receive multicast traffic, you can specify that a number of static groups be automatically created. This is useful when you want to test forwarding to multiple receivers without having to configure each receiver separately.

In this example, you create three groups.

1. On the DR, configure the number of static groups to be created by including the **group-count** statement and specifying the number of groups to be created.

```
[edit protocols igmp]
user@host# set interface fe-0/1/2 static group 225.1.1.1 group-count 3
```

2. After you commit the configuration, use the **show configuration protocol igmp** command to verify the IGMP protocol configuration.

```
user@host> show configuration protocol igmp

interface fe-0/1/2.0 {
  static {
    group 225.1.1.1 {
```

```

        group-count 3;
    }
}

```

3. After you have committed the configuration and after the source is sending traffic, use the **show igmp group** command to verify that static groups 225.1.1.1, 225.1.1.2, and 225.1.1.3 have been created.

```

user@host> show igmp group
Interface: fe-0/1/2
  Group: 225.1.1.1
    Source: 10.0.0.2
    Last reported by: Local
    Timeout: 0 Type: Static
  Group: 225.1.1.2
    Source: 10.0.0.2
    Last reported by: Local
    Timeout: 0 Type: Static
  Group: 225.1.1.3
    Source: 10.0.0.2
    Last reported by: Local
    Timeout: 0 Type: Static

```

When you create IGMP static group membership to test multicast forwarding on an interface on which you want to receive multicast traffic, you can also configure the group address to be automatically incremented for each group created. This is useful when you want to test forwarding to multiple receivers without having to configure each receiver separately and when you do not want the group addresses to be sequential.

In this example, you create three groups and increase the group address by an increment of two for each group.

1. On the DR, configure the group address increment by including the **group-increment** statement and specifying the number by which the address should be incremented for each group. The increment is specified in dotted decimal notation similar to an IPv4 address.

```

[edit protocols igmp]
user@host# set interface fe-0/1/2 static group 225.1.1.1 group-count 3 group-increment
0.0.0.2

```

2. After you commit the configuration, use the **show configuration protocol igmp** command to verify the IGMP protocol configuration.

```

user@host> show configuration protocol igmp

interface fe-0/1/2.0 {
  version 3;
  static {
    group 225.1.1.1 {
      group-increment 0.0.0.2;
      group-count 3;
    }
  }
}

```

3. After you have committed the configuration and after the source is sending traffic, use the **show igmp group** command to verify that static groups 225.1.1.1, 225.1.1.3, and 225.1.1.5 have been created.

```
user@host> show igmp group
Interface: fe-0/1/2
  Group: 225.1.1.1
    Source: 10.0.0.2
    Last reported by: Local
    Timeout: 0 Type: Static
  Group: 225.1.1.3
    Source: 10.0.0.2
    Last reported by: Local
    Timeout: 0 Type: Static
  Group: 225.1.1.5
    Source: 10.0.0.2
    Last reported by: Local
    Timeout: 0 Type: Static
```

When you create IGMP static group membership to test multicast forwarding on an interface on which you want to receive multicast traffic, and your network is operating in source-specific multicast (SSM) mode, you can also specify that the multicast source address be accepted. This is useful when you want to test forwarding to multicast receivers from a specific multicast source.

If you specify a group address in the SSM range, you must also specify a source.

If a source address is specified in a multicast group that is statically configured, the IGMP version on the interface must be set to IGMPv3. IGMPv2 is the default value.

In this example, you create group 225.1.1.1 and accept IP address 10.0.0.2 as the only source.

1. On the DR, configure the source address by including the **source** statement and specifying the IPv4 address of the source host.

```
[edit protocols igmp]
user@host# set interface fe-0/1/2 static group 225.1.1.1 source 10.0.0.2
```

2. After you commit the configuration, use the **show configuration protocol igmp** command to verify the IGMP protocol configuration.

```
user@host> show configuration protocol igmp
interface fe-0/1/2.0 {
  version 3;
  static {
    group 225.1.1.1 {
      source 10.0.0.2;
    }
  }
}
```

3. After you have committed the configuration and the source is sending traffic, use the **show igmp group** command to verify that static group 225.1.1.1 has been created and that source 10.0.0.2 has been accepted.

```
user@host> show igmp group
```

```
Interface: fe-0/1/2
Group: 225.1.1.1
Source: 10.0.0.2
Last reported by: Local
Timeout: 0 Type: Static
```

When you create IGMP static group membership to test multicast forwarding on an interface on which you want to receive multicast traffic, you can specify that a number of multicast sources be automatically accepted. This is useful when you want to test forwarding to multicast receivers from more than one specified multicast source.

In this example, you create group 255.1.1.1 and accept addresses 10.0.0.2, 10.0.0.3, and 10.0.0.4 as the sources.

1. On the DR, configure the number of multicast source addresses to be accepted by including the **source-count** statement and specifying the number of sources to be accepted.

```
[edit protocols igmp]
user@host# set interface fe-0/1/2 static group 225.1.1.1 source 10.0.0.2 source-count
3
```

2. After you commit the configuration, use the **show configuration protocol igmp** command to verify the IGMP protocol configuration.

```
user@host> show configuration protocol igmp

interface fe-0/1/2.0 {
  version 3;
  static {
    group 225.1.1.1 {
      source 10.0.0.2 {
        source-count 3;
      }
    }
  }
}
```

3. After you have committed the configuration and the source is sending traffic, use the **show igmp group** command to verify that static group 225.1.1.1 has been created and that sources 10.0.0.2, 10.0.0.3, and 10.0.0.4 have been accepted.

```
user@host> show igmp group
Interface: fe-0/1/2
Group: 225.1.1.1
Source: 10.0.0.2
Last reported by: Local
Timeout: 0 Type: Static
Group: 225.1.1.1
Source: 10.0.0.3
Last reported by: Local
Timeout: 0 Type: Static
Group: 225.1.1.1
Source: 10.0.0.4
Last reported by: Local
Timeout: 0 Type: Static
```



When you configure static groups on an interface on which you want to receive multicast traffic, and specify that a number of multicast sources be automatically accepted, you can also specify the number by which the address should be incremented for each source accepted. This is useful when you want to test forwarding to multiple receivers without having to configure each receiver separately and you do not want the source addresses to be sequential.

In this example, you create group 225.1.1.1 and accept addresses 10.0.0.2, 10.0.0.4, and 10.0.0.6 as the sources.

1. Configure the multicast source address increment by including the **source-increment** statement and specifying the number by which the address should be incremented for each source. The increment is specified in dotted decimal notation similar to an IPv4 address.

```
[edit protocols igmp]
```

```
user@host# set interface fe-0/1/2 static group 225.1.1.1 source 10.0.0.2 source-count 3 source-increment 0.0.0.2
```

2. After you commit the configuration, use the **show configuration protocol igmp** command to verify the IGMP protocol configuration.

```
user@host> show configuration protocol igmp
```

```
interface fe-0/1/2.0 {
  version 3;
  static {
    group 225.1.1.1 {
      source 10.0.0.2 {
        source-count 3;
        source-increment 0.0.0.2;
      }
    }
  }
}
```

3. After you have committed the configuration and after the source is sending traffic, use the **show igmp group** command to verify that static group 225.1.1.1 has been created and that sources 10.0.0.2, 10.0.0.4, and 10.0.0.6 have been accepted.

```
user@host> show igmp group
```

```
Interface: fe-0/1/2
  Group: 225.1.1.1
    Source: 10.0.0.2
    Last reported by: Local
    Timeout: 0 Type: Static
  Group: 225.1.1.1
    Source: 10.0.0.4
    Last reported by: Local
    Timeout: 0 Type: Static
  Group: 225.1.1.1
    Source: 10.0.0.6
    Last reported by: Local
    Timeout: 0 Type: Static
```

When you configure static groups on an interface on which you want to receive multicast traffic and your network is operating in source-specific multicast (SSM) mode, you can specify that certain multicast source addresses be excluded.

By default the multicast source address configured in a static group operates in include mode. In include mode the multicast traffic for the group is accepted from the source address configured. You can also configure the static group to operate in exclude mode. In exclude mode the multicast traffic for the group is accepted from any address other than the source address configured.

If a source address is specified in a multicast group that is statically configured, the IGMP version on the interface must be set to IGMPv3. IGMPv2 is the default value.

In this example, you exclude address 10.0.0.2 as a source for group 225.1.1.1.

1. On the DR, configure a multicast static group to operate in exclude mode by including the **exclude** statement and specifying which IPv4 source address to exclude.

```
[edit protocols igmp]
```

```
user@host# set interface fe-0/1/2 static group 225.1.1.1 exclude source 10.0.0.2
```

2. After you commit the configuration, use the **show configuration protocol igmp** command to verify the IGMP protocol configuration.

```
user@host> show configuration protocol igmp
```

```
interface fe-0/1/2.0 {
  version 3;
  static {
    group 225.1.1.1 {
      exclude;
      source 10.0.0.2;
    }
  }
}
```

3. After you have committed the configuration and the source is sending traffic, use the **show igmp group detail** command to verify that static group 225.1.1.1 has been created and that the static group is operating in exclude mode.

```
user@host> show igmp group detail
```

```
Interface: fe-0/1/2
  Group: 225.1.1.1
    Group mode: Exclude
    Source: 10.0.0.2
    Last reported by: Local
    Timeout: 0 Type: Static
```

#### Related Documentation

- [Enabling MLD Static Group Membership on page 89](#)
- [group \(Protocols IGMP\) on page 235](#)
- [group-count on page 236](#)
- [group-increment \(Protocols IGMP\) on page 236](#)
- [source-count \(Protocols IGMP\) on page 250](#)

- [source-increment \(Protocols IGMP\) on page 251](#)
- [static \(Protocols IGMP\) on page 252](#)

## Recording IGMP Join and Leave Events

To determine whether IGMP tuning is needed in a network, you can configure the routing device to record IGMP join and leave events. You can record events globally for the routing device or for individual interfaces.

[Table 4 on page 59](#) describes the recordable IGMP events.

**Table 4: IGMP Event Messages**

ERRMSG Tag	Definition
RPD_IGMP_JOIN	Records IGMP join events.
RPD_IGMP_LEAVE	Records IGMP leave events.
RPD_IGMP_ACCOUNTING_ON	Records when IGMP accounting is enabled on an IGMP interface.
RPD_IGMP_ACCOUNTING_OFF	Records when IGMP accounting is disabled on an IGMP interface.
RPD_IGMP_MEMBERSHIP_TIMEOUT	Records IGMP membership timeout events.

To enable IGMP accounting:

1. Enable accounting globally or on an IGMP interface. This example shows both options.

```
[edit protocols igmp]
user@host# set accounting
user@host# set interface fe-0/1/0.2 accounting
```

2. Configure the events to be recorded and filter the events to a system log file with a descriptive filename, such as **igmp-events**.

```
[edit system syslog file igmp-events]
user@host# set any info
user@host# set match ".*RPD_IGMP_JOIN.* | .*RPD_IGMP_LEAVE.* |
.*RPD_IGMP_ACCOUNTING.* | .*RPD_IGMP_MEMBERSHIP_TIMEOUT.*"
```

3. Periodically archive the log file.

This example rotates the file size when it reaches 100 KB and keeps three files.

```
[edit system syslog file igmp-events]
user@host# set archive size 100000
user@host# set archive files 3
user@host# set archive archive-sites "ftp://user@host1//var/tmp" password
"anonymous"
user@host# set archive archive-sites "ftp://user@host2//var/tmp" password "test"
user@host# set archive transfer-interval 24
user@host# set archive start-time 2011-01-07:12:30
```

4. You can monitor the system log file as entries are added to the file by running the **monitor start** and **monitor stop** commands.

```
user@host> monitor start igmp-events
```

```
*** igmp-events ***
```

```
Apr 16 13:08:23 host mgd[16416]: UI_CMDLINE_READ_LINE: User 'user', command  
'run monitor start igmp-events '  
monitor
```

**Related  
Documentation**

- [Understanding IGMP on page 40](#)
- [Specifying Log File Size, Number, and Archiving Properties](#)

---

## Limiting the Number of IGMP Multicast Group Joins on Logical Interfaces

The **group-limit** statement enables you to limit the number of IGMP multicast group joins for logical interfaces. When this statement is enabled on a router running IGMP version 2 (IGMPv2) or version 3 (IGMPv3), the limit is applied upon receipt of the group report. Once the group limit is reached, subsequent join requests are rejected.

When configuring limits for IGMP multicast groups, keep the following in mind:

- Each any-source group (\*G) counts as one group toward the limit.
- Each source-specific group (S,G) counts as one group toward the limit.
- Groups in IGMPv3 exclude mode are counted toward the limit.
- Multiple source-specific groups count individually toward the group limit, even if they are for the same group. For example, (S1, G1) and (S2, G1) would count as two groups toward the configured limit.
- Combinations of any-source groups and source-specific groups count individually toward the group limit, even if they are for the same group. For example, (\*, G1) and (S, G1) would count as two groups toward the configured limit.
- Configuring and committing a group limit on a network that is lower than what already exists on the network results in the removal of all groups from the configuration. The groups must then request to rejoin the network (up to the newly configured group limit).
- You can dynamically limit multicast groups on IGMP logical interfaces using dynamic profiles.

Beginning with Junos OS 12.2, you can optionally configure a system log warning threshold for IGMP multicast group joins received on the logical interface. It is helpful to review the system log messages for troubleshooting purposes and to detect if an excessive amount of IGMP multicast group joins have been received on the interface. These log messages convey when the configured group limit has been exceeded, when the configured threshold has been exceeded, and when the number of groups drop below the configured threshold.

The **group-threshold** statement enables you to configure the threshold at which a warning message is logged. The range is 1 through 100 percent. The warning threshold is a

percentage of the group limit, so you must configure the **group-limit** statement to configure a warning threshold. For instance, when the number of groups exceed the configured warning threshold, but remain below the configured group limit, multicast groups continue to be accepted, and the device logs the warning message. In addition, the device logs a warning message after the number of groups drop below the configured warning threshold. You can further specify the amount of time (in seconds) between the log messages by configuring the **log-interval** statement. The range is 6 through 32,767 seconds.

You might consider throttling log messages because every entry added after the configured threshold and every entry rejected after the configured limit causes a warning message to be logged. By configuring a log interval, you can throttle the amount of system log warning messages generated for IGMP multicast group joins.

To limit multicast group joins on an IGMP logical interface:

1. Access the logical interface at the IGMP protocol hierarchy level.

```
[edit]
user@host# edit protocols igmp interface interface-name
```

2. Specify the group limit for the interface.

```
[edit protocols igmp interface interface-name]
user@host# set group-limit limit
```

3. (Optional) Configure the threshold at which a warning message is logged.

```
[edit protocols igmp interface interface-name]
user@host# set group-threshold value
```

4. (Optional) Configure the amount of time between log messages.

```
[edit protocols igmp interface interface-name]
user@host# set log-interval seconds
```

To confirm your configuration, use the **show protocols igmp** command. To verify the operation of IGMP on the interface, including the configured group limit and the optional warning threshold and interval between log messages, use the **show igmp interface** command.

#### Related Documentation

- [Enabling IGMP Static Group Membership on page 52](#)

## Tracing IGMP Protocol Traffic

Tracing operations record detailed messages about the operation of routing protocols, such as the various types of routing protocol packets sent and received, and routing policy actions. You can specify which trace operations are logged by including specific tracing flags. The following table describes the flags that you can include.

Flag	Description
<b>all</b>	Trace all operations.
<b>client-notification</b>	Trace notifications.

Flag	Description
<b>general</b>	Trace general flow.
<b>group</b>	Trace group operations.
<b>host-notification</b>	Trace host notifications.
<b>leave</b>	Trace leave group messages (IGMPv2 only).
<b>mtrace</b>	Trace mtrace packets. Use the <b>mtrace</b> command to troubleshoot the software.
<b>normal</b>	Trace normal events.
<b>packets</b>	Trace all IGMP packets.
<b>policy</b>	Trace policy processing.
<b>query</b>	Trace IGMP membership query messages, including general and group-specific queries.
<b>report</b>	Trace membership report messages.
<b>route</b>	Trace routing information.
<b>state</b>	Trace state transitions.
<b>task</b>	Trace task processing.
<b>timer</b>	Trace timer processing.

In the following example, tracing is enabled for all routing protocol packets. Then tracing is narrowed to focus only on IGMP packets of a particular type. To configure tracing operations for IGMP:

1. (Optional) Configure tracing at the routing options level to trace all protocol packets.

```
[edit routing-options traceoptions]
user@host# set file all-packets-trace
user@host# set flag all
```

2. Configure the filename for the IGMP trace file.

```
[edit protocols igmp traceoptions]
user@host# set file igmp-trace
```

3. (Optional) Configure the maximum number of trace files.

```
[edit protocols igmp traceoptions]
user@host# set file files 5
```

4. (Optional) Configure the maximum size of each trace file.

```
[edit protocols igmp traceoptions]  
user@host# set file size 1m
```

5. (Optional) Enable unrestricted file access.

```
[edit protocols igmp traceoptions]  
user@host# set file world-readable
```

6. Configure tracing flags. Suppose you are troubleshooting issues with a particular multicast group. The following example shows how to flag all events for packets associated with the group IP address.

```
[edit protocols igmp traceoptions]  
user@host# set flag group | match 232.1.1.2
```

7. View the trace file.

```
user@host> file list /var/log  
user@host> file show /var/log/igmp-trace
```

- Related Documentation**
- [Understanding IGMP on page 40](#)
  - *Tracing and Logging Junos OS Operations*
  - [mtrace on page 431](#)

---

## Disabling IGMP

To disable IGMP on an interface, include the **disable** statement:

```
disable;
```

You can include this statement at the following hierarchy levels:

- [edit protocols igmp interface *interface-name*]
- [edit logical-systems *logical-system-name* protocols igmp interface *interface-name*]

- Related Documentation**
- [Enabling IGMP on page 43](#)





## CHAPTER 3

# Using IGMP Snooping

- [IGMP Snooping Overview on page 65](#)
- [Configuring IGMP Snooping on page 68](#)
- [Configuring VLAN-Specific IGMP Snooping Parameters on page 69](#)
- [Example: Configuring IGMP Snooping on page 70](#)
- [Monitoring IGMP Snooping on page 72](#)
- [Changing the IGMP Snooping Group Timeout Value on page 73](#)
- [Verifying the IGMP Snooping Group Timeout Value on page 74](#)

### IGMP Snooping Overview

---

With IGMP snooping enabled, a switch monitors the IGMP (Internet Group Management Protocol) traffic between hosts and multicast routers and uses what it learns to forward multicast traffic to only the downstream interfaces that are connected to interested receivers. This conserves bandwidth by allowing the switch to send multicast traffic to only those interfaces that are connected to devices that want to receive the traffic (instead of flooding the traffic to all the downstream VLAN interfaces).

This IGMP snooping topic includes:

- [How IGMP Snooping Works on page 65](#)
- [How IGMP Snooping Works with Routed VLAN Interfaces on page 66](#)
- [How Hosts Join and Leave Multicast Groups on page 66](#)
- [IGMP Snooping and Forwarding Interfaces on page 67](#)
- [General Forwarding Rules on page 67](#)

### How IGMP Snooping Works

A switch usually learns unicast MAC addresses by checking the source address field of the frames it receives and then sends any traffic for that unicast address only to the appropriate interface. However, a multicast MAC address can never be the source address for a packet. As a result, when a switch receives traffic for a multicast destination address, it floods the traffic on the relevant VLAN, which can cause a significant amount of traffic to be sent unnecessarily.

IGMP snooping prevents this flooding. When you enable IGMP snooping, the switch monitors IGMP packets between receivers and multicast routers and uses the content of the packets to build a multicast cache table—a database of multicast groups and the interfaces that are connected to members of the groups. When the switch receives multicast packets, it uses the cache table to selectively forward the traffic to only the interfaces that are connected to members of the appropriate multicast groups.



**NOTE:** IGMP snooping is enabled by default on the default VLAN only. With versions of Junos OS for the QFX Series previous to 13.2, IGMP snooping is enabled by default on all VLANs.



**NOTE:** You cannot configure IGMP snooping on a secondary (private) VLAN.

## How IGMP Snooping Works with Routed VLAN Interfaces

A switch can use a routed VLAN interface (RVI) to forward traffic between VLANs that connect to it. IGMP snooping works with Layer 2 interfaces and RVIs to forward multicast traffic in a switched network.

When a switch receives a multicast packet, its Packet Forwarding Engines perform a multicast lookup on the packet to determine how to forward the packet to its local interfaces. From the results of the lookup, each Packet Forwarding Engine extracts a list of Layer 3 interfaces that have ports local to the Packet Forwarding Engine. If the list includes an RVI, the switch provides a bridge multicast group ID for the RVI to the Packet Forwarding Engine.

For VLANs that include multicast receivers, the bridge multicast ID includes a sub-next-hop ID, which identifies the Layer 2 interfaces in the VLAN that are interested in receiving the multicast stream. The Packet Forwarding Engine then forwards multicast traffic to bridge multicast IDs that have multicast receivers for a given multicast group.

## How Hosts Join and Leave Multicast Groups

Hosts can join multicast groups in two ways:

- By sending an unsolicited IGMP join message to a multicast router that specifies the IP multicast group that the host is attempting to join.
- By sending an IGMP join message in response to a general query from a multicast router.

A multicast router continues to forward multicast traffic to a VLAN provided that at least one host on that VLAN responds to the periodic general IGMP queries. For a host to remain a member of a multicast group, therefore, it must continue to respond to the periodic general IGMP queries.

To leave a multicast group, either a host cannot respond to the periodic general IGMP queries, which results in a “silent leave” (the only leave option for IGMPv1), or a host can send a group-specific IGMPv2 leave message.

## IGMP Snooping and Forwarding Interfaces

To determine how to forward multicast traffic, a switch with IGMP snooping enabled maintains information about the following interfaces in its multicast forwarding table:

- Multicast-router interfaces—These interfaces lead toward multicast routers or IGMP queriers.
- Group-member interfaces—These interfaces lead toward hosts that are members of multicast groups.

The switch learns about these interfaces by monitoring IGMP traffic. If an interface receives IGMP queries or Protocol Independent Multicast (PIM) updates, the switch adds the interface to its multicast forwarding table as a multicast-router interface. If an interface receives membership reports for a multicast group, the switch adds the interface to its multicast forwarding table as a group-member interface.

Table entries for interfaces that the switch learns about are subject to aging. For example, if a learned multicast-router interface does not receive IGMP queries or PIM hellos within a certain interval, the switch removes the entry for that interface from its multicast forwarding table.



**NOTE:** For a switch to learn multicast-router interfaces and group-member interfaces, an IGMP querier must exist in the network. This is often a multicast router, but if there is no multicast router on the local network, you can configure the switch itself to be an IGMP querier.

You can statically configure an interface to be a multicast-router interface or a group-member interface. The switch adds a static interface to its multicast forwarding table without having to learn about the interface, and the entry in the table is not subject to aging. You can have a mix of statically configured and dynamically learned interfaces on a switch.

## General Forwarding Rules

Multicast traffic received on a switch interface in a VLAN on which IGMP snooping is enabled is forwarded according to the following rules.

IGMP traffic is forwarded as follows:

- IGMP general queries received on a multicast-router interface are forwarded to all other interfaces in the VLAN.
- IGMP group-specific queries received on a multicast-router interface are forwarded to only those interfaces in the VLAN that are members of the group.
- IGMP reports received on a host interface are forwarded to multicast-router interfaces in the same VLAN, but not to the other host interfaces in the VLAN.

Multicast traffic that is not IGMP traffic is forwarded as follows:

- A multicast packet with a destination address of 224.0.0.0/24 is flooded to all other interfaces on the VLAN.
- An unregistered multicast packet—that is, a packet for a group that has no current members—is forwarded to all multicast-router interfaces in the VLAN.
- A registered multicast packet is forwarded only to those host interfaces in the VLAN that are members of the multicast group and to all multicast-router interfaces in the VLAN.

**Related  
Documentation**

- [Example: Configuring IGMP Snooping on page 70](#)
- [Configuring IGMP Snooping on page 68](#)
- [Monitoring IGMP Snooping on page 72](#)
- [Configuring IGMP on page 42](#)
- RFC 3171, *IANA Guidelines for IPv4 Multicast Address Assignments*
- IGMPv1—See RFC 1112, *Host extensions for IP multicasting*.
- IGMPv2—See RFC 2236, *Internet Group Management Protocol, Version 2*.
- IGMPv3—See RFC 3376, *Internet Group Management Protocol, Version 3*.

---

## Configuring IGMP Snooping

With IGMP snooping enabled, a switch monitors the IGMP (Internet Group Management Protocol) traffic between hosts and multicast routers and uses what it learns to forward multicast traffic to only the downstream interfaces that are connected to interested receivers. This conserves bandwidth by allowing the switch to send multicast traffic to only those interfaces that are connected to devices that want to receive the traffic (instead of flooding the traffic to all the downstream VLAN interfaces).



**NOTE:** You cannot configure IGMP snooping on a secondary VLAN.

To enable IGMP snooping and configure individual options as needed for your network by using the CLI:

1. Enable IGMP snooping on a VLAN:

```
[edit protocols]  
user@switch# set igmp-snooping vlan employee-vlan
```

2. Configure the switch to immediately remove group membership from interfaces on a VLAN when it receives a leave message through that VLAN, and have it not forward any membership queries for the multicast group to the VLAN (IGMPv2 only):

```
[edit protocols]  
user@switch# set igmp-snooping vlan vlan-name immediate-leave
```

3. Configure an interface to belong to a multicast group:

```
[edit protocols]
user@switch# set igmp-snooping vlan vlan-name interface interface-name static group
group-address
```

4. Configure an interface to forward IGMP queries received from multicast routers.

```
[edit protocols]
user@switch# set igmp-snooping vlan vlan-name interface interface-name
multicast-router-interface
```

5. Configure the switch to wait for four timeout intervals before timing out a multicast group on a VLAN:

```
[edit protocols]
user@switch# set igmp-snooping vlan vlan-name robust-count 4
```

6. If you want a standalone switch to act as an IGMP querier, enter the following:

```
[edit protocols]
user@switch# set igmp-snooping vlan vlan-name l2-querier source-address source address
```

The switch uses the address that you configure as the source address in the IGMP queries that it sends. If there are any multicast routers on the same local network, make sure the source address for the IGMP querier is greater (a higher number) than the IP addresses for those routers on the network. This ensures that switch is always the IGMP querier on the network.

- Related Documentation**
- [IGMP Snooping Overview on page 65](#)
  - [Example: Configuring IGMP Snooping on page 70](#)
  - [Monitoring IGMP Snooping on page 72](#)

## Configuring VLAN-Specific IGMP Snooping Parameters

All of the IGMP snooping statements configured with the **igmp-snooping** statement, with the exception of the **traceoptions** statement, can be qualified with the same statement at the VLAN level. To configure IGMP snooping parameters at the VLAN level, include the **vlan** statement:

```
vlan vlan-id;
  immediate-leave;
  interface interface-name {
    group-limit limit;
    host-only-interface;
    multicast-router-interface;
    static {
      group ip-address {
        source ip-address;
      }
    }
  }
  proxy {
    source-address ip-address;
  }
  query-interval seconds;
  query-last-member-interval seconds;
  query-response-interval seconds;
  robust-count number;
```

```
}
```

You can include this statement at the following hierarchy levels:

- [edit bridge-domains *bridge-domain-name* protocols igmp-snooping]
- [edit routing-instances *routing-instance-name* bridge-domains *bridge-domain-name* protocols igmp-snooping]

#### Related Documentation

- [Layer 2 Frames and IPv4 Multicast Addresses on page 29](#)
- [Understanding Multicast Snooping](#)

## Example: Configuring IGMP Snooping

With IGMP snooping enabled, a switch monitors the IGMP (Internet Group Management Protocol) traffic between hosts and multicast routers and uses what it learns to forward multicast traffic to only the downstream interfaces that are connected to interested receivers. This conserves bandwidth by allowing the switch to send multicast traffic to only those interfaces that are connected to devices that want to receive the traffic (instead of flooding the traffic to all the downstream VLAN interfaces).

This example describes how to configure IGMP snooping:

- [Requirements on page 70](#)
- [Overview and Topology on page 70](#)
- [Configuration on page 71](#)

### Requirements

This example requires Junos OS Release 11.1 or later on a QFX Series product.

Before you configure IGMP snooping, be sure you have:

- Configured the **employee-vlan** VLAN
- Assigned interfaces **ge-0/0/1**, **ge-0/0/2**, and **ge-0/0/3** to **employee-vlan**

### Overview and Topology

In this example you configure an interface to receive multicast traffic from a source and configure some multicast-related behavior for downstream interfaces. The example assumes that IGMP snooping was previously disabled for the VLAN.

[Table 5 on page 70](#) shows the components of the topology for this example.

**Table 5: Components of the IGMP Snooping Topology**

Components	Settings
VLAN name	<b>employee-vlan</b> , tag 20
Interfaces in <b>employee-vlan</b>	<b>ge-0/0/1</b> , <b>ge-0/0/2</b> , <b>ge-0/0/3</b>

Table 5: Components of the IGMP Snooping Topology (*continued*)

Components	Settings
Multicast IP address for <b>employee-vlan</b>	225.100.100.100

## Configuration

To configure basic IGMP snooping on a switch:

### CLI Quick Configuration

To quickly configure IGMP snooping, copy the following commands and paste them into a terminal window:

```
[edit protocols]
set igmp-snooping vlan employee-vlan
set igmp-snooping vlan employee-vlan interface ge-0/0/3 static group 225.100.100.100
set igmp-snooping vlan employee-vlan interface ge-0/0/2 multicast-router-interface
set igmp-snooping vlan employee-vlan robust-count 4
```

### Step-by-Step Procedure

Configure IGMP snooping:

1. Enable and configure IGMP snooping on the VLAN **employee-vlan**:

```
[edit protocols]
user@switch# set igmp-snooping vlan employee-vlan
```

2. Configure an interface to belong to a multicast group:

```
[edit protocols]
user@switch# set igmp-snooping vlan employee-vlan interface ge-0/0/3 static group
225.100.100.100
```

3. Configure an interface to forward IGMP queries received from multicast routers.

```
[edit protocols]
user@switch# set igmp-snooping vlan employee-vlan interface ge-0/0/2
multicast-router-interface
```

4. Configure the switch to wait for four timeout intervals before timing out a multicast group on a VLAN:

```
[edit protocols]
user@switch# set igmp-snooping vlan employee-vlan robust-count 4
```

### Results

Check the results of the configuration:

```
user@switch# show protocols igmp-snooping
vlan employee-vlan {
  robust-count 4;
}
interface ge-0/0/2 {
  multicast-router-interface;
}
interface ge-0/0/3 {
  static {
    group 225.100.100.100;
  }
}
```

- Related Documentation**
- [IGMP Snooping Overview on page 65](#)
  - [Configuring IGMP Snooping on page 68](#)
  - [Changing the IGMP Snooping Group Timeout Value on page 73](#)
  - [Monitoring IGMP Snooping on page 72](#)
  - *Example: Setting Up Bridging with Multiple VLANs.*

## Monitoring IGMP Snooping

**Purpose** Use the monitoring feature to view status and information about the IGMP snooping configuration.

**Action** To display details about IGMP snooping, enter the following operational commands:

- **show igmp snooping interface**—Display information about interfaces enabled with IGMP snooping, including which interfaces are being snooped in a learning domain and the number of groups on each interface.
- **show igmp snooping membership**—Display IGMP snooping membership information, including the multicast group address and the number of active multicast groups.
- **show igmp snooping options**—Display brief or detailed information about IGMP snooping.
- **show igmp snooping statistics**—Display IGMP snooping statistics, including the number of messages sent and received.

The **show igmp snooping interface**, **show igmp snooping membership**, and **show igmp snooping statistics** commands also support the following options:

- **instance** *instance-name*
- **interface** *interface-name*
- **qualified-vlan** *vlan-identifier*
- **vlan** *vlan-name*

**Meaning** [Table 6 on page 72](#) summarizes the IGMP snooping details displayed.

**Table 6: Summary of IGMP Snooping Output Fields**

Field	Values
IGMP Snooping Monitor	
VLAN	VLAN for which IGMP snooping is enabled.
Interfaces	Interface connected to a multicast router.
Groups	Number of the multicast groups learned by the VLAN.
MRouters	Multicast router.



Table 6: Summary of IGMP Snooping Output Fields (*continued*)

Field	Values
Receivers	Multicast receiver.
IGMP Route Information	
VLAN	VLAN for which IGMP snooping is enabled.
Next-Hop	Next hop assigned by the switch after performing the route lookup.
Group	Multicast groups learned by the VLAN.

- Related Documentation**
- [IGMP Snooping Overview on page 65](#)
  - [Example: Configuring IGMP Snooping on page 70](#)
  - [Configuring IGMP Snooping on page 68](#)
  - [Changing the IGMP Snooping Group Timeout Value on page 73](#)

## Changing the IGMP Snooping Group Timeout Value

The IGMP snooping group timeout value determines how long a switch waits to receive an IGMP query from a multicast router before removing a multicast group from its multicast cache table. A switch calculates the timeout value by using the **query-interval** and **query-response-interval** values.

When you enable IGMP snooping, the **query-interval** and **query-response-interval** values are applied to all VLANs on the switch. The values are:

- **query-interval**—125 seconds
- **query-response-interval**—10 seconds

The switch automatically calculates the group timeout value for an IGMP snooping-enabled switch by multiplying the **query-interval** value by 2 (the default **robust-count** value) and then adding the **query-response-interval** value. By default, the switch waits 260 seconds to receive an IGMP query before removing a multicast group from its multicast cache table:  $(125 \times 2) + 10 = 260$ .

You can modify the group timeout value by changing the **robust-count** value. For example, if you want the system to wait 510 seconds before timing groups out— $(125 \times 4) + 10 = 510$ —enter this command:

```
[edit protocols]
user@switch# set igmp-snooping vlan employee-vlan robust-count 4
```

- Related Documentation**
- [Verifying the IGMP Snooping Group Timeout Value on page 74](#)
  - [Example: Configuring IGMP Snooping on page 70](#)

- [Configuring IGMP Snooping on page 68](#)

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## Verifying the IGMP Snooping Group Timeout Value

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**Purpose** Verify that the IGMP snooping group timeout value has been changed correctly from its default value.

**Action** Display the IGMP snooping membership information, which contains the group timeout value that was derived from the IGMP configuration:

```
user@switch> show igmp-snooping membership detail
VLAN: v43 Tag: 43 (Index: 4)
  Group: 225.0.0.1
    Receiver count: 1, Flags: <v2-hosts>
      ge-0/0/15.0 Uptime: 00:00:05 timeout: 510
```

**Meaning** The IGMP snooping group timeout value determines how long a switch waits to receive an IGMP query from a multicast router before removing a multicast group from its multicast cache table. When you enable IGMP snooping, the default IGMP snooping group timeout value of 260 seconds is applied to all VLANs, which means that the switch waits 260 seconds to receive an IGMP query before removing a multicast group from its multicast cache table. You can change the timeout value by using the **robust-count** option.

**Related Documentation**

- [Changing the IGMP Snooping Group Timeout Value on page 73](#)

## CHAPTER 4

# Using MLD

- [Understanding MLD on page 75](#)
- [Examples: Configuring MLD on page 78](#)

### Understanding MLD

---

The Multicast Listener Discovery (MLD) Protocol manages the membership of hosts and routers in multicast groups. IP version 6 (IPv6) multicast routers use MLD to learn, for each of their attached physical networks, which groups have interested listeners. Each routing device maintains a list of host multicast addresses that have listeners for each subnetwork, as well as a timer for each address. However, the routing device does not need to know the address of each listener—just the address of each host. The routing device provides addresses to the multicast routing protocol it uses, which ensures that multicast packets are delivered to all subnetworks where there are interested listeners. In this way, MLD is used as the transport for the Protocol Independent Multicast (PIM) Protocol.

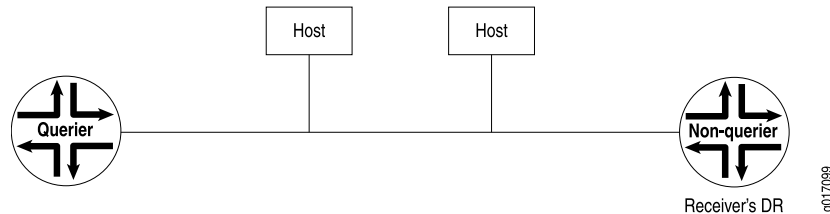
MLD is an integral part of IPv6 and must be enabled on all IPv6 routing devices and hosts that need to receive IP multicast traffic. The Junos OS supports MLD versions 1 and 2. Version 2 is supported for source-specific multicast (SSM) include and exclude modes.

In include mode, the receiver specifies the source or sources it is interested in receiving the multicast group traffic from. Exclude mode works the opposite of include mode. It allows the receiver to specify the source or sources it is not interested in receiving the multicast group traffic from.

For each attached network, a multicast routing device can be either a querier or a nonquerier. A querier routing device, usually one per subnet, solicits group membership information by transmitting MLD queries. When a host reports to the querier routing device that it has interested listeners, the querier routing device forwards the membership information to the rendezvous point (RP) routing device by means of the receiver's (host's) designated router (DR). This builds the rendezvous-point tree (RPT) connecting the host with interested listeners to the RP routing device. The RPT is the initial path used by the sender to transmit information to the interested listeners. Nonquerier routing devices do not transmit MLD queries on a subnet but can do so if the querier routing device fails.

All MLD-configured routing devices start as querier routing devices on each attached subnet (see [Figure 3 on page 76](#)). The querier routing device on the right is the receiver's DR.

**Figure 3: Routing Devices Start Up on a Subnet**

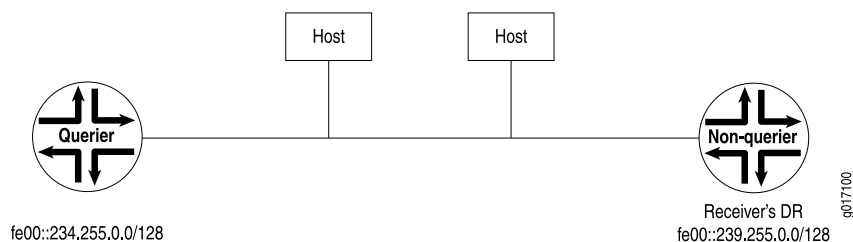


To elect the querier routing device, the routing devices exchange query messages containing their IPv6 source addresses. If a routing device hears a query message whose IPv6 source address is numerically lower than its own selected address, it becomes a nonquerier. In [Figure 4 on page 76](#), the routing device on the left has a source address numerically lower than the one on the right and therefore becomes the querier routing device.



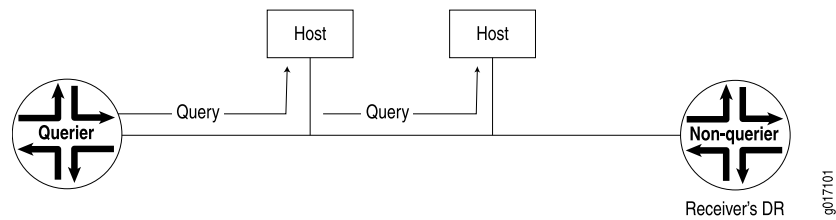
**NOTE:** In the practical application of MLD, several routing devices on a subnet are nonqueriers. If the elected querier routing device fails, query messages are exchanged among the remaining routing devices. The routing device with the lowest IPv6 source address becomes the new querier routing device. The IPv6 Neighbor Discovery Protocol (NDP) implementation drops incoming Neighbor Announcement (NA) messages that have a broadcast or multicast address in the target link-layer address option. This behavior is recommended by RFC 2461.

**Figure 4: Querier Routing Device Is Determined**



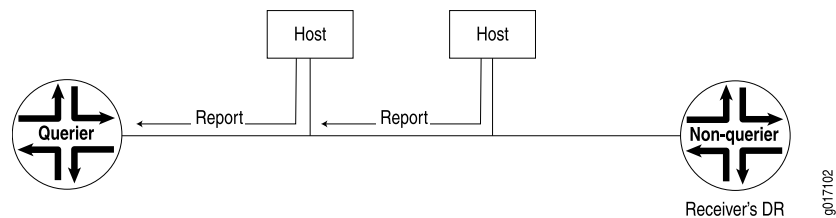
The querier routing device sends general MLD queries on the **link-scope all-nodes** multicast address FF02::1 at short intervals to all attached subnets to solicit group membership information (see [Figure 5 on page 77](#)). Within the query message is the *maximum response delay* value, specifying the maximum allowed delay for the host to respond with a report message.

Figure 5: General Query Message Is Issued



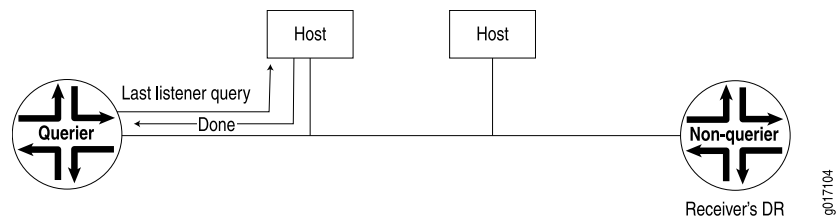
If interested listeners are attached to the host receiving the query, the host sends a report containing the host's IPv6 address to the routing device (see [Figure 6 on page 77](#)). If the reported address is not yet in the routing device's list of multicast addresses with interested listeners, the address is added to the list and a timer is set for the address. If the address is already on the list, the timer is reset. The host's address is transmitted to the RP in the PIM domain.

Figure 6: Reports Are Received by the Querier Routing Device



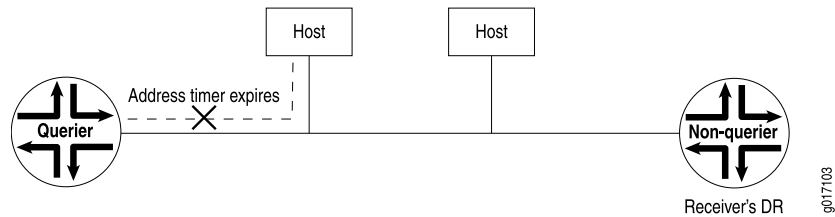
If the host has no interested multicast listeners, it sends a done message to the querier routing device. On receipt, the querier routing device issues a multicast address-specific query containing the last **listener query interval** value to the multicast address of the host. If the routing device does not receive a report from the multicast address, it removes the multicast address from the list and notifies the RP in the PIM domain of its removal (see [Figure 7 on page 77](#)).

Figure 7: Host Has No Interested Receivers and Sends a Done Message to Routing Device



If a done message is not received by the querier routing device, the querier routing device continues to send multicast address-specific queries. If the timer set for the address on receipt of the last report expires, the querier routing device assumes there are no longer interested listeners on that subnet, removes the multicast address from the list, and notifies the RP in the PIM domain of its removal (see [Figure 8 on page 78](#)).

**Figure 8: Host Address Timer Expires and Address Is Removed from Multicast Address List**



**Related Documentation**

- [Enabling MLD on page 82](#)
- [Example: Recording MLD Join and Leave Events on page 96](#)
- [Example: Modifying the MLD Robustness Variable on page 87](#)

## Examples: Configuring MLD

- [Understanding MLD on page 78](#)
- [Configuring MLD on page 81](#)
- [Enabling MLD on page 82](#)
- [Modifying the MLD Version on page 83](#)
- [Modifying the MLD Host-Query Message Interval on page 83](#)
- [Modifying the MLD Query Response Interval on page 84](#)
- [Modifying the MLD Last-Member Query Interval on page 84](#)
- [Specifying Immediate-Leave Host Removal for MLD on page 85](#)
- [Filtering Unwanted MLD Reports at the MLD Interface Level on page 86](#)
- [Example: Modifying the MLD Robustness Variable on page 87](#)
- [Limiting the Maximum MLD Message Rate on page 88](#)
- [Enabling MLD Static Group Membership on page 89](#)
- [Example: Recording MLD Join and Leave Events on page 96](#)
- [Configuring the Number of MLD Multicast Group Joins on Logical Interfaces on page 98](#)
- [Disabling MLD on page 100](#)

## Understanding MLD

The Multicast Listener Discovery (MLD) Protocol manages the membership of hosts and routers in multicast groups. IP version 6 (IPv6) multicast routers use MLD to learn, for each of their attached physical networks, which groups have interested listeners. Each routing device maintains a list of host multicast addresses that have listeners for each subnetwork, as well as a timer for each address. However, the routing device does not need to know the address of each listener—just the address of each host. The routing device provides addresses to the multicast routing protocol it uses, which ensures that multicast packets are delivered to all subnetworks where there are interested listeners. In this way, MLD is used as the transport for the Protocol Independent Multicast (PIM) Protocol.

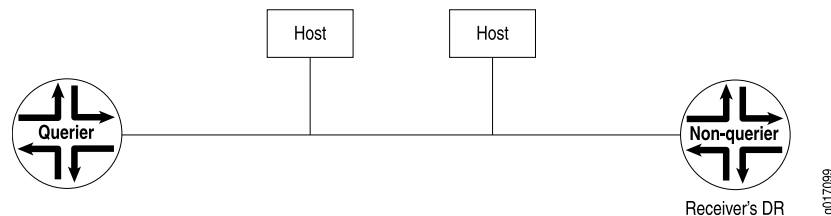
MLD is an integral part of IPv6 and must be enabled on all IPv6 routing devices and hosts that need to receive IP multicast traffic. The Junos OS supports MLD versions 1 and 2. Version 2 is supported for source-specific multicast (SSM) include and exclude modes.

In include mode, the receiver specifies the source or sources it is interested in receiving the multicast group traffic from. Exclude mode works the opposite of include mode. It allows the receiver to specify the source or sources it is not interested in receiving the multicast group traffic from.

For each attached network, a multicast routing device can be either a querier or a nonquerier. A querier routing device, usually one per subnet, solicits group membership information by transmitting MLD queries. When a host reports to the querier routing device that it has interested listeners, the querier routing device forwards the membership information to the rendezvous point (RP) routing device by means of the receiver's (host's) designated router (DR). This builds the rendezvous-point tree (RPT) connecting the host with interested listeners to the RP routing device. The RPT is the initial path used by the sender to transmit information to the interested listeners. Nonquerier routing devices do not transmit MLD queries on a subnet but can do so if the querier routing device fails.

All MLD-configured routing devices start as querier routing devices on each attached subnet (see [Figure 3 on page 76](#)). The querier routing device on the right is the receiver's DR.

**Figure 9: Routing Devices Start Up on a Subnet**

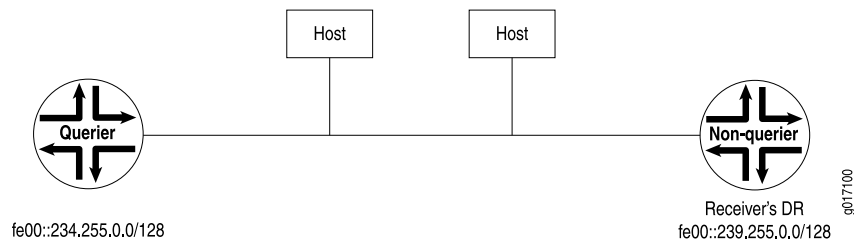


To elect the querier routing device, the routing devices exchange query messages containing their IPv6 source addresses. If a routing device hears a query message whose IPv6 source address is numerically lower than its own selected address, it becomes a nonquerier. In [Figure 4 on page 76](#), the routing device on the left has a source address numerically lower than the one on the right and therefore becomes the querier routing device.



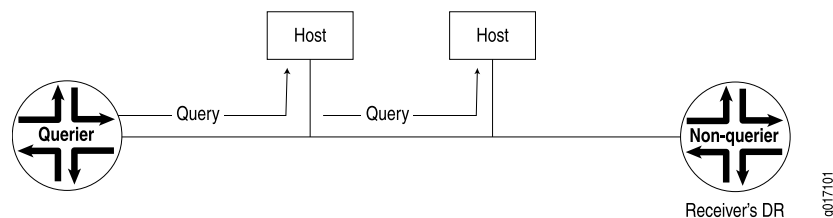
**NOTE:** In the practical application of MLD, several routing devices on a subnet are nonqueriers. If the elected querier routing device fails, query messages are exchanged among the remaining routing devices. The routing device with the lowest IPv6 source address becomes the new querier routing device. The IPv6 Neighbor Discovery Protocol (NDP) implementation drops incoming Neighbor Announcement (NA) messages that have a broadcast or multicast address in the target link-layer address option. This behavior is recommended by RFC 2461.

Figure 10: Querier Routing Device Is Determined



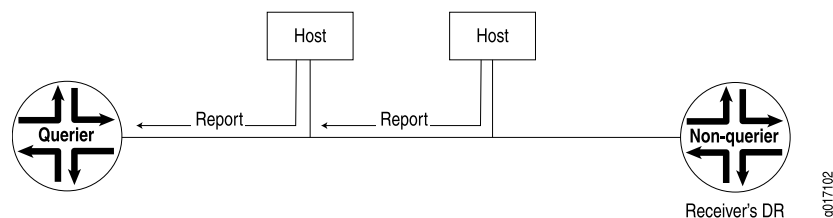
The querier routing device sends general MLD queries on the **link-scope all-nodes** multicast address FF02::1 at short intervals to all attached subnets to solicit group membership information (see [Figure 5 on page 77](#)). Within the query message is the *maximum response delay* value, specifying the maximum allowed delay for the host to respond with a report message.

Figure 11: General Query Message Is Issued



If interested listeners are attached to the host receiving the query, the host sends a report containing the host's IPv6 address to the routing device (see [Figure 6 on page 77](#)). If the reported address is not yet in the routing device's list of multicast addresses with interested listeners, the address is added to the list and a timer is set for the address. If the address is already on the list, the timer is reset. The host's address is transmitted to the RP in the PIM domain.

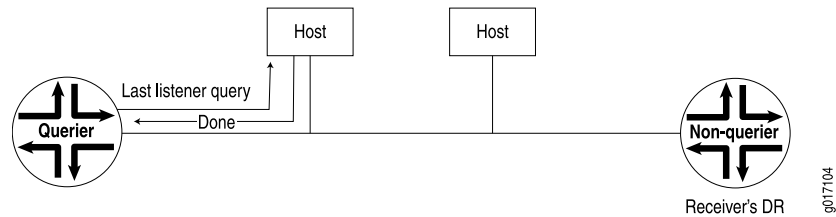
Figure 12: Reports Are Received by the Querier Routing Device



If the host has no interested multicast listeners, it sends a done message to the querier routing device. On receipt, the querier routing device issues a multicast address-specific query containing the last **listener query interval** value to the multicast address of the host. If the routing device does not receive a report from the multicast address, it removes the multicast address from the list and notifies the RP in the PIM domain of its removal (see [Figure 7 on page 77](#)).

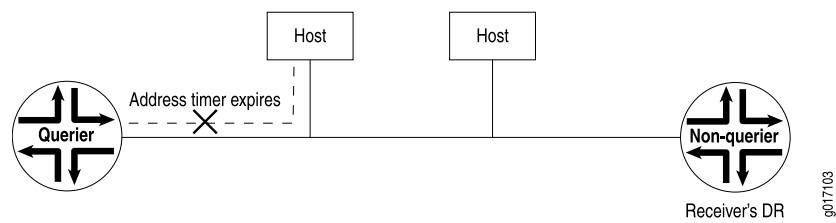


**Figure 13: Host Has No Interested Receivers and Sends a Done Message to Routing Device**



If a done message is not received by the querier routing device, the querier routing device continues to send multicast address-specific queries. If the timer set for the address on receipt of the last report expires, the querier routing device assumes there are no longer interested listeners on that subnet, removes the multicast address from the list, and notifies the RP in the PIM domain of its removal (see [Figure 8 on page 78](#)).

**Figure 14: Host Address Timer Expires and Address Is Removed from Multicast Address List**



## Configuring MLD

To configure the Multicast Listener Discovery (MLD) Protocol, include the **mld** statement:

```
mld {
  accounting;
  interface interface-name {
    disable;
    (accounting | no-accounting);
    group-policy [ policy-names ];
    immediate-leave;
    oif-map [ map-names ];
    passive;
    ssm-map ssm-map-name;
    static {
      group multicast-group-address {
        exclude;
        group-count number;
        group-increment increment;
        source ip-address {
          source-count number;
          source-increment increment;
        }
      }
    }
  }
  version version;
}
```

maximum-transmit-rate *packets-per-second*;

```
query-interval seconds;  
query-last-member-interval seconds;  
query-response-interval seconds;  
robust-count number;  
}
```

You can include this statement at the following hierarchy levels:

- **[edit protocols]**
- **[edit logical-systems *logical-system-name* protocols]**

By default, MLD is enabled on all broadcast interfaces when you configure Protocol Independent Multicast (PIM) or the Distance Vector Multicast Routing Protocol (DVMRP).

## Enabling MLD

The Multicast Listener Discovery (MLD) Protocol manages multicast groups by establishing, maintaining, and removing groups on a subnet. Multicast routing devices use MLD to learn which groups have members on each of their attached physical networks. MLD must be enabled for the router to receive IPv6 multicast packets. MLD is only needed for IPv6 networks, because multicast is handled differently in IPv4 networks. MLD is enabled on all IPv6 interfaces on which you configure PIM and on all IPv6 broadcast interfaces when you configure DVMRP.

MLD specifies different behaviors for multicast listeners and for routers. When a router is also a listener, the router responds to its own messages. If a router has more than one interface to the same link, it needs to perform the router behavior over only one of those interfaces. Listeners, on the other hand, must perform the listener behavior on all interfaces connected to potential receivers of multicast traffic.

If MLD is not running on an interface—either because PIM and DVMRP are not configured on the interface or because MLD is explicitly disabled on the interface—you can explicitly enable MLD.

To explicitly enable MLD:

1. If PIM and DVMRP are not running on the interface, explicitly enable MLD by including the interface name.

```
[edit protocols mld]  
user@host# set interface fe-0/0/0.0
```

2. Check to see if MLD is disabled on any interfaces. In the following example, MLD is disabled on a Gigabit Ethernet interface.

```
[edit protocols mld]  
user@host# show  
  
interface fe-0/0/0.0;  
interface ge-0/0/0.0 {  
    disable;  
}
```

3. Enable MLD on the interface by deleting the **disable** statement.

```
[edit protocols mld]
```

```
delete interface ge-0/0/0.0 disable
```

4. Verify the configuration.

```
[edit protocols mld]
```

```
user@host# show
```

```
interface fe-0/0/0.0;
```

```
interface ge-0/0/0.0;
```

5. Verify the operation of MLD by checking the output of the **show mld interface** command.

## Modifying the MLD Version

By default, the router supports MLD version 1 (MLDv1). To enable the router to use MLD version 2 (MLDv2) for source-specific multicast (SSM) only, include the **version 2** statement.

If you configure the MLD version setting at the individual interface hierarchy level, it overrides configuring the IGMP version using the **interface all** statement.

If a source address is specified in a multicast group that is statically configured, the version must be set to MLDv2.

To change an MLD interface to version 2:

1. Configure the MLD interface.

```
[edit protocols mld]
```

```
user@host# set interface fe-0/0/0.0 version 2
```

2. Verify the configuration by checking the **version** field in the output of the **show mld interface** command. The **show mld statistics** command has version-specific output fields, such as the counters in the **MLD Message type** field.

## Modifying the MLD Host-Query Message Interval

The objective of MLD is to keep routers up to date with IPv6 group membership of the entire subnet. Routers need not know who all the members are, only that members exist. Each host keeps track of which multicast groups are subscribed to. On each link, one router is elected the querier. The MLD querier router periodically sends general host-query messages on each attached network to solicit membership information. These messages solicit group membership information and are sent to the **link-scope all-nodes** address **FF02::1**. A general host-query message has a maximum response time that you can set by configuring the query response interval.

The query response timeout, the query interval, and the robustness variable are related in that they are all variables that are used to calculate the multicast listener interval. The multicast listener interval is the number of seconds that must pass before a multicast router determines that no more members of a host group exist on a subnet. The multicast listener interval is calculated as the (robustness variable x query-interval) + (1 x query-response-interval). If no reports are received for a particular group before the multicast listener interval has expired, the routing device stops forwarding remotely-originated multicast packets for that group onto the attached network.

By default, host-query messages are sent every 125 seconds. You can change this interval to change the number of MLD messages sent on the subnet.

To modify the query interval:

1. Configure the interval.

```
[edit protocols mld]  
user@host# set query-interval 200
```

The value can be from 1 through 1024 seconds.

2. Verify the configuration by checking the **MLD Query Interval** field in the output of the **show mld interface** command.
3. Verify the operation of the query interval by checking the **Listener Query** field in the output of the **show mld statistics** command.

## Modifying the MLD Query Response Interval

The query response interval is the maximum amount of time that can elapse between when the querier router sends a host-query message and when it receives a response from a host. You can change this interval to adjust the burst peaks of MLD messages on the subnet. Set a larger interval to make the traffic less bursty.

The query response timeout, the query interval, and the robustness variable are related in that they are all variables that are used to calculate the multicast listener interval. The multicast listener interval is the number of seconds that must pass before a multicast router determines that no more members of a host group exist on a subnet. The multicast listener interval is calculated as the (robustness variable x query-interval) + (1 x query-response-interval). If no reports are received for a particular group before the multicast listener interval has expired, the routing device stops forwarding remotely-originated multicast packets for that group onto the attached network.

The default query response interval is 10 seconds. You can configure a subsecond interval up to one digit to the right of the decimal point. The configurable range is 0.1 through 0.9, then in 1-second intervals 1 through 999,999.

To modify the query response interval:

1. Configure the interval.

```
[edit protocols mld]  
user@host# set query-response-interval 0.5
```

2. Verify the configuration by checking the **MLD Query Response Interval** field in the output of the **show mld interface** command.
3. Verify the operation of the query interval by checking the **Listener Query** field in the output of the **show mld statistics** command.

## Modifying the MLD Last-Member Query Interval

The last-member query interval (also called the last-listener query interval) is the maximum amount of time between group-specific query messages, including those sent

in response to done messages sent on the **link-scope-all-routers** address FF02::2. You can lower this interval to reduce the amount of time it takes a router to detect the loss of the last member of a group.

When the routing device that is serving as the querier receives a leave-group (done) message from a host, the routing device sends multiple group-specific queries to the group. The querier sends a specific number of these queries, and it sends them at a specific interval. The number of queries sent is called the last-listener query count. The interval at which the queries are sent is called the last-listener query interval. Both settings are configurable, thus allowing you to adjust the leave latency. The IGMP leave latency is the time between a request to leave a multicast group and the receipt of the last byte of data for the multicast group.

The last-listener query count x (times) the last-listener query interval = (equals) the amount of time it takes a routing device to determine that the last member of a group has left the group and to stop forwarding group traffic.

The default last-listener query interval is 1 second. You can configure a subsecond interval up to one digit to the right of the decimal point. The configurable range is 0.1 through 0.9, then in 1-second intervals 1 through 999,999.

To modify this interval:

1. Configure the time (in seconds) that the routing device waits for a report in response to a group-specific query.  

```
[edit protocols mld]
user@host# set query-last-member-interval 0.1
```
2. Verify the configuration by checking the **MLD Last Member Query Interval** field in the output of the **show igmp interfaces** command.



**NOTE:** You can configure the last-member query count by configuring the robustness variable. The two are always equal.

## Specifying Immediate-Leave Host Removal for MLD

The immediate leave setting is useful for minimizing the leave latency of MLD memberships. When this setting is enabled, the routing device leaves the multicast group immediately after the last host leaves the multicast group.

The immediate-leave setting enables host tracking, meaning that the device keeps track of the hosts that send join messages. This allows MLD to determine when the last host sends a leave message for the multicast group.

When the immediate leave setting is enabled, the device removes an interface from the forwarding-table entry without first sending MLD group-specific queries to the interface. The interface is pruned from the multicast tree for the multicast group specified in the MLD leave message. The immediate leave setting ensures optimal bandwidth management for hosts on a switched network, even when multiple multicast groups are being used simultaneously.

When immediate leave is disabled and one host sends a leave group message, the routing device first sends a group query to determine if another receiver responds. If no receiver responds, the routing device removes all hosts on the interface from the multicast group. Immediate leave is disabled by default for both MLD version 1 and MLD version 2.



**NOTE:** Although host tracking is enabled for IGMPv2 and MLDv1 when you enable immediate leave, use immediate leave with these versions only when there is one host on the interface. The reason is that IGMPv2 and MLDv1 use a report suppression mechanism whereby only one host on an interface sends a group join report in response to a membership query. The other interested hosts suppress their reports. The purpose of this mechanism is to avoid a flood of reports for the same group. But it also interferes with host tracking, because the router only knows about the one interested host and does not know about the others.

To enable immediate leave:

1. Configure immediate leave on the MLD interface.

```
[edit protocols mld]
user@host# set interface ge-0/0/0.1 immediate-leave
```

2. Verify the configuration by checking the **Immediate Leave** field in the output of the **show mld interface** command.

## Filtering Unwanted MLD Reports at the MLD Interface Level

Suppose you need to limit the subnets that can join a certain multicast group. The **group-policy** statement enables you to filter unwanted MLD reports at the interface level.

When the **group-policy** statement is enabled on a router, after the router receives an MLD report, the router compares the group against the specified group policy and performs the action configured in that policy (for example, rejects the report if the policy matches the defined address or network).

You define the policy to match only MLD group addresses (for MLDv1) by using the policy's **route-filter** statement to match the group address. You define the policy to match MLD (source, group) addresses (for MLDv2) by using the policy's **route-filter** statement to match the group address and the policy's **source-address-filter** statement to match the source address.

To filter unwanted MLD reports:

1. Configure an MLDv1 policy.

```
[edit policy-statement reject_policy_v1]
user@host# set from route-filter fec0:1:1:4::/64 exact
user@host# set then reject
```

2. Configure an MLDv2 policy.

```
[edit policy-statement reject_policy_v2]
```

```

user@host# set from route-filter fec0:1:1:4::/64 exact
user@host# set from source-address-filter fe80::2e0:81ff:fe05:1a8d/32 orlonger
user@host# set then reject

```

3. Apply the policies to the MLD interfaces where you prefer not to receive specific group or (source, group) reports. In this example, **ge-0/0/0.1** is running MLDv1 and **ge-0/1/1.0** is running MLDv2.

```

[edit protocols mld]
user@host# set interface ge-0/0/0.1 group-policy reject_policy_v1
user@host# set interface ge-0/1/1.0 group-policy reject_policy_v2

```

4. Verify the operation of the filter by checking the **Rejected Report** field in the output of the **show mld statistics** command.

### Example: Modifying the MLD Robustness Variable

This example shows how to configure and verify the MLD robustness variable in a multicast domain.

- [Requirements on page 87](#)
- [Overview on page 87](#)
- [Configuration on page 88](#)
- [Verification on page 88](#)

#### Requirements

Before you begin:

- Configure the router interfaces. See the *Junos OS Network Interfaces Library for Routing Devices*.
- Configure an interior gateway protocol or static routing. See the *Junos OS Routing Protocols Library for Routing Devices*.
- Enable IPv6 unicast routing. See the *Junos OS Routing Protocols Library for Routing Devices*.
- Enable PIM. See “[PIM Overview](#)” on page 103.

#### Overview

The MLD robustness variable can be fine-tuned to allow for expected packet loss on a subnet. Increasing the robust count allows for more packet loss but increases the leave latency of the subnetwork.

The value of the robustness variable is used in calculating the following MLD message intervals:

- Group member interval—Amount of time that must pass before a multicast router determines that there are no more members of a group on a network. This interval is calculated as follows: (robustness variable x query-interval) + (1 x query-response-interval).

- Other querier present interval—Amount of time that must pass before a multicast router determines that there is no longer another multicast router that is the querier. This interval is calculated as follows: (robustness variable x query-interval) + (0.5 x query-response-interval).
- Last-member query count—Number of group-specific queries sent before the router assumes there are no local members of a group. The default number is the value of the robustness variable.

By default, the robustness variable is set to 2. The number can be from 2 through 10. You might want to increase this value if you expect a subnet to lose packets.

---

### Configuration

#### CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, copy and paste the commands into the CLI at the **[edit]** hierarchy level, and then **enter** commit from configuration mode.

```
set protocols mld robust-count 5
```

#### Step-by-Step Procedure

The following example requires you to navigate various levels in the configuration hierarchy. For information about navigating the CLI, see *Using the CLI Editor in Configuration Mode* in the *CLI User Guide*.

To change the value of the robustness variable:

1. Configure the robust count.

```
[edit protocols mld]  
user@host# set robust-count 5
```

2. If you are done configuring the device, commit the configuration.

```
[edit protocols mld]  
user@host# commit
```

---

### Verification

To verify the configuration is working properly, check the **MLD Robustness Count** field in the output of the **show mld interfaces** command.

## Limiting the Maximum MLD Message Rate

You can change the limit for the maximum number of MLD packets transmitted in 1 second by the router.

Increasing the maximum number of MLD packets transmitted per second might be useful on a router with a large number of interfaces participating in MLD.



To change the limit for the maximum number of MLD packets the router can transmit in 1 second, include the **maximum-transmit-rate** statement and specify the maximum number of packets per second to be transmitted.

## Enabling MLD Static Group Membership

- [Create a MLD Static Group Member on page 89](#)
- [Automatically create static groups on page 90](#)
- [Automatically increment group addresses on page 91](#)
- [Specify multicast source address \(in SSM mode\) on page 92](#)
- [Automatically specify multicast sources on page 93](#)
- [Automatically increment source addresses on page 94](#)
- [Exclude multicast source addresses \(in SSM mode\) on page 95](#)

### Create a MLD Static Group Member

You can create MLD static group membership to test multicast forwarding without a receiver host. When you enable MLD static group membership, data is forwarded to an interface without that interface receiving membership reports from downstream hosts.

Class-of-service (CoS) adjustment is not supported with MLD static group membership.

When you configure static groups on an interface on which you want to receive multicast traffic, you can specify the number of static groups to be automatically created.

In this example, you create static group ff0e::1:ff05:1a8d.

1. Configure the static groups to be created by including the **static** statement and **group** statement and specifying which IPv6 multicast address of the group to be created.

```
[edit protocols mld]
user@host# set interface fe-0/1/2 static group ff0e::1:ff05:1a8d
```

2. After you commit the configuration, use the **show configuration protocol mld** command to verify the MLD protocol configuration.

```
user@host> show configuration protocol mld

interface fe-0/1/2.0 {
  static {
    group ff0e::1:ff05:1a8d;
  }
}
```

3. After you have committed the configuration and after the source is sending traffic, use the **show mld group** command to verify that static group ff0e::1:ff05:1a8d has been created.

```
user@host> show mld group
Interface: fe-0/1/2
Group: ff0e::1:ff05:1a8d
Group mode: Include
Source: fe80::2e0:81ff:fe05:1a8d
Last reported by: Local
Timeout: 0 Type: Static
```



**NOTE:** You must specify a unique address for each group.

### Automatically create static groups

When you create MLD static group membership to test multicast forwarding on an interface on which you want to receive multicast traffic, you can specify that a number of static groups be automatically created. This is useful when you want to test forwarding to multiple receivers without having to configure each receiver separately.

In this example, you create three groups.

1. Configure the number of static groups to be created by including the **group-count** statement and specifying the number of groups to be created.

```
[edit protocols mld]
```

```
user@host# set interface fe-0/1/2 static group ff0e::1:ff05:1a8d group-count 3
```

2. After you commit the configuration, use the **show configuration protocol mld** command to verify the MLD protocol configuration.

```
user@host> show configuration protocol mld
```

```
interface fe-0/1/2.0 {
  static {
    group ff0e::1:ff05:1a8d {
      group-count 3;
    }
  }
}
```

3. After you have committed the configuration and the source is sending traffic, use the **show mld group** command to verify that static groups ff0e::1:ff05:1a8d, ff0e::1:ff05:1a8e, and ff0e::1:ff05:1a8f have been created.

```
user@host> show mld group
```

```
Interface: fe-0/1/2
  Group: ff0e::1:ff05:1a8d
    Source: fe80::2e0:81ff:fe05:1a8d
    Last reported by: Local
    Timeout: 0 Type: Static
Interface: fe-0/1/2
  Group: ff0e::1:ff05:1a8e
    Source: fe80::2e0:81ff:fe05:1a8d
    Last reported by: Local
    Timeout: 0 Type: Static
Interface: fe-0/1/2
  Group: ff0e::1:ff05:1a8f
    Source: fe80::2e0:81ff:fe05:1a8d
    Last reported by: Local
    Timeout: 0 Type: Static
```

### Automatically increment group addresses

When you configure static groups on an interface on which you want to receive multicast traffic and you specify the number of static groups to be automatically created, you can also configure the group address to be automatically incremented by some number of addresses.

In this example, you create three groups and increase the group address by an increment of two for each group.

1. Configure the group address increment by including the **group-increment** statement and specifying the number by which the address should be incremented for each group. The increment is specified in a format similar to an IPv6 address.

```
[edit protocols mld]
user@host# set interface fe-0/1/2 static group ff0e::1:ff05:1a8d group-count 3
group-increment ::2
```

2. After you commit the configuration, use the **show configuration protocol mld** command to verify the MLD protocol configuration.

```
user@host> show configuration protocol mld

interface fe-0/1/2.0 {
  static {
    group ff0e::1:ff05:1a8d {
      group-increment ::2;
      group-count 3;
    }
  }
}
```

3. After you have committed the configuration and the source is sending traffic, use the **show mld group** command to verify that static groups ff0e::1:ff05:1a8d, ff0e::1:ff05:1a8f, and ff0e::1:ff05:1a91 have been created.

```
user@host> show mld group

Interface: fe-0/1/2
  Group: ff0e::1:ff05:1a8d
    Source: fe80::2e0:81ff:fe05:1a8d
    Last reported by: Local
    Timeout: 0 Type: Static
Interface: fe-0/1/2
  Group: ff0e::1:ff05:1a8f
    Source: fe80::2e0:81ff:fe05:1a8d
    Last reported by: Local
    Timeout: 0 Type: Static
Interface: fe-0/1/2
  Group: ff0e::1:ff05:1a91
    Source: fe80::2e0:81ff:fe05:1a8d
    Last reported by: Local
    Timeout: 0 Type: Static
```

### Specify multicast source address (in SSM mode)

---

When you configure static groups on an interface on which you want to receive multicast traffic and your network is operating in source-specific multicast (SSM) mode, you can specify the multicast source address to be accepted.

If you specify a group address in the SSM range, you must also specify a source.

If a source address is specified in a multicast group that is statically configured, the MLD version must be set to MLDv2 on the interface. MLDv1 is the default value.

In this example, you create group ff0e::1:ff05:1a8d and accept IPv6 address fe80::2e0:81ff:fe05:1a8d as the only source.

1. Configure the source address by including the **source** statement and specifying the IPv6 address of the source host.

```
[edit protocols mld]
user@host# set interface fe-0/1/2 static group ff0e::1:ff05:1a8d source
fe80::2e0:81ff:fe05:1a8d
```

2. After you commit the configuration, use the **show configuration protocol mld** command to verify the MLD protocol configuration.

```
user@host> show configuration protocol mld

interface fe-0/1/2.0 {
  static {
    group ff0e::1:ff05:1a8d {
      source fe80::2e0:81ff:fe05:1a8d;
    }
  }
}
```

3. After you have committed the configuration and the source is sending traffic, use the **show mld group** command to verify that static group ff0e::1:ff05:1a8d has been created and that source fe80::2e0:81ff:fe05:1a8d has been accepted.

```
user@host> show mld group

Interface: fe-0/1/2
Group: ff0e::1:ff05:1a8d
Source: fe80::2e0:81ff:fe05:1a8d
Last reported by: Local
Timeout: 0 Type: Static
```

### Automatically specify multicast sources

When you configure static groups on an interface on which you want to receive multicast traffic, you can specify a number of multicast sources to be automatically accepted.

In this example, you create static group ff0e::1:ff05:1a8d and accept fe80::2e0:81ff:fe05:1a8d, fe80::2e0:81ff:fe05:1a8e, and fe80::2e0:81ff:fe05:1a8f as the source addresses.

1. Configure the number of multicast source addresses to be accepted by including the **source-count** statement and specifying the number of sources to be accepted.

```
[edit protocols mld]
user@host# set interface fe-0/1/2 static group ff0e::1:ff05:1a8d source
fe80::2e0:81ff:fe05:1a8d source-count 3
```

2. After you commit the configuration, use the **show configuration protocol mld** command to verify the MLD protocol configuration.

```
user@host> show configuration protocol mld

interface fe-0/1/2.0 {
  static {
    group ff0e::1:ff05:1a8d {
      source fe80::2e0:81ff:fe05:1a8d {
        source-count 3;
      }
    }
  }
}
```

3. After you have committed the configuration and the source is sending traffic, use the **show mld group** command to verify that static group ff0e::1:ff05:1a8d has been created and that sources fe80::2e0:81ff:fe05:1a8d, fe80::2e0:81ff:fe05:1a8e, and fe80::2e0:81ff:fe05:1a8f have been accepted.

```
user@host> show mld group

Interface: fe-0/1/2
  Group: ff0e::1:ff05:1a8d
    Source: fe80::2e0:81ff:fe05:1a8d
    Last reported by: Local
    Timeout: 0 Type: Static
Interface: fe-0/1/2
  Group: ff0e::1:ff05:1a8d
    Source: fe80::2e0:81ff:fe05:1a8e
    Last reported by: Local
    Timeout: 0 Type: Static
Interface: fe-0/1/2
  Group: ff0e::1:ff05:1a8d
    Source: fe80::2e0:81ff:fe05:1a8f
    Last reported by: Local
    Timeout: 0 Type: Static
```

### Automatically increment source addresses

When you configure static groups on an interface on which you want to receive multicast traffic, and specify a number of multicast sources to be automatically accepted, you can also specify the number by which the address should be incremented for each source accepted.

In this example, you create static group ff0e::1:ff05:1a8d and accept fe80::2e0:81ff:fe05:1a8d, fe80::2e0:81ff:fe05:1a8f, and fe80::2e0:81ff:fe05:1a91 as the sources.

1. Configure the number of multicast source addresses to be accepted by including the **source-increment** statement and specifying the number of sources to be accepted.

```
[edit protocols mld]
```

```
user@host# set interface fe-0/1/2 static group ff0e::1:ff05:1a8d source
fe80::2e0:81ff:fe05:1a8d source-count 3 source-increment ::2
```

2. After you commit the configuration, use the **show configuration protocol mld** command to verify the MLD protocol configuration.

```
user@host> show configuration protocol mld
```

```
interface fe-0/1/2.0 {
  static {
    group ff0e::1:ff05:1a8d {
      source fe80::2e0:81ff:fe05:1a8d {
        source-count 3;
        source-increment ::2;
      }
    }
  }
}
```

3. After you have committed the configuration and the source is sending traffic, use the **show mld group** command to verify that static group ff0e::1:ff05:1a8d has been created and that sources fe80::2e0:81ff:fe05:1a8d, fe80::2e0:81ff:fe05:1a8f, and fe80::2e0:81ff:fe05:1a91 have been accepted.

```
user@host> show mld group
```

```
Interface: fe-0/1/2
  Group: ff0e::1:ff05:1a8d
    Source: fe80::2e0:81ff:fe05:1a8d
    Last reported by: Local
    Timeout: 0 Type: Static
Interface: fe-0/1/2
  Group: ff0e::1:ff05:1a8d
    Source: fe80::2e0:81ff:fe05:1a8f
    Last reported by: Local
    Timeout: 0 Type: Static
Interface: fe-0/1/2
  Group: ff0e2::1:ff05:1a8d
    Source: fe80::2e0:81ff:fe05:1a91
    Last reported by: Local
    Timeout: 0 Type: Static
```

```

Interface: fe-0/1/2
Group: ff0e::1:ff05:1a8d
Group mode: Include
Source: fe80::2e0:81ff:fe05:1a8d
Last reported by: Local
Timeout: 0 Type: Static
Group: ff0e::1:ff05:1a8d
Group mode: Include
Source: fe80::2e0:81ff:fe05:1a8f
Last reported by: Local
Timeout: 0 Type: Static
Group: ff0e::1:ff05:1a8d
Group mode: Include
Source: fe80::2e0:81ff:fe05:1a91
Last reported by: Local
Timeout: 0 Type: Static

```

### Exclude multicast source addresses (in SSM mode)

When you configure static groups on an interface on which you want to receive multicast traffic and your network is operating in source-specific multicast (SSM) mode, you can specify that certain multicast source addresses be excluded.

By default the multicast source address configured in a static group operates in include mode. In include mode the multicast traffic for the group is accepted from the configured source address. You can also configure the static group to operate in exclude mode. In exclude mode the multicast traffic for the group is accepted from any address other than the configured source address.

If a source address is specified in a multicast group that is statically configured, the MLD version must be set to MLDv2 on the interface. MLDv1 is the default value.

In this example, you exclude address fe80::2e0:81ff:fe05:1a8d as a source for group ff0e::1:ff05:1a8d.

1. Configure a multicast static group to operate in exclude mode by including the **exclude** statement and specifying which IPv6 source address to be excluded.

```

[edit protocols mld]
user@host# set interface fe-0/1/2 static group ff0e::1:ff05:1a8d exclude source
fe80::2e0:81ff:fe05:1a8d

```

2. After you commit the configuration, use the **show configuration protocol mld** command to verify the MLD protocol configuration.

```

user@host> show configuration protocol mld

interface fe-0/1/2.0 {
  static {
    group ff0e::1:ff05:1a8d {
      exclude;
      source fe80::2e0:81ff:fe05:1a8d;
    }
  }
}

```

- After you have committed the configuration and the source is sending traffic, use the **show mld group detail** command to verify that static group ff0e::1:ff05:1a8d has been created and that the static group is operating in exclude mode.

```
user@host> show mld group detail
Interface: fe-0/1/2
  Group: ff0e::1:ff05:1a8d
    Group mode: Exclude
    Source: fe80::2e0:81ff:fe05:1a8d
    Last reported by: Local
    Timeout: 0 Type: Static
```

Similar configuration is available for IPv4 multicast traffic using the IGMP protocol.

### Example: Recording MLD Join and Leave Events

This example shows how to determine whether MLD tuning is needed in a network by configuring the routing device to record MLD join and leave events.

- [Requirements on page 96](#)
- [Overview on page 96](#)
- [Configuration on page 97](#)
- [Verification on page 98](#)

#### Requirements

Before you begin:

- Configure the router interfaces.
- Configure an interior gateway protocol or static routing. See the *Junos OS Routing Protocols Library for Routing Devices*.
- Enable IPv6 unicast routing. See the *Junos OS Routing Protocols Library for Routing Devices*.
- Enable PIM. See [“PIM Overview” on page 103](#).

#### Overview

[Table 7 on page 96](#) describes the recordable MLD join and leave events.

**Table 7: MLD Event Messages**

ERRMSG Tag	Definition
RPD_MLD_JOIN	Records MLD join events.
RPD_MLD_LEAVE	Records MLD leave events.
RPD_MLD_ACCOUNTING_ON	Records when MLD accounting is enabled on an MLD interface.
RPD_MLD_ACCOUNTING_OFF	Records when MLD accounting is disabled on an MLD interface.



Table 7: MLD Event Messages (*continued*)

ERRMSG Tag	Definition
RPD_MLD_MEMBERSHIP_TIMEOUT	Records MLD membership timeout events.

### Configuration

**CLI Quick Configuration** To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, copy and paste the commands into the CLI at the **[edit]** hierarchy level, and then enter **commit** from configuration mode.

```
set protocols mld interface fe-0/1/0.2 accounting
set system syslog file mld-events any info
set system syslog file mld-events match ".*RPD_MLD_JOIN.* | .*RPD_MLD_LEAVE.* |
.*RPD_MLD_ACCOUNTING.* | .*RPD_MLD_MEMBERSHIP_TIMEOUT.*"
set system syslog file mld-events archive size 100000
set system syslog file mld-events archive files 3
set system syslog file mld-events archive transfer-interval 1440
set system syslog file mld-events archive archive-sites "ftp://user@host1//var/tmp"
password "anonymous"
set system syslog file mld-events archive archive-sites "ftp://user@host2//var/tmp"
password "test"
```

**Step-by-Step Procedure** The following example requires you to navigate various levels in the configuration hierarchy. For information about navigating the CLI, see *Using the CLI Editor in Configuration Mode* in the *CLI User Guide*.

To configure recording of MLD join and leave events:

1. Enable accounting globally or on an MLD interface. This example shows the interface configuration.

```
[edit protocols mld]
user@host# set interface fe-0/1/0.2 accounting
```

2. Configure the events to be recorded, and filter the events to a system log file with a descriptive filename, such as **mld-events**.

```
[edit system syslog file mld-events]
user@host# set any info
[edit system syslog file mld-events]
user@host# set match ".*RPD_MLD_JOIN.* | .*RPD_MLD_LEAVE.* |
.*RPD_MLD_ACCOUNTING.* | .*RPD_MLD_MEMBERSHIP_TIMEOUT.*"
```

3. Periodically archive the log file.

This example rotates the file every 24 hours (1440 minutes) when it reaches 100 KB and keeps three files.

```
[edit system syslog file mld-events]
user@host# set archive size 100000
[edit system syslog file mld-events]
user@host# set archive files 3
[edit system syslog file mld-events]
```

```
user@host# set archive archive-sites "ftp://user@host1//var/tmp" password
"anonymous"
[edit system syslog file mld-events]
user@host# set archive archive-sites "ftp://user@host2//var/tmp" password "test"
[edit system syslog file mld-events]
user@host# set archive transfer-interval 1440
[edit system syslog file mld-events]
user@host# set archive start-time 2011-01-07:12:30
```

4. If you are done configuring the device, commit the configuration.

```
[edit system syslog file mld-events]]
user@host# commit
```

---

### Verification

You can view the system log file by running the **file show** command.

```
user@host> file show mld-events
```

You can monitor the system log file as entries are added to the file by running the **monitor start** and **monitor stop** commands.

```
user@host> monitor start mld-events
```

```
*** mld-events ***
Apr 16 13:08:23 host mgd[16416]: UI_CMDLINE_READ_LINE: User 'user', command 'run
monitor start mld-events '
monitor
```

## Configuring the Number of MLD Multicast Group Joins on Logical Interfaces

The **group-limit** statement enables you to limit the number of MLD multicast group joins for logical interfaces. When this statement is enabled on a router running MLD version 2, the limit is applied upon receipt of the group report. Once the group limit is reached, subsequent join requests are rejected.

When configuring limits for MLD multicast groups, keep the following in mind:

- Each any-source group (\*G) counts as one group toward the limit.
- Each source-specific group (S,G) counts as one group toward the limit.
- Groups in MLDv2 exclude mode are counted toward the limit.
- Multiple source-specific groups count individually toward the group limit, even if they are for the same group. For example, (S1, G1) and (S2, G1) would count as two groups toward the configured limit.
- Combinations of any-source groups and source-specific groups count individually toward the group limit, even if they are for the same group. For example, (\*, G1) and (S, G1) would count as two groups toward the configured limit.
- Configuring and committing a group limit on a network that is lower than what already exists on the network results in the removal of all groups from the configuration. The

groups must then request to rejoin the network (up to the newly configured group limit).

- You can dynamically limit multicast groups on MLD logical interfaces by using dynamic profiles. For detailed information about creating dynamic profiles, see the *Junos OS Broadband Subscriber Management and Services Library*.

Beginning with Junos OS 12.2, you can optionally configure a system log warning threshold for MLD multicast group joins received on the logical interface. It is helpful to review the system log messages for troubleshooting purposes and to detect if an excessive amount of MLD multicast group joins have been received on the interface. These log messages convey when the configured group limit has been exceeded, when the configured threshold has been exceeded, and when the number of groups drop below the configured threshold.

The **group-threshold** statement enables you to configure the threshold at which a warning message is logged. The range is 1 through 100 percent. The warning threshold is a percentage of the group limit, so you must configure the **group-limit** statement to configure a warning threshold. For instance, when the number of groups exceed the configured warning threshold, but remain below the configured group limit, multicast groups continue to be accepted, and the device logs a warning message. In addition, the device logs a warning message after the number of groups drop below the configured warning threshold. You can further specify the amount of time (in seconds) between the log messages by configuring the **log-interval** statement. The range is 6 through 32,767 seconds.

You might consider throttling log messages because every entry added after the configured threshold and every entry rejected after the configured limit causes a warning message to be logged. By configuring a log interval, you can throttle the amount of system log warning messages generated for MLD multicast group joins.

To limit multicast group joins on an MLD logical interface:

1. Access the logical interface at the MLD protocol hierarchy level.

```
[edit]
user@host# edit protocols mld interface interface-name
```

2. Specify the group limit for the interface.

```
[edit protocols mld interface interface-name]
user@host# set group-limit limit
```

3. (Optional) Configure the threshold at which a warning message is logged.

```
[edit protocols mld interface interface-name]
user@host# set group-threshold value
```

4. (Optional) Configure the amount of time between log messages.

```
[edit protocols mld interface interface-name]
user@host# set log-interval seconds
```

To confirm your configuration, use the **show protocols mld** command. To verify the operation of MLD on the interface, including the configured group limit and the optional warning threshold and interval between log messages, use the **show mld interface** command.

## Disabling MLD

To disable MLD on an interface, include the **disable** statement:

```
interface interface-name {  
    disable;  
}
```

You can include this statement at the following hierarchy levels:

- [edit protocols mld]
- [edit logical-systems *logical-system-name* protocols mld]

### Related Documentation

- *Configuring IGMP*

## PART 2

# Configuring PIM

- [Using PIM Basic Features on page 103](#)
- [Using PIM Sparse Mode on page 121](#)
- [Using PIM Dense Mode and PIM Sparse-Dense Mode on page 135](#)
- [Using Source-Specific Multicast on page 141](#)
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## CHAPTER 5

# Using PIM Basic Features

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## PIM Overview

---

The predominant multicast routing protocol in use on the Internet today is Protocol Independent Multicast, or PIM. The type of PIM used on the Internet is PIM sparse mode. PIM sparse mode is so accepted that when the simple term “PIM” is used in an Internet context, some form of sparse mode operation is assumed.

PIM emerged as an algorithm to overcome the limitations of dense-mode protocols such as the Distance Vector Multicast Routing Protocol (DVMRP), which was efficient for dense clusters of multicast receivers, but did not scale well for the larger, sparser, groups encountered on the Internet. The Core Based Trees (CBT) Protocol was intended to support sparse mode as well, but CBT, with its all-powerful core approach, made placement of the core critical, and large conference-type applications (many-to-many) resulted in bottlenecks in the core. PIM was designed to avoid the dense-mode scaling issues of DVMRP and the potential performance issues of CBT at the same time.

PIM is one of the most rapidly evolving specifications on the Internet today. Since its introduction in 1995, PIM has already seen two major revisions to its packet structure (PIM version 1 [PIMv1] and PIM version 2 [PIMv2]), two major RFCs (RFC 2362 obsoleted RFC 2117), and numerous drafts describing major components of PIM, such as many-to-many trees and source-specific multicast (SSM). Long-lasting RFCs are not a feature of PIM, and virtually all of PIM must be researched, understood, and implemented

directly from Internet drafts. In fact, no current RFC describes PIMv1 at all. The drafts have all expired, and PIMv1 was never issued as an official RFC.

PIM itself is not nonstandard or unstable, however. PIM has been a promising multicast routing protocol since its inception, especially PIM sparse mode, the first real sparse-mode multicast routing protocol. Work continues on PIM in a number of areas, from bidirectional trees to network management, and the rapid pace of development makes drafts essential for PIM.

PIMv1 and PIMv2 can coexist on the same router and even on the same interface. The main difference between PIMv1 and PIMv2 is the packet format. PIMv1 messages use Internet Group Management Protocol (IGMP) packets, whereas PIMv2 has its own IP protocol number (103) and packet structure. All routers connecting to an IP subnet such as a LAN must use the same PIM version. Some PIM implementations can recognize PIMv1 packets and automatically switch the router interface to PIMv1. Because the difference between PIMv1 and PIMv2 involves the message format, but not the meaning of the message or how the router processes the PIM message, a router can easily mix PIMv1 and PIMv2 interfaces.

PIM is used for efficient routing to multicast groups that might span wide-area and interdomain internetworks. It is called “protocol independent” because it does not depend on a particular unicast routing protocol. Junos OS supports bidirectional mode, sparse mode, dense mode, and sparse-dense mode.

PIM operates in several modes: bidirectional mode, sparse mode, dense mode, and sparse-dense mode. In sparse-dense mode, some multicast groups are configured as dense mode (flood-and-prune, [S,G] state) and others are configured as sparse mode (explicit join to rendezvous point [RP], [\*G] state).

PIM drafts also establish a mode known as PIM source-specific mode, or PIM SSM. In PIM SSM there is only one specific source for the content of a multicast group within a given domain.

Because the PIM mode you choose determines the PIM configuration properties, you first must decide whether PIM operates in bidirectional, sparse, dense, or sparse-dense mode in your network. Each mode has distinct operating advantages in different network environments.

- In sparse mode, routers must join and leave multicast groups explicitly. Upstream routers do not forward multicast traffic to a downstream router unless the downstream router has sent an explicit request (by means of a join message) to the rendezvous point (RP) router to receive this traffic. The RP serves as the root of the shared multicast delivery tree and is responsible for forwarding multicast data from different sources to the receivers.

Sparse mode is well suited to the Internet, where frequent interdomain join messages and prune messages are common.

- Bidirectional PIM is similar to sparse mode, and is especially suited to applications that must scale to support a large number of dispersed sources and receivers. In bidirectional PIM, routers build shared bidirectional trees and do not switch to a source-based tree.



Bidirectional PIM scales well because it needs no source-specific (S,G) state. Instead, it builds only group-specific (\*G) state.

- Unlike sparse mode and bidirectional mode, in which data is forwarded only to routers sending an explicit PIM join request, dense mode implements a *flood-and-prune* mechanism, similar to the Distance Vector Multicast Routing Protocol (DVMRP). In dense mode, a router receives the multicast data on the incoming interface, then forwards the traffic to the outgoing interface list. Flooding occurs periodically and is used to refresh state information, such as the source IP address and multicast group pair. If the router has no interested receivers for the data, and the outgoing interface list becomes empty, the router sends a PIM prune message upstream.

Dense mode works best in networks where few or no prunes occur. In such instances, dense mode is actually more efficient than sparse mode.

- Sparse-dense mode, as the name implies, allows the interface to operate on a per-group basis in either sparse or dense mode. A group specified as “dense” is not mapped to an RP. Instead, data packets destined for that group are forwarded by means of PIM dense mode rules. A group specified as “sparse” is mapped to an RP, and data packets are forwarded by means of PIM sparse-mode rules. Sparse-dense mode is useful in networks implementing auto-RP for PIM sparse mode.



**NOTE:** On SRX Series devices, PIM does not support upstream and downstream interfaces across different virtual routers in flow mode.

## Basic PIM Network Components

PIM dense mode requires only a multicast source and series of multicast-enabled routers running PIM dense mode to allow receivers to obtain multicast content. Dense mode makes sure that all multicast traffic gets everywhere by periodically flooding the network with multicast traffic, and relies on prune messages to make sure that subnets where all receivers are uninterested in that particular multicast group stop receiving packets.

PIM sparse mode is more complicated and requires the establishment of special routers called *rendezvous points (RPs)* in the network core. These routers are where upstream join messages from interested receivers meet downstream traffic from the source of the multicast group content. A network can have many RPs, but PIM sparse mode allows only one RP to be active for any multicast group.

If there is only one RP in a routing domain, the RP and adjacent links might become congested and form a single point of failure for all multicast traffic. Thus, multiple RPs are the rule, but the issue then becomes how other multicast routers find the RP that is the source of the multicast group the receiver is trying to join. This RP-to-group mapping is controlled by a special *bootstrap router (BSR)* running the PIM BSR mechanism. There can be more than one bootstrap router as well, also for single-point-of-failure reasons.

The bootstrap router does not have to be an RP itself, although this is a common implementation. The bootstrap router's main function is to manage the collection of RPs and allow interested receivers to find the source of their group's multicast traffic.

PIM SSM can be seen as a subset of a special case of PIM sparse mode and requires no specialized equipment other than that used for PIM sparse mode (and IGMP version 3).

Bidirectional PIM RPs, unlike RPs for PIM sparse mode, do not need to perform PIM Register tunneling or other specific protocol action. Bidirectional PIM RPs implement no specific functionality. RP addresses are simply a location in the network to rendezvous toward. In fact, for bidirectional PIM, RP addresses need not be loopback interface addresses or even be addresses configured on any router, as long as they are covered by a subnet that is connected to a bidirectional PIM-capable router and advertised to the network.

**Related Documentation**

- *Supported IP Multicast Protocol Standards*

---

## PIM on Aggregated Interfaces

If you configure PIM on an aggregated (**ae-** or **as-**) interface, each of the interfaces in the aggregate is included in the multicast output interface list and carries the single stream of replicated packets in a load-sharing fashion. The multicast aggregate interface is “expanded” into its constituent interfaces in the next-hop database.

**Related Documentation**

- [PIM Overview on page 103](#)
- [interface on page 311](#)

---

## Changing the PIM Version

All systems on a subnet must run the same version of PIM.

The default PIM version can be version 1 or version 2, depending on the mode you are configuring. PIMv1 is the default for rendezvous point (RP) mode (at the **[edit protocols pim rp static address address]** hierarchy level). However, PIMv2 is the default for interface mode (at the **[edit protocols pim interface interface-name]** hierarchy level). Explicitly configured versions override the defaults.

To configure the PIM version, include the **version** statement:

```
version (1 | 2);
```

---

## Modifying the PIM Hello Interval

Routing devices send hello messages at a fixed interval on all PIM-enabled interfaces. By using hello messages, routing devices advertise their existence as PIM routing devices on the subnet. With all PIM-enabled routing devices advertised, a single designated router for the subnet is established.

When a routing device is configured for PIM, it sends a hello message at a 30-second default interval. The interval range is from 0 through 255. When the interval counts down to 0, the routing device sends another hello message, and the timer is reset. A routing device that receives no response from a neighbor in 3.5 times the interval value drops

the neighbor. In the case of a 30-second interval, the amount of time a routing device waits for a response is 105 seconds.

If a PIM hello message contains the hold-time option, the neighbor timeout is set to the hold-time sent in the message. If a PIM hello message does not contain the hold-time option, the neighbor timeout is set to the default hello hold time.

To modify how often the routing device sends hello messages out of an interface:

1. This example shows the configuration for the routing instance. Configure the interface globally or in the routing instance.

```
[edit routing-instances PIM.master protocols pim interface fe-3/0/2.0]
user@host# set hello-interval 255
```

2. Verify the configuration by checking the **Hello Option Holdtime** field in the output of the **show pim neighbors detail** command.

```
user@host> show pim neighbors detail
Instance: PIM.master
Interface: fe-3/0/2.0
Address: 192.168.195.37, IPv4, PIM v2, Mode: Sparse
Hello Option Holdtime: 255 seconds
Hello Option DR Priority: 1
Hello Option LAN Prune Delay: delay 500 ms override 2000 ms
Join Suppression supported
Rx Join: Group Source Timeout
225.1.1.1 192.168.195.78 0
225.1.1.1 0

Interface: lo0.0
Address: 10.255.245.91, IPv4, PIM v2, Mode: Sparse
Hello Option Holdtime: 255 seconds
Hello Option DR Priority: 1
Hello Option LAN Prune Delay: delay 500 ms override 2000 ms
Join Suppression supported

Interface: pd-6/0/0.32768
Address: 0.0.0.0, IPv4, PIM v2, Mode: Sparse
Hello Option Holdtime: 255 seconds
Hello Option DR Priority: 0
Hello Option LAN Prune Delay: delay 500 ms override 2000 ms
Join Suppression supported
```

Related Documentation • [show pim neighbors on page 499](#)

## Preserving Multicast Performance by Disabling Response to the ping Utility

The ping utility uses ICMP Echo messages to verify connectivity to any device with an IP address. However, in the case of multicast applications, a single ping sent to a multicast address can degrade the performance of routers because the stream of packets is replicated multiple times.

You can disable the router's response to ping (ICMP Echo) packets sent to multicast addresses. The system responds normally to unicast ping packets.

To disable the router's response to ping packets sent to multicast addresses:

1. Include the **no-multicast-echo** statement:

```
[edit system]
user@host# set no-multicast-echo
```

2. Verify the configuration by checking the **echo drops with broadcast or multicast destination address** field in the output of the **show system statistics icmp** command.

```
user@host> show system statistics icmp

icmp:
0 drops due to rate limit
0 calls to icmp_error
0 errors not generated because old message was icmp
Output histogram:
echo reply: 21
0 messages with bad code fields
0 messages less than the minimum length
0 messages with bad checksum
0 messages with bad source address
0 messages with bad length
100 echo drops with broadcast or multicast destination address
0 timestamp drops with broadcast or multicast destination address
Input histogram:
echo: 21
21 message responses generated
```

- Related Documentation**
- *Configuring Junos OS to Disable the Routing Engine Response to Multicast Ping Packets*
  - *show system statistics icmp*

## Configuring PIM Trace Options

Tracing operations record detailed messages about the operation of routing protocols, such as the various types of routing protocol packets sent and received, and routing policy actions. You can specify which trace operations are logged by including specific tracing flags. The following table describes the flags that you can include.

Flag	Description
<b>all</b>	Trace all operations.
<b>assert</b>	Trace assert messages, which are used to resolve which of the parallel routers connected to a multiaccess LAN is responsible for forwarding packets to the LAN.
<b>autorp</b>	Trace bootstrap, RP, and auto-RP messages.
<b>bidirectional-df-election</b>	Trace bidirectional PIM designated-forwarder (DF) election events.
<b>bootstrap</b>	Trace bootstrap messages, which are sent periodically by the PIM domain's bootstrap router and are forwarded, hop by hop, to all routers in that domain.

Flag	Description
<b>general</b>	Trace general events.
<b>graft</b>	Trace graft and graft acknowledgment messages.
<b>hello</b>	Trace hello packets, which are sent so that neighboring routers can discover one another.
<b>join</b>	Trace join messages, which are sent to join a branch onto the multicast distribution tree.
<b>mdt</b>	Trace messages related to multicast data tunnels.
<b>normal</b>	Trace normal events.
<b>nsr-synchronization</b>	Trace nonstop routing synchronization events
<b>packets</b>	Trace all PIM packets.
<b>policy</b>	Trace poison-route-reverse packets.
<b>prune</b>	Trace prune messages, which are sent to prune a branch off the multicast distribution tree.
<b>register</b>	Trace register and register-stop messages. Register messages are sent to the RP when a multicast source first starts sending to a group.
<b>route</b>	Trace routing information.
<b>rp</b>	Trace candidate RP advertisements.
<b>state</b>	Trace state transitions.
<b>task</b>	Trace task processing.
<b>timer</b>	Trace timer processing.

In the following example, tracing is enabled for all routing protocol packets. Then tracing is narrowed to focus only on PIM packets of a particular type.

To configure tracing operations for PIM:

1. (Optional) Configure tracing at the [**routing-options** hierarchy level to trace all protocol packets.

```
[edit routing-options traceoptions]
user@host# set file all-packets-trace
user@host# set flag all
```

2. Configure the filename for the PIM trace file.

```
[edit protocols pim traceoptions]  
user@host# set file pim-trace
```

3. (Optional) Configure the maximum number of trace files.

```
[edit protocols pim traceoptions]  
user@host# set file files 5
```

4. (Optional) Configure the maximum size of each trace file.

```
[edit protocols pim traceoptions]  
user@host# set file size 1m
```

5. (Optional) Enable unrestricted file access.

```
[edit protocols pim traceoptions]  
user@host# set file world-readable
```

6. Configure tracing flags.

Suppose you are troubleshooting issues with PIM version 1 control packets that are received on an interface configured for PIM version 2. The following example shows how to trace messages associated with this problem.

```
[edit protocols pim traceoptions]  
user@host# set flag packets | match "Rx V1 Require V2"
```

7. View the trace file.

```
user@host> file list /var/log  
user@host> file show /var/log/pim-trace
```

- Related Documentation**
- [PIM Overview on page 103](#)
  - *Tracing and Logging Junos OS Operations*

---

## Configuring Interface Priority for PIM Designated Router Selection

A designated router (DR) sends periodic join messages and prune messages toward a group-specific rendezvous point (RP) for each group for which it has active members. When a Protocol Independent Multicast (PIM) router learns about a source, it originates a Multicast Source Discovery Protocol (MSDP) source-address message if it is the DR on the upstream interface.

By default, every PIM interface has an equal probability (priority 1) of being selected as the DR. Configuring the interface DR priority helps ensure that changing an IP address does not alter your forwarding model.

To configure the interface designated router priority:

1. This example shows the configuration for the routing instance. Configure the interface globally or in the routing instance.

```
[edit routing-instances PIM.master protocols pim interface ge-0/0/0.0 family inet]  
user@host# set priority 5
```

2. Verify the configuration by checking the **Hello Option DR Priority** field in the output of the **show pim neighbors detail** command.

```
user@host> show pim neighbors detail
```

```
Instance: PIM.master
Interface: ge-0/0/0.0
Address: 192.168.195.37, IPv4, PIM v2, Mode: Sparse
Hello Option Holdtime: 65535 seconds
Hello Option DR Priority: 5
Hello Option LAN Prune Delay: delay 500 ms override 2000 ms
Join Suppression supported
Rx Join: Group Source Timeout
225.1.1.1 192.168.195.78 0
225.1.1.1 0
```

```
Interface: lo0.0
Address: 10.255.245.91, IPv4, PIM v2, Mode: Sparse
Hello Option Holdtime: 65535 seconds
Hello Option DR Priority: 1
Hello Option LAN Prune Delay: delay 500 ms override 2000 ms
Join Suppression supported
```

```
Interface: pd-6/0/0.32768
Address: 0.0.0.0, IPv4, PIM v2, Mode: Sparse
Hello Option Holdtime: 65535 seconds
Hello Option DR Priority: 0
Hello Option LAN Prune Delay: delay 500 ms override 2000 ms
Join Suppression supported
```

- Related Documentation**
- [Configuring PIM Designated Router Election on Point-to-Point Links on page 111](#)
  - [Understanding PIM Sparse Mode on page 121](#)
  - [show pim neighbors on page 499](#)

## Configuring PIM Designated Router Election on Point-to-Point Links

To comply with the latest PIM drafts, enable designated router (DR) election on all PIM interfaces, including point-to-point (P2P) interfaces. (DR election is enabled by default on all other interfaces.) One of the two routers might join a multicast group on its P2P link interface. The DR on that link is responsible for initiating the relevant join messages.

To enable DR election on point-to-point interfaces:

1. On both point-to-point link routers, configure the router globally or in the routing instance. This example shows the configuration for the routing instance.  

```
[edit routing-instances PIM.master protocols pim]
user@host# set dr-election-on-p2p
```
2. Verify the configuration by checking the **State** field in the output of the **show pim interfaces** command. The possible values for the **State** field are DR, NotDR, and P2P. When a point-to-point link interface is elected to be the DR, the interface state becomes DR instead of P2P.
3. If the **show pim interfaces** command continues to report the P2P state, consider running the **restart routing** command on both routers on the point-to-point link. Then recheck the state.



**CAUTION:** Do not restart a software process unless specifically asked to do so by your Juniper Networks customer support representative. Restarting a software process during normal operation of a routing platform could cause interruption of packet forwarding and loss of data.

```
[edit]
user@host# run restart routing
```

**Related  
Documentation**

- [Understanding PIM Sparse Mode on page 121](#)
- [Configuring Interface Priority for PIM Designated Router Selection on page 110](#)
- [show pim interfaces on page 475](#)

---

## Configuring BFD for PIM

The Bidirectional Forwarding Detection (BFD) Protocol is a simple hello mechanism that detects failures in a network. BFD works with a wide variety of network environments and topologies. A pair of routing devices exchanges BFD packets. Hello packets are sent at a specified, regular interval. A neighbor failure is detected when the routing device stops receiving a reply after a specified interval. The BFD failure detection timers have shorter time limits than the Protocol Independent Multicast (PIM) hello hold time, so they provide faster detection.

The BFD failure detection timers are adaptive and can be adjusted to be faster or slower. The lower the BFD failure detection timer value, the faster the failure detection and vice versa. For example, the timers can adapt to a higher value if the adjacency fails (that is, the timer detects failures more slowly). Or a neighbor can negotiate a higher value for a timer than the configured value. The timers adapt to a higher value when a BFD session flap occurs more than three times in a span of 15 seconds. A back-off algorithm increases the receive (Rx) interval by two if the local BFD instance is the reason for the session flap. The transmission (Tx) interval is increased by two if the remote BFD instance is the reason for the session flap. You can use the **clear bfd adaptation** command to return BFD interval timers to their configured values. The **clear bfd adaptation** command is hitless, meaning that the command does not affect traffic flow on the routing device.

You must specify the minimum transmit and minimum receive intervals to enable BFD on PIM.

To enable failure detection:

1. Configure the interface globally or in a routing instance.

This example shows the global configuration.

```
[edit protocols pim]
user@host# edit interface fe-1/0/0.0 family inet bfd-liveness-detection
```

2. Configure the minimum transmit interval.



This is the minimum interval after which the routing device transmits hello packets to a neighbor with which it has established a BFD session. Specifying an interval smaller than 300 ms can cause undesired BFD flapping.

```
[edit protocols pim interface fe-1/0/0.0 family inet bfd-liveness-detection]
user@host# set transmit-interval 350
```

3. Configure the minimum interval after which the routing device expects to receive a reply from a neighbor with which it has established a BFD session.

Specifying an interval smaller than 300 ms can cause undesired BFD flapping.

```
[edit protocols pim interface fe-1/0/0.0 family inet bfd-liveness-detection]
user@host# set minimum-receive-interval 350
```

4. (Optional) Configure other BFD settings.

As an alternative to setting the receive and transmit intervals separately, configure one interval for both.

```
[edit protocols pim interface fe-1/0/0.0 family inet bfd-liveness-detection]
user@host# set minimum-interval 350
```

5. Configure the threshold for the adaptation of the BFD session detection time.

When the detection time adapts to a value equal to or greater than the threshold, a single trap and a single system log message are sent.

```
[edit protocols pim interface fe-1/0/0.0 family inet bfd-liveness-detection]
user@host# set detection-time threshold 800
```

6. Configure the number of hello packets not received by a neighbor that causes the originating interface to be declared down.

```
[edit protocols pim interface fe-1/0/0.0 family inet bfd-liveness-detection]
user@host# set multiplier 50
```

7. Configure the BFD version.

```
[edit protocols pim interface fe-1/0/0.0 family inet bfd-liveness-detection]
user@host# set version 1
```

8. Specify that BFD sessions should not adapt to changing network conditions.

We recommend that you not disable BFD adaptation unless it is preferable not to have BFD adaptation enabled in your network.

```
[edit protocols pim interface fe-1/0/0.0 family inet bfd-liveness-detection]
user@host# set no-adaptation
```

9. Verify the configuration by checking the output of the **show bfd session** command.

**Related Documentation**

- *show bfd session*

## Configuring BFD Authentication for PIM

Beginning with Junos OS Release 9.6, you can configure authentication for Bidirectional Forwarding Detection (BFD) sessions running over Protocol Independent Multicast (PIM).

Routing instances are also supported. The following steps are needed to configure authentication on a BFD session:

1. Specify the BFD authentication algorithm for the PIM protocol.
2. Associate the authentication keychain with the PIM protocol.
3. Configure the related security authentication keychain.

The following sections provide instructions for configuring and viewing BFD authentication on PIM:

- [Configuring BFD Authentication Parameters on page 114](#)
- [Viewing Authentication Information for BFD Sessions on page 115](#)

## Configuring BFD Authentication Parameters

BFD authentication is only supported in the Canada and United States version of the Junos OS image and is not available in the export version.

To configure BFD authentication:

1. Specify the algorithm (**keyed-md5**, **keyed-sha-1**, **meticulous-keyed-md5**, **meticulous-keyed-sha-1**, or **simple-password**) to use for BFD authentication on a PIM route or routing instance.

```
[edit protocols pim]
```

```
user@host# set interface ge-0/1/5 family inet bfd-liveness-detection authentication  
algorithm keyed-sha-1
```



**NOTE:** Nonstop active routing (NSR) is not supported with the **meticulous-keyed-md5** and **meticulous-keyed-sha-1** authentication algorithms. BFD sessions using these algorithms might go down after a switchover.

2. Specify the keychain to be used to associate BFD sessions on the specified PIM route or routing instance with the unique security authentication keychain attributes.

The keychain you specify must match the keychain name configured at the **[edit security authentication key-chains]** hierarchy level.

```
[edit protocols pim]
```

```
user@host# set interface ge-0/1/5 family inet bfd-liveness-detection authentication  
keychain bfd-pim
```



**NOTE:** The algorithm and keychain must be configured on both ends of the BFD session, and they must match. Any mismatch in configuration prevents the BFD session from being created.

3. Specify the unique security authentication information for BFD sessions:

- The matching keychain name as specified in Step 2.
- At least one key, a unique integer between 0 and 63. Creating multiple keys allows multiple clients to use the BFD session.
- The secret data used to allow access to the session.
- The time at which the authentication key becomes active, in the format *yyyy-mm-dd.hh:mm:ss*.

```
[edit security]
```

```
user@host# set authentication-key-chains key-chain bfd-pim key 53 secret $ABC123/
start-time 2009-06-14.10:00:00
```

4. (Optional) Specify loose authentication checking if you are transitioning from nonauthenticated sessions to authenticated sessions.

```
[edit protocols pim]
```

```
user@host# set interface ge-0/1/5 family inet bfd-liveness-detection authentication
loose-check
```

5. (Optional) View your configuration by using the **show bfd session detail** or **show bfd session extensive** command.
6. Repeat these steps to configure the other end of the BFD session.

## Viewing Authentication Information for BFD Sessions

You can view the existing BFD authentication configuration by using the **show bfd session detail** and **show bfd session extensive** commands.

The following example shows BFD authentication configured for the **ge-0/1/5** interface. It specifies the keyed SHA-1 authentication algorithm and a keychain name of **bfd-pim**. The authentication keychain is configured with two keys. Key 1 contains the secret data "\$ABC123/" and a start time of June 1, 2009, at 9:46:02 AM PST. Key 2 contains the secret data "\$ABC123/" and a start time of June 1, 2009, at 3:29:20 PM PST.

```
[edit protocols pim]
```

```
interface ge-0/1/5 {
  family inet {
    bfd-liveness-detection {
      authentication {
        key-chain bfd-pim;
        algorithm keyed-sha-1;
      }
    }
  }
}
```

```
[edit security]
```

```
authentication key-chains {
  key-chain bfd-pim {
    key 1 {
      secret "$ABC123/";
      start-time "2009-6-1.09:46:02 -0700";
    }
    key 2 {
```

```

        secret "$ABC123/";
        start-time "2009-6-1.15:29:20 -0700";
    }
}

```

If you commit these updates to your configuration, you see output similar to the following example. In the output for the **show bfd session detail** command, **Authenticate** is displayed to indicate that BFD authentication is configured. For more information about the configuration, use the **show bfd session extensive** command. The output for this command provides the keychain name, the authentication algorithm and mode for each client in the session, and the overall BFD authentication configuration status, keychain name, and authentication algorithm and mode.

#### show bfd session detail

```
user@host# show bfd session detail
```

Address	State	Interface	Detect Time	Transmit Interval	Multiplier
50.0.0.2	Up	ge-0/1/5.0	0.900	0.300	3

Client PIM, TX interval 0.300, RX interval 0.300, **Authenticate**  
 Session up time 3d 00:34  
 Local diagnostic None, remote diagnostic NbrSignal  
 Remote state Up, version 1  
 Replicated

#### show bfd session extensive

```
user@host# show bfd session extensive
```

Address	State	Interface	Detect Time	Transmit Interval	Multiplier
50.0.0.2	Up	ge-0/1/5.0	0.900	0.300	3

Client PIM, TX interval 0.300, RX interval 0.300, **Authenticate**  
**keychain bfd-pim, algo keyed-sha-1, mode strict**  
 Session up time 00:04:42  
 Local diagnostic None, remote diagnostic NbrSignal  
 Remote state Up, version 1  
 Replicated  
 Min async interval 0.300, min slow interval 1.000  
 Adaptive async TX interval 0.300, RX interval 0.300  
 Local min TX interval 0.300, minimum RX interval 0.300, multiplier 3  
 Remote min TX interval 0.300, min RX interval 0.300, multiplier 3  
 Local discriminator 2, remote discriminator 2  
 Echo mode disabled/inactive  
**Authentication enabled/active, keychain bfd-pim, algo keyed-sha-1, mode strict**

#### Related Documentation

- [Understanding Bidirectional Forwarding Detection Authentication for PIM](#)
- [Configuring BFD for PIM on page 112](#)
- [authentication-key-chains](#)
- [bfd-liveness-detection on page 289](#)
- [show bfd session](#)

## Disabling PIM

By default, when configured, the PIM protocol is enabled on all interfaces for all families. If desired, you can disable PIM at the protocol, interface, or family hierarchy levels.

The hierarchy in which you configure PIM is critical. In general, the most specific configuration takes precedence. However, if PIM is disabled at the protocol level, then any disable statements with respect to an interface or family are ignored.

For example, the order of precedence for disabling PIM on a particular interface family is:

1. If PIM is disabled at the **[edit protocols pim interface *interface-name* family]** hierarchy level, then PIM is disabled for that interface family.
2. If PIM is not configured at the **[edit protocols pim interface *interface-name* family]** hierarchy level, but is disabled at the **[edit protocols pim interface *interface-name*]** hierarchy level, then PIM is disabled for all families on the specified interface.
3. If PIM is not configured at either the **[edit protocols pim interface *interface-name* family]** hierarchy level or the **[edit protocols pim interface *interface-name*]** hierarchy level, but is disabled at the **[edit protocols pim]** hierarchy level, then the PIM protocol is disabled globally for all interfaces and all families.

The following sections describe how to disable PIM at the various hierarchy levels.

- [Disabling the PIM Protocol on page 117](#)
- [Disabling PIM on an Interface on page 118](#)
- [Disabling PIM for a Family on page 118](#)
- [Disabling PIM for a Rendezvous Point on page 119](#)

### Disabling the PIM Protocol

You can explicitly disable the PIM protocol. Disabling the PIM protocol disables the protocol for all interfaces and all families. This is accomplished at the **[edit protocols pim]** hierarchy level:

```
[edit protocols]
pim {
  disable;
}
```

To disable the PIM protocol:

1. Include the **disable** statement.  

```
user@host# set protocols pim disable
```
2. (Optional) Verify your configuration settings before committing them by using the **show protocols pim** command.  

```
user@host# run show protocols pim
```

## Disabling PIM on an Interface

You can disable the PIM protocol on a per-interface basis. This is accomplished at the **[edit protocols pim interface *interface-name*]** hierarchy level:

```
[edit protocols]
pim {
  interface interface-name {
    disable;
  }
}
```

To disable PIM on an interface:

1. Include the **disable** statement.  

```
user@host# set protocols pim interface fe-0/1/0 disable
```
2. (Optional) Verify your configuration settings before committing them by using the **show protocols pim** command.  

```
user@host# run show protocols pim
```

## Disabling PIM for a Family

You can disable the PIM protocol on a per-family basis. This is accomplished at the **[edit protocols pim family]** hierarchy level:

```
[edit protocols]
pim {
  family inet {
    disable;
  }
  family inet6 {
    disable;
  }
}
```

To disable PIM for a family:

1. Include the **disable** statement.  

```
user@host# set protocols pim family inet disable
user@host# set protocols pim family inet6 disable
```
2. (Optional) Verify your configuration settings before committing them by using the **show protocols pim** command.  

```
user@host# run show protocols pim
```

## Disabling PIM for a Rendezvous Point

You can disable the PIM protocol for a rendezvous point (RP) on a per-family basis. This is accomplished at the **[edit protocols pim rp local family]** hierarchy level:

```
[edit protocols]
pim {
  rp {
    local {
      family inet {
        disable;
      }
      family inet6 {
        disable;
      }
    }
  }
}
```

To disable PIM for an RP family:

1. Use the **disable** statement.

```
user@host# set protocols pim rp local family inet disable
user@host# set protocols pim rp local family inet6 disable
```

2. (Optional) Verify your configuration settings before committing them by using the **show protocols pim** command.

```
user@host# run show protocols pim
```





## CHAPTER 6

# Using PIM Sparse Mode

- [Understanding PIM Sparse Mode on page 121](#)
- [Designated Router on page 124](#)
- [Enabling PIM Sparse Mode on page 124](#)
- [Configuring PIM Join Load Balancing on page 125](#)
- [Modifying the Join State Timeout on page 129](#)
- [Example: Enabling Join Suppression on page 129](#)

## Understanding PIM Sparse Mode

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A Protocol Independent Multicast (PIM) sparse-mode domain uses reverse-path forwarding (RPF) to create a path from a data source to the receiver requesting the data. When a receiver issues an explicit join request, an RPF check is triggered. A (\*,G) PIM join message is sent toward the RP from the receiver's designated router (DR). (By definition, this message is actually called a join/prune message, but for clarity in this description, it is called either join or prune, depending on its context.) The join message is multicast hop by hop upstream to the ALL-PIM-ROUTERS group (224.0.0.13) by means of each router's RPF interface until it reaches the RP. The RP router receives the (\*,G) PIM join message and adds the interface on which it was received to the outgoing interface list (OIL) of the rendezvous-point tree (RPT) forwarding state entry. This builds the RPT connecting the receiver with the RP. The RPT remains in effect, even if no active sources generate traffic.



**NOTE:** State—the (\*,G) or (S,G) entries—is the information used for forwarding unicast or multicast packets. S is the source IP address, G is the multicast group address, and \* represents any source sending to group G. Routers keep track of the multicast forwarding state for the incoming and outgoing interfaces for each group.

When a source becomes active, the source DR encapsulates multicast data packets into a PIM register message and sends them by means of unicast to the RP router.

If the RP router has interested receivers in the PIM sparse-mode domain, it sends a PIM join message toward the source to build a shortest-path tree (SPT) back to the source. The source sends multicast packets out on the LAN, and the source DR encapsulates

the packets in a PIM register message and forwards the message toward the RP router by means of unicast. The RP router receives PIM register messages back from the source, and thus adds a new source to the distribution tree, keeping track of sources in a PIM table. Once an RP router receives packets natively (with S,G), it sends a register stop message to stop receiving the register messages by means of unicast.

In actual application, many receivers with multiple SPTs are involved in a multicast traffic flow. To illustrate the process, we track the multicast traffic from the RP router to one receiver. In such a case, the RP router begins sending multicast packets down the RPT toward the receiver's DR for delivery to the interested receivers. When the receiver's DR receives the first packet from the RPT, the DR sends a PIM join message toward the source DR to start building an SPT back to the source. When the source DR receives the PIM join message from the receiver's DR, it starts sending traffic down all SPTs. When the first multicast packet is received by the receiver's DR, the receiver's DR sends a PIM prune message to the RP router to stop duplicate packets from being sent through the RPT. In turn, the RP router stops sending multicast packets to the receiver's DR, and sends a PIM prune message for this source over the RPT toward the source DR to halt multicast packet delivery to the RP router from that particular source.

If the RP router receives a PIM register message from an active source but has no interested receivers in the PIM sparse-mode domain, it still adds the active source into the PIM table. However, after adding the active source into the PIM table, the RP router sends a register stop message. The RP router discovers the active source's existence and no longer needs to receive advertisement of the source (which utilizes resources).



**NOTE:** If the number of PIM join messages exceeds the configured MTU, the messages are fragmented in IPv6 PIM sparse mode. To avoid the fragmentation of PIM join messages, the multicast traffic receives the interface MTU instead of the path MTU.

---

The major characteristics of PIM sparse mode are as follows:

- Routers with downstream receivers join a PIM sparse-mode tree through an explicit join message.
- PIM sparse-mode RPs are the routers where receivers meet sources.
- Senders announce their existence to one or more RPs, and receivers query RPs to find multicast sessions.
- Once receivers get content from sources through the RP, the last-hop router (the router closest to the receiver) can optionally remove the RP from the shared distribution tree (\*,G) if the new source-based tree (S,G) is shorter. Receivers can then get content directly from the source.

The transitional aspect of PIM sparse mode from shared to source-based tree is one of the major features of PIM, because it prevents overloading the RP or surrounding core links.

There are related issues regarding source, RPs, and receivers when sparse mode multicast is used:

- Sources must be able to send to all RPs.
- RPs must all know one another.
- Receivers must send explicit join messages to a known RP.
- Receivers initially need to know only one RP (they later learn about others).
- Receivers can explicitly prune themselves from a tree.
- Receivers that never transition to a source-based tree are effectively running Core Based Trees (CBT).

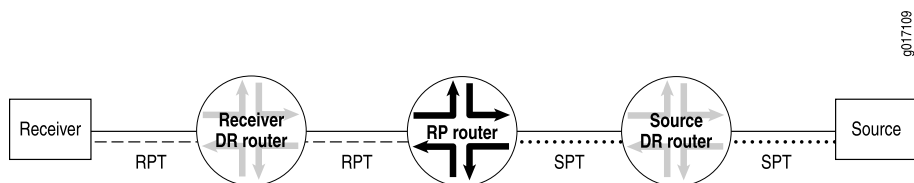
PIM sparse mode has standard features for all of these issues.

## Rendezvous Point

The RP router serves as the information exchange point for the other routers. All routers in a PIM domain must provide mapping to an RP router. It is the only router that needs to know the active sources for a domain—the other routers just need to know how to reach the RP. In this way, the RP matches receivers with sources.

The RP router is downstream from the source and forms one end of the shortest-path tree. As shown in [Figure 15 on page 123](#), the RP router is upstream from the receiver and thus forms one end of the rendezvous-point tree.

**Figure 15: Rendezvous Point As Part of the RPT and SPT**



The benefit of using the RP as the information exchange point is that it reduces the amount of state in non-RP routers. No network flooding is required to provide non-RP routers information about active sources.

## RP Mapping Options

RPs can be learned by one of the following mechanisms:

- Static configuration
- Anycast RP
- Auto-RP
- Bootstrap router

We recommend a static RP mapping with anycast RP and a bootstrap router (BSR) with auto-RP configuration, because static mapping provides all the benefits of a bootstrap router and auto-RP without the complexity of the full BSR and auto-RP mechanisms.

**Related Documentation**

- [Understanding Static RP on page 159](#)
- [Understanding RP Mapping with Anycast RP on page 165](#)
- [Understanding the PIM Bootstrap Router on page 181](#)
- [Understanding PIM Auto-RP on page 175](#)

## Designated Router

---

In a PIM sparse mode (PIM-SM) domain, there are two types of designated routers to consider:

- The receiver DR sends PIM join and PIM prune messages from the receiver network toward the RP.
- The source DR sends PIM register messages from the source network to the RP.

Neighboring PIM routers multicast periodic PIM hello messages to each other every 30 seconds (the default). The PIM hello message usually includes a holdtime value for the neighbor to use, but this is not a requirement. If the PIM hello message does not include a holdtime value, a default timeout value (in Junos OS, 105 seconds) is used. On receipt of a PIM hello message, a router stores the IP address and priority for that neighbor. If the DR priorities match, the router with the highest IP address is selected as the DR.

If a DR fails, a new one is selected using the same process of comparing IP addresses.



**NOTE:** In PIM dense mode (PIM-DM), a DR is elected by the same process that PIM-SM uses. However, the only time that a DR has any effect in PIM-DM is when IGMPv1 is used on the interface. (IGMPv2 is the default.) In this case, the DR also functions as the IGMP Query Router because IGMPv1 does not have a Query Router election mechanism.

## Enabling PIM Sparse Mode

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In PIM sparse mode (PIM-SM), the assumption is that very few of the possible receivers want packets from a source, so the network establishes and sends packets only on branches that have at least one leaf indicating (by message) a desire for the traffic. WANs are appropriate networks for sparse-mode operation.

By default, PIM is disabled. When you enable PIM, it operates in sparse mode by default. You do not need to configure Internet Group Management Protocol (IGMP) version 2 for a sparse mode configuration. After you enable PIM, by default, IGMP version 2 is also enabled.

All systems on a subnet must run the same version of PIM.

The default PIM version can be version 1 or version 2, depending on the mode you are configuring. PIMv1 is the default for rendezvous point (RP) mode (at the **[edit protocols pim rp static address address]** hierarchy level). However, PIMv2 is the default for interface mode (at the **[edit protocols pim interface interface-name]** hierarchy level). Explicitly configured versions override the defaults. The following example explicitly configures PIMv2 on the interfaces.

You can configure PIM sparse mode globally or for a routing instance. This example shows how to configure PIM sparse mode globally on all interfaces. It also shows how to configure a static RP router and how to configure the non-RP routers.

To configure the router properties for PIM sparse mode:

1. Configure the static RP router.

```
[edit protocols pim]
user@host# set rp local family inet address 192.168.3.253
```

2. Configure the RP router interfaces. When configuring all interfaces, exclude the **fxp0.0** management interface by including the **disable** statement for that interface.

```
[edit protocols pim]
user@host# set interface all mode sparse
user@host# set interface all version 2
user@host# set interface fxp0.0 disable
```

3. Configure the non-RP routers. Include the following configuration on all of the non-RP routers.

```
[edit protocols pim]
user@host# set rp static address 192.168.3.253 version 2
user@host# set interface all mode sparse
user@host# set interface all version 2
user@host# set interface fxp0.0 disable
```

4. Monitor the operation of PIM sparse mode.

- [show pim interfaces](#)
- [show pim join](#)
- [show pim neighbors](#)
- [show pim rps](#)

**Related Documentation**

- [Understanding PIM Sparse Mode on page 121](#)

## Configuring PIM Join Load Balancing

By default, PIM join messages are sent toward a source based on the RPF routing table check. If there is more than one equal-cost path toward the source, then one upstream interface is chosen to send the join message. This interface is also used for all downstream

traffic, so even though there are alternative interfaces available, the multicast load is concentrated on one upstream interface and routing device.

For PIM sparse mode, you can configure PIM join load balancing to spread join messages and traffic across equal-cost upstream paths (interfaces and routing devices) provided by unicast routing toward a source. PIM join load balancing is only supported for PIM sparse mode configurations.

PIM join load balancing is supported on draft-rosen multicast VPNs (also referred to as dual PIM multicast VPNs). PIM join load balancing is not supported on multiprotocol BGP-based multicast VPNs (also referred to as next-generation Layer 3 VPN multicast). When PIM join load balancing is enabled in a draft-rosen Layer 3 VPN scenario, the load balancing is achieved based on the join counts for the far-end PE routing devices, not for any intermediate P routing devices.

If an internal BGP (IBGP) multipath forwarding VPN route is available, the Junos OS uses the multipath forwarding VPN route to send join messages to the remote PE routers to achieve load balancing over the VPN.

By default, when multiple PIM joins are received for different groups, all joins are sent to the same upstream gateway chosen by the unicast routing protocol. Even if there are multiple equal-cost paths available, these alternative paths are not utilized to distribute multicast traffic from the source to the various groups.

When PIM join load balancing is configured, the PIM joins are distributed equally among all equal-cost upstream interfaces and neighbors. Every new join triggers the selection of the least-loaded upstream interface and neighbor. If there are multiple neighbors on the same interface (for example, on a LAN), join load balancing maintains a value for each of the neighbors and distributes multicast joins (and downstream traffic) among these as well.

Join counts for interfaces and neighbors are maintained globally, not on a per-source basis. Therefore, there is no guarantee that joins for a particular source are load-balanced. However, the joins for all sources and all groups known to the routing device are load-balanced. There is also no way to administratively give preference to one neighbor over another: all equal-cost paths are treated the same way.

You can configure message filtering globally or for a routing instance. This example shows the global configuration.

You configure PIM join load balancing on the non-RP routers in the PIM domain.

1. Determine if there are multiple paths available for a source (for example, an RP) with the output of the **show pim join extensive** or **show pim source** commands.

```
user@host> show pim join extensive
Instance: PIM.master Family: INET

Group: 224.1.1.1
  Source: *
  RP: 10.255.245.6
  Flags: sparse,rptree,wildcard
  Upstream interface: t1-0/2/3.0
  Upstream neighbor: 192.168.38.57
  Upstream state: Join to RP
  Downstream neighbors:
    Interface: t1-0/2/1.0
    192.168.38.16 State: JOIN Flags; SRW Timeout: 164
Group: 224.2.127.254
  Source: *
  RP: 10.255.245.6
  Flags: sparse,rptree,wildcard
  Upstream interface: so-0/3/0.0
  Upstream neighbor: 192.168.38.47
  Upstream state: Join to RP
  Downstream neighbors:
    Interface: t1-0/2/3.0
    192.168.38.16 State: JOIN Flags; SRW Timeout: 164
```

Note that for this router, the RP at IP address 10.255.245.6 is the source for two multicast groups: 224.1.1.1 and 224.2.127.254. This router has two equal-cost paths through two different upstream interfaces (**t1-0/2/3.0** and **so-0/3/0.0**) with two different neighbors (192.168.38.57 and 192.168.38.47). This router is a good candidate for PIM join load balancing.

2. On the non-RP router, configure PIM sparse mode and join load balancing.

```
[edit protocols pim ]
user@host# set interface all mode sparse version 2
user@host# set join-load-balance
```

3. Then configure the static address of the RP.

```
[edit protocols pim rp]
user@host# set static address 10.10.10.1
```

4. Monitor the operation.

If load balancing is enabled for this router, the number of PIM joins sent on each interface is shown in the output for the **show pim interfaces** command.

```
user@host> show pim interfaces
Instance: PIM.master
```

Name	Stat	Mode	IP V	State	NbrCnt	JoinCnt	DR address
lo0.0	Up	Sparse	4 2	DR	0	0	10.255.168.58
pe-1/2/0.32769	Up	Sparse	4 2	P2P	0	0	
so-0/3/0.0	Up	Sparse	4 2	P2P	1	1	
t1-0/2/1.0	Up	Sparse	4 2	P2P	1	0	
t1-0/2/3.0	Up	Sparse	4 2	P2P	1	1	
lo0.0	Up	Sparse	6 2	DR	0	0	fe80::2a0:a5ff:4b7

Note that the two equal-cost paths shown by the **show pim interfaces** command now have nonzero join counts. If the counts differ by more than one and were zero (0) when load balancing commenced, an error occurs (joins before load balancing are not redistributed). The join count also appears in the **show pim neighbors detail** output:

```
user@host> show pim neighbors detail
Interface: so-0/3/0.0
```

```
Address: 192.168.38.46, IPv4, PIM v2, Mode: Sparse, Join Count: 0
Hello Option Holdtime: 65535 seconds
Hello Option DR Priority: 1
Hello Option Generation ID: 1689116164
Hello Option LAN Prune Delay: delay 500 ms override 2000 ms
```

```
Address: 192.168.38.47, IPv4, PIM v2, Join Count: 1
BFD: Disabled
Hello Option Holdtime: 105 seconds 102 remaining
Hello Option DR Priority: 1
Hello Option Generation ID: 792890329
Hello Option LAN Prune Delay: delay 500 ms override 2000 ms
```

```
Interface: t1-0/2/3.0
```

```
Address: 192.168.38.56, IPv4, PIM v2, Mode: Sparse, Join Count: 0
Hello Option Holdtime: 65535 seconds
Hello Option DR Priority: 1
Hello Option Generation ID: 678582286
Hello Option LAN Prune Delay: delay 500 ms override 2000 ms
```

```
Address: 192.168.38.57, IPv4, PIM v2, Join Count: 1
BFD: Disabled
Hello Option Holdtime: 105 seconds 97 remaining
Hello Option DR Priority: 1
Hello Option Generation ID: 1854475503
Hello Option LAN Prune Delay: delay 500 ms override 2000 ms
```

Note that the join count is nonzero on the two load-balanced interfaces toward the upstream neighbors.

PIM join load balancing only takes effect when the feature is configured. Prior joins are not redistributed to achieve perfect load balancing. In addition, if an interface or neighbor fails, the new joins are redistributed among remaining active interfaces and neighbors. However, when the interface or neighbor is restored, prior joins are not redistributed. The **clear pim join-distribution** command redistributes the existing flows to new or restored upstream neighbors. Redistributing the existing flows causes traffic to be disrupted, so we recommend that you perform PIM join redistribution during a maintenance window.

- Related Documentation**
- [\*clear pim join-distribution\*](#)
  - [show pim interfaces on page 475](#)
  - [show pim neighbors on page 499](#)
  - [show pim source on page 510](#)



## Modifying the Join State Timeout

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This section describes how to configure the join state timeout.

A downstream router periodically sends join messages to refresh the join state on the upstream router. If the join state is not refreshed before the timeout expires, the join state is removed.

By default, the join state timeout is 210 seconds. You can change this timeout to allow additional time to receive the join messages. Because the messages are called join-prune messages, the name used is the **join-prune-timeout** statement.

To modify the timeout, include the **join-prune-timeout** statement:

```
user@host# set protocols pim join-prune-timeout 230
```

The join timeout value can be from 210 through 420 seconds.

### Related Documentation

- [join-prune-timeout on page 313](#)

## Example: Enabling Join Suppression

---

This example describes how to enable PIM join suppression.

- [Requirements on page 129](#)
- [Overview on page 129](#)
- [Configuration on page 132](#)
- [Verification on page 133](#)

### Requirements

Before you begin:

- Configure the router interfaces.
- Configure an interior gateway protocol or static routing. See the *Junos OS Routing Protocols Library for Routing Devices*.
- Configure PIM Sparse Mode on the interfaces. See “[Enabling PIM Sparse Mode](#)” on [page 124](#).

### Overview

PIM join suppression enables a router on a multiaccess network to defer sending join messages to an upstream router when it sees identical join messages on the same network. Eventually, only one router sends these join messages, and the other routers suppress identical messages. Limiting the number of join messages improves scalability and efficiency by reducing the number of messages sent to the same router.

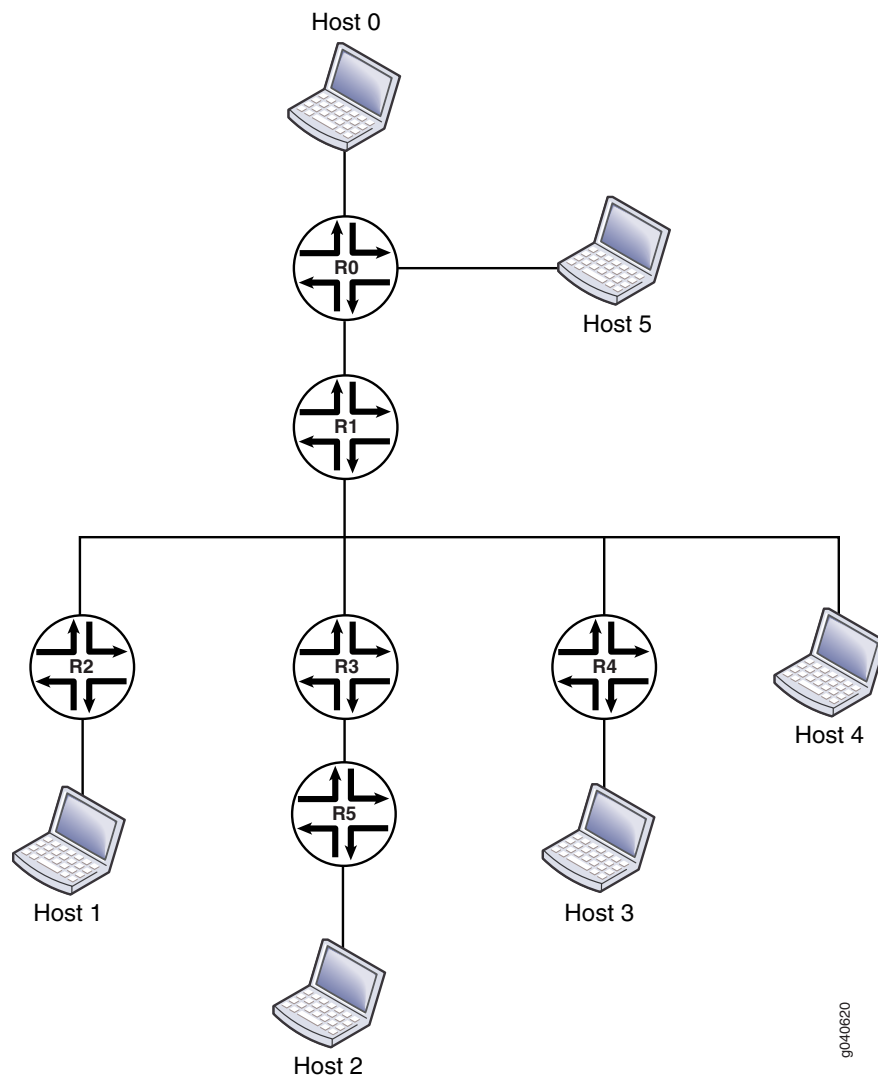
This example includes the following statements:

- **override-interval**—Sets the maximum time in milliseconds to delay sending override join messages. When a router sees a prune message for a join it is currently suppressing, it waits before it sends an override join message. Waiting helps avoid multiple downstream routers sending override join messages at the same time. The override interval is a random timer with a value of 0 through the maximum override value.
- **propagation-delay**—Sets a value in milliseconds for a prune pending timer, which specifies how long to wait before executing a prune on an upstream router. During this period, the router waits for any prune override join messages that might be currently suppressed. The period for the prune pending timer is the sum of the **override-interval** value and the value specified for **propagation-delay**.
- **reset-tracking-bit**—Enables PIM join suppression on each multiaccess downstream interface. This statement resets a tracking bit field (T-bit) on the LAN prune delay hello option from the default of 1 (join suppression disabled) to 0 (join suppression enabled).

When multiple identical join messages are received, a random join suppression timer is activated, with a range of 66 through 84 milliseconds. The timer is reset each time join suppression is triggered.

[Figure 16 on page 131](#) shows the topology used in this example.

Figure 16: Join Suppression



The items in [Figure 16 on page 131](#) represent the following functions:

- Host 0 is the multicast source.
- Host 1, Host 2, Host 3, and Host 4 are receivers.
- Router R0 is the first-hop router and the RP.
- Router R1 is an upstream router.
- Routers R2, R3, R4, and R5 are downstream routers in the multicast LAN.

This example shows the configuration of the downstream devices: Routers R2, R3, R4, and R5.

## Configuration

**CLI Quick Configuration** To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, copy and paste the commands into the CLI at the **[edit]** hierarchy level, and then enter **commit** from configuration mode.

```
[edit]
set protocols pim traceoptions file pim.log
set protocols pim traceoptions file size 5m
set protocols pim traceoptions file world-readable
set protocols pim traceoptions flag join detail
set protocols pim traceoptions flag prune detail
set protocols pim traceoptions flag normal detail
set protocols pim traceoptions flag register detail
set protocols pim rp static address 10.255.112.160
set protocols pim interface all mode sparse
set protocols pim interface all version 2
set protocols pim interface fxp0.0 disable
set protocols pim reset-tracking-bit
set protocols pim propagation-delay 500
set protocols pim override-interval 4000
```

**Step-by-Step Procedure** The following example requires you to navigate various levels in the configuration hierarchy. For information about navigating the CLI, see *Using the CLI Editor in Configuration Mode* in the *CLI User Guide*.

To configure PIM join suppression on a non-RP downstream router in the multicast LAN:

1. Configure PIM sparse mode on the interfaces.

```
[edit]
user@host# edit protocols pim
[edit protocols pim]
user@host# set rp static address 10.255.112.160
[edit protocols pim]
user@host# set interface all mode sparse version 2
[edit protocols pim]
user@host# set interface all version 2
[edit protocols pim]
user@host# set interface fxp0.0 disable
```

2. Enable the join suppression timer.

```
[edit protocols pim]
user@host# set reset-tracking-bit
```

3. Configure the prune override interval value.

```
[edit protocols pim]
user@host# set override-interval 4000
```

4. Configure the propagation delay of the link.

```
[edit protocols pim]
user@host# set propagation-delay 500
```

5. (Optional) Configure PIM tracing operations.

```
[edit protocols pim]
user@host# set traceoptions file pim.log size 5m world-readable
[edit protocols pim]
user@host# set traceoptions flag join detail
[edit protocols pim]
user@host# set traceoptions flag normal detail
[edit protocols pim]
user@host# set traceoptions flag register detail
```

6. If you are done configuring the device, commit the configuration.

```
[edit protocols pim]
user@host# commit
```

## Results

From configuration mode, confirm your configuration by entering the **show protocols** command. If the output does not display the intended configuration, repeat the instructions in this example to correct the configuration.

```
user@host# show protocols
pim {
  traceoptions {
    file pim.log size 5m world-readable;
    flag join detail;
    flag prune detail;
    flag normal detail;
    flag register detail;
  }
  rp {
    static {
      address 10.255.112.160;
    }
  }
  interface all {
    mode sparse;
    version 2;
  }
  interface fxp0.0 {
    disable;
  }
  reset-tracking-bit;
  propagation-delay 500;
  override-interval 4000;
}
```

## Verification

To verify the configuration, run the following commands on the upstream and downstream routers:

- **show pim join extensive**

- [show multicast route extensive](#)

**Related  
Documentation**

- [Example: Configuring the PIM Assert Timeout on page 202](#)
- [Example: Configuring PIM RPF Selection](#)
- [Example: Configuring the PIM SPT Threshold Policy on page 204](#)
- [Enabling PIM Sparse Mode on page 124](#)
- [PIM Overview on page 103](#)

## CHAPTER 7

# Using PIM Dense Mode and PIM Sparse-Dense Mode

- [Understanding PIM Dense Mode on page 135](#)
- [Understanding PIM Sparse-Dense Mode on page 137](#)
- [Mixing PIM Sparse and Dense Modes on page 137](#)
- [Configuring PIM Dense Mode Properties on page 138](#)
- [Configuring PIM Sparse-Dense Mode Properties on page 139](#)

## Understanding PIM Dense Mode

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PIM dense mode is less sophisticated than PIM sparse mode. PIM dense mode is useful for multicast LAN applications, the main environment for all dense mode protocols.

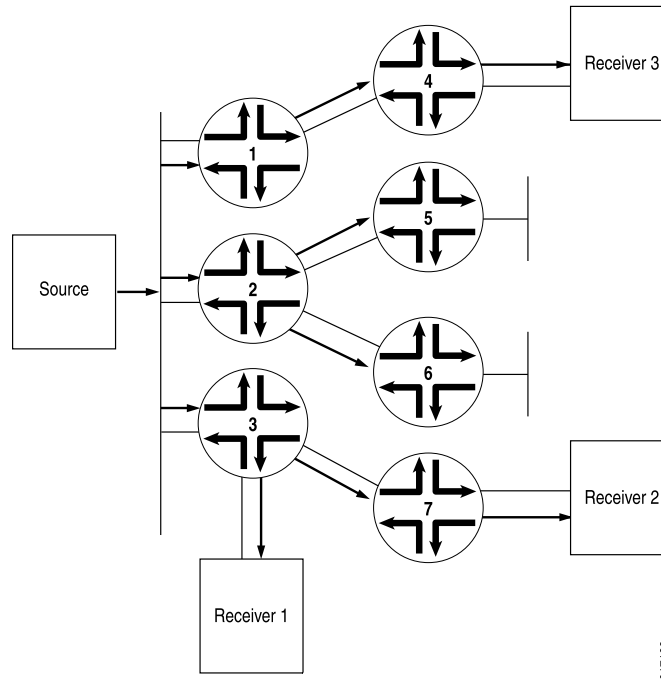
PIM dense mode implements the same flood-and-prune mechanism that DVMRP and other dense mode routing protocols employ. The main difference between DVMRP and PIM dense mode is that PIM dense mode introduces the concept of protocol independence. PIM dense mode can use the routing table populated by any underlying unicast routing protocol to perform reverse-path-forwarding (RPF) checks.

Internet service providers (ISPs) typically appreciate the ability to use any underlying unicast routing protocol with PIM dense mode because they do not need to introduce and manage a separate routing protocol just for RPF checks. While unicast routing protocols extended as multiprotocol BGP (MBGP) and Multitopology Routing in IS-IS (M-IS-IS) were later employed to build special tables to perform RPF checks, PIM dense mode does not require them.

PIM dense mode can use the unicast routing table populated by OSPF, IS-IS, BGP, and so on, or PIM dense mode can be configured to use a special multicast RPF table populated by MBGP or M-IS-IS when performing RPF checks.

Unlike sparse mode, in which data is forwarded only to routers sending an explicit request, dense mode implements a *flood-and-prune* mechanism, similar to DVMRP. In PIM dense mode, there is no RP. A router receives the multicast data on the interface closest to the source, then forwards the traffic to all other interfaces (see [Figure 17 on page 136](#)).

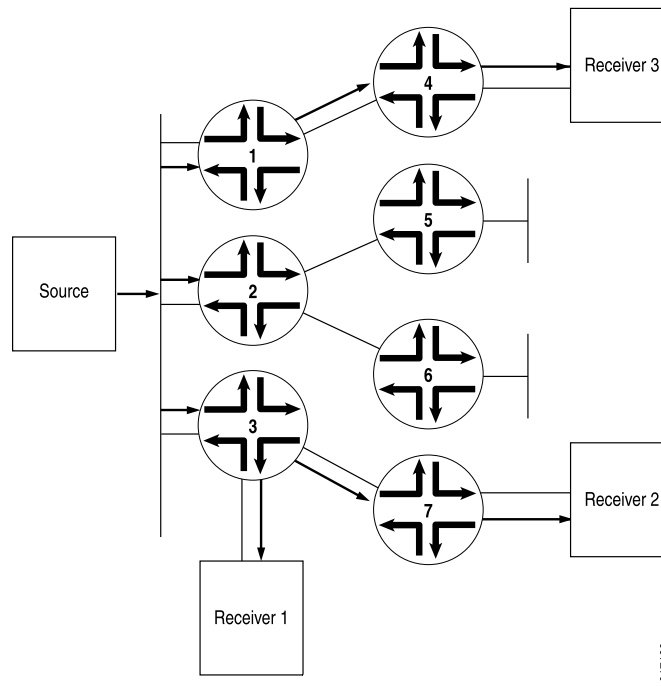
**Figure 17: Multicast Traffic Flooded from the Source Using PIM Dense Mode**



Flooding occurs periodically. It is used to refresh state information, such as the source IP address and multicast group pair. If the router has no interested receivers for the data, and the OIL becomes empty, the router sends a prune message upstream to stop delivery of multicast traffic (see [Figure 18 on page 137](#)).



**Figure 18: Prune Messages Sent Back to the Source to Stop Unwanted Multicast Traffic**



## Understanding PIM Sparse-Dense Mode

Sparse-dense mode, as the name implies, allows the interface to operate on a per-group basis in either sparse or dense mode. A group specified as dense is not mapped to an RP. Instead, data packets destined for that group are forwarded by means of PIM dense-mode rules. A group specified as sparse is mapped to an RP, and data packets are forwarded by means of PIM sparse-mode rules.

For information about PIM sparse-mode and PIM dense-mode rules, see [“Understanding PIM Sparse Mode” on page 121](#) and [“Understanding PIM Dense Mode” on page 135](#).

- Related Documentation**
- [Understanding PIM Sparse Mode on page 121](#)
  - [Understanding PIM Dense Mode on page 135](#)

## Mixing PIM Sparse and Dense Modes

It is possible to mix PIM dense mode, PIM sparse mode, and PIM source-specific multicast (SSM) on the same network, the same router, and even the same interface. This is because modes are effectively tied to multicast groups, an IP multicast group address must be unique for a particular group's traffic, and scoping limits enforce the division between potential or actual overlaps.



**NOTE:** PIM sparse mode was capable of forming shortest-path trees (SPTs) already. Changes to PIM sparse mode to support PIM SSM mainly involved defining behavior in the SSM address range, because shared-tree behavior is prohibited for groups in the SSM address range.

A multicast router employing sparse-dense mode is a good example of mixing PIM modes on the same network or router or interface. Dense modes are easy to support because of the flooding, but scaling issues make dense modes inappropriate for Internet use beyond very restricted uses.

---

## Configuring PIM Dense Mode Properties

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In PIM dense mode (PIM-DM), the assumption is that almost all possible subnets have at least one receiver wanting to receive the multicast traffic from a source, so the network is flooded with traffic on all possible branches, then pruned back when branches do not express an interest in receiving the packets, explicitly (by message) or implicitly (time-out silence). LANs are appropriate networks for dense-mode operation.

By default, PIM is disabled. When you enable PIM, it operates in sparse mode by default.

You can configure PIM dense mode globally or for a routing instance. This example shows how to configure the routing instance and how to specify that PIM dense mode use **inet.2** as its RPF routing table instead of **inet.0**.

To configure the router properties for PIM dense mode:

1. (Optional) Create an IPv4 routing table group so that interface routes are installed into two routing tables, **inet.0** and **inet.2**.

```
[edit routing-options rib-groups]
user@host# set pim-rg export-rib inet.0
user@host# set pim-rg import-rib [ inet.0 inet.2 ]
```

2. (Optional) Associate the routing table group with a PIM routing instance.

```
[edit routing-instances PIM.dense protocols pim]
user@host# set rib-group inet pim-rg
```

3. Configure the PIM interface. If you do not specify any interfaces, PIM is enabled on all router interfaces. Generally, you specify interface names only if you are disabling PIM on certain interfaces.

```
[edit routing-instances PIM.dense protocols pim]
user@host# set interface fe-0/0/1.0 mode dense
```



**NOTE:** You cannot configure both PIM and Distance Vector Multicast Routing Protocol (DVMRP) in forwarding mode on the same interface. You can configure PIM on the same interface only if you configured DVMRP in unicast-routing mode.

4. Monitor the operation of PIM dense mode by running the **show pim interfaces**, **show pim join**, **show pim neighbors**, and **show pim statistics** commands.

- Related Documentation**
- [Understanding PIM Dense Mode on page 135](#)
  - [Example: Configuring a Dedicated PIM RPF Routing Table](#)

## Configuring PIM Sparse-Dense Mode Properties

Sparse-dense mode allows the interface to operate on a per-group basis in either sparse or dense mode. A group specified as “dense” is not mapped to an RP. Instead, data packets destined for that group are forwarded by means of PIM dense mode rules. A group specified as “sparse” is mapped to an RP, and data packets are forwarded by means of PIM sparse-mode rules. Sparse-dense mode is useful in networks implementing auto-RP for PIM sparse mode.

By default, PIM is disabled. When you enable PIM, it operates in sparse mode by default.

You can configure PIM sparse-dense mode globally or for a routing instance. This example shows how to configure PIM sparse-dense mode globally on all interfaces, specifying that the groups 224.0.1.39 and 224.0.1.40 are using dense mode.

To configure the router properties for PIM sparse-dense mode:

1. Configure the dense-mode groups.

```
[protocols pim]
user@host# set dense-groups 224.0.1.39
user@host# set dense-groups 224.0.1.40
```

2. Configure all interfaces on the routing device to use sparse-dense mode. When configuring all interfaces, exclude the **fxp0.0** management interface by adding the **disable** statement for that interface.

```
[edit protocols pim]
user@host# set interface all mode sparse-dense
user@host# set interface fxp0.0 disable
```

3. Monitor the operation of PIM sparse-dense mode by running the **show pim interfaces**, **show pim join**, **show pim neighbors**, and **show pim statistics** commands.

- Related Documentation**
- [Understanding PIM Sparse-Dense Mode on page 137](#)



## CHAPTER 8

# Using Source-Specific Multicast

- [Source-Specific Multicast Groups Overview on page 141](#)
- [Understanding PIM SSM on page 142](#)
- [PIM SSM on page 143](#)
- [Example: Configuring PIM SSM on a Network on page 145](#)
- [Example: Configuring an SSM-Only Domain on page 147](#)
- [Example: Configuring SSM Mapping on page 147](#)
- [Example: Configuring Source-Specific Multicast Groups with Any-Source Override on page 150](#)
- [Example: Configuring SSM Maps for Different Groups to Different Sources on page 153](#)

### Source-Specific Multicast Groups Overview

---

Source-specific multicast (SSM) is a service model that identifies session traffic by both source and group address. SSM implemented in Junos OS has the efficient explicit join procedures of Protocol Independent Multicast (PIM) sparse mode but eliminates the immediate shared tree and rendezvous point (RP) procedures using (\*,G) pairs. The (\*) is a wildcard referring to any source sending to group G, and "G" refers to the IP multicast group. SSM builds shortest-path trees (SPTs) directly represented by (S,G) pairs. The "S" refers to the source's unicast IP address, and the "G" refers to the specific multicast group address. The SSM (S,G) pairs are called channels to differentiate them from any-source multicast (ASM) groups. Although ASM supports both one-to-many and many-to-many communications, ASM's complexity is in its method of source discovery. For example, if you click a link in a browser, the receiver is notified about the group information, but not the source information. With SSM, the client receives both source and group information.

SSM is ideal for one-to-many multicast services such as network entertainment channels. However, many-to-many multicast services might require ASM.

To deploy SSM successfully, you need an end-to-end multicast-enabled network and applications that use an Internet Group Management Protocol version 3 (IGMPv3) or Multicast Listener Discovery version 2 (MLDv2) stack, or you need to configure SSM mapping from IGMPv1 or IGMPv2 to IGMPv3. An IGMPv3 stack provides the capability of a host operating system to use the IGMPv3 protocol. IGMPv3 is available for Windows XP, Windows Vista, and most UNIX operating systems.

SSM mapping allows operators to support an SSM network without requiring all hosts to support IGMPv3. This support exists in static (S,G) configurations, but SSM mapping also supports dynamic per-source group state information, which changes as hosts join and leave the group using IGMP.

SSM is typically supported with a subset of IGMPv3 and PIM sparse mode known as *PIM SSM*. Using SSM, a client can receive multicast traffic directly from the source. PIM SSM uses the PIM sparse-mode functionality to create an SPT between the client and the source, but builds the SPT without the help of an RP.

An SSM-configured network has distinct advantages over a traditionally configured PIM sparse-mode network. There is no need for shared trees or RP mapping (no RP is required), or for RP-to-RP source discovery through the Multicast Source Discovery Protocol (MSDP).

---

## Understanding PIM SSM

RFC 1112, the original multicast RFC, supported both many-to-many and one-to-many models. These came to be known collectively as any-source multicast (ASM) because ASM allowed one or many sources for a multicast group's traffic. However, an ASM network must be able to determine the locations of all sources for a particular multicast group whenever there are interested listeners, no matter where the sources might be located in the network. In ASM, the key function of *source discovery* is a required function of the network itself.

Multicast source discovery appears to be an easy process, but in sparse mode it is not. In dense mode, it is simple enough to flood traffic to every router in the whole network so that every router learns the source address of the content for that multicast group. However, the flooding presents scalability and network resource use issues and is not a viable option in sparse mode.

PIM sparse mode (like any sparse mode protocol) achieves the required source discovery functionality without flooding at the cost of a considerable amount of complexity. The RP routers must be added and must know all multicast sources, and complicated shared distribution trees must be built to the RPs.

In an environment where many sources come and go, such as for a videoconferencing service, ASM is appropriate. However, by ignoring the many-to-many model and focusing attention on the one-to-many source-specific multicast (SSM) model, several commercially promising multicast applications, such as television channel distribution over the Internet, might be brought to the Internet much more quickly and efficiently than if full ASM functionality were required of the network.

PIM SSM is simpler than PIM sparse mode because only the one-to-many model is supported. Initial commercial multicast Internet applications are likely to be available to *subscribers* (that is, receivers that issue join messages) from only a single source (a special case of SSM covers the need for a backup source). PIM SSM therefore forms a subset of PIM sparse mode. PIM SSM builds shortest-path trees (SPTs) rooted at the source immediately because in SSM, the router closest to the interested receiver host is informed of the unicast IP address of the source for the multicast traffic. That is, PIM SSM bypasses the RP connection stage through shared distribution trees, as in PIM sparse mode, and goes directly to the source-based distribution tree.

PIM SSM introduces new terms for many of the concepts in PIM sparse mode. PIM SSM can technically be used in the entire 224/4 multicast address range, although PIM SSM operation is guaranteed only in the 232/8 range (232.0.0/24 is reserved). The new SSM terms are appropriate for Internet video applications and are summarized in

[Table 8 on page 143](#).

**Table 8: ASM and SSM Terminology**

Term	Any-Source Multicast	Source-Specific Multicast
Address identifier	G	S,G
Address designation	group	channel
Receiver operations	join, leave	subscribe, unsubscribe
Group address range	224/4 excluding 232/8	224/4 (guaranteed only for 232/8)

Although PIM SSM describes receiver operations as *subscribe* and *unsubscribe*, the same PIM sparse mode join and leave messages are used by both forms of the protocol. The terminology change distinguishes ASM from SSM even though the receiver messages are identical.

## PIM SSM

PIM source-specific multicast (SSM) uses a subset of PIM sparse mode and IGMP version 3 (IGMPv3) to allow a client to receive multicast traffic directly from the source. PIM SSM uses the PIM sparse-mode functionality to create an SPT between the receiver and the source, but builds the SPT without the help of an RP.

By default, the SSM group multicast address is limited to the IP address range from 232.0.0.0 through 232.255.255.255. However, you can extend SSM operations into another Class D range by including the **ssm-groups** statement at the **[edit routing-options multicast]** hierarchy level. The default SSM address range from 232.0.0.0 through 232.255.255.255 cannot be used in the **ssm-groups** statement. This statement is for adding other multicast addresses to the default SSM group addresses. This statement does not override the default SSM group address range.

You can also configure Junos OS to accept any-source multicast (ASM) join messages (\*G) for group addresses that are within the default or configured range of source-specific multicast (SSM) groups. This allows you to support a mix of any-source and source-specific multicast groups simultaneously.

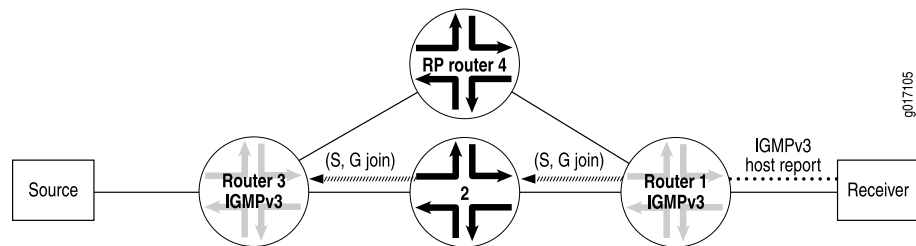
An SSM-configured network has distinct advantages over a traditionally configured PIM sparse-mode network. There is no need for shared trees or RP mapping (no RP is required), or for RP-to-RP source discovery through MSDP.

Deploying SSM is easy. You need to configure PIM sparse mode on all router interfaces and issue the necessary SSM commands, including specifying IGMPv3 on the receiver's LAN. If PIM sparse mode is not explicitly configured on both the source and group member

interfaces, multicast packets are not forwarded. Source lists, supported in IGMPv3, are used in PIM SSM. As sources become active and start sending multicast packets, interested receivers in the SSM group receive the multicast packets.

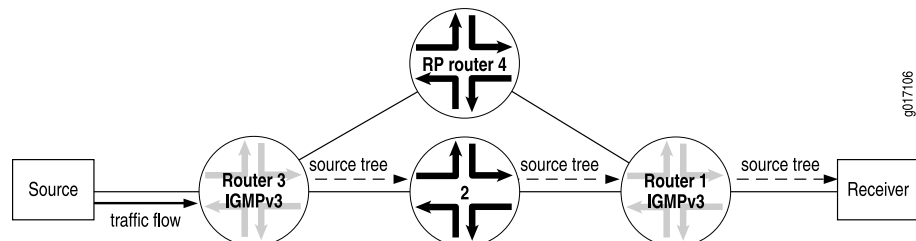
In a PIM SSM-configured network, a host subscribes to an SSM channel (by means of IGMPv3), announcing a desire to join group G and source S (see [Figure 19 on page 144](#)). The directly connected PIM sparse-mode router, the receiver's DR, sends an (S,G) join message to its RPF neighbor for the source. Notice in [Figure 19 on page 144](#) that the RP is not contacted in this process by the receiver, as would be the case in normal PIM sparse-mode operations.

**Figure 19: Receiver Announces Desire to Join Group G and Source S**



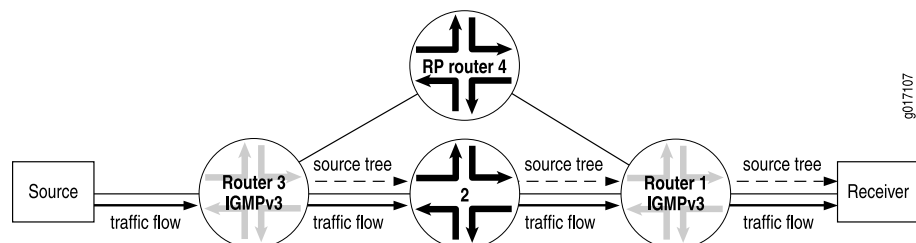
The (S,G) join message initiates the source tree and then builds it out hop by hop until it reaches the source. In [Figure 20 on page 144](#), the source tree is built across the network to Router 3, the last-hop router connected to the source.

**Figure 20: Router 3 (Last-Hop Router) Joins the Source Tree**



Using the source tree, multicast traffic is delivered to the subscribing host (see [Figure 21 on page 144](#)).

**Figure 21: (S,G) State Is Built Between the Source and the Receiver**



To configure additional SSM groups, include the **ssm-groups** statement at the **[edit routing-options multicast]** hierarchy level.

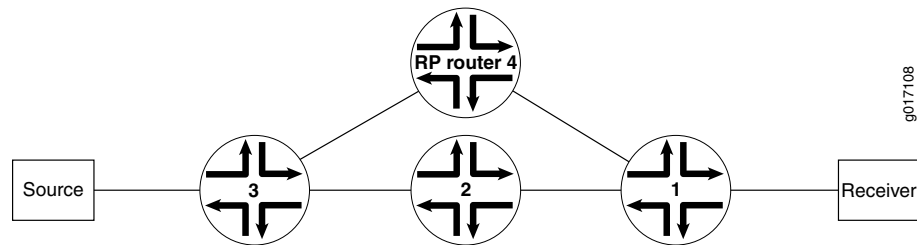


- Related Documentation**
- [Source-Specific Multicast Groups Overview on page 141](#)
  - [Example: Configuring Source-Specific Multicast Groups with Any-Source Override on page 150](#)

## Example: Configuring PIM SSM on a Network

The following example shows how PIM SSM is configured between a receiver and a source in the network illustrated in [Figure 22 on page 145](#).

**Figure 22: Network on Which to Configure PIM SSM**



This example shows how to configure the IGMP version to IGMPv3 on all receiving host interfaces.

1. Enable IGMPv3 on all host-facing interfaces, and disable IGMP on the **fxp0.0** interface on Router 1.

```

user@router1# set protocols igmp interface all version 3
user@router1# set protocols igmp interface fxp0.0 disable

```



**NOTE:** When you configure IGMPv3 on a router, hosts on interfaces configured with IGMPv2 cannot join the source tree.

2. After the configuration is committed, use the **show configuration protocol igmp** command to verify the IGMP protocol configuration.

```

user@router1> show configuration protocol igmp

[edit protocols igmp]
interface all {
  version 3;
}
interface fxp0.0 {
  disable;
}

```

3. Use the **show igmp interface** command to verify that IGMP interfaces are configured.

```

user@router1> show igmp interface

```

Interface	State	Querier	Timeout	Version	Groups
fe-0/0/0.0	Up	198.58.3.245	213	3	0
fe-0/0/1.0	Up	198.58.3.241	220	3	0
fe-0/0/2.0	Up	198.58.3.237	218	3	0

```

Configured Parameters:
IGMP Query Interval (1/10 secs): 1250

```

```

IGMP Query Response Interval (1/10 secs): 100
IGMP Last Member Query Interval (1/10 secs): 10
IGMP Robustness Count: 2
Derived Parameters:
IGMP Membership Timeout (1/10 secs): 2600
IGMP Other Querier Present Timeout (1/10 secs): 2550

```

4. Use the **show pim join extensive** command to verify the PIM join state on Router 2 and Router 3 (the upstream routers).

```

user@router2> show pim join extensive
232.1.1.1      10.4.1.2      sparse
Upstream interface: fe-1/1/3.0
Upstream State: Local Source
Keepalive timeout: 209
Downstream Neighbors:
Interface: so-1/0/2.0
10.10.71.1      State: Join   Flags: S    Timeout: 209

```

5. Use the **show pim join extensive** command to verify the PIM join state on Router 1 (the router connected to the receiver).

```

user@router1> show pim join extensive
232.1.1.1      10.4.1.2      sparse
Upstream interface: so-1/0/2.0
Upstream State: Join to Source
Keepalive timeout: 209
Downstream Neighbors:
Interface: fe-0/2/3.0
10.3.1.1      State: Join   Flags: S    Timeout: Infinity

```



**NOTE:** IP version 6 (IPv6) multicast routers use the Multicast Listener Discovery (MLD) Protocol to manage the membership of hosts and routers in multicast groups and to learn which groups have interested listeners for each attached physical networks. Each routing device maintains a list of host multicast addresses that have listeners for each subnetwork, as well as a timer for each address. However, the routing device does not need to know the address of each listener—just the address of each host. The routing device provides addresses to the multicast routing protocol it uses, which ensures that multicast packets are delivered to all subnetworks where there are interested listeners. In this way, MLD is used as the transport for the Protocol Independent Multicast (PIM) Protocol. MLD is an integral part of IPv6 and must be enabled on all IPv6 routing devices and hosts that need to receive IP multicast traffic. The Junos OS supports MLD versions 1 and 2. Version 2 is supported for source-specific multicast (SSM) include and exclude modes.

**Related Documentation**

- [Example: Configuring SSM Mapping on page 147](#)

## Example: Configuring an SSM-Only Domain

Deploying an SSM-only domain is much simpler than deploying an ASM domain because it only requires a few configuration steps. Enable PIM sparse mode on all interfaces by adding the **mode** statement at the **[edit protocols pim interface all]** hierarchy level. When configuring all interfaces, exclude the **fxp0.0** management interface by adding the **disable** statement for that interface. Then configure IGMPv3 on all host-facing interfaces by adding the **version** statement at the **[edit protocols igmp interface *interface-name*]** hierarchy level.

In the following example, the host-facing interface is **fe-0/1/2**:

```
[edit]
protocols {
  pim {
    interface all {
      mode sparse;
      version 2;
    }
    interface fxp0.0 {
      disable;
    }
  }
  igmp {
    interface fe-0/1/2 {
      version 3;
    }
  }
}
```

## Example: Configuring SSM Mapping

SSM mapping does not require that all hosts support IGMPv3. SSM mapping translates IGMPv1 or IGMPv2 membership reports to an IGMPv3 report. This enables hosts running IGMPv1 or IGMPv2 to participate in SSM until the hosts transition to IGMPv3.

SSM mapping applies to all group addresses that match the policy, not just those that conform to SSM addressing conventions (232/8 for IPv4, ff30::/32 through ff3F::/32 for IPv6).

We recommend separate SSM maps for IPv4 and IPv6 if both address families require SSM support. If you apply an SSM map containing both IPv4 and IPv6 addresses to an interface in an IPv4 context (using IGMP), only the IPv4 addresses in the list are used. If there are no such addresses, no action is taken. Similarly, if you apply an SSM map containing both IPv4 and IPv6 addresses to an interface in an IPv6 context (using MLD), only the IPv6 addresses in the list are used. If there are no such addresses, no action is taken.

In this example, you create a policy to match the group addresses that you want to translate to IGMPv3. Then you define the SSM map that associates the policy with the source addresses where these group addresses are found. Finally, you apply the SSM map to one or more IGMP (for IPv4) or MLD (for IPv6) interfaces.

1. Create an SSM policy named **ssm-policy-example**. The policy terms match the IPv4 SSM group address 232.1.1.1/32 and the IPv6 SSM group address ff35::1/128. All other addresses are rejected.

```
user@router1# set policy-options policy-statement ssm-policy-example term A from
route-filter 232.1.1.1/32 exact
user@router1# set policy-options policy-statement ssm-policy-example term A then
accept
user@router1# set policy-options policy-statement ssm-policy-example term B from
route-filter ff35::1/128 exact
user@router1# set policy-options policy-statement ssm-policy-example term B then
accept
```

2. After the configuration is committed, use the **show configuration policy-options** command to verify the policy configuration.

```
user@host> show configuration policy-options

[edit policy-options]
policy-statement ssm-policy-example {
  term A {
    from {
      route-filter 232.1.1.1/32 exact;
    }
    then accept;
  }
  term B {
    from {
      route-filter ff35::1/128 exact;
    }
    then accept;
  }
  then reject;
}
```

The group addresses must match the configured policy for SSM mapping to occur.

3. Define two SSM maps, one called **ssm-map-ipv6-example** and one called **ssm-map-ipv4-example**, by applying the policy and configuring the source addresses as a multicast routing option.

```
user@host# set routing-options multicast ssm-map ssm-map-ipv6-example policy
ssm-policy-example
user@host# set routing-options multicast ssm-map ssm-map-ipv6-example source
fec0::1 fec0::12
user@host# set routing-options multicast ssm-map ssm-map-ipv4-example policy
ssm-policy-example
user@host# set routing-options multicast ssm-map ssm-map-ipv4-example source
10.10.10.4
user@host# set routing-options multicast ssm-map ssm-map-ipv4-example source
192.168.43.66
```

- After the configuration is committed, use the **show configuration routing-options** command to verify the policy configuration.

```
user@host> show configuration routing-options

[edit routing-options]
multicast {
  ssm-map ssm-map-ipv6-example {
    policy ssm-policy-example;
    source [ fec0::1 fec0::12 ];
  }
  ssm-map ssm-map-ipv4-example {
    policy ssm-policy-example;
    source [ 10.10.10.4 192.168.43.66 ];
  }
}
```

We recommend separate SSM maps for IPv4 and IPv6.

- Apply SSM maps for IPv4-to-IGMP interfaces and SSM maps for IPv6-to-MLD interfaces:

```
user@host# set protocols igmp interface fe-0/1/0.0 ssm-map ssm-map-ipv4-example
user@host# set protocols mld interface fe-0/1/1.0 ssm-map ssm-map-ipv6-example
```

- After the configuration is committed, use the **show configuration protocol** command to verify the IGMP and MLD protocol configuration.

```
user@router1> show configuration protocol

[edit protocols]
igmp {
  interface fe-0/1/0.0 {
    ssm-map ssm-map-ipv4-example;
  }
}
mld {
  interface fe-0/1/1.0 {
    ssm-map ssm-map-ipv6-example;
  }
}
```

- Use the **show igmp interface** and the **show mld interface** commands to verify that the SSM maps are applied to the interfaces.

```
user@host> show igmp interface fe-0/1/0.0
Interface: fe-0/1/0.0
Querier: 192.168.224.28
State:      Up Timeout:      None Version: 2 Groups: 2
SSM Map: ssm-map-ipv4-example

user@host> show mld interface fe-0/1/1.0
Interface: fe-0/1/1.0
Querier: fec0:0:0:0:1::12
State:      Up Timeout:      None Version: 2 Groups: 2
SSM Map: ssm-map-ipv6-example
```

## Example: Configuring Source-Specific Multicast Groups with Any-Source Override

This example shows how to extend source-specific multicast (SSM) group operations beyond the default IP address range of 232.0.0.0 through 232.255.255.255. This example also shows how to accept any-source multicast (ASM) join messages (\*G) for group addresses that are within the default or configured range of SSM groups. This allows you to support a mix of any-source and source-specific multicast groups simultaneously.

- [Requirements on page 150](#)
- [Overview on page 150](#)
- [Configuration on page 151](#)
- [Verification on page 153](#)

### Requirements

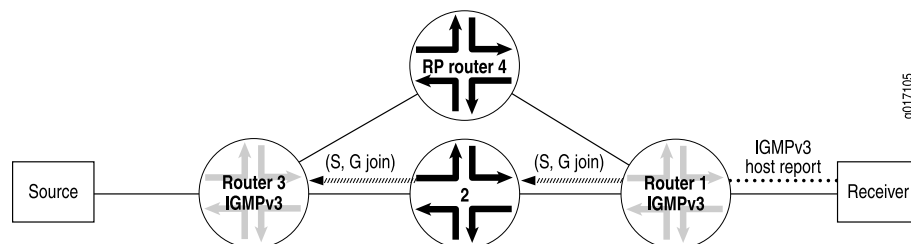
Before you begin, configure the router interfaces. See the *Junos OS Network Interfaces Library for Routing Devices*.

### Overview

To deploy SSM, configure PIM sparse mode on all routing device interfaces and issue the necessary SSM commands, including specifying IGMPv3 or MLDv2 on the receiver's LAN. If PIM sparse mode is not explicitly configured on both the source and group members interfaces, multicast packets are not forwarded. Source lists, supported in IGMPv3 and MLDv2, are used in PIM SSM. Only sources that are specified send traffic to the SSM group.

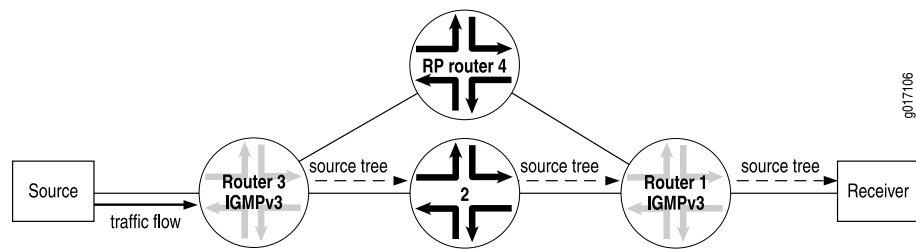
In a PIM SSM-configured network, a host subscribes to an SSM channel (by means of IGMPv3 or MLDv2) to join group G and source S (see [Figure 23 on page 150](#)). The directly connected PIM sparse-mode router, the receiver's designated router (DR), sends an (S,G) join message to its reverse-path forwarding (RPF) neighbor for the source. Notice in [Figure 23 on page 150](#) that the RP is not contacted in this process by the receiver, as would be the case in normal PIM sparse-mode operations.

**Figure 23: Receiver Sends Messages to Join Group G and Source S**



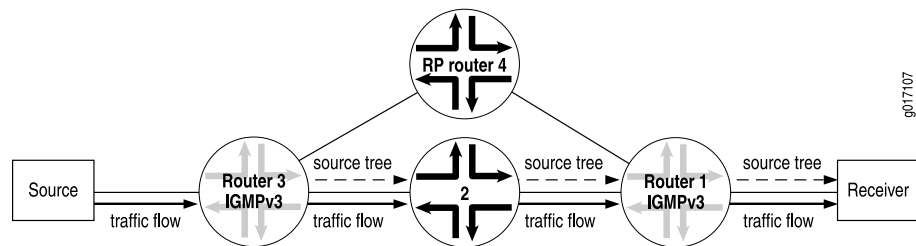
The (S,G) join message initiates the source tree and then builds it out hop by hop until it reaches the source. In [Figure 24 on page 151](#), the source tree is built across the network to Router 3, the last-hop router connected to the source.

Figure 24: Router 3 (Last-Hop Router) Joins the Source Tree



Using the source tree, multicast traffic is delivered to the subscribing host (see [Figure 25 on page 151](#)).

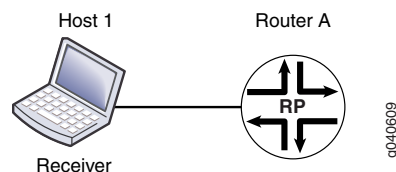
Figure 25: (S,G) State Is Built Between the Source and the Receiver



SSM can operate in include mode or in exclude mode. In exclude mode the receiver specifies a list of sources that it does not want to receive the multicast group traffic from. The routing device forwards traffic to the receiver from any source except the sources specified in the exclusion list. The receiver accepts traffic from any sources except the sources specified in the exclusion list.

This example works with the simple RPF topology shown in [Figure 26 on page 151](#).

Figure 26: Simple RPF Topology



## Configuration

### CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, copy and paste the commands into the CLI at the **[edit]** hierarchy level and then enter **commit** from configuration mode.

```
set protocols ospf area 0.0.0.0 interface fxp0.0 disable
set protocols ospf area 0.0.0.0 interface all
set protocols pim rp local address 10.255.72.46
set protocols pim rp local group-ranges 239.0.0.0/24
set protocols pim interface fe-1/0/0.0 mode sparse
set protocols pim interface lo0.0 mode sparse
set routing-options multicast ssm-groups 232.0.0.0/8
```

```
set routing-options multicast ssm-groups 239.0.0.0/8
set routing-options multicast asm-override-ssm
```

**Step-by-Step Procedure** The following example requires that you navigate various levels in the configuration hierarchy. For information about navigating the CLI, see *Using the CLI Editor in Configuration Mode* in the *CLI User Guide*.

To configure an RPF policy:

1. Configure OSPF.

```
[edit protocols ospf]
user@host# set area 0.0.0.0 interface fxp0.0 disable
user@host# set area 0.0.0.0 interface all
```

2. Configure PIM sparse mode.

```
[edit protocols pim]
user@host# set rp local address 10.255.72.46
user@host# set rp local group-ranges 239.0.0.0/24
user@host# set interface fe-1/0/0.0 mode sparse
user@host# set interface lo0.0 mode sparse
```

3. Configure additional SSM groups.

```
[edit routing-options]
user@host# set ssm-groups [ 232.0.0.0/8 239.0.0.0/8 ]
```

4. Configure the RP to accept ASM join messages for groups within the SSM address range.

```
[edit routing-options]
user@host# set multicast asm-override-ssm
```

5. If you are done configuring the device, commit the configuration.

```
user@host# commit
```

---

## Results

Confirm your configuration by entering the **show protocols** and **show routing-options** commands.

```
user@host# show protocols
ospf {
  area 0.0.0.0 {
    interface fxp0.0 {
      disable;
    }
    interface all;
  }
}
pim {
  rp {
    local {
      address 10.255.72.46;
      group-ranges {
```



```

        239.0.0.0/24;
    }
}
interface fe-1/0/0.0 {
    mode sparse;
}
interface lo0.0 {
    mode sparse;
}
}

user@host# show routing-options
multicast {
    ssm-groups [ 232.0.0.0/8 239.0.0.0/8 ];
    asm-override-ssm;
}

```

## Verification

To verify the configuration, run the following commands:

- [show igmp group](#)
- [show igmp statistics](#)
- [show pim join](#)

### Related Documentation

- [Source-Specific Multicast Groups Overview on page 141](#)

## Example: Configuring SSM Maps for Different Groups to Different Sources

- [Multiple SSM Maps and Groups for Interfaces on page 153](#)
- [Example: Configuring Multiple SSM Maps Per Interface on page 153](#)

### Multiple SSM Maps and Groups for Interfaces

You can configure multiple source-specific multicast (SSM) maps so that different groups map to different sources, which enables a single multicast group to map to different sources for different interfaces.

### Example: Configuring Multiple SSM Maps Per Interface

This example shows how to assign more than one SSM map to an IGMP interface.

- [Requirements on page 154](#)
- [Overview on page 154](#)
- [Configuration on page 154](#)
- [Verification on page 156](#)

## Requirements

This example requires Junos OS Release 11.4 or later.

## Overview

In this example, you configure a routing policy, POLICY-ipv4-example1, that maps multicast group join messages over an IGMP logical interface to IPv4 multicast source addresses based on destination IP address as follows:

Routing Policy Name	Multicast Group Join Messages for a Route Filter at This Destination Address	Multicast Source Addresses
POLICY-ipv4-example1 term 1	232.1.1.1	10.10.10.4, 192.168.43.66
POLICY-ipv4-example1 term 2	232.1.1.2	10.10.10.5, 192.168.43.67

You apply routing policy POLICY-ipv4-example1 to IGMP logical interface fe-0/1/0.0.

## Configuration

The following example requires that you navigate various levels in the configuration hierarchy. For information about navigating the CLI, see the *CLI User Guide*.

To configure this example, perform the following task:

### CLI Quick Configuration

To quickly configure this example, copy the following configuration commands into a text file, remove any line breaks, change any details necessary to match your network configuration, copy and paste the commands into the CLI at the **[edit]** hierarchy level, and then enter **commit** from configuration mode.

```
set policy-options policy-statement POLICY-ipv4-example1 term 1 from route-filter
  232.1.1.1/32 exact
set policy-options policy-statement POLICY-ipv4-example1 term 1 then ssm-source
  10.10.10.4
set policy-options policy-statement POLICY-ipv4-example1 term 1 then ssm-source
  192.168.43.66
set policy-options policy-statement POLICY-ipv4-example1 term 1 then accept
set policy-options policy-statement POLICY-ipv4-example1 term 2 from route-filter
  232.1.1.2/32 exact
set policy-options policy-statement POLICY-ipv4-example1 term 2 then ssm-source
  10.10.10.5
set policy-options policy-statement POLICY-ipv4-example1 term 2 then ssm-source
  192.168.43.67
set policy-options policy-statement POLICY-ipv4-example1 term 2 then accept
set protocols igmp interface fe-0/1/0.0 ssm-map-policy POLICY-ipv4-example1
```

**Step-by-Step Procedure**

To configure multiple SSM maps per interface:

1. Configure protocol-independent routing options for route filter 232.1.1.1, and specify the multicast source addresses to which matching multicast groups are to be mapped.

```
[edit policy-options policy-statement POLICY-ipv4-example1 term 1]
user@host# set from route-filter 232.1.1.1/32 exact
user@host# set then ssm-source 10.10.10.4
user@host# set then ssm-source 192.168.43.66
user@host# set then accept
```

2. Configure protocol-independent routing options for route filter 232.1.1.2, and specify the multicast source addresses to which matching multicast groups are to be mapped.

```
[edit policy-options policy-statement POLICY-ipv4-example1 term 2]
user@host# set from route-filter 232.1.1.2/32 exact
user@host# set then ssm-source 10.10.10.5
user@host# set then ssm-source 192.168.43.67
user@host# set then accept
```

3. Apply the policy map POLICY-ipv4-example1 to IGMP logical interface fe-0/1/1/0.

```
[edit protocols igmp interface fe-0/1/0.0]
user@host# set ssm-map-policy POLICY-ipv4-example1
```

**Results** After the configuration is committed, confirm the configuration by entering the **show policy-options** and **show protocols** configuration mode commands. If the command output does not display the intended configuration, repeat the instructions in this procedure to correct the configuration.

```
user@host# show policy-options
policy-statement POLICY-ipv4-example1 {
  term 1 {
    from {
      route-filter 232.1.1.1/32 exact;
    }
    then {
      ssm-source [ 10.10.10.4 192.168.43.66 ];
      accept;
    }
  }
  term 2 {
    from {
      route-filter 232.1.1.2/32 exact;
    }
    then {
      ssm-source [ 10.10.10.5 192.168.43.67 ];
      accept;
    }
  }
}

user@host# show protocols
igmp {
  interface fe-0/1/0.0 {
```

```
        ssm-map-policy POLICY-ipv4-example1;
    }
}
```

### Verification

---

Confirm that the configuration is working properly.

- [Displaying Information About IGMP-Enabled Interfaces on page 156](#)
- [Displaying the PIM Groups on page 156](#)
- [Displaying the Entries in the IP Multicast Forwarding Table on page 156](#)

#### *Displaying Information About IGMP-Enabled Interfaces*

- Purpose** Verify that the SSM map policy POLICY-ipv4-example1 is applied to logical interface fe-0/1/0.0.
- Action** Use the [show igmp interface](#) operational mode command for the IGMP logical interface to which you applied the SSM map policy.
- ```
user@host> show igmp interface
Interface: fe-0/1/0.0
  Querier: 10.111.30.1
  State:      Up Timeout:   None Version:  2 Groups:      2
  SSM Map Policy: POLICY-ipv4-example1;

Configured Parameters:
IGMP Query Interval: 125.0
IGMP Query Response Interval: 10.0
IGMP Last Member Query Interval: 1.0
IGMP Robustness Count: 2

Derived Parameters:
IGMP Membership Timeout: 260.0
IGMP Other Querier Present Timeout: 255.0
```
- The command output displays the name of the IGMP logical interface (fe-0/1/0.0), which is the address of the routing device that has been elected to send membership queries and group information.

#### *Displaying the PIM Groups*

- Purpose** Verify the Protocol Independent Multicast (PIM) source and group pair (S,G) entries.
- Action** Use the [show pim join extensive 232.1.1.1](#) operational mode command to display the PIM source and group pair (S,G) entries for the 232.1.1.1 group.

#### *Displaying the Entries in the IP Multicast Forwarding Table*

- Purpose** Verify that the IP multicast forwarding table displays the multicast route state.
- Action** Use the [show multicast route extensive](#) operational mode command to display the entries in the IP multicast forwarding table to verify that the **Route state** is active and that the **Forwarding state** is forwarding.

- Related Documentation**
- *Example: Configuring Source-Specific Multicast*
  - *Example: Configuring Source-Specific Draft-Rosen 7 Multicast VPNs*



## CHAPTER 9

# Using Static RP

- [Understanding Static RP on page 159](#)
- [Configuring Local PIM RPs on page 159](#)
- [Configuring the Static PIM RP Address on the Non-RP Routing Device on page 161](#)

### Understanding Static RP

---

Protocol Independent Multicast (PIM) sparse mode is the most common multicast protocol used on the Internet. PIM sparse mode is the default mode whenever PIM is configured on any interface of the device. However, because PIM must not be configured on the network management interface, you must disable it on that interface.

Each any-source multicast (ASM) group has a shared tree through which receivers learn about new multicast sources and new receivers learn about all multicast sources. The rendezvous point (RP) router is the root of this shared tree and receives the multicast traffic from the source. To receive multicast traffic from the groups served by the RP, the device must determine the IP address of the RP for the source.

You can configure a static rendezvous point (RP) configuration that is similar to static routes. A static configuration has the benefit of operating in PIM version 1 or version 2. When you configure the static RP, the RP address that you select for a particular group must be consistent across all routers in a multicast domain.

One common way for the device to locate RPs is by static configuration of the IP address of the RP. A static configuration is simple and convenient. However, if the statically defined RP router becomes unreachable, there is no automatic failover to another RP router. To remedy this problem, you can use anycast RP.

#### Related Documentation

- [Configuring Local PIM RPs on page 159](#)
- [Configuring the Static PIM RP Address on the Non-RP Routing Device on page 161](#)

### Configuring Local PIM RPs

---

Local RP configuration makes the routing device a statically defined RP. Consider statically defining an RP if the network does not have many different RPs defined or if the RP assignment does not change very often. The Junos IPv6 PIM implementation supports

only static RP configuration. Automatic RP announcement and bootstrap routers are not available with IPv6.

You can configure a local RP globally or for a routing instance. This example shows how to configure a local RP in a routing instance for IPv4 or IPv6.

To configure the routing device's RP properties:

1. Configure the routing instance as the local RP.

```
[routing-instances VPN-A protocols pim]
user@host# set rp local
```

2. Configure the IP protocol family and IP address.

IPv6 PIM hello messages are sent to every interface on which you configure **family inet6**, whether at the PIM level of the hierarchy or not. As a result, if you configure an interface with both **family inet** at the [edit interface *interface-name*] hierarchy level and **family inet6** at the [edit protocols pim interface *interface-name*] hierarchy level, PIM sends both IPv4 and IPv6 hellos to that interface.

By default, PIM operates in sparse mode on an interface. If you explicitly configure sparse mode, PIM uses this setting for all IPv6 multicast groups. However, if you configure sparse-dense mode, PIM does not accept IPv6 multicast groups as dense groups and operates in sparse mode over them.

```
[edit routing-instances VPN-A protocols pim rp local]
user@host# set family inet6 address 2001:db8:85a3::8a2e:370:7334
user@host# set family inet address 10.1.2.254
```

3. (IPv4 only) Configure the routing device's RP priority.



**NOTE:** The priority statement is not supported for IPv6, but is included here for informational purposes. The routing device's priority value for becoming the RP is included in the bootstrap messages that the routing device sends. Use a smaller number to increase the likelihood that the routing device becomes the RP for local multicast groups. Each PIM routing device uses the priority value and other factors to determine the candidate RPs for a particular group range. After the set of candidate RPs is distributed, each routing device determines algorithmically the RP from the candidate RP set using a hash function. By default, the priority value is set to 1. If this value is set to 0, the bootstrap router can override the group range being advertised by the candidate RP.

```
[edit routing-instances VPN-A protocols pim rp local]
user@host# set priority 5
```

4. Configure the groups for which the routing device is the RP.

By default, a routing device running PIM is eligible to be the RP for all IPv4 or IPv6 groups (224.0.0.0/4 or FF70::/12 to FFF0::/12). The following example limits the groups for which this routing device can be the RP.

```
[edit routing-instances VPN-A protocols pim rp local]
```



```
user@host# set group-ranges fec0::/10
user@host# set group-ranges 10.1.2.0/24
```

5. (IPv4 only) Modify the local RP hold time.

If the local routing device is configured as an RP, it is considered a candidate RP for its local multicast groups. For candidate RPs, the hold time is used by the bootstrap router to time out RPs, and applies to the bootstrap RP-set mechanism. The RP hold time is part of the candidate RP advertisement message sent by the local routing device to the bootstrap router. If the bootstrap router does not receive a candidate RP advertisement from an RP within the hold time, it removes that routing device from its list of candidate RPs. The default hold time is 150 seconds.

```
[edit routing-instances VPN-A protocols pim rp local]
user@host# set hold-time 200
```

6. (Optional) Override dynamic RP for the specified group address range.

If you configure both static RP mapping and dynamic RP mapping (such as auto-RP) in a single routing instance, allow the static mapping to take precedence for the given static RP group range, and allow dynamic RP mapping for all other groups.

If you exclude this statement from the configuration and you use both static and dynamic RP mechanisms for different group ranges within the same routing instance, the dynamic RP mapping takes precedence over the static RP mapping, even if static RP is defined for a specific group range.

```
[edit routing-instances VPN-A protocols pim rp local]
user@host# set override
```

7. Monitor the operation of PIM by running the **show pim** commands. Run **show pim ?** to display the supported commands.

- Related Documentation**
- [PIM Overview on page 103](#)
  - [Understanding MLD on page 75](#)

## Configuring the Static PIM RP Address on the Non-RP Routing Device

Consider statically defining an RP if the network does not have many different RPs defined or if the RP assignment does not change very often. The Junos IPv6 PIM implementation supports only static RP configuration. Automatic RP announcement and bootstrap routers are not available with IPv6.

You configure a static RP address on the non-RP routing device. This enables the non-RP routing device to recognize the local statically defined RP. For example, if R0 is a non-RP router and R1 is the local RP router, you configure R0 with the static RP address of R1. The static IP address is the routable address assigned to the loopback interface on R1. In the following example, the loopback address of the RP is 2001:db8:85a3::8a2e:370:7334.

You can configure a static RP address globally or for a routing instance. This example shows how to configure a static RP address in a routing instance for IPv6.

To configure the static RP address:

1. On a non-RP routing device, configure the routing instance to point to the routable address assigned to the loopback interface of the RP.

```
[routing-instances VPN-A protocols pim rp]
user@host# set static address 2001:db8:85a3::8a2e:370:7334
```



**NOTE:** Logical systems are also supported. You can configure a static RP address in a logical system only if the logical system is not directly connected to a source.

2. (Optional) Set the PIM sparse mode version.

For each static RP address, you can optionally specify the PIM version. The default PIM version is version 1.

```
[edit routing-instances VPN-A protocols pim rp]
user@host# set static address 2001:db8:85a3::8a2e:370:7334 version 2
```



**NOTE:** The default PIM version can be version 1 or version 2, depending on the mode you are configuring. PIM version 1 is the default for RP mode ([edit pim rp static address *address*]). PIM version 2 is the default for interface mode ([edit pim interface *interface-name*]). Explicitly configured versions override the defaults.

3. (Optional) Set the group address range.

By default, a routing device running PIM is eligible to be the RP for all IPv4 or IPv6 groups (224.0.0.0/4 or FF70::/12 to FFF0::/12). The following example limits the groups for which the 2001:db8:85a3::8a2e:370:7334 address can be the RP.

```
[edit routing-instances VPN-A protocols pim rp]
user@host# set static address 2001:db8:85a3::8a2e:370:7334 group-ranges fec0::/10
```

The RP that you select for a particular group must be consistent across all routers in a multicast domain.

4. (Optional) Override dynamic RP for the specified group address range.

If you configure both static RP mapping and dynamic RP mapping (such as auto-RP) in a single routing instance, allow the static mapping to take precedence for the given static RP group range, and allow dynamic RP mapping for all other groups.

If you exclude this statement from the configuration and you use both static and dynamic RP mechanisms for different group ranges within the same routing instance, the dynamic RP mapping takes precedence over the static RP mapping, even if static RP is defined for a specific group range.

```
[edit routing-instances VPN-A protocols pim rp static address  
  2001:db8:85a3::8a2e:370:7334]  
user@host# set override
```

5. Monitor the operation of PIM by running the **show pim** commands. Run **show pim ?** to display the supported commands.

- Related Documentation**
- [PIM Overview on page 103](#)
  - [Understanding MLD on page 75](#)



## CHAPTER 10

# Using Anycast RP

- [Understanding RP Mapping with Anycast RP on page 165](#)
- [Example: Configuring PIM Anycast With or Without MSDP on page 166](#)
- [Configuring a PIM Anycast RP Router with MSDP on page 169](#)
- [Configuring a PIM Anycast RP Router Using Only PIM on page 170](#)
- [Configuring All PIM Anycast Non-RP Routers on page 171](#)
- [Example: Configuring Multiple RPs in a Domain with Anycast RP on page 172](#)

### Understanding RP Mapping with Anycast RP

---

Having a single active rendezvous point (RP) per multicast group is much the same as having a single server providing any service. All traffic converges on this single point, although other servers are sitting idle, and convergence is slow when the resource fails. In multicast specifically, there might be closer RPs on the shared tree, so the use of a single RP is suboptimal.

For the purposes of load balancing and redundancy, you can configure anycast RP. You can use anycast RP within a domain to provide redundancy and RP load sharing. When an RP fails, sources and receivers are taken to a new RP by means of unicast routing. When you configure anycast RP, you bypass the restriction of having one active RP per multicast group, and instead deploy multiple RPs for the same group range. The RP routers share one unicast IP address. Sources from one RP are known to other RPs that use the Multicast Source Discovery Protocol (MSDP). Sources and receivers use the closest RP, as determined by the interior gateway protocol (IGP).

Anycast means that multiple RP routers share the same unicast IP address. Anycast addresses are advertised by the routing protocols. Packets sent to the anycast address are sent to the nearest RP with this address. Anycast addressing is a generic concept and is used in PIM sparse mode to add load balancing and service reliability to RPs.

Anycast RP is defined in RFC3446 , *Anycast RP Mechanism Using PIM and MSDP*, and can be found here: <https://www.ietf.org/rfc/rfc3446.txt> .

#### Related Documentation

- [Configuring the Static PIM RP Address on the Non-RP Routing Device on page 161](#)
- [Example: Configuring Multiple RPs in a Domain with Anycast RP on page 172](#)
- [Example: Configuring PIM Anycast With or Without MSDP on page 166](#)

## Example: Configuring PIM Anycast With or Without MSDP

When you configure anycast RP, you bypass the restriction of having one active rendezvous point (RP) per multicast group, and instead deploy multiple RPs for the same group range. The RP routers share one unicast IP address. Sources from one RP are known to other RPs that use the Multicast Source Discovery Protocol (MSDP). Sources and receivers use the closest RP, as determined by the interior gateway protocol (IGP).

You can use anycast RP within a domain to provide redundancy and RP load sharing. When an RP stops operating, sources and receivers are taken to a new RP by means of unicast routing.

You can configure anycast RP to use PIM and MSDP for IPv4, or PIM alone for both IPv4 and IPv6 scenarios. Both are discussed in this section.

We recommend a static RP mapping with anycast RP over a bootstrap router and auto-RP configuration because it provides all the benefits of a bootstrap router and auto-RP without the complexity of the BSR and auto-RP mechanisms.

All systems on a subnet must run the same version of PIM.

The default PIM version can be version 1 or version 2, depending on the mode you are configuring. PIMv1 is the default RP mode (at the **[edit protocols pim rp static address address]** hierarchy level). However, PIMv2 is the default for interface mode (at the **[edit protocols pim interface interface-name]** hierarchy level). Explicitly configured versions override the defaults. This example explicitly configures PIMv2 on the interfaces.

The following example shows an anycast RP configuration for the RP routers, first with MSDP and then using PIM alone, and for non-RP routers.

1. For a network using an RP with MSDP, configure the RP using the **lo0** loopback interface, which is always up. Include the **address** statement and specify the unique and routable router ID and the RP address at the **[edit interfaces lo0 unit 0 family inet]** hierarchy level. In this example, the router ID is **198.58.3.254** and the shared RP address is **198.58.3.253**. Include the **primary** statement for the first address. Including the **primary** statement selects the router's primary address from all the preferred addresses on all interfaces.

```
interfaces {
  lo0 {
    description "PIM RP";
    unit 0 {
      family inet {
        address 198.58.3.254/32;
        primary;
        address 198.58.3.253/32;
      }
    }
  }
}
```

2. Specify the RP address. Include the **address** statement at the **[edit protocols pim rp local]** hierarchy level (the same address as the secondary **lo0** interface).

For all interfaces, include the **mode** statement to set the mode to **sparse** and the **version** statement to specify PIM version 2 at the **[edit protocols pim rp local interface all]** hierarchy level. When configuring all interfaces, exclude the **fxp0.0** management interface by including the **disable** statement for that interface.

```
protocols {
  pim {
    rp {
      local {
        family inet;
        address 198.58.3.253;
      }
    }
    interface all {
      mode sparse;
      version 2;
    }
    interface fxp0.0 {
      disable;
    }
  }
}
```

3. Configure MSDP peering. Include the **peer** statement to configure the address of the MSDP peer at the **[edit protocols msdp]** hierarchy level. For MSDP peering, use the unique, primary addresses instead of the anycast address. To specify the local address for MSDP peering, include the **local-address** statement at the **[edit protocols msdp peer]** hierarchy level.

```
protocols {
  msdp {
    peer 198.58.3.250 {
      local-address 198.58.3.254;
    }
  }
}
```



**NOTE:** If you need to configure a PIM RP for both IPv4 and IPv6 scenarios, perform Step 4 and Step 5. Otherwise, go to Step 6.

4. Configure an RP using the **lo0** loopback interface, which is always up. Include the **address** statement to specify the unique and routable router address and the RP address at the **[edit interfaces lo0 unit 0 family inet]** hierarchy level. In this example, the router ID is **198.58.3.254** and the shared RP address is **198.58.3.253**. Include the **primary** statement on the first address. Including the **primary** statement selects the router's primary address from all the preferred addresses on all interfaces.

```
interfaces {
  lo0 {
    description "PIM RP";
```

```

unit 0 {
  family inet {
    address 198.58.3.254/32 {
      primary;
    }
    address 198.58.3.253/32;
  }
}

```

5. Include the **address** statement at the **[edit protocols pim rp local]** hierarchy level to specify the RP address (the same address as the secondary **lo0** interface).

For all interfaces, include the **mode** statement to set the mode to **sparse**, and the **version** statement to specify PIM version 2 at the **[edit protocols pim rp local interface all]** hierarchy level. When configuring all interfaces, exclude the **fxp0.0** management interface by including the **disable** statement for that interface.

Include the **anycast-pim** statement to configure anycast RP without MSDP (for example, if IPv6 is used for multicasting). The other RP routers that share the same IP address are configured using the **rp-set** statement. There is one entry for each RP, and the maximum that can be configured is 15. For each RP, specify the routable IP address of the router and whether MSDP source active (SA) messages are forwarded to the RP.

MSDP configuration is not necessary for this type of IPv4 anycast RP configuration.

```

protocols {
  pim {
    rp {
      local {
        family inet {
          address 198.58.3.253;
          anycast-pim {
            rp-set {
              address 198.58.3.240;
              address 198.58.3.241 forward-msdp-sa;
            }
            local-address 198.58.3.254; #If not configured, use lo0 primary
          }
        }
      }
    }
  }
  interface all {
    mode sparse;
    version 2;
  }
  interface fxp0.0 {
    disable;
  }
}

```

6. Configure the non-RP routers. The anycast RP configuration for a non-RP router is the same whether MSDP is used or not. Specify a static RP by adding the address at



the **[edit protocols pim rp static]** hierarchy level. Include the **version** statement at the **[edit protocols pim rp static address]** hierarchy level to specify PIM version 2.

```
protocols {
  pim {
    rp {
      static {
        address 198.58.3.253 {
          version 2;
        }
      }
    }
  }
}
```

7. Include the **mode** statement at the **[edit protocols pim interface all]** hierarchy level to specify sparse mode on all interfaces. Then include the **version** statement at the **[edit protocols pim rp interface all mode]** to configure all interfaces for PIM version 2. When configuring all interfaces, exclude the **fxp0.0** management interface by including the **disable** statement for that interface.

```
protocols {
  pim {
    interface all {
      mode sparse;
      version 2;
    }
    interface fxp0.0 {
      disable;
    }
  }
}
```

## Configuring a PIM Anycast RP Router with MSDP

Add the **address** statement at the **[edit protocols pim rp local]** hierarchy level to specify the RP address (the same address as the secondary **lo0** interface).

For all interfaces, use the **mode** statement to set the mode to **sparse** and the **version** statement to specify PIM version 2 at the **[edit protocols pim rp local interface all]** hierarchy level. When configuring all interfaces, exclude the **fxp0.0** management interface by adding the **disable** statement for that interface.

```
protocols {
  pim {
    rp {
      local {
        family inet;
        address 198.58.3.253;
      }
      interface all {
        mode sparse;
        version 2;
      }
    }
  }
}
```

```
        interface fxp0.0 {
            disable;
        }
    }
}
```

To configure MSDP peering, add the **peer** statement to configure the address of the MSDP peer at the **[edit protocols msdp]** hierarchy level. For MSDP peering, use the unique, primary addresses instead of the anycast address. To specify the local address for MSDP peering, add the **local-address** statement at the **[edit protocols msdp peer]** hierarchy level.

```
protocols {
  msdp {
    peer 198.58.3.250 {
      local-address 198.58.3.254;
    }
  }
}
```

---

## Configuring a PIM Anycast RP Router Using Only PIM

In this example, configure an RP using the **lo0** loopback interface, which is always up. Use the **address** statement to specify the unique and routable router address and the RP address at the **[edit interfaces lo0 unit 0 family inet]** hierarchy level. In this case, the router ID is 198.58.3.254/32 and the shared RP address is 198.58.3.253/32. Add the flag statement **primary** to the first address. Using this flag selects the router's primary address from all the preferred addresses on all interfaces.

```
interfaces {
  lo0 {
    description "PIM RP";
    unit 0 {
      family inet {
        address 198.58.3.254/32 {
          primary;
        }
        address 198.58.3.253/32;
      }
    }
  }
}
```

Add the **address** statement at the **[edit protocols pim rp local]** hierarchy level to specify the RP address (the same address as the secondary **lo0** interface).

For all interfaces, use the **mode** statement to set the mode to **sparse**, and include the **version** statement to specify PIM version 2 at the **[edit protocols pim rp local interface all]** hierarchy level. When configuring all interfaces, exclude the **fxp0.0** management interface by adding the **disable** statement for that interface.

Use the **anycast-pim** statement to configure anycast RP without MSDP (for example, if IPv6 is used for multicasting). The other RP routers that share the same IP address are

configured using the **rp-set** statement. There is one entry for each RP, and the maximum that can be configured is 15. For each RP, specify the routable IP address of the router and whether MSDP source active (SA) messages are forwarded to the RP.

```
protocols {
  pim {
    rp {
      local {
        family inet {
          address 198.58.3.253;
          anycast-pim {
            rp-set {
              address 198.58.3.240;
              address 198.58.3.241 forward-msdp-sa;
            }
            local-address 198.58.3.254; #If not configured, use lo0 primary
          }
        }
      }
    }
  }
  interface all {
    mode sparse;
    version 2;
  }
  interface fxp0.0 {
    disable;
  }
}
```

MSDP configuration is not necessary for this type of IPv4 anycast RP configuration.

## Configuring All PIM Anycast Non-RP Routers

Use the **mode** statement at the **[edit protocols pim rp interface all]** hierarchy level to specify sparse mode on all interfaces. Then add the **version** statement at the **[edit protocols pim rp interface all mode]** to configure all interfaces for PIM version 2. When configuring all interfaces, exclude the **fxp0.0** management interface by adding the **disable** statement for that interface.

```
protocols {
  pim {
    interface all {
      mode sparse;
      version 2;
    }
    interface fxp0.0 {
      disable;
    }
  }
}
```

## Example: Configuring Multiple RPs in a Domain with Anycast RP

---

This example shows how to configure anycast RP on each RP router in the PIM-SM domain. With this configuration you can deploy more than one RP for a single group range. This enables load balancing and redundancy.

- [Requirements on page 172](#)
- [Overview on page 172](#)
- [Configuration on page 172](#)
- [Verification on page 174](#)

### Requirements

Before you begin:

- Configure the router interfaces. See the *Junos OS Network Interfaces Library for Routing Devices*.
- Configure an interior gateway protocol or static routing. See the *Junos OS Routing Protocols Library for Routing Devices*.
- Configure PIM Sparse Mode on the interfaces. See [“Enabling PIM Sparse Mode” on page 124](#).

### Overview

When you configure anycast RP, the RP routers in the PIM-SM domain use a shared address. In this example, the shared address is 10.1.1.2/32. Anycast RP uses Multicast Source Discovery Protocol (MSDP) to discover and maintain a consistent view of the active sources. Anycast RP also requires an RP selection method, such as static, auto-RP, or bootstrap RP. This example uses static RP and shows only one RP router configuration.

### Configuration

|                                |                                                                                                                                                                                                                                                                                                                         |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CLI Quick Configuration</b> | To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, and then copy and paste the commands into the CLI at the <b>[edit]</b> hierarchy level.                                          |
| <b>RP Routers</b>              | <pre>set interfaces lo0 unit 0 family inet address 192.168.132.1/32 primary set interfaces lo0 unit 0 family inet address 10.1.1.2/32 set protocols msdp local-address 192.168.132.1 set protocols msdp peer 192.168.12.1 set protocols pim rp local address 10.1.1.2 set routing-options router-id 192.168.132.1</pre> |
| <b>Non-RP Routers</b>          | <pre>set protocols pim rp static address 10.1.1.2</pre>                                                                                                                                                                                                                                                                 |

**Step-by-Step Procedure** The following example requires that you navigate various levels in the configuration hierarchy. For information about navigating the CLI, see *Using the CLI Editor in Configuration Mode* in the *CLI User Guide*.

To configure anycast RP:

1. On each RP router in the domain, configure the shared anycast address on the router's loopback address.

```
[edit interfaces]
user@host# set lo0 unit 0 family inet address 10.1.1.2/32
```

2. On each RP router in the domain, make sure that the router's regular loopback address is the primary address for the interface, and set the router ID.

```
[edit interfaces]
user@host# set lo0 unit 0 family inet address 192.168.132.1/32 primary
```

```
[edit routing-options]
user@host# set router-id 192.168.132.1
```

3. On each RP router in the domain, configure the local RP address, using the shared address.

```
[edit protocols pim]
user@host# set rp local address 10.1.1.2
```

4. On each RP router in the domain, create MSDP sessions to the other RPs in the domain.

```
[edit protocols msdp]
user@host# set local-address 192.168.132.1
user@host# set peer 192.168.12.1
```

5. On each non-RP router in the domain, configure a static RP address using the shared address.

```
[edit protocols pim]
user@host# set rp static address 10.1.1.2
```

6. If you are done configuring the devices, commit the configuration.

```
user@host# commit
```

## Results

From configuration mode, confirm your configuration by entering the **show interfaces**, **show protocols**, and **show routing-options** commands. If the output does not display the intended configuration, repeat the instructions in this example to correct the configuration.

```
user@host# show interfaces
lo0 {
  unit 0 {
    family inet {
      address 192.168.132.1/32 {
        primary;
      }
    }
  }
}
```

```
        address 10.1.1.2/32;
    }
}
```

*On the RP routers:*

```
user@host# show protocols
msdp {
  local-address 192.168.132.1;
  peer 192.168.12.1;
}
pim {
  rp {
    local {
      address 10.1.1.2;
    }
  }
}
```

*On the non-RP routers:*

```
user@host# show protocols
pim {
  rp {
    static {
      address 10.1.1.2;
    }
  }
}

user@host# show routing-options
router-id 192.168.132.1;
```

## Verification

To verify the configuration, run the `show pim rps extensive inet` command.

### Related Documentation

- [Example: Configuring PIM Anycast With or Without MSDP on page 166](#)
- [Understanding PIM Sparse Mode on page 121](#)
- [Understanding RP Mapping with Anycast RP on page 165](#)

## CHAPTER 11

# Using Auto-RP

- [Understanding PIM Auto-RP on page 175](#)
- [Configuring PIM Auto-RP on page 175](#)

## Understanding PIM Auto-RP

---

You can configure a more dynamic way of assigning rendezvous points (RPs) in a multicast network by means of auto-RP. When you configure auto-RP for a router, the router learns the address of the RP in the network automatically and has the added advantage of operating in PIM version 1 and version 2.

Although auto-RP is a nonstandard (non-RFC-based) function that typically uses dense mode PIM to advertise control traffic, it provides an important failover advantage that simple static RP assignment does not. You can configure multiple routers as RP candidates. If the elected RP fails, one of the other preconfigured routers takes over the RP functions. This capability is controlled by the auto-RP mapping agent.

### Related Documentation

- [Configuring PIM Auto-RP on page 175](#)

## Configuring PIM Auto-RP

---

For correct operation, every multicast router within a PIM domain must be able to map a particular multicast group address to the same rendezvous point (RP). The auto-RP mechanism is one way that a multicast router can learn the set of group-to-RP mappings. Auto-RP automatically distributes mapping information to routing devices. It simplifies use of multiple RPs for different multicast group ranges, thus allowing multiple RPs to act as backups for each other. Auto-RP relies on a router to act as the RP mapping agent. Potential RPs announce themselves to the mapping agent, and the mapping agent resolves any conflicts.

The mapping agent sends the multicast group-RP mapping information to the other routers using PIM dense mode. The specific groups used are 224.0.1.39 and .40. The first (.39) is used to advertise, the second (.40) is used for discovery. Because PIM dense mode is necessary to enable auto-RP to work, which in turns enables PIM sparse mode to work, you must configure PIM sparse-dense mode in the PIM domains that use auto-RP.

Although auto-RP is a nonstandard (non-RFC-based) function requiring dense mode PIM to advertise control traffic, it provides an important failover advantage that static

RP assignment does not. That is, you can configure multiple routing devices as RP candidates. If the elected RP fails, one of the other preconfigured routing devices takes over the RP functions. This capability is controlled by the auto-RP mapping agent.

Auto-RP operates in PIM version 1 and version 2.

In most cases, how the routing device handles auto-RP discovery, announce, or mapping messages depends on whether the routing device is an RP (configured as local RP) or not. [Table 9 on page 176](#) shows how the routing device behaves depending on the local RP configuration.

**Table 9: Local RP and Auto-RP Message Types**

| Auto-RP Message Type | Local RP? | Routing Device Behavior                                                                                                                                             |
|----------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| discovery            | No        | Listen for auto-RP mapping messages.                                                                                                                                |
| discovery            | Yes       | Listen for auto-RP mapping messages.                                                                                                                                |
| announce             | No        | Listen for auto-RP mapping messages.                                                                                                                                |
| announce             | Yes       | Listen for auto-RP mapping messages. Send auto-RP announce messages.                                                                                                |
| mapping              | No        | Listen for auto-RP mapping messages. Listen for auto-RP announce messages. If elected mapping agent, send auto-RP mapping messages.                                 |
| mapping              | Yes       | Listen for auto-RP mapping messages. Send auto-RP announce messages. Listen for auto-RP announce messages. If elected mapping agent, send auto-RP mapping messages. |



**NOTE:** If the routing device receives auto-RP announcements split across multiple messages, the routing device loses the information in the previous part of the message as soon as the next part of the message is received.

You can configure auto-RP properties globally or for a routing instance. This example shows the global configuration.

To configure auto-RP properties:

1. Configure PIM in sparse-dense mode on all routing devices in the PIM domain.

```
[edit protocols pim]
user@host# edit
user@host# set interface all mode sparse-dense
```



This configuration allows the routing device to operate in sparse mode for most groups and dense mode for others. The default is to operate in sparse mode unless the routing device is specifically informed of a dense mode group.

2. Configure a routable loopback interface address on all routing devices in the PIM domain.

The routing device joins the auto-RP groups on the configured interfaces and on the loopback interface **lo0.0**. For auto-RP to work correctly, configure a routable IP address on the loopback interface. You cannot use the loopback address 127.0.0.1. Also, you must enable PIM sparse-dense mode on the **lo0.0** interface if you do not specify **interface all**.

```
[edit interfaces lo0.0 unit 0 family inet]
user@host# set address 192.168.0.3 preferred
```

3. Configure the two multicast dense groups on all the routing devices.

Auto-RP requires multicast flooding to announce potential RP candidates and to discover the elected RPs in the network. Multicast flooding occurs through a PIM dense mode model, where group 224.0.1.39 is used for **announce** messages and group 224.0.1.40 is used for **discovery** messages.

```
[edit protocols pim]
user@host# set dense-groups 224.0.1.39/32
user@host# set dense-groups 224.0.1.40/32
```



**TIP:** Step 3 is required. When auto-RP is enabled, the auto-RP announce group (224.0.1.39) and auto-RP-discovery group (224.0.1.40) must be configured explicitly as dense groups. When the auto-RP discovery group is not configured as a dense group, auto-RP is not enabled. When the auto-RP announce group is not configured as a dense group, auto-RP is enabled in the discovery mode only, and mapping and announce modes are disabled.

4. Configure the auto-RP **announce** option.

At least one routing device in the PIM domain must announce auto-RP messages and at least one must map them, or you can configure a routing device to perform both functions.

When a routing device sends announce messages in the network, it is advertising itself as a candidate RP. A routing device configured with this option must also be configured as an RP, or announce messages are not sent.

```
[edit protocols pim rp]
user@host# set local address 192.168.0.1
user@host# set auto-rp announce
```



**NOTE:** You cannot include the `auto-rp announce` option at the `[edit logical-systems logical-system-name routing-instances routing-instance-name protocols pim]` hierarchy level.

5. Configure the auto-RP mapping agent.

The mapping agent sends discovery messages to the network, informing all routing devices in a multicast group of which RP to use. If the mapping agent is also an RP, the **mapping** option also allows the routing device to send auto-RP announcements (mapping on an RP allows the routing device to perform both the announcement and mapping functions).

```
[edit protocols pim rp]
user@host# set auto-rp mapping
```

If the mapping agent is also an RP, configure the mapping agent as a local RP.

```
[edit protocols pim rp]
user@host# set local address 192.168.0.2
```

6. Configure mapping agent election.

If you configure the **mapping** option on more than one routing device in the PIM domain, configure mapping agent election on each potential mapping agent.

Auto-RP specifications state that mapping agents do not send mapping messages if they receive messages from a mapping agent with a higher IP address. However, some vendors' mapping agents continue to announce mappings, even in the presence of higher-addressed mapping agents. In other words, some mapping agents will always send mapping messages.

The default auto-RP operation is to perform mapping agent election. To explicitly configure mapping agent election, you can include the **mapping-agent-election** statement. When this option is configured, the mapping agent will stop sending mapping messages if it receives messages from a mapping agent with a higher IP address.

```
[edit protocols pim rp]
user@host# set auto-rp mapping mapping-agent-election
```

Mapping message suppression is disabled with the **no-mapping-agent-election** statement. When this option is configured, the mapping agent will always send mapping messages even in the presence of higher-addressed mapping agents.

To disable mapping agent election for compatibility with other vendors' equipment, include the **no-mapping-agent-election** statement.

```
[edit protocols pim rp]
user@host# set auto-rp mapping no-mapping-agent-election
```

7. Configure the remaining routing devices in the PIM domain to discover the RP.

Discovery enables the routing devices to receive and process discovery messages from the mapping agent. This is the most basic auto-RP option.

```
[edit protocols pim rp]
user@host# set auto-rp discovery
```

8. Monitor the operation of PIM auto-RP routers by running the following commands:

- **show pim interfaces**
- **show pim rps**

- [show pim rps](#)

9. Issue the **show pim rps extensive** command to see information about how an RP is learned, what groups it handles, and the number of groups actively using the RP.

```

user@host> show pim rps extensive
RP: 192.168.5.1
Learned from 192.168.5.1 via: auto-rp
Time Active: 00:34:29
Holdtime: 150 with 108 remaining
Device Index: 6
Subunit: 32769
Interface: pd-0/0/0.32769
Group Ranges:
    224.0.0.0/4
Active groups using RP:
    224.2.2.100
    total 1 groups active
Register State for RP:
Group      Source FirstHop      RP Address      StateRP address Type Holdtime
Timeout

```

In the example, the RP at 192.168.5.1 was learned through auto-RP. The RP is able to support all groups in the 224.0.0.0/4 range (all possible groups). The local router has sent PIM control traffic for the 224.2.2.100 group to the RP.

Additionally, the presence of a Tunnel Physical Interface Card (PIC) in an RP router creates a de-encapsulation interface, which allows the RP to receive multicast traffic from the source. This interface is indicated by **pd-0/0/0.32769**.

#### Related Documentation

- [Understanding PIM Sparse Mode on page 121](#)
- [show pim interfaces on page 475](#)
- [show pim rps on page 503](#)



## CHAPTER 12

# Using PIM Bootstrap Router

- [Understanding the PIM Bootstrap Router on page 181](#)
- [Configuring PIM Bootstrap Properties for IPv4 or IPv6 on page 181](#)
- [Example: Rejecting PIM Bootstrap Messages at the Boundary of a PIM Domain on page 183](#)
- [Example: Configuring PIM BSR Filters on page 183](#)

## Understanding the PIM Bootstrap Router

---

To determine which router is the rendezvous point (RP), all routers within a PIM sparse-mode domain collect bootstrap messages. A PIM sparse-mode domain is a group of routers that all share the same RP router. The domain bootstrap router initiates bootstrap messages, which are sent hop by hop within the domain. The routers use bootstrap messages to distribute RP information dynamically and to elect a bootstrap router when necessary.

### Related Documentation

- [Configuring PIM Bootstrap Properties for IPv4 or IPv6](#)

## Configuring PIM Bootstrap Properties for IPv4 or IPv6

---

For correct operation, every multicast router within a PIM domain must be able to map a particular multicast group address to the same rendezvous point (RP). The bootstrap router mechanism is one way that a multicast router can learn the set of group-to-RP mappings. Bootstrap routers are supported in IPv4 and IPv6.

To determine which routing device is the RP, all routing devices within a PIM domain collect bootstrap messages. A PIM domain is a contiguous set of routing devices that implement PIM. All devices are configured to operate within a common boundary. The domain's bootstrap router initiates bootstrap messages, which are sent hop by hop within the domain. The routing devices use bootstrap messages to distribute RP information dynamically and to elect a bootstrap router when necessary.

You can configure bootstrap properties globally or for a routing instance. This example shows the global configuration.

To configure the bootstrap router properties:

1. Configure the bootstrap priority.

By default, each routing device has a bootstrap priority of 0, which means the routing device can never be the bootstrap router. The routing device with the highest priority value is elected to be the bootstrap router. In the case of a tie, the routing device with the highest IP address is elected to be the bootstrap router. A simple bootstrap configuration assigns a bootstrap priority value to a routing device.



**NOTE:** In the IPv4-only configuration, specifying a bootstrap priority of 0 disables the bootstrap function and does not cause the routing device to send BSR packets with a 0 in the priority field. In the combined IPv4 and IPv6 configuration, specifying a bootstrap priority of 0 does not disable the function, but causes the routing device to send BSR packets with a 0 in the priority field. To disable the bootstrap function in the IPv4 and IPv6 configuration, delete the `bootstrap` statement.

```
user@host# edit protocols pim rp
user@host# set bootstrap family inet priority 3
```

2. (Optional) Create import and export policies to control the flow of bootstrap messages to and from the RP, and apply the policies to PIM. Import and export policies are useful when some of the routers in your PIM domain have interfaces that connect to other PIM domains. Configuring a policy prevents bootstrap messages from crossing domain boundaries. The **import** statement prevents messages from being imported into the RP. The **export** statement prevents messages from being exported from the RP.

```
[edit protocols pim rp]
user@host# set bootstrap family inet import pim-bootstrap-import
user@host# set bootstrap family inet export pim-bootstrap-export
user@host# exit
```

3. Configure the policies.

```
user@host# edit policy-options policy-statement pim-bootstrap-import
[edit policy-options policy-statement pim-bootstrap-import]
user@host# set from interface se-0/0/0
user@host# set then reject
user@host# exit
user@host# edit policy-options policy-statement pim-bootstrap-export
user@host# set from interface se-0/0/0
user@host# set then reject
user@host# exit
```

4. Monitor the operation of PIM bootstrap routers by running the **show pim bootstrap** command.

**Related Documentation**

- [Understanding PIM Sparse Mode on page 121](#)

- [Example: Rejecting PIM Bootstrap Messages at the Boundary of a PIM Domain on page 183](#)
- [show pim bootstrap on page 473](#) in the CLI Explorer

## Example: Rejecting PIM Bootstrap Messages at the Boundary of a PIM Domain

In this example, the **from interface so-0-1/0 then reject** policy statement rejects bootstrap messages from the specified interface (the example is configured for both IPv4 and IPv6 operation):

```
protocols {
  pim {
    rp {
      bootstrap {
        family inet {
          priority 1;
          import pim-import;
          export pim-export;
        }
        family inet6 {
          priority 1;
          import pim-import;
          export pim-export;
        }
      }
    }
  }
}
policy-options {
  policy-statement pim-import {
    from interface so-0/1/0;
    then reject;
  }
  policy-statement pim-export {
    to interface so-0/1/0;
    then reject;
  }
}
```

## Example: Configuring PIM BSR Filters

Configure a filter to prevent BSR messages from entering or leaving your network. Add this configuration to all routers:

```
protocols {
  pim {
    rp {
      bootstrap-import no-bsr;
      bootstrap-export no-bsr;
    }
  }
}
```

```
policy-options {  
  policy-statement no-bsr {  
    then reject;  
  }  
}
```



## CHAPTER 13

# Using PIM Filtering

- [Understanding Multicast Message Filters on page 185](#)
- [Filtering MAC Addresses on page 186](#)
- [Filtering RP and DR Register Messages on page 186](#)
- [Configuring Interface-Level PIM Neighbor Policies on page 187](#)
- [Filtering Outgoing PIM Join Messages on page 188](#)
- [Filtering Incoming PIM Join Messages on page 189](#)
- [Configuring Register Message Filters on a PIM RP and DR on page 191](#)

### Understanding Multicast Message Filters

---

Multicast sources and routers generate a considerable number of control messages, especially when using PIM sparse mode. These messages form distribution trees, locate rendezvous points (RPs) and designated routers (DRs), and transition from one type of tree to another. In most cases, this multicast messaging system operates transparently and efficiently. However, in some configurations, more control over the sending and receiving of multicast control messages is necessary.

You can configure multicast filtering to control the sending and receiving of multicast control messages.

To prevent unauthorized groups and sources from registering with an RP router, you can define a routing policy to reject PIM register messages from specific groups and sources and configure the policy on the designated router or the RP router.

- If you configure the reject policy on an RP router, it rejects incoming PIM register messages from the specified groups and sources. The RP router also sends a register stop message by means of unicast to the designated router. On receiving the register stop message, the designated router sends periodic null register messages for the specified groups and sources to the RP router.
- If you configure the reject policy on a designated router, it stops sending PIM register messages for the specified groups and sources to the RP router.



**NOTE:** If you have configured the reject policy on an RP router, we recommend that you configure the same policy on all the RP routers in your multicast network.



**NOTE:** If you delete a group and source address from the reject policy configured on an RP router and commit the configuration, the RP router will register the group and source only when the designated router sends a null register message.

**Related  
Documentation**

- [Filtering MAC Addresses on page 186](#)
- [Filtering RP and DR Register Messages on page 186](#)
- [Filtering MSDP SA Messages on page 214](#)

---

## Filtering MAC Addresses

When a router is exclusively configured with multicast protocols on an interface, multicast sets the interface media access control (MAC) filter to multicast promiscuous mode, and the number of multicast groups is unlimited. However, when the router is not exclusively used for multicasting and other protocols such as OSPF, Routing Information Protocol version 2 (RIPv2), or Network Time Protocol (NTP) are configured on an interface, each of these protocols individually requests that the interface program the MAC filter to pick up its respective multicast group only. In this case, without multicast configured on the interface, the maximum number of multicast MAC filters is limited to 20. For example, the maximum number of interface MAC filters for protocols such as OSPF (multicast group 224.0.0.5) is 20, unless a multicast protocol is also configured on the interface.

No configuration is necessary for MAC filters.

---

## Filtering RP and DR Register Messages

You can filter Protocol Independent Multicast (PIM) register messages sent from the designated router (DR) or to the rendezvous point (RP). The PIM RP keeps track of all active sources in a single PIM sparse mode domain. In some cases, more control over which sources an RP discovers, or which sources a DR notifies other RPs about, is desired. A high degree of control over PIM register messages is provided by RP and DR register message filtering. Message filtering also prevents unauthorized groups and sources from registering with an RP router.

Register messages that are filtered at a DR are not sent to the RP, but the sources are available to local users. Register messages that are filtered at an RP arrive from source DRs, but are ignored by the router. Sources on multicast group traffic can be limited or directed by using RP or DR register message filtering alone or together.

If the action of the register filter policy is to discard the register message, the router needs to send a register-stop message to the DR. Register-stop messages are throttled to prevent malicious users from triggering them on purpose to disrupt the routing process.

Multicast group and source information is encapsulated inside unicast IP packets. This feature allows the router to inspect the multicast group and source information before sending or accepting the PIM register message.

Incoming register messages to an RP are passed through the configured register message filtering policy before any further processing. If the register message is rejected, the RP router sends a register-stop message to the DR. When the DR receives the register-stop message, the DR stops sending register messages for the filtered groups and sources to the RP. Two fields are used for register message filtering:

- Group multicast address
- Source address

The syntax of the existing policy statements is used to configure the filtering on these two fields. The **route-filter** statement is useful for multicast group address filtering, and the **source-address-filter** statement is useful for source address filtering. In most cases, the action is to **reject** the register messages, but more complex filtering policies are possible.

Filtering cannot be performed on other header fields, such as DR address, protocol, or port. In some configurations, an RP might not send register-stop messages when the policy action is to discard the register messages. This has no effect on the operation of the feature, but the router will continue to receive register messages.

When anycast RP is configured, register messages can be sent or received by the RP. All the RPs in the anycast RP set need to be configured with the same RP register message filtering policies. Otherwise, it might be possible to circumvent the filtering policy.

#### Related Documentation

- [Understanding RP Mapping with Anycast RP on page 165](#)
- [Configuring Register Message Filters on a PIM RP and DR on page 191](#)

## Configuring Interface-Level PIM Neighbor Policies

You can configure a policy to filter unwanted PIM neighbors. In the following example, the PIM interface compares neighbor IP addresses with the IP address in the policy statement before any hello processing takes place. If any of the neighbor IP addresses (primary or secondary) match the IP address specified in the prefix list, PIM drops the hello packet and rejects the neighbor.

If you configure a PIM neighbor policy after PIM has already established a neighbor adjacency to an unwanted PIM neighbor, the adjacency remains intact until the neighbor hold time expires. When the unwanted neighbor sends another hello message to update its adjacency, the router recognizes the unwanted address and rejects the neighbor.

To configure a policy to filter unwanted PIM neighbors:

1. Configure the policy. The neighbor policy must be a properly structured policy statement that uses a prefix list (or a route filter) containing the neighbor primary address (or any secondary IP addresses) in a prefix list, and the **reject** option to reject the unwanted address.

```
[edit policy-options]
user@host# set prefix-list nbrGroup 1 20.20.20.1/32
user@host# set policy-statement nbr-policy from prefix-list nbrGroup1
user@host# set policy-statement nbr-policy then reject
```

2. Configure the interface globally or in the routing instance. This example shows the configuration for the routing instance.

```
[edit routing-instances PIM.master protocols pim]
user@host# set neighbor-policy nbr-policy
```

3. Verify the configuration by checking the **Hello dropped on neighbor policy** field in the output of the **show pim statistics** command.

- Related Documentation**
- [Understanding PIM Sparse Mode on page 121](#)
  - [show pim statistics on page 513](#)

---

## Filtering Outgoing PIM Join Messages

When the core of your network is using MPLS, PIM join and prune messages stop at the customer edge (CE) routers and are not forwarded toward the core, because these routers do not have PIM neighbors on the core-facing interfaces. When the core of your network is using IP, PIM join and prune messages are forwarded to the upstream PIM neighbors in the core of the network.

When the core of your network is using a mix of IP and MPLS, you might want to filter certain PIM join and prune messages at the upstream egress interface of the CE routers.

You can filter PIM sparse mode (PIM-SM) join and prune messages at the egress interfaces for IPv4 and IPv6 in the upstream direction. The messages can be filtered based on the group address, source address, outgoing interface, PIM neighbor, or a combination of these values. If the filter is removed, the join is sent after the PIM periodic join timer expires.

To filter PIM sparse mode join and prune messages at the egress interfaces, create a policy rejecting the group address, source address, outgoing interface, or PIM neighbor, and then apply the policy.

The following example filters PIM join and prune messages for group addresses 224.0.1.2 and 225.1.1.1.

1. In configuration mode, create the policy.

```
user@host# set policy-options policy-statement block-groups term t1 from route-filter
224.0.1.2/32 exact
user@host# set policy-options policy-statement block-groups term t1 from route-filter
225.1.1.1/32 exact
```

```
user@host# set policy-options policy-statement block-groups term t1 then reject
user@host# set policy-options policy-statement block-groups term last then accept
```

2. Verify the policy configuration by running the **show policy-options** command.

```
user@host# show policy-options
policy-statement block-groups {
  term t1 {
    from {
      route-filter 224.0.1.2/32 exact;
      route-filter 225.1.1.1/32 exact;
      then reject;
    }
    term last {
      then accept;
    }
  }
}
```

3. Apply the PIM join and prune message filter.

```
user@host> set protocols pim export block-groups
```

4. After the configuration is committed, use the **show pim statistics** command to verify that outgoing PIM join and prune messages are being filtered.

```
user@host> show pim statistics | grep filtered
RP Filtered Source          0

Rx Joins/Prunes filtered    0

Tx Joins/Prunes filtered    254
```

The egress filter count is shown on the **Tx Joins/Prunes filtered** line.

**Related Documentation** • [Filtering Incoming PIM Join Messages on page 189](#)

## Filtering Incoming PIM Join Messages

Multicast scoping controls the propagation of multicast messages. Whereas multicast scoping prevents the actual multicast data packets from flowing in or out of an interface, PIM join filters prevent a state from being created in a router. A state—the (\*,G) or (S,G) entries—is the information used for forwarding unicast or multicast packets. Using PIM join filters prevents the transport of multicast traffic across a network and the dropping of packets at a scope at the edge of the network. Also, PIM join filters reduce the potential for denial-of-service (DoS) attacks and PIM state explosion—large numbers of PIM join messages forwarded to each router on the rendezvous-point tree (RPT), resulting in memory consumption.

To use PIM join filters to efficiently restrict multicast traffic from certain source addresses, create and apply the routing policy across all routers in the network.

See [Table 10 on page 190](#) for a list of match conditions.

Table 10: PIM Join Filter Match Conditions

| Match Condition              | Matches On                                                                           |
|------------------------------|--------------------------------------------------------------------------------------|
| <b>interface</b>             | Router interface or interfaces specified by name or IP address                       |
| <b>neighbor</b>              | Neighbor address (the source address in the IP header of the join and prune message) |
| <b>route-filter</b>          | Multicast group address embedded in the join and prune message                       |
| <b>source-address-filter</b> | Multicast source address embedded in the join and prune message                      |

The following example shows how to create a PIM join filter. The filter is composed of a route filter and a source address filter—**bad-groups** and **bad-sources**, respectively. the **bad-groups** filter prevents (\*G) or (S,G) join messages from being received for all groups listed. The **bad-sources** filter prevents (S,G) join messages from being received for all sources listed. The **bad-groups** filter and **bad-sources** filter are in two different terms. If route filters and source address filters are in the same term, they are logically ANDed.

To filter incoming PIM join messages:

1. Configure the policy.

```
[edit policy-statement pim-join-filter term bad-groups]
user@host# set from route-filter 224.0.1.2/32 exact
user@host# set from route-filter 239.0.0.0/8 orlonger
user@host# set then reject

[edit policy-statement pim-join-filter term bad-sources]
user@host# set from source-address-filter 10.0.0.0/8 orlonger
user@host# set from source-address-filter 127.0.0.0/8 orlonger
user@host# set then reject

[edit policy-statement pim-join-filter term last]
user@host# set then accept
```

2. Apply one or more policies to routes being imported into the routing table from PIM.

```
[edit protocols pim]
user@host# set import pim-join-filter
```

3. Verify the configuration by checking the output of the **show pim join** and **show policy** commands.

#### Related Documentation

- [Understanding Multicast Administrative Scoping](#)
- [Filtering Outgoing PIM Join Messages on page 188](#)
- [show pim join on page 478](#) in the [CLI Explorer](#)
- [show policy](#) in the [CLI Explorer](#)

## Configuring Register Message Filters on a PIM RP and DR

PIM register messages are sent to the rendezvous point (RP) by a designated router (DR). When a source for a group starts transmitting, the DR sends unicast PIM register packets to the RP.

Register messages have the following purposes:

- Notify the RP that a source is sending to a group.
- Deliver the initial multicast packets sent by the source to the RP for delivery down the shortest-path tree (SPT).

The PIM RP keeps track of all active sources in a single PIM sparse mode domain. In some cases, you want more control over which sources an RP discovers, or which sources a DR notifies other RPs about. A high degree of control over PIM register messages is provided by RP or DR register message filtering. Message filtering prevents unauthorized groups and sources from registering with an RP router.

You configure RP or DR register message filtering to control the number and location of multicast sources that an RP discovers. You can apply register message filters on a DR to control outgoing register messages, or apply them on an RP to control incoming register messages.

When anycast RP is configured, all RPs in the anycast RP set need to be configured with the same register message filtering policy.

You can configure message filtering globally or for a routing instance. These examples show the global configuration.

To configure an RP filter to drop the register packets for multicast group range 224.1.1.0/24 from source address 10.10.94.2:

1. On the RP, configure the policy.

```
[edit policy-options policy-statement incoming-policy-for-rp from]
user@host# set route-filter 224.1.1.0/24 orlonger
user@host# set source-address-filter 10.10.94.2/32 exact
user@host# set then reject
user@host# exit
```

2. Apply the policy to the RP.

```
[edit protocols pim rp]
user@host# set rp-register-policy incoming-policy-for-rp
user@host# set local address 10.10.10.5
user@host# exit
```

To configure a DR filter to prevent sending register packets for group range 224.1.1.0/24 and source address 10.10.10.1/32:

1. On the DR, configure the policy.

```
[edit policy-options policy-statement outgoing-policy-for-rp]
```

```
user@host# set from route-filter 224.1.1.0/24 orlonger
user@host# set from source-address-filter 10.10.10.1/32 exact
user@host# set then reject
user@host# exit
```

2. Apply the policy to the DR.

The static address is the address of the RP to which you do not want the DR to send the filtered register messages.

```
[edit protocols pim rp]
user@host# set dr-register-policy outgoing-policy-for-dr
user@host# set static 10.10.10.3
user@host# exit
```

To configure a policy expression to accept register messages for multicast group 224.1.1.5 but reject those for 224.1.1.1:

1. On the RP, configure the policies.

```
[edit policy-options policy-statement reject_224_1_1_1]
user@host# set from route-filter 224.1.1.0/24 orlonger
user@host# set from source-address-filter 10.10.94.2/32 exact
user@host# set then reject
user@host# exit

[edit policy-options policy-statement accept_224_1_1_5]
user@host# set term one from route-filter 224.1.1.5/32 exact
user@host# set term one from source-address-filter 10.10.94.2/32 exact
user@host# set term one then accept
user@host# set term two then reject
user@host# exit
```

2. Apply the policies to the RP.

```
[edit protocols pim rp]
user@host# set rp-register-policy [ reject_224_1_1_1 | accept_224_1_1_5 ]
user@host# set local address 10.10.10.5
```

To monitor the operation of the filters, run the **show pim statistics** command. The command output contains the following fields related to filtering:

- RP Filtered Source
- Rx Joins/Prunes filtered
- Tx Joins/Prunes filtered
- Rx Register msgs filtering drop
- Tx Register msgs filtering drop

#### Related Documentation

- [PIM Sparse Mode Source Registration on page 195](#)
- [Filtering RP and DR Register Messages on page 186](#)
- [show pim statistics on page 513](#)



## CHAPTER 14

# Using PIM RPT and SPT Cutover

- [Understanding Multicast Rendezvous Points, Shared Trees, and Rendezvous-Point Trees on page 193](#)
- [Building an RPT Between the RP and Receivers on page 194](#)
- [PIM Sparse Mode Source Registration on page 195](#)
- [Multicast Shortest-Path Tree on page 198](#)
- [SPT Cutover on page 199](#)
- [SPT Cutover Control on page 202](#)
- [Example: Configuring the PIM Assert Timeout on page 202](#)
- [Example: Configuring the PIM SPT Threshold Policy on page 204](#)

## Understanding Multicast Rendezvous Points, Shared Trees, and Rendezvous-Point Trees

---

In a shared tree, the root of the distribution tree is a router, not a host, and is located somewhere in the core of the network. In the primary sparse mode multicast routing protocol, Protocol Independent Multicast sparse mode (PIM SM), the core router at the root of the shared tree is the rendezvous point (RP). Packets from the upstream source and join messages from the downstream routers “rendezvous” at this core router.

In the RP model, other routers do not need to know the addresses of the sources for every multicast group. All they need to know is the IP address of the RP router. The RP router discovers the sources for all multicast groups.

The RP model shifts the burden of finding sources of multicast content from each router (the (S,G) notation) to the network (the (\*,G) notation knows only the RP). Exactly how the RP finds the unicast IP address of the source varies, but there must be some method to determine the proper source for multicast content for a particular group.

Consider a set of multicast routers without any active multicast traffic for a certain group. When a router learns that an interested receiver for that group is on one of its directly connected subnets, the router attempts to join the distribution tree for that group back to the RP, not to the actual source of the content.

To join the shared tree, or *rendezvous-point tree (RPT)* as it is called in PIM sparse mode, the router must do the following:

- Determine the IP address of the RP for that group. Determining the address can be as simple as static configuration in the router, or as complex as a set of nested protocols.
- Build the shared tree for that group. The router executes an RPF check on the RP address in its routing table, which produces the interface closest to the RP. The router now detects that multicast packets from this RP for this group need to flow into the router on this RPF interface.
- Send a join message out on this interface using the proper multicast protocol (probably PIM sparse mode) to inform the upstream router that it wants to join the shared tree for that group. This message is a (\*,G) join message because S is not known. Only the RP is known, and the RP is not actually the source of the multicast packets. The router receiving the (\*,G) join message adds the interface on which the message was received to its outgoing interface list (OIL) for the group and also performs an RPF check on the RP address. The upstream router then sends a (\*,G) join message out from the RPF interface toward the source, informing the upstream router that it also wants to join the group.

Each upstream router repeats this process, propagating join messages from the RPF interface, building the shared tree as it goes. The process stops when the join message reaches one of the following:

- The RP for the group that is being joined
- A router along the RPT that already has a multicast forwarding state for the group that is being joined

In either case, the branch is created, and packets can flow from the source to the RP and from the RP to the receiver. Note that there is no guarantee that the shared tree (RPT) is the shortest path tree to the source. Most likely it is not. However, there are ways to “migrate” a shared tree to an SPT once the flow of packets begins. In other words, the forwarding state can transition from (\*,G) to (S,G). The formation of both types of tree depends heavily on the operation of the RPF check and the RPF table.

**Related  
Documentation**

- *Understanding Multicast Reverse Path Forwarding*

---

## Building an RPT Between the RP and Receivers

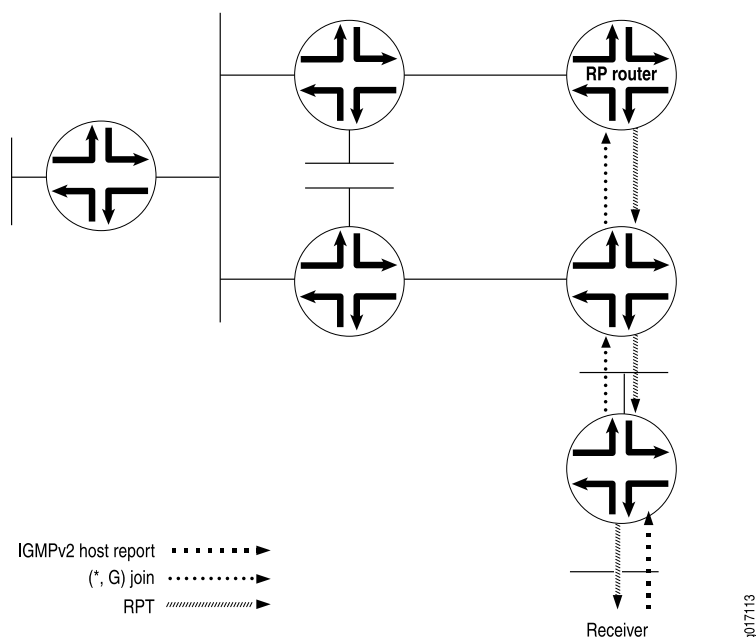
---

The RPT is the path between the RP and receivers (hosts) in a multicast group (see [Figure 27 on page 195](#)). The RPT is built by means of a PIM join message from a receiver's DR:

1. A receiver sends a request to join group (G) in an Internet Group Management Protocol (IGMP) host membership report. A PIM sparse-mode router, the receiver's DR, receives the report on a directly attached subnet and creates an RPT branch for the multicast group of interest.
2. The receiver's DR sends a PIM join message to its RPF neighbor, the next-hop address in the RPF table, or the unicast routing table.
3. The PIM join message travels up the tree and is multicast to the ALL-PIM-ROUTERS group (224.0.0.13). Each router in the tree finds its RPF neighbor by using either the

RPF table or the unicast routing table. This is done until the message reaches the RP and forms the RPT. Routers along the path set up the multicast forwarding state to forward requested multicast traffic back down the RPT to the receiver.

**Figure 27: Building an RPT Between the RP and the Receiver**



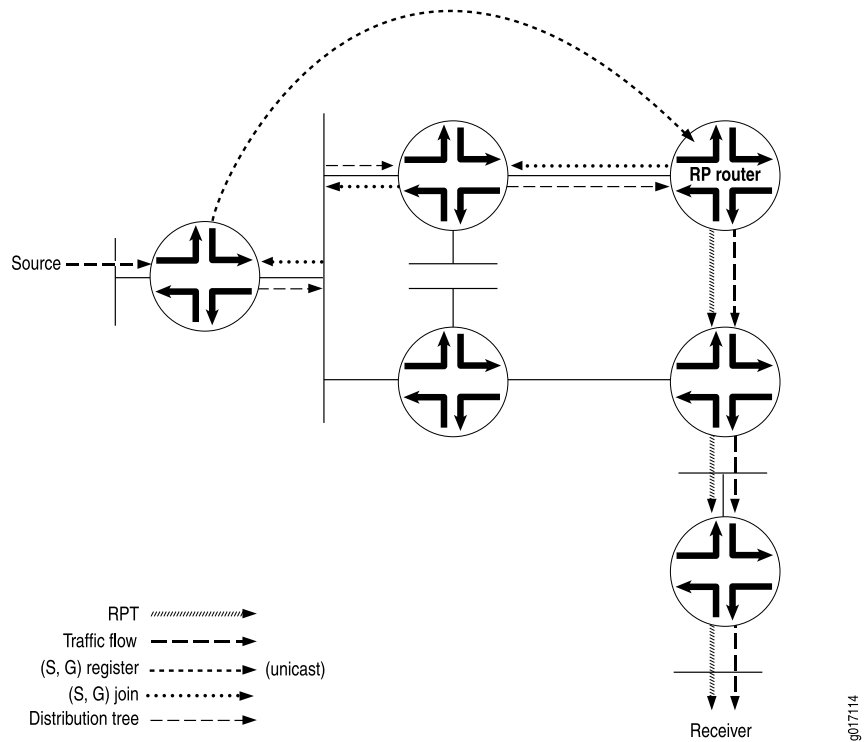
## PIM Sparse Mode Source Registration

The RPT is a unidirectional tree, permitting traffic to flow down from the RP to the receiver in one direction. For multicast traffic to reach the receiver from the source, another branch of the distribution tree, called the shortest-path tree, needs to be built from the source's DR to the RP.

The shortest-path tree is created in the following way:

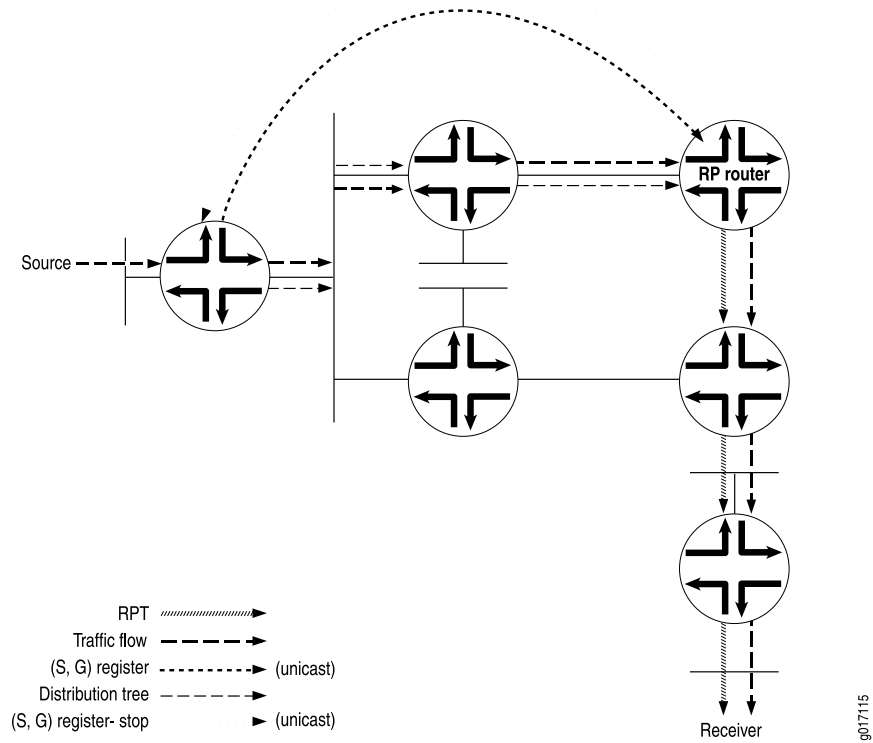
1. The source becomes active, sending out multicast packets on the LAN to which it is attached. The source's DR receives the packets and encapsulates them in a PIM register message, which it sends to the RP router (see [Figure 28 on page 196](#)).
2. When the RP router receives the PIM register message from the source, it sends a PIM join message back to the source.

Figure 28: PIM Register Message and PIM Join Message Exchanged



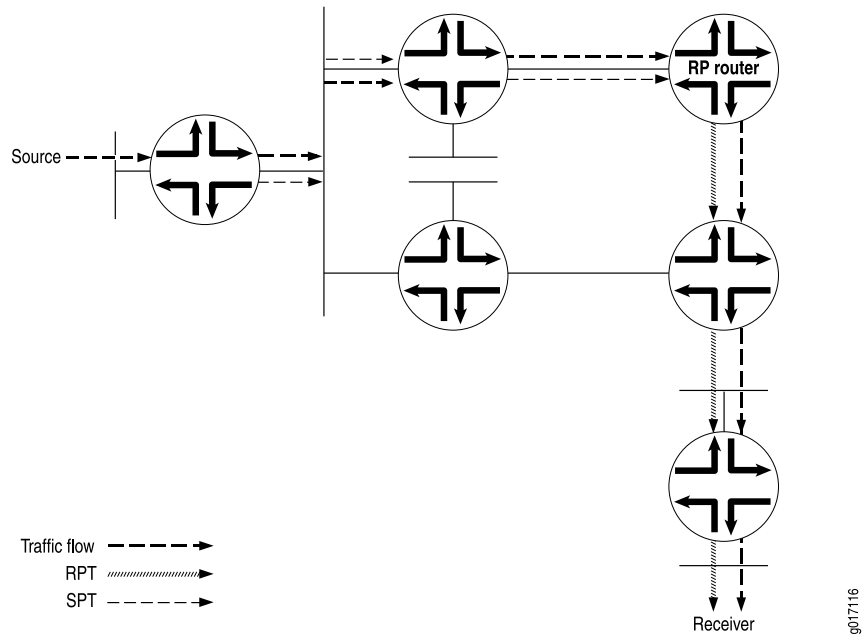
3. The source's DR receives the PIM join message and begins sending traffic down the SPT toward the RP router (see [Figure 29 on page 197](#)).
4. Once traffic is received by the RP router, it sends a register stop message to the source's DR to stop the register process.

Figure 29: Traffic Sent from the Source to the RP Router



- The RP router sends the multicast traffic down the RPT toward the receiver (see [Figure 30 on page 197](#)).

Figure 30: Traffic Sent from the RP Router Toward the Receiver



## Multicast Shortest-Path Tree

---

The distribution tree used for multicast is rooted at the source and is the shortest-path tree (SPT) as well. Consider a set of multicast routers without any active multicast traffic for a certain group (that is, they have no multicast forwarding state for that group). When a router learns that an interested receiver for that group is on one of its directly connected subnets, the router attempts to join the tree for that group.

To join the distribution tree, the router determines the unicast IP address of the source for that group. This address can be a simple static configuration on the router, or as complex as a set of protocols.

To build the SPT for that group, the router executes an a reverse path forwarding (RPF) check on the source address in its routing table. The RPF check produces the interface closest to the source, which is where multicast packets from this source for this group need to flow into the router.

The router next sends a join message out on this interface using the proper multicast protocol to inform the upstream router that it wants to join the distribution tree for that group. This message is an (S,G) join message because both S and G are known. The router receiving the (S,G) join message adds the interface on which the message was received to its output interface list (OIL) for the group and also performs an RPF check on the source address. The upstream router then sends an (S,G) join message out on the RPF interface toward the source, informing the upstream router that it also wants to join the group.

Each upstream router repeats this process, propagating joins out on the RPF interface, building the SPT as it goes. The process stops when the join message does one of two things:

- Reaches the router directly connected to the host that is the source.
- Reaches a router that already has multicast forwarding state for this source-group pair.

In either case, the branch is created, each of the routers has multicast forwarding state for the source-group pair, and packets can flow down the distribution tree from source to receiver. The RPF check at each router makes sure that the tree is an SPT.

SPTs are always the shortest path, but they are not necessarily short. That is, sources and receivers tend to be on the periphery of a router network, not on the backbone, and multicast distribution trees have a tendency to sprawl across almost every router in the network. Because multicast traffic can overwhelm a slow interface, and one packet can easily become a hundred or a thousand on the opposite side of the backbone, it makes sense to provide a shared tree as a distribution tree so that the multicast source can be located more centrally in the network, on the backbone. This sharing of distribution trees with roots in the core network is accomplished by a multicast rendezvous point.

### Related Documentation

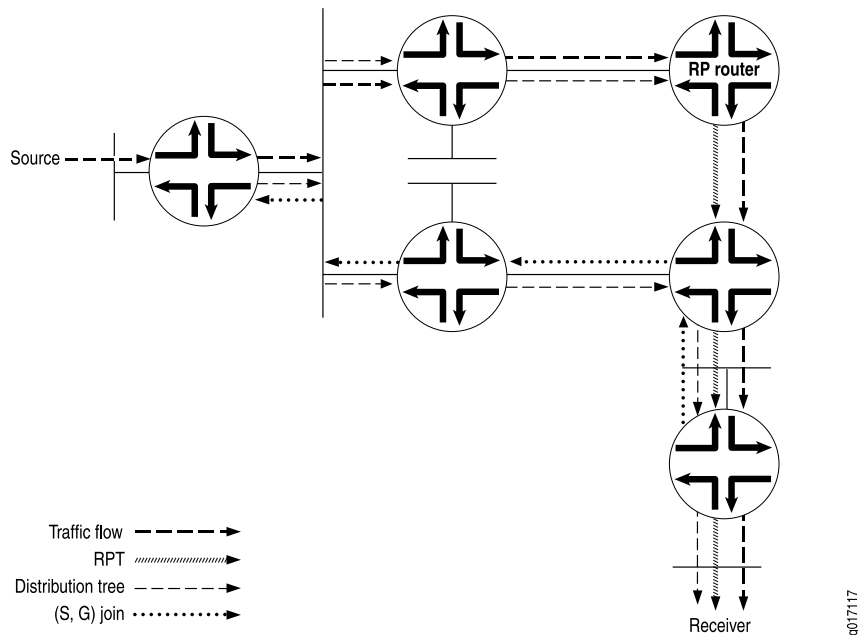
- [Understanding Multicast Rendezvous Points, Shared Trees, and Rendezvous-Point Trees on page 193](#)

## SPT Cutover

Instead of continuing to use the SPT to the RP and the RPT toward the receiver, a direct SPT is created between the source and the receiver in the following way:

1. Once the receiver's DR receives the first multicast packet from the source, the DR sends a PIM join message to its RPF neighbor (see [Figure 31 on page 199](#)).
2. The source's DR receives the PIM join message, and an additional (S,G) state is created to form the SPT.
3. Multicast packets from that particular source begin coming from the source's DR and flowing down the new SPT to the receiver's DR. The receiver's DR is now receiving two copies of each multicast packet sent by the source—one from the RPT and one from the new SPT.

**Figure 31: Receiver DR Sends a PIM Join Message to the Source**



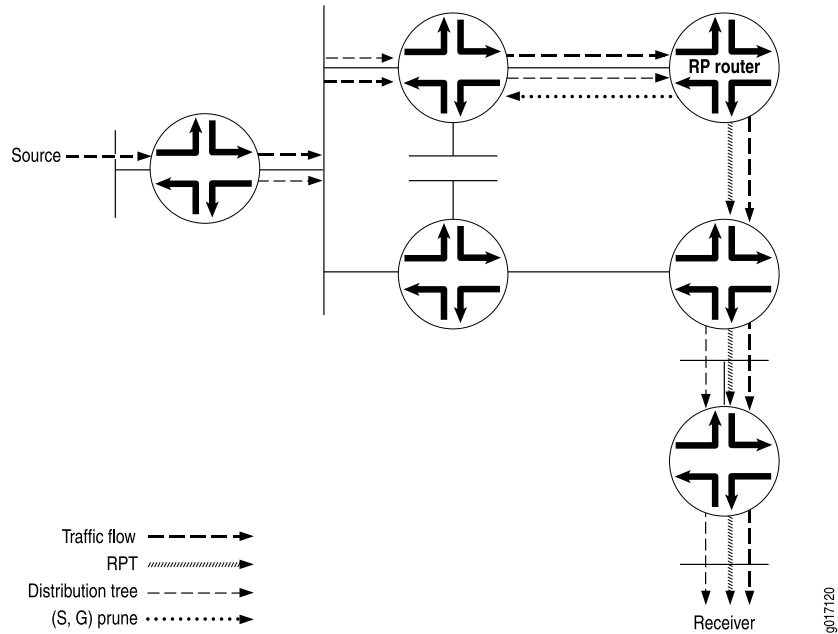
4. To stop duplicate multicast packets, the receiver's DR sends a PIM prune message toward the RP router, letting it know that the multicast packets from this particular source coming in from the RPT are no longer needed (see [Figure 32 on page 200](#)).





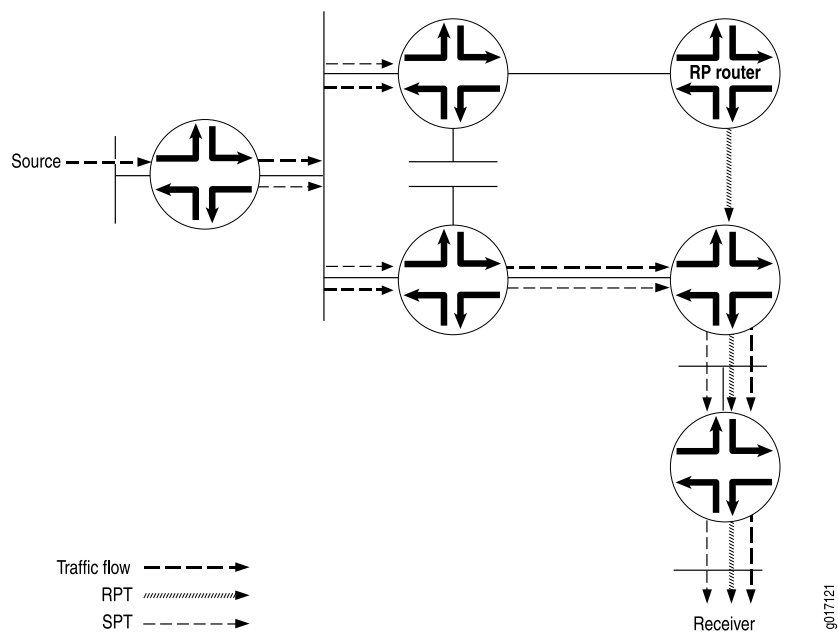
6. To stop the unneeded multicast packets from this particular source, the RP router sends a PIM prune message to the source's DR (see [Figure 34 on page 201](#)).

**Figure 34: RP Router Sends a PIM Prune Message to the Source DR**



7. The receiver's DR now receives multicast packets only for the particular source from the SPT (see [Figure 35 on page 201](#)).

**Figure 35: Source's DR Stops Sending Duplicate Multicast Packets Toward the RP Router**



## SPT Cutover Control

---

In some cases, the last-hop router needs to stay on the shared tree to the RP and not transition to a direct SPT to the source. You might not want the last-hop router to transition when, for example, a low-bandwidth multicast stream is forwarded from the RP to a last-hop router. All routers between last hop and source must maintain and refresh the SPT state. This can become a resource-intensive activity that does not add much to the network efficiency for a particular pair of source and multicast group addresses.

In these cases, you configure an SPT threshold policy on the last-hop router to control the transition to a direct SPT. An SPT cutover threshold of infinity applied to a source-group address pair means the last-hop router will never transition to a direct SPT. For all other source-group address pairs, the last-hop router transitions immediately to a direct SPT rooted at the source DR.

## Example: Configuring the PIM Assert Timeout

---

This example shows how to configure the timeout period for a PIM assert forwarder.

- [Requirements on page 202](#)
- [Overview on page 202](#)
- [Configuration on page 204](#)

### Requirements

Before you begin:

- Configure the router interfaces. See the *Junos OS Network Interfaces Library for Routing Devices*.
- Configure an interior gateway protocol or static routing. See the *Junos OS Routing Protocols Library for Routing Devices*.
- Configure PIM Sparse Mode on the interfaces. See [“Enabling PIM Sparse Mode” on page 124](#).

### Overview

The role of PIM assert messages is to determine the forwarder on a network with multiple routers. The forwarder is the router that forwards multicast packets to a network with multicast group members. The forwarder is generally the same as the PIM DR.

A router sends an assert message when it receives a multicast packet on an interface that is listed in the outgoing interface list of the matching routing entry. Receiving a message on an outgoing interface is an indication that more than one router forwards the same multicast packets to a network.

In [Figure 36 on page 203](#), both routing devices R1 and R2 forward multicast packets for the same (S,G) entry on a network. Both devices detect this situation and both devices send assert messages on the Ethernet network. An assert message contains, in addition

to a source address and group address, a unicast cost metric for sending packets to the source, and a preference metric for the unicast cost. The preference metric expresses a preference between unicast routing protocols. The routing device with the smallest preference metric becomes the forwarder (also called the assert winner). If the preference metrics are equal, the device that sent the lowest unicast cost metric becomes the forwarder. If the unicast metrics are also equal, the routing device with the highest IP address becomes the forwarder. After the transmission of assert messages, only the forwarder continues to forward messages on the network.

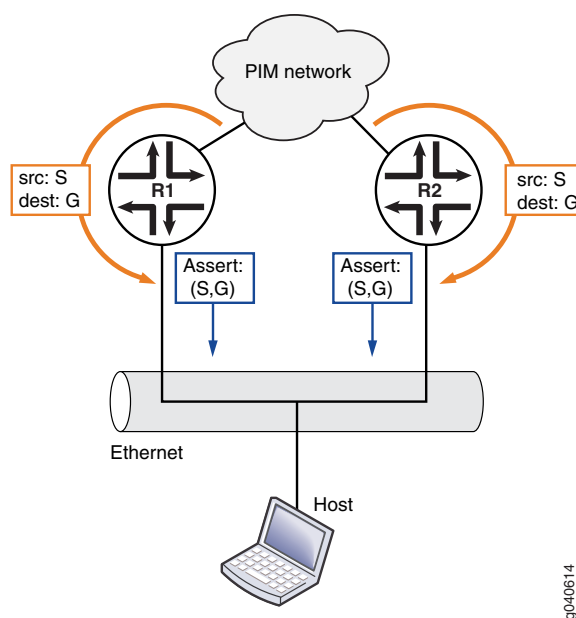
When an assert message is received and the RPF neighbor is changed to the assert winner, the assert timer is set to an assert timeout period. The assert timeout period is restarted every time a subsequent assert message for the route entry is received on the incoming interface. When the assert timer expires, the routing device resets its RPF neighbor according to its unicast routing table. Then, if multiple forwarders still exist, the forwarders reenter the assert message cycle. In effect, the assert timeout period determines how often multicast routing devices enter a PIM assert message cycle.

The range is from 5 through 210 seconds. The default is 180 seconds.

Assert messages are useful for LANs that connect multiple routing devices and no hosts.

Figure 36 on page 203 shows the topology for this example.

**Figure 36: PIM Assert Topology**



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## Configuration

**Step-by-Step Procedure** The following example requires you to navigate various levels in the configuration hierarchy. For information about navigating the CLI, see *Using the CLI Editor in Configuration Mode* in the *CLI User Guide*.

To configure an assert timeout:

1. Configure the timeout period, in seconds.

```
[edit protocols pim]
user@host# set assert-timeout 60
```

2. (Optional) Trace assert messages.

```
[edit protocols pim]
user@host# set traceoptions file PIM.log
user@host# set traceoptions flag assert detail
```

3. If you are done configuring the device, commit the configuration.

```
user@host# commit
```

4. To verify the configuration, run the following commands:

- `show pim join`
- `show pim statistics`

**Related Documentation**

- [Configuring PIM Trace Options on page 108](#)
- [SPT Cutover on page 199](#)
- [SPT Cutover Control on page 202](#)

---

## Example: Configuring the PIM SPT Threshold Policy

This example shows how to apply a policy that suppresses the transition from the rendezvous-point tree (RPT) rooted at the RP to the shortest-path tree (SPT) rooted at the source.

- [Requirements on page 204](#)
- [Overview on page 205](#)
- [Configuration on page 206](#)
- [Verification on page 208](#)

## Requirements

Before you begin:

- Configure the router interfaces. See the *Junos OS Network Interfaces Library for Routing Devices*.

- Configure an interior gateway protocol or static routing. See the *Junos OS Routing Protocols Library for Routing Devices*.
- Configure PIM Sparse Mode on the interfaces. See [“Enabling PIM Sparse Mode” on page 124](#).

## Overview

Multicast routing devices running PIM sparse mode can forward the same stream of multicast packets onto the same LAN through an RPT rooted at the RP or through an SPT rooted at the source. In some cases, the last-hop routing device needs to stay on the shared RPT to the RP and not transition to a direct SPT to the source. Receiving the multicast data traffic on SPT is optimal but introduces more state in the network, which might not be desirable in some multicast deployments. Ideally, low-bandwidth multicast streams can be forwarded on the RPT, and high-bandwidth streams can use the SPT. This example shows how to configure such a policy.

This example includes the following settings:

- **spt-threshold**—Enables you to configure an SPT threshold policy on the last-hop routing device to control the transition to a direct SPT. When you include this statement in the main PIM instance, the PE router stays on the RPT for control traffic.
- **infinity**—Applies an SPT cutover threshold of infinity to a source-group address pair, so that the last-hop routing device never transitions to a direct SPT. For all other source-group address pairs, the last-hop routing device transitions immediately to a direct SPT rooted at the source DR. This statement must reference a properly configured policy to set the SPT cutover threshold for a particular source-group pair to infinity. The use of values other than infinity for the SPT threshold is not supported. You can configure more than one policy.
- **policy-statement**—Configures the policy. The simplest type of SPT threshold policy uses a route filter and source address filter to specify the multicast group and source addresses and to set the SPT threshold for that pair of addresses to infinity. The policy is applied to the main PIM instance.

This example sets the SPT transition value for the source-group pair 10.10.10.1 and 224.1.1.1 to infinity. When the policy is applied to the last-hop router, multicast traffic from this source-group pair never transitions to a direct SPT to the source. Traffic will continue to arrive through the RP. However, traffic for any other source-group address combination at this router transitions to a direct SPT to the source.

Note these points when configuring the SPT threshold policy:

- Configuration changes to the SPT threshold policy affect how the routing device handles the SPT transition.

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- Configuration changes to the SPT threshold policy affect how the routing device handles the SPT transition.

Note these points when configuring the SPT threshold policy:

- Configuration changes to the SPT threshold policy affect how the routing device handles the SPT transition.
- When the policy is configured for the first time, the routing device continues to transition to the direct SPT for the source-group address pair until the PIM-join state is cleared with the **clear pim join** command.
- If you do not clear the PIM-join state when you apply the infinity policy configuration for the first time, you must apply it before the PE router is brought up.
- When the policy is deleted for a source-group address pair for the first time, the routing device does not transition to the direct SPT for that source-group address pair until the PIM-join state is cleared with the **clear pim join** command.
- When the policy is changed for a source-group address pair for the first time, the routing device does not use the new policy until the PIM-join state is cleared with the **clear pim join** command.

## Configuration

### CLI Quick Configuration

To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, copy and paste the commands into the CLI at the **[edit]** hierarchy level and then enter **commit** from configuration mode.

```
[edit]
set policy-options policy-statement spt-infinity-policy term one from route-filter
  224.1.1.1/32 exact
set policy-options policy-statement spt-infinity-policy term one from source-address-filter
  10.10.10.1/32 exact
set policy-options policy-statement spt-infinity-policy term one then accept
set policy-options policy-statement spt-infinity-policy term two then reject
set protocols pim spt-threshold infinity spt-infinity-policy
```

### Step-by-Step Procedure

The following example requires you to navigate various levels in the configuration hierarchy. For information about navigating the CLI, see the *CLI User Guide*.

To configure an SPT threshold policy:

1. Apply the policy.

```
[edit]
user@host# edit protocols pim
```

```
[edit protocols pim]
user@host# set spt-threshold infinity spt-infinity-policy
[edit protocols pim]
user@host# exit
```

2. Configure the policy.

```
[edit]
user@host# edit policy-options policy-statement spt-infinity-policy
[edit policy-options policy-statement spt-infinity-policy]
user@host# set term one from route-filter 224.1.1.1/32 exact
[edit policy-options policy-statement spt-infinity-policy]
user@host# set term one from source-address-filter 10.10.10.1/32 exact
[edit policy-options policy-statement spt-infinity-policy]
user@host# set term one then accept
[edit policy-options policy-statement spt-infinity-policy]
user@host# set term two then reject
[edit policy-options policy-statement spt-infinity-policy]
user@host# exit
policy-statement {
```

3. If you are done configuring the device, commit the configuration.

```
[edit]
user@host# commit
```

4. Clear the PIM join cache to force the configuration to take effect.

```
[edit]
user@host# run clear pim join
```

## Results

Confirm your configuration by entering the **show policy-options** command and the **show protocols** command from configuration mode. If the output does not display the intended configuration, repeat the instructions in this example to correct the configuration.

```
user@host# show policy-options
policy-statement spt-infinity-policy {
  term one {
    from {
      route-filter 224.1.1.1/32 exact;
      source-address-filter 10.10.10.1/32 exact;
    }
    then accept;
  }
  term two {
    then reject;
  }
}

user@host# show protocols
pim {
  spt-threshold {
    infinity spt-infinity-policy;
  }
}
```

## Verification

To verify the configuration, run the [show pim join](#) command.

**Related Documentation**

- [SPT Cutover Control on page 202](#)



## PART 3

# Configuring MSDP

- [Using MSDP on page 211](#)



## CHAPTER 15

# Using MSDP

- [Understanding MSDP on page 211](#)
- [Configuring MSDP on page 212](#)
- [Filtering MSDP SA Messages on page 214](#)
- [Tracing MSDP Protocol Traffic on page 214](#)
- [Configuring the Interface to Accept Traffic from a Remote Source on page 216](#)
- [Example: Configuring MSDP on page 217](#)
- [Example: Configuring MSDP with Active Source Limits and Mesh Groups on page 218](#)
- [Example: Configuring PIM Anycast With or Without MSDP on page 224](#)
- [Configuring a PIM Anycast RP Router with MSDP on page 227](#)

### Understanding MSDP

---

The Multicast Source Discovery Protocol (MSDP) is used to connect multicast routing domains. It typically runs on the same router as the Protocol Independent Multicast (PIM) sparse-mode rendezvous point (RP). Each MSDP router establishes adjacencies with internal and external MSDP peers similar to the way BGP establishes peers. These peer routers inform each other about active sources within the domain. When they detect active sources, the routers can send PIM sparse-mode explicit join messages to the active source.

The peer with the higher IP address passively listens to a well-known port number and waits for the side with the lower IP address to establish a Transmission Control Protocol (TCP) connection. When a PIM sparse-mode RP that is running MSDP becomes aware of a new local source, it sends source-active type, length, and values (TLVs) to its MSDP peers. When a source-active TLV is received, a peer-reverse-path-forwarding (peer-RPF) check (not the same as a multicast RPF check) is done to make sure that this peer is in the path that leads back to the originating RP. If not, the source-active TLV is dropped. This TLV is counted as a “rejected” source-active message.

The MSDP peer-RPF check is different from the normal RPF checks done by non-MSDP multicast routers. The goal of the peer-RPF check is to stop source-active messages from looping. Router R accepts source-active messages originated by Router S only from neighbor Router N or an MSDP mesh group member. For more information about configuring MSDP mesh groups, see [“Example: Configuring MSDP with Active Source Limits and Mesh Groups” on page 218](#).

Router R locates its MSDP peer-RPF neighbor (Router N) deterministically. A series of rules is applied in a particular order to received source-active messages, and the first rule that applies determines the peer-RPF neighbor. All source-active messages from other routers are rejected.

The six rules applied to source-active messages originating at Router S received at Router R from Router X are as follows:

1. If Router X originated the source-active message (Router X is Router S), then Router X is also the peer-RPF neighbor, and its source-active messages are accepted.
2. If Router X is a member of the Router R mesh group, or is the configured peer, then Router X is the peer-RPF neighbor, and its source-active messages are accepted.
3. If Router X is the BGP next hop of the active multicast RPF route toward Router S (Router X installed the route on Router R), then Router X is the peer-RPF neighbor, and its source-active messages are accepted.
4. If Router X is an external BGP (EBGP) or internal BGP (IBGP) peer of Router R, and the last autonomous system (AS) number in the BGP AS-path to Router S is the same as Router X's AS number, then Router X is the peer-RPF neighbor, and its source-active messages are accepted.
5. If Router X uses the same next hop as the next hop to Router S, then Router X is the peer-RPF neighbor, and its source-active messages are accepted.
6. If Router X fits none of these criteria, then Router X is not an MSDP peer-RPF neighbor, and its source-active messages are rejected.

The MSDP peers that receive source-active TLVs can be constrained by BGP reachability information. If the AS path of the network layer reachability information (NLRI) contains the receiving peer's AS number prepended second to last, the sending peer is using the receiving peer as a next hop for this source. If the split horizon information is not being received, the peer can be pruned from the source-active TLV distribution list.

#### Related Documentation

- [Configuring MSDP on page 212](#)

---

## Configuring MSDP

To configure the Multicast Source Discovery Protocol (MSDP), include the **msdp** statement:

```
msdp {  
  disable;  
  active-source-limit {  
    maximum number;  
    threshold number;  
  }  
  data-encapsulation (disable | enable);  
  export [ policy-names ];  
  group group-name {  
    ... group-configuration ...  
  }  
}
```

```

hold-time seconds;
import [ policy-names ];
local-address address;
keep-alive seconds;
peer address {
    ... peer-configuration ...
}
rib-group group-name;
source ip-prefix </prefix-length> {
    active-source-limit {
        maximum number;
        threshold number;
    }
}
sa-hold-time seconds;
traceoptions {
    file filename <files number> <size size> <world-readable | no-world-readable>;
    flag flag <flag-modifier> <disable>;
}
group group-name {
    disable;
    export [ policy-names ];
    import [ policy-names ];
    local-address address;
    mode (mesh-group | standard);
    peer address {
        ... same statements as at the [edit protocols msdp peer address] hierarchy level shown
        just following ...
    }
    traceoptions {
        file filename <files number> <size size> <world-readable | no-world-readable>;
        flag flag <flag-modifier> <disable>;
    }
}
peer address {
    disable;
    active-source-limit {
        maximum number;
        threshold number;
    }
    authentication-key peer-key;
    default-peer;
    export [ policy-names ];
    import [ policy-names ];
    local-address address;
    traceoptions {
        file filename <files number> <size size> <world-readable | no-world-readable>;
        flag flag <flag-modifier> <disable>;
    }
}
}
}

```

You can include this statement at the following hierarchy levels:

- [\[edit protocols\]](#)
- [\[edit routing-instances \*routing-instance-name\* protocols\]](#)
- [\[edit logical-systems \*logical-system-name\* protocols\]](#)
- [\[edit logical-systems \*logical-system-name\* routing-instances \*routing-instance-name\* protocols\]](#)

By default, MSDP is disabled.

- Related Documentation**
- [Example: Configuring MSDP in a Routing Instance](#)
  - [Example: Configuring MSDP with Active Source Limits and Mesh Groups on page 218](#)

## Filtering MSDP SA Messages

Along with applying MSDP source active (SA) filters on all external MSDP sessions (in and out) to prevent SAs for groups and sources from leaking in and out of the network, you need to apply bootstrap router (BSR) filters. Applying a BSR filter to the boundary of a network prevents foreign BSR messages (which announce RP addresses) from leaking into your network. Since the routers in a PIM sparse-mode domain need to know the address of only one RP router, having more than one in the network can create issues.

If you did not use multicast scoping to create boundary filters for all customer-facing interfaces, you might want to use PIM join filters. Multicast scopes prevent the actual multicast data packets from flowing in or out of an interface. PIM join filters prevent PIM sparse-mode state from being created in the first place. Since PIM join filters apply only to the PIM sparse-mode state, it might be more beneficial to use multicast scoping to filter the actual data.



**NOTE:** When you apply firewall filters, firewall action modifiers, such as **log**, **sample**, and **count**, work only when you apply the filter on an inbound interface. The modifiers do not work on an outbound interface.

- Related Documentation**
- [Filtering Incoming PIM Join Messages on page 189](#)
  - [Example: Configuring PIM BSR Filters on page 183](#)

## Tracing MSDP Protocol Traffic

Tracing operations record detailed messages about the operation of routing protocols, such as the various types of routing protocol packets sent and received, and routing policy actions. You can specify which trace operations are logged by including specific tracing flags. The following table describes the flags that you can include.

| Flag | Description           |
|------|-----------------------|
| all  | Trace all operations. |

| Flag                          | Description                              |
|-------------------------------|------------------------------------------|
| <b>general</b>                | Trace general events.                    |
| <b>keepalive</b>              | Trace keepalive messages.                |
| <b>normal</b>                 | Trace normal events.                     |
| <b>packets</b>                | Trace all MSDP packets.                  |
| <b>policy</b>                 | Trace policy processing.                 |
| <b>route</b>                  | Trace MSDP changes to the routing table. |
| <b>source-active</b>          | Trace source-active packets.             |
| <b>source-active-request</b>  | Trace source-active request packets.     |
| <b>source-active-response</b> | Trace source-active response packets.    |
| <b>state</b>                  | Trace state transitions.                 |
| <b>task</b>                   | Trace task processing.                   |
| <b>timer</b>                  | Trace timer processing.                  |

You can configure MSDP tracing for all peers, for all peers in a particular group, or for a particular peer.

In the following example, tracing is enabled for all routing protocol packets. Then tracing is narrowed to focus only on MSDP peers in a particular group. To configure tracing operations for MSDP:

1. (Optional) Configure tracing by including the **traceoptions** statement at the **[edit routing-options]** hierarchy level and set the **all-packets-trace** and **all** flags to trace all protocol packets.

```
[edit routing-options traceoptions]
user@host# set file all-packets-trace
user@host# set flag all
```

2. Configure the filename for the MSDP trace file.

```
[edit protocols msdp group groupa traceoptions]
user@host# set file msdp-trace
```

3. (Optional) Configure the maximum number of trace files.

```
[edit protocols msdp group groupa traceoptions]
user@host# set file files 5
```

4. (Optional) Configure the maximum size of each trace file.

```
[edit protocols msdp group groupa traceoptions]
```

```
user@host# set file size 1m
```

- (Optional) Enable unrestricted file access.

```
[edit protocols msdp group groupa traceoptions]
```

```
user@host# set file world-readable
```

- Configure tracing flags. Suppose you are troubleshooting issues with the source-active cache for **groupa**. The following example shows how to trace messages associated with the group address.

```
[edit protocols msdp group groupa traceoptions]
```

```
user@host# set flag source-active | match 230.0.0.3
```

- View the trace file.

```
user@host> file list /var/log
```

```
user@host> file show /var/log/msdp-trace
```

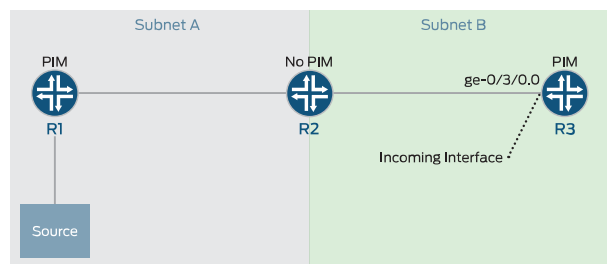
#### Related Documentation

- [Understanding MSDP on page 211](#)
- *Tracing and Logging Junos OS Operations* in the *Junos OS Administration Library for Routing Devices*

## Configuring the Interface to Accept Traffic from a Remote Source

You can configure an incoming interface to accept multicast traffic from a remote source. A remote source is a source that is not on the same subnet as the incoming interface. [Figure 37 on page 216](#) shows such a topology, where R2 connects to the R1 source on one subnet, and to the incoming interface on R3 (ge-1/3/0.0 in the figure) on another subnet.

**Figure 37: Accepting Multicast Traffic from a Remote Source**



In this topology R2 is a pass-through device not running PIM, so R3 is the first hop router for multicast packets sent from R1. Because R1 and R3 are in different subnets, the default behavior of R3 is to disregard R1 as a remote source. You can have R3 accept multicast traffic from R1, however, by enabling **accept-remote-source** on the target interface.

To accept traffic from a remote source:

- Identify the router and physical interface that you want to receive multicast traffic from the remote source.
- Configure the interface to accept traffic from the remote source.

```
[edit protocols pim interface ge-1/3/0.0]
```



```
user@host# set accept-remote-source
```



**NOTE:** If the interface you identified is not the only path from the remote source, you need to ensure that it is the best path. For example you can configure a static route on the receiver side PE router to the source, or you can prepend the AS path on the other possible routes:

```
[edit policy-options policy-statement as-path-prepend term prepend]
user@host# set from route-filter 192.168.0.0/16 orlonger
user@host# set from route-filter 172.16.0.0/16 orlonger
user@host# set then as-path-prepend "1 1 1"
```

3. Commit the configuration changes.
4. Confirm that the interface you configured accepts traffic from the remote source.

```
user@host# show pim statistics
```

#### Related Documentation

- *Example: Allowing MBGP MVPN Remote Sources*
- *Understanding Prepending AS Numbers to BGP AS Paths*
- [show pim statistics on page 513](#)

## Example: Configuring MSDP

Configure a router to act as a PIM sparse-mode rendezvous point and an MSDP peer:

```
[edit]
routing-options {
  interface-routes {
    rib-group ifrg;
  }
  rib-groups {
    ifrg {
      import-rib [inet.0 inet.2];
    }
    mcrg {
      export-rib inet.2;
      import-rib inet.2;
    }
  }
}
protocols {
  bgp {
    group lab {
      type internal;
      family any;
      neighbor 192.168.6.18 {
        local-address 192.168.6.17;
      }
    }
  }
}
```

```
pim {
  dense-groups {
    224.0.1.39/32;
    224.0.1.40/32;
  }
  rib-group mcr;
  rp {
    local {
      address 192.168.1.1;
    }
  }
  interface all {
    mode sparse-dense;
    version 1;
  }
}
msdp {
  rib-group mcr;
  group lab {
    peer 192.168.6.18 {
      local-address 192.168.6.17;
    }
  }
}
```

---

## Example: Configuring MSDP with Active Source Limits and Mesh Groups

This example shows how to configure MSDP to filter source-active messages and limit the flooding of source-active messages.

- [Requirements on page 218](#)
- [Overview on page 218](#)
- [Configuration on page 222](#)
- [Verification on page 223](#)

### Requirements

Before you begin:

- Configure the router interfaces.
- Configure an interior gateway protocol or static routing. See the *Junos OS Routing Protocols Library for Routing Devices*.
- Enable PIM sparse mode. See “[PIM Overview](#)” on [page 103](#).
- Configure the router as a PIM sparse-mode RP. See “[Configuring Local PIM RPs](#)” on [page 159](#).

### Overview

A router interested in MSDP messages, such as an RP, might have to process a large number of MSDP messages, especially source-active messages, arriving from other

routers. Because of the potential need for a router to examine, process, and create state tables for many MSDP packets, there is a possibility of an MSDP-based denial-of-service (DoS) attack on a router running MSDP. To minimize this possibility, you can configure the router to limit the number of source active messages the router accepts. Also, you can configure a threshold for applying random early detection (RED) to drop some but not all MSDP active source messages.

By default, the router accepts 25,000 source active messages before ignoring the rest. The limit can be from 1 through 1,000,000. The limit is applied to both the number of messages and the number of MSDP peers.

By default, the router accepts 24,000 source-active messages before applying the RED profile to prevent a possible DoS attack. This number can also range from 1 through 1,000,000. The next 1000 messages are screened by the RED profile and the accepted messages processed. If you configure no drop profiles (as this example does not), RED is still in effect and functions as the primary mechanism for managing congestion. In the default RED drop profile, when the packet queue fill-level is 0 percent, the drop probability is 0 percent. When the fill-level is 100 percent, the drop probability is 100 percent.



**NOTE:** The router ignores source-active messages with encapsulated TCP packets. Multicast does not use TCP; segments inside source-active messages are most likely the result of worm activity.

The number configured for the threshold must be less than the number configured for the maximum number of active MSDP sources.

You can configure an active source limit globally, for a group, or for a peer. If active source limits are configured at multiple levels of the hierarchy (as shown in this example), all are applied.

You can configure an active source limit for an address range as well as for a specific peer. A per-source active source limit uses an IP prefix and prefix length instead of a specific address. You can configure more than one per-source active source limit. The longest match determines the limit.

Per-source active source limits can be combined with active source limits at the peer, group, and global (instance) hierarchy level. Per-source limits are applied before any other type of active source limit. Limits are tested in the following order:

- Per-source
- Per-peer or group
- Per-instance

An active source message must “pass” all limits established before being accepted. For example, if a source is configured with an active source limit of 10,000 active multicast groups and the instance is configured with a limit of 5000 (and there are no other sources or limits configured), only 5000 active source messages are accepted from this source.

MSDP mesh groups are groups of peers configured in a full-mesh topology that limits the flooding of source-active messages to neighboring peers. Every mesh group member must have a peer connection with every other mesh group member. When a source-active message is received from a mesh group member, the source-active message is always accepted but is not flooded to other members of the same mesh group. However, the source-active message is flooded to non-mesh group peers or members of other mesh groups. By default, standard flooding rules apply if **mesh-group** is not specified.



**CAUTION:** When configuring MSDP mesh groups, you must configure all members the same way. If you do not configure a full mesh, excessive flooding of source-active messages can occur.

A common application for MSDP mesh groups is peer-reverse-path-forwarding (peer-RPF) check bypass. For example, if there are two MSDP peers inside an autonomous system (AS), and only one of them has an external MSDP session to another AS, the internal MSDP peer often rejects incoming source-active messages relayed by the peer with the external link. Rejection occurs because the external MSDP peer must be reachable by the internal MSDP peer through the next hop toward the source in another AS, and this next-hop condition is not certain. To prevent rejections, configure an MSDP mesh group on the internal MSDP peer so it always accepts source-active messages.



**NOTE:** An alternative way to bypass the peer-RPF check is to configure a default peer. In networks with only one MSDP peer, especially stub networks, the source-active message always needs to be accepted. An MSDP default peer is an MSDP peer from which all source-active messages are accepted without performing the peer-RPF check. You can establish a default peer at the peer or group level by including the **default-peer** statement.

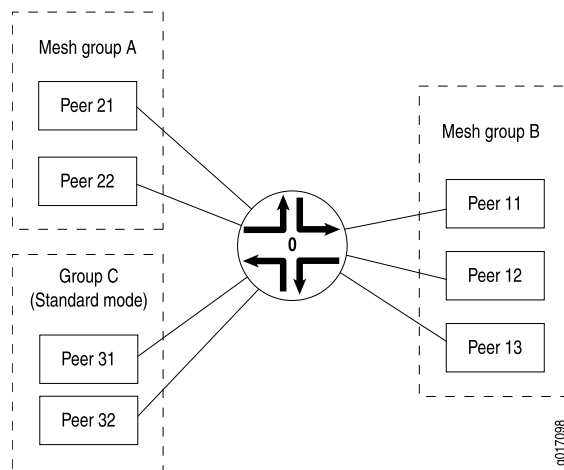
Table 11 on page 220 explains how flooding is handled by peers in this example. .

**Table 11: Source-Active Message Flooding Explanation**

| Source-Active Message Received From | Source-Active Message Flooded To                     | Source-Active Message Not Flooded To |
|-------------------------------------|------------------------------------------------------|--------------------------------------|
| Peer 21                             | Peer 11, Peer 12, Peer 13, Peer 31, Peer 32          | Peer 22                              |
| Peer 11                             | Peer 21, Peer 22, Peer 31, Peer 32                   | Peer 12, Peer 13                     |
| Peer 31                             | Peer 21, Peer 22, Peer 11, Peer 12, Peer 13, Peer 32 | —                                    |

Figure 38 on page 221 illustrates source-active message flooding between different mesh groups and peers within the same mesh group.

Figure 38: Source-Active Message Flooding



This example includes the following settings:

- **active-source-limit maximum 10000**—Applies a limit of 10,000 active sources to all other peers.
- **data-encapsulation disable**—On an RP router using MSDP, disables the default encapsulation of multicast data received in MSDP register messages inside MSDP source-active messages.

MSDP data encapsulation mainly concerns bursty sources of multicast traffic. Sources that send only one packet every few minutes have trouble with the timeout of state relationships between sources and their multicast groups (S,G). Routers lose data while they attempt to reestablish (S,G) state tables. As a result, multicast register messages contain data, and this data encapsulation in MSDP source-active messages can be turned on or off through configuration.

By default, MSDP data encapsulation is enabled. An RP running MSDP takes the data packets arriving in the source's register message and encapsulates the data inside an MSDP source-active message.

However, data encapsulation creates both a multicast forwarding cache entry in the **inet.1** table (this is also the forwarding table) and a routing table entry in the **inet.4** table. Without data encapsulation, MSDP creates only a routing table entry in the **inet.4** table. In some circumstances, such as the presence of Internet worms or other forms of DoS attack, the router's forwarding table might fill up with these entries. To prevent the forwarding table from filling up with MSDP entries, you can configure the router not to use MSDP data encapsulation. However, if you disable data encapsulation, the router ignores and discards the encapsulated data. Without data encapsulation, multicast applications with bursty sources having transmit intervals greater than about 3 minutes might not work well.

- **group MSDP-group local-address 10.1.2.3**—Specifies the address of the local router (this router).
- **group MSDP-group mode mesh-group**—Specifies that all peers belonging to the MSDP-group group are mesh group members.

- **group MSDP-group peer 10.10.10.10**—Prevents the sending of source-active messages to neighboring peer 10.10.10.10.
- **group MSDP-group peer 10.10.10.10 active-source-limit maximum 7500**—Applies a limit of 7500 active sources to MSDP peer 10.10.10.10 in group **MSDP-group**.
- **peer 10.0.0.1 active-source-limit maximum 5000 threshold 4000**—Applies a threshold of 4000 active sources and a limit of 5000 active sources to MSDP peer 10.0.0.1.
- **source 10.1.0.0/16 active-source-limit maximum 500**—Applies a limit of 500 active sources to any source on the 10.1.0.0/16 network.

## Configuration

**CLI Quick Configuration** To quickly configure this example, copy the following commands, paste them into a text file, remove any line breaks, change any details necessary to match your network configuration, copy and paste the commands into the CLI at the **[edit]** hierarchy level, and then enter **commit** from configuration mode.

```
set protocols msdp data-encapsulation disable
set protocols msdp active-source-limit maximum 10000
set protocols msdp peer 10.0.0.1 active-source-limit maximum 5000
set protocols msdp peer 10.0.0.1 active-source-limit threshold 4000
set protocols msdp source 10.1.0.0/16 active-source-limit maximum 500
set protocols msdp group MSDP-group mode mesh-group
set protocols msdp group MSDP-group local-address 10.1.2.3
set protocols msdp group MSDP-group peer 10.10.10.10 active-source-limit maximum
7500
```

**Step-by-Step Procedure** The following example requires that you navigate various levels in the configuration hierarchy. For information about navigating the CLI, see *Using the CLI Editor in Configuration Mode* in the *CLI User Guide*.

To configure MSDP source active routes and mesh groups:

1. (Optional) Disable data encapsulation.

```
[edit protocols msdp]
user@host# set data-encapsulation disable
```

2. Configure the active source limits.

```
[edit protocols msdp]
user@host# set peer 10.0.0.1 active-source-limit maximum 5000 threshold 4000
user@host# set group MSDP-group peer 10.10.10.10 active-source-limit maximum
7500
user@host# set active-source-limit maximum 10000
user@host# set source 10.1.0.0/16 active-source-limit maximum 500
```

3. Configure the mesh group.

```
[edit protocols msdp]
user@host# set group MSDP-group mode mesh-group
user@host# set group MSDP-group peer 10.10.10.10
user@host# set group MSDP-group local-address 10.1.2.3
```

4. If you are done configuring the device, commit the configuration.

```
[edit routing-instances]
user@host# commit
```

## Results

---

Confirm your configuration by entering the **show protocols** command.

```
user@host# show protocols
msdp {
  data-encapsulation disable;
  active-source-limit {
    maximum 10000;
  }
  peer 10.0.0.1 {
    active-source-limit {
      maximum 5000;
      threshold 4000;
    }
  }
  source 10.1.0.0/16 {
    active-source-limit {
      maximum 500;
    }
  }
  group MSDP-group {
    mode mesh-group;
    local-address 10.1.2.3;
    peer 10.10.10.10 {
      active-source-limit {
        maximum 7500;
      }
    }
  }
}
```

## Verification

To verify the configuration, run the following commands:

- [show msdp source-active](#)
- [show msdp statistics](#)

### Related Documentation

- [Examples: Configuring MSDP](#)
- [Filtering MSDP SA Messages on page 214](#)
- [Configuring Local PIM RPs on page 159](#)

## Example: Configuring PIM Anycast With or Without MSDP

When you configure anycast RP, you bypass the restriction of having one active rendezvous point (RP) per multicast group, and instead deploy multiple RPs for the same group range. The RP routers share one unicast IP address. Sources from one RP are known to other RPs that use the Multicast Source Discovery Protocol (MSDP). Sources and receivers use the closest RP, as determined by the interior gateway protocol (IGP).

You can use anycast RP within a domain to provide redundancy and RP load sharing. When an RP stops operating, sources and receivers are taken to a new RP by means of unicast routing.

You can configure anycast RP to use PIM and MSDP for IPv4, or PIM alone for both IPv4 and IPv6 scenarios. Both are discussed in this section.

We recommend a static RP mapping with anycast RP over a bootstrap router and auto-RP configuration because it provides all the benefits of a bootstrap router and auto-RP without the complexity of the BSR and auto-RP mechanisms.

All systems on a subnet must run the same version of PIM.

The default PIM version can be version 1 or version 2, depending on the mode you are configuring. PIMv1 is the default RP mode (at the **[edit protocols pim rp static address address]** hierarchy level). However, PIMv2 is the default for interface mode (at the **[edit protocols pim interface interface-name]** hierarchy level). Explicitly configured versions override the defaults. This example explicitly configures PIMv2 on the interfaces.

The following example shows an anycast RP configuration for the RP routers, first with MSDP and then using PIM alone, and for non-RP routers.

1. For a network using an RP with MSDP, configure the RP using the **lo0** loopback interface, which is always up. Include the **address** statement and specify the unique and routable router ID and the RP address at the **[edit interfaces lo0 unit 0 family inet]** hierarchy level. In this example, the router ID is **198.58.3.254** and the shared RP address is **198.58.3.253**. Include the **primary** statement for the first address. Including the **primary** statement selects the router's primary address from all the preferred addresses on all interfaces.

```
interfaces {
  lo0 {
    description "PIM RP";
    unit 0 {
      family inet {
        address 198.58.3.254/32;
        primary;
        address 198.58.3.253/32;
      }
    }
  }
}
```



2. Specify the RP address. Include the **address** statement at the **[edit protocols pim rp local]** hierarchy level (the same address as the secondary **lo0** interface).

For all interfaces, include the **mode** statement to set the mode to **sparse** and the **version** statement to specify PIM version 2 at the **[edit protocols pim rp local interface all]** hierarchy level. When configuring all interfaces, exclude the **fxp0.0** management interface by including the **disable** statement for that interface.

```
protocols {
  pim {
    rp {
      local {
        family inet;
        address 198.58.3.253;
      }
    }
    interface all {
      mode sparse;
      version 2;
    }
    interface fxp0.0 {
      disable;
    }
  }
}
```

3. Configure MSDP peering. Include the **peer** statement to configure the address of the MSDP peer at the **[edit protocols msdp]** hierarchy level. For MSDP peering, use the unique, primary addresses instead of the anycast address. To specify the local address for MSDP peering, include the **local-address** statement at the **[edit protocols msdp peer]** hierarchy level.

```
protocols {
  msdp {
    peer 198.58.3.250 {
      local-address 198.58.3.254;
    }
  }
}
```



**NOTE:** If you need to configure a PIM RP for both IPv4 and IPv6 scenarios, perform Step 4 and Step 5. Otherwise, go to Step 6.

4. Configure an RP using the **lo0** loopback interface, which is always up. Include the **address** statement to specify the unique and routable router address and the RP address at the **[edit interfaces lo0 unit 0 family inet]** hierarchy level. In this example, the router ID is **198.58.3.254** and the shared RP address is **198.58.3.253**. Include the **primary** statement on the first address. Including the **primary** statement selects the router's primary address from all the preferred addresses on all interfaces.

```
interfaces {
  lo0 {
    description "PIM RP";
```

```

unit 0 {
  family inet {
    address 198.58.3.254/32 {
      primary;
    }
    address 198.58.3.253/32;
  }
}

```

5. Include the **address** statement at the **[edit protocols pim rp local]** hierarchy level to specify the RP address (the same address as the secondary **lo0** interface).

For all interfaces, include the **mode** statement to set the mode to **sparse**, and the **version** statement to specify PIM version 2 at the **[edit protocols pim rp local interface all]** hierarchy level. When configuring all interfaces, exclude the **fxp0.0** management interface by including the **disable** statement for that interface.

Include the **anycast-pim** statement to configure anycast RP without MSDP (for example, if IPv6 is used for multicasting). The other RP routers that share the same IP address are configured using the **rp-set** statement. There is one entry for each RP, and the maximum that can be configured is 15. For each RP, specify the routable IP address of the router and whether MSDP source active (SA) messages are forwarded to the RP.

MSDP configuration is not necessary for this type of IPv4 anycast RP configuration.

```

protocols {
  pim {
    rp {
      local {
        family inet {
          address 198.58.3.253;
          anycast-pim {
            rp-set {
              address 198.58.3.240;
              address 198.58.3.241 forward-msdp-sa;
            }
            local-address 198.58.3.254; #If not configured, use lo0 primary
          }
        }
      }
    }
  }
  interface all {
    mode sparse;
    version 2;
  }
  interface fxp0.0 {
    disable;
  }
}

```

6. Configure the non-RP routers. The anycast RP configuration for a non-RP router is the same whether MSDP is used or not. Specify a static RP by adding the address at

the **[edit protocols pim rp static]** hierarchy level. Include the **version** statement at the **[edit protocols pim rp static address]** hierarchy level to specify PIM version 2.

```
protocols {
  pim {
    rp {
      static {
        address 198.58.3.253 {
          version 2;
        }
      }
    }
  }
}
```

7. Include the **mode** statement at the **[edit protocols pim interface all]** hierarchy level to specify sparse mode on all interfaces. Then include the **version** statement at the **[edit protocols pim rp interface all mode]** to configure all interfaces for PIM version 2. When configuring all interfaces, exclude the **fxp0.0** management interface by including the **disable** statement for that interface.

```
protocols {
  pim {
    interface all {
      mode sparse;
      version 2;
    }
    interface fxp0.0 {
      disable;
    }
  }
}
```

## Configuring a PIM Anycast RP Router with MSDP

Add the **address** statement at the **[edit protocols pim rp local]** hierarchy level to specify the RP address (the same address as the secondary **lo0** interface).

For all interfaces, use the **mode** statement to set the mode to **sparse** and the **version** statement to specify PIM version 2 at the **[edit protocols pim rp local interface all]** hierarchy level. When configuring all interfaces, exclude the **fxp0.0** management interface by adding the **disable** statement for that interface.

```
protocols {
  pim {
    rp {
      local {
        family inet;
        address 198.58.3.253;
      }
      interface all {
        mode sparse;
        version 2;
      }
    }
  }
}
```

```
        interface fxp0.0 {  
            disable;  
        }  
    }  
}
```

To configure MSDP peering, add the **peer** statement to configure the address of the MSDP peer at the **[edit protocols msdp]** hierarchy level. For MSDP peering, use the unique, primary addresses instead of the anycast address. To specify the local address for MSDP peering, add the **local-address** statement at the **[edit protocols msdp peer]** hierarchy level.

```
protocols {  
    msdp {  
        peer 198.58.3.250 {  
            local-address 198.58.3.254;  
        }  
    }  
}
```

## PART 4

# Configuration Statements and Operational Commands

- [Configuration Statements \(IGMP\) on page 231](#)
- [Configuration Statements \(IGMP Snooping\) on page 257](#)
- [Configuration Statements \(PIM\) on page 279](#)
- [Configuration Statements \(Source-Specific Multicast\) on page 353](#)
- [Configuration Statements \(MSDP\) on page 359](#)
- [Operational Commands \(IGMP\) on page 381](#)
- [Operational Commands \(IGMP Snooping\) on page 405](#)
- [Operational Commands \(PIM\) on page 417](#)
- [Operational Commands \(MSDP\) on page 523](#)



## Configuration Statements (IGMP)

- [accounting \(Protocols IGMP\) on page 232](#)
- [accounting \(Protocols IGMP Interface\) on page 232](#)
- [asm-override-ssm on page 233](#)
- [disable \(Protocols IGMP\) on page 233](#)
- [exclude \(Protocols IGMP\) on page 234](#)
- [group \(Protocols IGMP\) on page 235](#)
- [group-count on page 236](#)
- [group-increment \(Protocols IGMP\) on page 236](#)
- [group-limit \(Protocols IGMP\) on page 237](#)
- [group-policy \(Protocols IGMP\) on page 237](#)
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- [immediate-leave \(Protocols IGMP\) on page 240](#)
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- [maximum-transmit-rate \(Protocols IGMP\) on page 242](#)
- [oif-map \(IGMP Interface\) on page 242](#)
- [passive \(IGMP\) on page 243](#)
- [promiscuous-mode \(Protocols IGMP\) on page 244](#)
- [query-interval \(Protocols IGMP\) on page 245](#)
- [query-last-member-interval \(Protocols IGMP\) on page 246](#)
- [query-response-interval \(Protocols IGMP\) on page 247](#)
- [robust-count \(Protocols IGMP\) on page 248](#)
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- [source-count \(Protocols IGMP\) on page 250](#)
- [source-increment \(Protocols IGMP\) on page 251](#)
- [static \(Protocols IGMP\) on page 252](#)
- [traceoptions \(Protocols IGMP\) on page 253](#)
- [version \(Protocols IGMP\) on page 255](#)

## accounting (Protocols IGMP)

---

|                                 |                                                                                                                                                                                            |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | accounting;                                                                                                                                                                                |
| <b>Hierarchy Level</b>          | [edit logical-systems <i>logical-system-name</i> protocols <a href="#">igmp</a> ],<br>[edit protocols <a href="#">igmp</a> ]                                                               |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.5.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 12.1 for the QFX Series. |
| <b>Description</b>              | Enable the collection of IGMP join and leave event statistics on the system.                                                                                                               |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Recording IGMP Join and Leave Events on page 59</a></li></ul>                                                                          |

## accounting (Protocols IGMP Interface)

---

|                                 |                                                                                                                                                                                              |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | (accounting   no-accounting);                                                                                                                                                                |
| <b>Hierarchy Level</b>          | [edit logical-systems <i>logical-system-name</i> protocols <a href="#">igmp interface</a> <i>interface-name</i> ],<br>[edit protocols <a href="#">igmp interface</a> <i>interface-name</i> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.5.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 12.1 for the QFX Series.   |
| <b>Description</b>              | Enable or disable the collection of IGMP join and leave event statistics for an interface.                                                                                                   |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                          |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Recording IGMP Join and Leave Events on page 59</a></li></ul>                                                                            |



## asm-override-ssm

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | asm-override-ssm;                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Hierarchy Level</b>          | [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> routing-options multicast],<br>[edit logical-systems <i>logical-system-name</i> routing-options multicast],<br>[edit routing-instances <i>routing-instance-name</i> routing-options multicast],<br>[edit routing-options multicast]                                                                                         |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.4.<br>Statement introduced in Junos OS Release 9.5 for EX Series switches.<br>Statement introduced in Junos OS Release 12.1 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.<br>Statement introduced in Junos OS Release 12.3 for ACX Series routers.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series. |
| <b>Description</b>              | Enable the routing device to accept any-source multicast join messages (*G) for group addresses that are within the default or configured range of source-specific multicast groups.                                                                                                                                                                                                                                        |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                         |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Example: Configuring Source-Specific Multicast Groups with Any-Source Override on page 150</a></li> </ul>                                                                                                                                                                                                                                                              |

## disable (Protocols IGMP)


|                                 |                                                                                                                                                                                                |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | disable;                                                                                                                                                                                       |
| <b>Hierarchy Level</b>          | [edit logical-systems <i>logical-system-name</i> protocols <b>igmp interface</b> <i>interface-name</i> ],<br>[edit protocols <b>igmp interface</b> <i>interface-name</i> ]                     |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 12.1 for the QFX Series. |
| <b>Description</b>              | Disable IGMP on the system.                                                                                                                                                                    |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Disabling IGMP on page 63</a></li> </ul>                                                                                                  |

## exclude (Protocols IGMP)

---

|                                 |                                                                                                                                                                                                                                                                          |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | exclude;                                                                                                                                                                                                                                                                 |
| <b>Hierarchy Level</b>          | [edit logical-systems <i>logical-system-name</i> protocols <b>igmp</b> interface <i>interface-name</i> <b>static group</b> <i>mcast-group-address</i> ],<br>[edit protocols <b>igmp</b> interface <i>interface-name</i> <b>static group</b> <i>mcast-group-address</i> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.3.                                                                                                                                                                                                                            |
| <b>Description</b>              | Configure the static group to operate in exclude mode. In exclude mode all sources except the address configured are accepted for the group. If this statement is not included, the group operates in include mode.                                                      |
| <b>Required Privilege Level</b> | view-level—To view this statement in the configuration.<br>control-level—To add this statement to the configuration.                                                                                                                                                     |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Enabling IGMP Static Group Membership on page 52</a></li></ul>                                                                                                                                                       |

## group (Protocols IGMP)

|                                                                                                                                                                                             |                                                                                                                                                                                                                                         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                                                                                                                                                               | <pre>group <i>multicast-group-address</i> {   exclude;   group-count <i>number</i>;   group-increment <i>increment</i>;   source <i>ip-address</i> {     source-count <i>number</i>;     source-increment <i>increment</i>;   } }</pre> |
| <b>Hierarchy Level</b>                                                                                                                                                                      | [edit logical-systems <i>logical-system-name</i> protocols <a href="#">igmp interface interface-name static</a> ],<br>[edit protocols <a href="#">igmp interface interface-name static</a> ]                                            |
| <b>Release Information</b>                                                                                                                                                                  | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 12.1 for the QFX Series.                                          |
| <b>Description</b>                                                                                                                                                                          | Specify the IGMP multicast group address and (optionally) the source address for the multicast group being statically configured on an interface.                                                                                       |
| <div style="text-align: center;">  <b>NOTE:</b> You must specify a unique address for each group. </div> |                                                                                                                                                                                                                                         |
| The remaining statements are explained separately.                                                                                                                                          |                                                                                                                                                                                                                                         |
| <b>Required Privilege Level</b>                                                                                                                                                             | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                     |
| <b>Related Documentation</b>                                                                                                                                                                | <ul style="list-style-type: none"> <li><a href="#">Enabling IGMP Static Group Membership on page 52</a></li> </ul>                                                                                                                      |

## group-count

---

|                                 |                                                                                                                                                                                                                                                                          |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>group-count <i>number</i>;</code>                                                                                                                                                                                                                                  |
| <b>Hierarchy Level</b>          | [edit logical-systems <i>logical-system-name</i> protocols <b>igmp</b> interface <i>interface-name</i> <b>static group</b> <i>mcast-group-address</i> ],<br>[edit protocols <b>igmp</b> interface <i>interface-name</i> <b>static group</b> <i>mcast-group-address</i> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.6.<br>Statement introduced in Junos OS Release 12.1 for the QFX Series.                                                                                                                                                       |
| <b>Description</b>              | Specify the number of static groups to be created.                                                                                                                                                                                                                       |
| <b>Options</b>                  | <i>number</i> —Number of static groups.<br><b>Default:</b><br><b>Range:</b> 1 through 512                                                                                                                                                                                |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Enabling IGMP Static Group Membership on page 52</a></li></ul>                                                                                                                                                       |

## group-increment (Protocols IGMP)

---

|                                 |                                                                                                                                                                                                                                                                          |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>group-increment <i>increment</i>;</code>                                                                                                                                                                                                                           |
| <b>Hierarchy Level</b>          | [edit logical-systems <i>logical-system-name</i> protocols <b>igmp</b> interface <i>interface-name</i> <b>static group</b> <i>mcast-group-address</i> ],<br>[edit protocols <b>igmp</b> interface <i>interface-name</i> <b>static group</b> <i>mcast-group-address</i> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.6.<br>Statement introduced in Junos OS Release 12.1 for the QFX Series.                                                                                                                                                       |
| <b>Description</b>              | Configure the number of times the address should be incremented for each static group created. The increment is specified in dotted decimal notation similar to an IPv4 address.                                                                                         |
| <b>Options</b>                  | <i>increment</i> —Number of times the address should be incremented.<br><b>Default:</b> 0.0.0.1<br><b>Range:</b> 0.0.0.1 through 255.255.255.255                                                                                                                         |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Enabling IGMP Static Group Membership on page 52</a></li></ul>                                                                                                                                                       |

## group-limit (Protocols IGMP)

|                                 |                                                                                                                                                                                                                          |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>group-limit <i>limit</i>;</code>                                                                                                                                                                                   |
| <b>Hierarchy Level</b>          | [edit logical-systems <i>logical-system-name</i> protocols <b>igmp interface</b> <i>interface-name</i> ],<br>[edit protocols <b>igmp interface</b> <i>interface-name</i> ]                                               |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.4.<br>Statement introduced in Junos OS Release 12.1 for the QFX Series.                                                                                                      |
| <b>Description</b>              | Configure a limit for the number of multicast groups (or [S,G] channels in IGMPv3) allowed on an interface. After this limit is reached, new reports are ignored and all related flows are not flooded on the interface. |
| <b>Default</b>                  | By default, there is no limit to the number of multicast groups that can join the interface.                                                                                                                             |
| <b>Options</b>                  | <i>limit</i> —group limit value for the interface.<br><b>Range:</b> 1 through 32767                                                                                                                                      |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Limiting the Number of IGMP Multicast Group Joins on Logical Interfaces on page 60</a></li> </ul>                                                                   |

## group-policy (Protocols IGMP)

|                                 |                                                                                                                                                                                                                                                                                                                   |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>group-policy [ <i>policy-names</i> ];</code>                                                                                                                                                                                                                                                                |
| <b>Hierarchy Level</b>          | [edit logical-systems <i>logical-system-name</i> protocols <b>igmp interface</b> <i>interface-name</i> ],<br>[edit protocols <b>igmp interface</b> <i>interface-name</i> ]                                                                                                                                        |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.1.<br>Statement introduced in Junos OS Release 12.1 for the QFX Series.                                                                                                                                                                                                |
| <b>Description</b>              | When this statement is enabled on a router running IGMP version 2 (IGMPv2) or version 3 (IGMPv3), after the routing device receives an IGMP report, the routing device compares the group against the specified group policy and performs the action configured in that policy (for example, rejects the report). |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                                                               |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Filtering Unwanted IGMP Reports at the IGMP Interface Level on page 48</a></li> </ul>                                                                                                                                                                        |

## igmp

```
Syntax  igmp {
        accounting;
        interface interface-name {
            disable;
            (accounting | no-accounting);
            group-limit limit;
            group-policy [ policy-names ];
            immediate-leave;
            oif-map map-name;
            passive;
            promiscuous-mode;
            ssm-map ssm-map-name;
            ssm-map-policy ssm-map-policy-name;
            static {
                group multicast-group-address {
                    exclude;
                    group-count number;
                    group-increment increment;
                    source ip-address {
                        source-count number;
                        source-increment increment;
                    }
                }
            }
            version version;
        }
        query-interval seconds;
        query-last-member-interval seconds;
        query-response-interval seconds;
        robust-count number;
        traceoptions {
            file filename <files number> <size size> <world-readable | no-world-readable>;
            flag flag <flag-modifier> <disable>;
        }
    }
```

**Hierarchy Level** [edit logical-systems *logical-system-name* protocols],  
[edit protocols]

**Release Information** Statement introduced before Junos OS Release 7.4.  
Statement introduced in Junos OS Release 12.1 for the QFX Series.


**Description** Enable IGMP on the router. IGMP must be enabled for the router to receive multicast packets.

The remaining statements are explained separately.

**Default** IGMP is disabled on the router. IGMP is automatically enabled on all broadcast interfaces when you configure Protocol Independent Multicast (PIM) or Distance Vector Multicast Routing Protocol (DVMRP).

|                              |                                                                                            |
|------------------------------|--------------------------------------------------------------------------------------------|
| <b>Required Privilege</b>    | routing—To view this statement in the configuration.                                       |
| <b>Level</b>                 | routing-control—To add this statement to the configuration.                                |
| <b>Related Documentation</b> | <ul style="list-style-type: none"><li>• <a href="#">Enabling IGMP on page 43</a></li></ul> |

## immediate-leave (Protocols IGMP)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | immediate-leave;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Hierarchy Level</b>          | [edit logical-systems <i>logical-system-name</i> protocols <b>igmp</b> interface <i>interface-name</i> ],<br>[edit protocols <b>igmp</b> interface <i>interface-name</i> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.3.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 12.1 for the QFX Series.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Description</b>              | <p>The immediate leave setting is useful for minimizing the leave latency of IGMP memberships. When this setting is enabled, the routing device leaves the multicast group immediately after the last host leaves the multicast group.</p> <p>The immediate leave setting enables host tracking, meaning that the device keeps track of the hosts that send join messages. This allows IGMP to determine when the last host sends a leave message for the multicast group.</p> <p>When the immediate leave setting is enabled, the device removes an interface from the forwarding-table entry without first sending IGMP group-specific queries to the interface. The interface is pruned from the multicast tree for the multicast group specified in the IGMP leave message. The immediate leave setting ensures optimal bandwidth management for hosts on a switched network, even when multiple multicast groups are being used simultaneously.</p> <p>When immediate leave is disabled and one host sends a leave group message, the routing device first sends a group query to determine if another receiver responds. If no receiver responds, the routing device removes all hosts on the interface from the multicast group. Immediate leave is disabled by default for both IGMP version 2 and IGMP version 3.</p> |
|                                 | <p>.....</p> <div>  <p><b>NOTE:</b> Although host tracking is enabled for IGMPv2 and MLDv1 when you enable immediate leave, use immediate leave with these versions only when there is one host on the interface. The reason is that IGMPv2 and MLDv1 use a report suppression mechanism whereby only one host on an interface sends a group join report in response to a membership query. The other interested hosts suppress their reports. The purpose of this mechanism is to avoid a flood of reports for the same group. But it also interferes with host tracking, because the router only knows about the one interested host and does not know about the others.</p> </div> <p>.....</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Specifying Immediate-Leave Host Removal for IGMP on page 47</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |



## interface (Protocols IGMP)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre> interface <i>interface-name</i> {   disable;   (accounting   no-accounting);   group-limit <i>limit</i>;   group-policy [ <i>policy-names</i> ];   immediate-leave;   oif-map <i>map-name</i>;   passive;   promiscuous-mode;   ssm-map <i>ssm-map-name</i>;   ssm-map-policy <i>ssm-map-policy-name</i>;   static {     group <i>multicast-group-address</i> {       exclude;       group-count <i>number</i>;       group-increment <i>increment</i>;       source <i>ip-address</i> {         source-count <i>number</i>;         source-increment <i>increment</i>;       }     }   }   version <i>version</i>; } </pre> |
| <b>Hierarchy Level</b>          | [edit logical-systems <i>logical-system-name</i> protocols <b>igmp</b> ],<br>[edit protocols <b>igmp</b> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 12.1 for the QFX Series.                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Description</b>              | Enable IGMP on an interface and configure interface-specific properties.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Options</b>                  | <p><b><i>interface-name</i></b>—Name of the interface. Specify the full interface name, including the physical and logical address components. To configure all interfaces, you can specify <b>all</b>.</p> <p>The remaining statements are explained separately.</p>                                                                                                                                                                                                                                                                                                                                                              |
| <b>Required Privilege Level</b> | <p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Enabling IGMP on page 43</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

## maximum-transmit-rate (Protocols IGMP)

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|                                 |                                                                                                                                                                    |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | maximum-transmit-rate <i>packets-per-second</i> ;                                                                                                                  |
| <b>Hierarchy Level</b>          | [edit logical-systems <i>logical-system-name</i> protocols igmp],<br>[edit protocols igmp]                                                                         |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.3.<br>Statement introduced in Junos OS Release 12.1 for the QFX Series.                                                 |
| <b>Description</b>              | Limit the transmission rate of IGMP packets                                                                                                                        |
| <b>Options</b>                  | <b>packets-per-second</b> —Maximum number of IGMP packets transmitted in one second by the router.<br><b>Range:</b> 1 through 10000<br><b>Default:</b> 500 packets |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Limiting the Maximum IGMP Message Rate on page 52</a></li></ul>                                                |

## oif-map (IGMP Interface)

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|                                 |                                                                                                                                                                            |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | oif-map <i>map-name</i> ;                                                                                                                                                  |
| <b>Hierarchy Level</b>          | [edit logical-systems <i>logical-system-name</i> protocols <b>igmp interface</b> <i>interface-name</i> ],<br>[edit protocols <b>igmp interface</b> <i>interface-name</i> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.6.<br>Statement introduced in Junos OS Release 12.1 for the QFX Series.                                                         |
| <b>Description</b>              | Associates an outgoing interface (OIF) map to the IGMP interface. The OIF map is a routing policy statement that can contain multiple terms.                               |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Example: Configuring Multicast with Subscriber VLANs</a></li></ul>                                                     |

## passive (IGMP)

|                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                      |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                                                                                                                                                                                                                                                                                                                                                   | <code>passive &lt;allow-receive&gt; &lt;send-general-query&gt; &lt;send-group-query&gt;;</code>                                                                                                                                                                                                      |
| <b>Hierarchy Level</b>                                                                                                                                                                                                                                                                                                                                                          | [edit logical-systems <i>logical-system-name</i> protocols <b>igmp</b> interface <i>interface-name</i> ],<br>[edit protocols <b>igmp</b> interface <i>interface-name</i> ]                                                                                                                           |
| <b>Release Information</b>                                                                                                                                                                                                                                                                                                                                                      | Statement introduced in Junos OS Release 9.6.<br><b>allow-receive</b> , <b>send-general-query</b> , and <b>send-group-query</b> options were added in Junos OS Release 10.0.<br>Statement introduced in Junos OS Release 12.1 for the QFX Series.                                                    |
| <b>Description</b>                                                                                                                                                                                                                                                                                                                                                              | Specify that IGMP run on the interface and either not send and receive control traffic or selectively send and receive control traffic such as IGMP reports, queries, and leaves.                                                                                                                    |
| <div>  <p><b>NOTE:</b> You can selectively activate up to two out of the three available options for the <b>passive</b> statement while keeping the other functions passive (inactive). Activating all three options would be equivalent to not using the <b>passive</b> statement.</p> </div> |                                                                                                                                                                                                                                                                                                      |
| <b>Options</b>                                                                                                                                                                                                                                                                                                                                                                  | <p><b>allow-receive</b>—Enables IGMP to receive control traffic on the interface.</p> <p><b>send-general-query</b>—Enables IGMP to send general queries on the interface.</p> <p><b>send-group-query</b>—Enables IGMP to send group-specific and group-source-specific queries on the interface.</p> |
| <b>Required Privilege Level</b>                                                                                                                                                                                                                                                                                                                                                 | <p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>                                                                                                                                                                       |
| <b>Related Documentation</b>                                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>• <i>Example: Configuring Multicast with Subscriber VLANs</i></li> <li>• <a href="#">Enabling IGMP on page 43</a></li> </ul>                                                                                                                                  |

## promiscuous-mode (Protocols IGMP)

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|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>promiscuous-mode;</code>                                                                                                                                                                                                                                                                                                                        |
| <b>Hierarchy Level</b>          | [edit dynamic-profiles <i>profile-name</i> protocols igmp interface <i>interface-name</i> ],<br>[edit logical-systems <i>logical-system-name</i> protocols <b>igmp interface</b> <i>interface-name</i> ],<br>[edit protocols <b>igmp interface</b> <i>interface-name</i> ]                                                                            |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.3.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 9.2 for dynamic profiles.<br>Statement introduced in Junos OS Release 12.1 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.          |
| <b>Description</b>              | Specify that the interface accepts IGMP reports from hosts on any subnetwork. Note that when enabling promiscuous-mode, all routing devices on the ethernet segment must be configured with the promiscuous mode statement. Otherwise, only the interface configured with lowest IPv4 address acts as the querier for IGMP for this Ethernet segment. |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                                                                                                   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Dynamic IGMP Configuration Overview</i></li><li>• <i>Configuring Dynamic DHCP Client Access to a Multicast Network</i></li><li>• <a href="#">Accepting IGMP Messages from Remote Subnetworks on page 49</a></li></ul>                                                                                      |

## query-interval (Protocols IGMP)

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|                                 |                                                                                                                                                                                                                                                                                                  |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>query-interval seconds;</code>                                                                                                                                                                                                                                                             |
| <b>Hierarchy Level</b>          | [edit logical-systems <i>logical-system-name</i> protocols <a href="#">igmp</a> ],<br>[edit protocols <a href="#">igmp</a> ]                                                                                                                                                                     |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 12.1 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                       |
| <b>Description</b>              | Specify how often the querier routing device sends general host-query messages.                                                                                                                                                                                                                  |
| <b>Options</b>                  | <i>seconds</i> —Time interval.<br><b>Range:</b> 1 through 1024<br><b>Default:</b> 125 seconds                                                                                                                                                                                                    |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                                              |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Modifying the IGMP Host-Query Message Interval on page 46</a></li> <li>• <a href="#">query-last-member-interval (Protocols IGMP) on page 246</a></li> <li>• <a href="#">query-response-interval (Protocols IGMP) on page 247</a></li> </ul> |

## query-last-member-interval (Protocols IGMP)

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|                                 |                                                                                                                                                                                                                                                                                 |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | query-last-member-interval <i>seconds</i> ;                                                                                                                                                                                                                                     |
| <b>Hierarchy Level</b>          | [edit logical-systems <i>logical-system-name</i> protocols <a href="#">igmp</a> ],<br>[edit protocols <a href="#">igmp</a> ]                                                                                                                                                    |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 12.1 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.      |
| <b>Description</b>              | Specify how often the querier routing device sends group-specific query messages.                                                                                                                                                                                               |
| <b>Options</b>                  | <b>seconds</b> —Time interval, in fractions of a second or seconds.<br><b>Range:</b> 0.1 through 0.9, then in 1-second intervals 1 through 9999999<br><b>Default:</b> 1 second                                                                                                  |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Modifying the IGMP Last-Member Query Interval on page 46</a></li><li>• <a href="#">query-interval (Protocols IGMP) on page 245</a></li><li>• <a href="#">query-response-interval (Protocols IGMP) on page 247</a></li></ul> |

## query-response-interval (Protocols IGMP)

|                                 |                                                                                                                                                                                                                                                                                     |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>query-response-interval <i>seconds</i>;</code>                                                                                                                                                                                                                                |
| <b>Hierarchy Level</b>          | [edit logical-systems <i>logical-system-name</i> protocols <a href="#">igmp</a> ],<br>[edit protocols <a href="#">igmp</a> ]                                                                                                                                                        |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 12.1 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.          |
| <b>Description</b>              | Specify how long the querier routing device waits to receive a response to a host-query message from a host.                                                                                                                                                                        |
| <b>Options</b>                  | <b><i>seconds</i></b> —The query response interval must be less than the query interval.<br><b>Range:</b> 1 through 1024<br><b>Default:</b> 10 seconds                                                                                                                              |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                                 |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Modifying the IGMP Query Response Interval on page 50</a></li> <li>• <a href="#">query-interval (Protocols IGMP) on page 245</a></li> <li>• <a href="#">query-last-member-interval (Protocols IGMP) on page 246</a></li> </ul> |

## robust-count (Protocols IGMP)

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|                                 |                                                                                                                                                                                                                                                                            |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>robust-count <i>number</i>;</code>                                                                                                                                                                                                                                   |
| <b>Hierarchy Level</b>          | [edit logical-systems <i>logical-system-name</i> protocols <a href="#">igmp</a> ],<br>[edit protocols <a href="#">igmp</a> ]                                                                                                                                               |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 12.1 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series. |
| <b>Description</b>              | Tune the expected packet loss on a subnet. This factor is used to calculate the group member interval, other querier present interval, and last-member query count.                                                                                                        |
| <b>Options</b>                  | <i>number</i> —Robustness variable.<br><b>Range:</b> 2 through 10<br><b>Default:</b> 2                                                                                                                                                                                     |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Modifying the IGMP Robustness Variable on page 51</a></li></ul>                                                                                                                                                        |



## source (Protocols IGMP)

|                                 |                                                                                                                                                                                                                                                                                  |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>source <i>ip-address</i> {     <i>source-count</i> <i>number</i>;     <i>source-increment</i> <i>increment</i>; }</pre>                                                                                                                                                     |
| <b>Hierarchy Level</b>          | [edit logical-systems <i>logical-system-name</i> protocols <b>igmp interface</b> <i>interface-name</i> <b>static group</b> <i>multicast-group-address</i> ],<br>[edit protocols <b>igmp interface</b> <i>interface-name</i> <b>static group</b> <i>multicast-group-address</i> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 12.1 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.       |
| <b>Description</b>              | Specify the IP version 4 (IPv4) unicast source address for the multicast group being statically configured on an interface.                                                                                                                                                      |
| <b>Options</b>                  | <p><i>ip-address</i>—IPv4 unicast address.</p> <p>The remaining statements are explained separately.</p>                                                                                                                                                                         |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                              |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Enabling IGMP Static Group Membership on page 52</a></li> </ul>                                                                                                                                                             |

## source-count (Protocols IGMP)


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|                                 |                                                                                                                                                                                                                                                                                                |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>source-count <i>number</i>;</code>                                                                                                                                                                                                                                                       |
| <b>Hierarchy Level</b>          | [edit logical-systems <i>logical-system-name</i> protocols <b>igmp</b> interface <i>interface-name</i> <b>static group multicast-group-address</b> <b>source</b> ],<br>[edit protocols <b>igmp</b> interface <i>interface-name</i> <b>static group multicast-group-address</b> <b>source</b> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.6.<br>Statement introduced in Junos OS Release 12.1 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                                                                                 |
| <b>Description</b>              | Configure the number of multicast source addresses that should be accepted for each static group created.                                                                                                                                                                                      |
| <b>Options</b>                  | <b><i>number</i></b> —Number of source addresses.<br><b>Default:</b> 1<br><b>Range:</b> 1 through 1024                                                                                                                                                                                         |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Enabling IGMP Static Group Membership on page 52</a></li></ul>                                                                                                                                                                             |

## source-increment (Protocols IGMP)

|                                 |                                                                                                                                                                                                                                                                                  |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | source-increment <i>number</i> ;                                                                                                                                                                                                                                                 |
| <b>Hierarchy Level</b>          | [edit logical-systems <i>logical-system-name</i> protocols <b>igmp</b> interface <i>interface-name</i> <b>static group multicast-group-address source</b> ],<br>[edit protocols <b>igmp</b> interface <i>interface-name</i> <b>static group multicast-group-address source</b> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.6.<br>Statement introduced in Junos OS Release 12.1 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                                                                   |
| <b>Description</b>              | Configure the number of times the multicast source address should be incremented for each static group created. The increment is specified in dotted decimal notation similar to an IPv4 address.                                                                                |
| <b>Options</b>                  | <b>increment</b> —Number of times the source address should be incremented.<br><b>Default:</b> 0.0.0.1<br><b>Range:</b> 0.0.0.1 through 255.255.255.255                                                                                                                          |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                              |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Enabling IGMP Static Group Membership on page 52</a></li> </ul>                                                                                                                                                             |

## static (Protocols IGMP)

|                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                          |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                                                                                                                                                                                                                        | <pre>static {   group multicast-group-address {     exclude;     group-count number;     group-increment increment;     source ip-address {       source-count number;       source-increment increment;     }   } }</pre>                                                                                                                                               |
| <b>Hierarchy Level</b>                                                                                                                                                                                                                               | [edit logical-systems <i>logical-system-name</i> protocols <b>igmp interface</b> <i>interface-name</i> ],<br>[edit protocols <b>igmp interface</b> <i>interface-name</i> ]                                                                                                                                                                                               |
| <b>Release Information</b>                                                                                                                                                                                                                           | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 12.1 for the QFX Series.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>                                                                            |
| <b>Description</b>                                                                                                                                                                                                                                   | <p>Test multicast forwarding on an interface without a receiver host.</p> <p>The <b>static</b> statement simulates IGMP joins on a routing device statically on an interface without any IGMP hosts. It is supported for both IGMPv2 and IGMPv3 joins. This statement is especially useful for testing multicast forwarding on an interface without a receiver host.</p> |
| <div>  <b>NOTE:</b> To prevent joining too many groups accidentally, the <b>static</b> statement is not supported with the <b>interface all</b> statement. </div> |                                                                                                                                                                                                                                                                                                                                                                          |
| The remaining statements are explained separately.                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Required Privilege Level</b>                                                                                                                                                                                                                      | <p>routing and trace—To view this statement in the configuration.</p> <p>routing-control and trace-control—To add this statement to the configuration.</p>                                                                                                                                                                                                               |
| <b>Related Documentation</b>                                                                                                                                                                                                                         | <ul style="list-style-type: none"> <li>• <a href="#">Enabling IGMP Static Group Membership on page 52</a></li> </ul>                                                                                                                                                                                                                                                     |

## traceoptions (Protocols IGMP)

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <pre> traceoptions {     file <i>filename</i> &lt;files <i>number</i>&gt; &lt;size <i>size</i>&gt; &lt;world-readable   no-world-readable&gt;;     flag <i>flag</i> &lt;flag-modifier&gt; &lt;disable&gt;; } </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Hierarchy Level</b>     | [edit logical-systems <i>logical-system-name</i> protocols <b>igmp</b> ],<br>[edit protocols <b>igmp</b> ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Release Information</b> | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 12.1 for the QFX Series.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Description</b>         | <p>Configure IGMP tracing options.</p> <p>To specify more than one tracing operation, include multiple <b>flag</b> statements.</p> <p>To trace the paths of multicast packets, use the <b>mtrace</b> command.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Default</b>             | The default IGMP trace options are those inherited from the routing protocols <b>traceoptions</b> statement included at the [edit routing-options] hierarchy level.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Options</b>             | <p><b>disable</b>—(Optional) Disable the tracing operation. You can use this option to disable a single operation when you have defined a broad group of tracing operations, such as <b>all</b>.</p> <p><b>file <i>filename</i></b>—Name of the file to receive the output of the tracing operation. Enclose the name within quotation marks. All files are placed in the directory <b>/var/log</b>. We recommend that you place tracing output in the file <b>igmp-log</b>.</p> <p><b>files <i>number</i></b>—(Optional) Maximum number of trace files. When a trace file named <b>trace-file</b> reaches its maximum size, it is renamed <b>trace-file.0</b>, then <b>trace-file.1</b>, and so on, until the maximum number of trace files is reached. Then the oldest trace file is overwritten.</p> <p>If you specify a maximum number of files, you must also include the <b>size</b> statement to specify the maximum file size.</p> <p><b>Range:</b> 2 through 1000 files</p> <p><b>Default:</b> 2 files</p> <p><b>flag</b>—Tracing operation to perform. To specify more than one tracing operation, include multiple <b>flag</b> statements.</p> <p><b>IGMP Tracing Flags</b></p> <ul style="list-style-type: none"> <li><b>leave</b>—Leave group messages (for IGMP version 2 only).</li> <li><b>mtrace</b>—Mtrace packets. Use the <b>mtrace</b> command to troubleshoot the software.</li> </ul> |

- **packets**—All IGMP packets.
- **query**—IGMP membership query messages, including general and group-specific queries.
- **report**—Membership report messages.

#### Global Tracing Flags

- **all**—All tracing operations
- **general**—A combination of the **normal** and **route** trace operations
- **normal**—All normal operations

**Default:** If you do not specify this option, only unusual or abnormal operations are traced.

- **policy**—Policy operations and actions
- **route**—Routing table changes
- **state**—State transitions
- **task**—Interface transactions and processing
- **timer**—Timer usage

**flag-modifier**—(Optional) Modifier for the tracing flag. You can specify one or more of these modifiers:

- **detail**—Detailed trace information
- **receive**—Packets being received
- **send**—Packets being transmitted

**no-stamp**—(Optional) Do not place timestamp information at the beginning of each line in the trace file.

**Default:** If you omit this option, timestamp information is placed at the beginning of each line of the tracing output.

**no-world-readable**—(Optional) Do not allow users to read the log file.

**replace**—(Optional) Replace an existing trace file if there is one.

**Default:** If you do not include this option, tracing output is appended to an existing trace file.

**size size**—(Optional) Maximum size of each trace file, in kilobytes (KB), megabytes (MB), or gigabytes (GB). When a trace file named **trace-file** reaches this size, it is renamed **trace-file.0**. When **trace-file** again reaches this size, **trace-file.0** is renamed **trace-file.1** and **trace-file** is renamed **trace-file.0**. This renaming scheme continues until the maximum number of trace files is reached. Then the oldest trace file is overwritten.

If you specify a maximum file size, you must also include the **files** statement to specify the maximum number of trace files.

**Syntax:** *xk* to specify KB, *xm* to specify MB, or *xg* to specify GB

**Range:** 10 KB through the maximum file size supported on your system

**Default:** 1 MB

**world-readable**—(Optional) Allow any user to read the log file.

|                                 |                                                                                                              |
|---------------------------------|--------------------------------------------------------------------------------------------------------------|
| <b>Required Privilege Level</b> | routing and trace—To view this statement in the configuration.                                               |
|                                 | routing-control and trace-control—To add this statement to the configuration.                                |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Tracing IGMP Protocol Traffic on page 61</a></li> </ul> |

## version (Protocols IGMP)

|                                 |                                                                                                                                                                                                                                                                            |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>version <i>version</i>;</code>                                                                                                                                                                                                                                       |
| <b>Hierarchy Level</b>          | [edit logical-systems <i>logical-system-name</i> protocols <b>igmp interface</b> <i>interface-name</i> ],<br>[edit protocols <b>igmp interface</b> <i>interface-name</i> ]                                                                                                 |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 12.1 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series. |
| <b>Description</b>              | Specify the version of IGMP.                                                                                                                                                                                                                                               |
| <b>Options</b>                  | <p><b>version</b>—IGMP version number.</p> <p><b>Range:</b> 1, 2, or 3</p> <p><b>Default:</b> IGMP version 2</p>                                                                                                                                                           |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Changing the IGMP Version on page 44</a></li> </ul>                                                                                                                                                                   |





# Configuration Statements (IGMP Snooping)

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## all

---

|                                 |                                                                                                                     |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | all;                                                                                                                |
| <b>Hierarchy Level</b>          | [edit protocols igmp-snooping vlan ]                                                                                |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 15.1 for the QFX series.                                                   |
| <b>Description</b>              | Apply IGMP snooping to all configured VLANs.                                                                        |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration. |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring IGMP Snooping on page 68</a></li></ul>              |

## data-forwarding

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>data-forwarding {<br/>  receiver {<br/>    source-vlans <i>vlan-list</i>;<br/>    install;<br/>  }<br/>  source {<br/>    groups <i>group-prefix</i>;<br/>  }<br/>}</pre>                                                                                                                                                                                                                                                           |
| <b>Hierarchy Level</b>          | [edit protocols igmp-snooping vlan (all   <i>vlan-name</i> )]                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.6 for EX Series switches.<br>Statement introduced in Junos OS Release 12.3 for the QFX Series.                                                                                                                                                                                                                                                                                                |
| <b>Description</b>              | <p>Configure the VLAN to be a multicast source VLAN (MVLAN) or a multicast VLAN registration (MVR) receiver VLAN. Each data-forwarding VLAN, which can be a multicast source VLAN (MVLAN) or a multicast receiver VLAN, must have exactly one source statement or exactly one receiver statement. A data-forwarding VLAN can operate only in IGMP version 2 (IGMPv2) mode.</p> <p>The remaining statements are explained separately.</p> |
| <b>Default</b>                  | Disabled                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Example: Configuring Multicast VLAN Registration</i></li><li>• <i>Configuring Multicast VLAN Registration (CLI Procedure)</i></li></ul>                                                                                                                                                                                                                                                       |

## disable (IGMP Snooping)

---

|                                 |                                                                                                                                                                                   |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>disable;</code>                                                                                                                                                             |
| <b>Hierarchy Level</b>          | <code>[edit protocols igmp-snooping vlan <i>vlan-name</i>]</code>                                                                                                                 |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 11.1 for the QFX Series.                                                                                                                 |
| <b>Description</b>              | Disable IGMP snooping on all interfaces in a VLAN.                                                                                                                                |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                               |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Example: Configuring IGMP Snooping on page 70</a></li> <li>• <a href="#">Configuring IGMP Snooping on page 68</a></li> </ul> |

## group (IGMP Snooping)

---

|                                 |                                                                                                                                                                                                                                                   |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>group <i>ip-address</i>;</code>                                                                                                                                                                                                             |
| <b>Hierarchy Level</b>          | <code>[edit protocols igmp-snooping vlan <i>vlan-name</i> <a href="#">interface <i>interface-name</i></a> <a href="#">static</a>]</code>                                                                                                          |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 11.1 for the QFX Series.                                                                                                                                                                                 |
| <b>Description</b>              | Configure a static multicast group using a valid IP multicast address.                                                                                                                                                                            |
| <b>Default</b>                  | None.                                                                                                                                                                                                                                             |
| <b>Options</b>                  | <i>ip-address</i> —IP address of the multicast group receiving data on an interface.                                                                                                                                                              |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                               |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">show igmp-snooping vlans on page 415</a></li> <li>• <a href="#">Example: Configuring IGMP Snooping on page 70</a></li> <li>• <a href="#">Configuring IGMP Snooping on page 68</a></li> </ul> |

## group-limit (IGMP and MLD Snooping)

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>group-limit <i>limit</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Hierarchy Level</b>          | <code>[edit bridge-domains <i>bridge-domain-name</i> protocols igmp-snooping <a href="#">interface</a> <i>interface-name</i>],</code><br><code>[edit bridge-domains <i>bridge-domain-name</i> protocols igmp-snooping vlan <i>vlan-id</i> <a href="#">interface</a> <i>interface-name</i>],</code><br><code>[edit routing-instances <i>routing-instance-name</i> bridge-domains <i>bridge-domain-name</i> protocols igmp-snooping <a href="#">interface</a> <i>interface-name</i>],</code><br><code>[edit routing-instances <i>routing-instance-name</i> bridge-domains <i>bridge-domain-name</i> protocols vlan <i>vlan-id</i> igmp-snooping <a href="#">interface</a> <i>interface-name</i>]</code> |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.5.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Description</b>              | Configure a limit for the number of multicast groups (or [S,G] channels in IGMPv3) allowed on an interface. After this limit is reached, new reports are ignored and all related flows are not flooded on the interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Default</b>                  | By default, there is no limit to the number of multicast groups joining an interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Options</b>                  | <i>limit</i> —a 32-bit number for the limit on the interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Example: Configuring IGMP Snooping</i></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

## host-only-interface

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | host-only-interface;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Hierarchy Level</b>          | [edit bridge-domains <i>bridge-domain-name</i> protocols igmp-snooping <a href="#">interface interface-name</a> ],<br>[edit bridge-domains <i>bridge-domain-name</i> protocols igmp-snooping vlan <i>vlan-id</i> <a href="#">interface interface-name</a> ],<br>[edit routing-instances <i>routing-instance-name</i> bridge-domains <i>bridge-domain-name</i> protocols igmp-snooping <a href="#">interface interface-name</a> ],<br>[edit routing-instances <i>routing-instance-name</i> bridge-domains <i>bridge-domain-name</i> protocols vlan <i>vlan-id</i> igmp-snooping <a href="#">interface interface-name</a> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.5.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Description</b>              | Configure an interface as a host-facing interface. IGMP queries received on these interfaces are dropped.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Default</b>                  | The interface can either be a host-side or multicast-router interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Example: Configuring IGMP Snooping</a></li> <li>• <a href="#">multicast-router-interface</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

## igmp-querier

|                                 |                                                                                                                                                                                                                                                                                                                              |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | igmp-querier <a href="#">source-address</a> <i>source address</i> ;                                                                                                                                                                                                                                                          |
| <b>Hierarchy Level</b>          | [edit protocols igmp-snooping vlan <i>vlan-name</i> ]                                                                                                                                                                                                                                                                        |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 14.1X53-D15 for QFabric Systems.                                                                                                                                                                                                                                                    |
| <b>Description</b>              | Configure a QFabric Node device to be an IGMP querier. If there are any multicast routers on the same local network, make sure the source address for the IGMP querier is lower (a smaller number) than the IP addresses for those routers on the network. This ensures that Node is always the IGMP querier on the network. |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                                                                          |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Example: Configuring IGMP Snooping on page 70</a></li> <li>• <a href="#">Configuring IGMP Snooping on page 68</a></li> <li>• <a href="#">show igmp-snooping vlans on page 415</a></li> <li>• <a href="#">show configuration protocols igmp on page 391</a></li> </ul>   |

## igmp-snooping

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre> igmp-snooping {   vlan <i>vlan-id</i> {     all     immediate-leave;     interface <i>interface-name</i> {       group-limit <i>limit</i>;       host-only-interface;       immediate-leave;       multicast-router-interface;       static {         group <i>ip-address</i> {           source <i>ip-address</i>;         }       }     }   }   l2-querier {     source-address <i>ip-address</i>;   }   proxy {     source-address <i>ip-address</i>;   }   query-interval <i>seconds</i>;   query-last-member-interval <i>seconds</i>;   query-response-interval <i>seconds</i>;   robust-count <i>number</i>;   traceoptions {     file <i>filename</i> &lt;files <i>number</i>&gt; &lt;no-stamp&gt; &lt;replace&gt; &lt;size <i>size</i>&gt; &lt;world-readable         no-world-readable&gt;;     flag <i>flag</i> &lt;flag-modifier&gt;;   } } </pre> |
| <b>Hierarchy Level</b>          | [edit protocols]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 13.2 for the QFX Series.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Description</b>              | Enable IGMP snooping on the router or switch.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Default</b>                  | IGMP snooping is disabled on the router or switch.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Options</b>                  | The statements are explained separately.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Understanding IGMP Snooping</i></li> <li>• <i>IGMP Snooping in MC-LAG Active-Active Mode</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

## immediate-leave (Bridge Domains)

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <code>immediate-leave;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Hierarchy Level</b>     | <pre>[edit bridge-domains <i>bridge-domain-name</i> protocols igmp-snooping], [edit bridge-domains <i>bridge-domain-name</i> protocols igmp-snooping <b>interface</b> <i>interface-name</i>], [edit bridge-domains <i>bridge-domain-name</i> protocols igmp-snooping vlan <i>vlan-id</i> <b>interface</b> <i>interface-name</i>], [edit routing-instances <i>routing-instance-name</i> bridge-domains <i>bridge-domain-name</i> protocols igmp-snooping], [edit routing-instances <i>routing-instance-name</i> bridge-domains <i>bridge-domain-name</i> protocols igmp-snooping <b>interface</b> <i>interface-name</i>], [edit routing-instances <i>routing-instance-name</i> bridge-domains <i>bridge-domain-name</i> protocols vlan <i>vlan-id</i> igmp-snooping <b>interface</b> <i>interface-name</i>]</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Release Information</b> | Statement introduced in Junos OS Release 8.5.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Description</b>         | <p>The immediate leave setting is useful for minimizing the leave latency of IGMP memberships. When this setting is enabled, the routing device leaves the multicast group immediately after the last host leaves the multicast group.</p> <p>The immediate-leave setting enables host tracking, meaning that the device keeps track of the hosts that send join messages. This allows IGMP to determine when the last host sends a leave message for the multicast group.</p> <p>When the immediate leave setting is enabled, the device removes an interface from the forwarding-table entry without first sending IGMP group-specific queries to the interface. The interface is pruned from the multicast tree for the multicast group specified in the IGMP leave message. The immediate leave setting ensures optimal bandwidth management for hosts on a switched network, even when multiple multicast groups are being used simultaneously.</p> <p>When immediate leave is disabled and one host sends a leave group message, the routing device first sends a group query to determine if another receiver responds. If no receiver responds, the routing device removes all hosts on the interface from the multicast group. Immediate leave is disabled by default for both IGMP version 2 and IGMP version 3.</p> |



**NOTE:** Although host tracking is enabled for IGMPv2 and MLDv1 when you enable immediate leave, use immediate leave with these versions only when there is one host on the interface. The reason is that IGMPv2 and MLDv1 use a report suppression mechanism whereby only one host on an interface sends a group join report in response to a membership query. The other interested hosts suppress their reports. The purpose of this mechanism is to avoid a flood of reports for the same group. But it also interferes with host tracking, because the router only knows about the one interested host and does not know about the others.

**Required Privilege Level** routing—To view this statement in the configuration.  
routing-control—To add this statement to the configuration.

**Related Documentation**

- *Example: Configuring IGMP Snooping*

---

## interface (Bridge Domains)

---

**Syntax**

```
interface interface-name {  
    group-limit limit;  
    host-only-interface;  
    multicast-router-interface;  
    static {  
        group ip-address {  
            source ip-address;  
        }  
    }  
}
```

**Hierarchy Level** [edit bridge-domains *bridge-domain-name* protocols igmp-snooping],  
[edit bridge-domains *bridge-domain-name* protocols igmp-snooping vlan *vlan-id*],  
[edit routing-instances *routing-instance-name* bridge-domains *bridge-domain-name* protocols  
igmp-snooping],  
[edit routing-instances *routing-instance-name* bridge-domains *bridge-domain-name* protocols  
vlan *vlan-id* igmp-snooping]

**Release Information** Statement introduced in Junos OS Release 8.5.

**Description** Enable IGMP snooping on an interface and configure interface-specific properties.

**Options** *interface-name*—Name of the interface. Specify the full interface name, including the physical and logical address components. To configure all interfaces, you can specify **all**.

The remaining statements are explained separately.

**Required Privilege Level** routing—To view this statement in the configuration.  
routing-control—To add this statement to the configuration.

**Related Documentation**

- *Example: Configuring IGMP Snooping*



## interface (IGMP Snooping)

|                                 |                                                                                                                                                                                                                                                   |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>interface <i>interface-name</i> {     multicast-router-interface;     static {         group <i>ip-address</i>;     } }</pre>                                                                                                                |
| <b>Hierarchy Level</b>          | [edit protocols igmp-snooping vlan <i>vlan-name</i> ]                                                                                                                                                                                             |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 11.1 for the QFX Series.                                                                                                                                                                                 |
| <b>Description</b>              | <p>Enable IGMP snooping on an interface and configure interface-specific properties.</p> <p>The remaining statements are explained separately.</p>                                                                                                |
| <b>Options</b>                  | <i>interface-name</i> —Name of the interface.                                                                                                                                                                                                     |
| <b>Required Privilege Level</b> | <p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>                                                                                                                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Example: Configuring IGMP Snooping on page 70</a></li> <li>• <a href="#">Configuring IGMP Snooping on page 68</a></li> <li>• <a href="#">show igmp-snooping vlans on page 415</a></li> </ul> |

## l2-querier

|                                 |                                                                                                                                                       |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>l2-querier {     source-address <i>ip-address</i>; }</pre>                                                                                       |
| <b>Hierarchy Level</b>          | [edit protocols igmp-snooping vlan],                                                                                                                  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 13.2 for the QFX Series.                                                                                     |
| <b>Description</b>              | Configure the switch to be an IGMP querier. Use the <b>source-address</b> statement to configure the source address to use for IGMP snooping queries. |
| <b>Options</b>                  | <p><b>seconds</b>—Time interval.</p> <p><b>Range:</b> 1 through 1024</p> <p><b>Default:</b> 125 seconds</p>                                           |
| <b>Required Privilege Level</b> | <p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>                        |
| <b>Related Documentation</b>    |                                                                                                                                                       |

## multicast-router-interface (IGMP Snooping)

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|                                 |                                                                                                                                                                                                                                               |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | multicast-router-interface;                                                                                                                                                                                                                   |
| <b>Hierarchy Level</b>          | [edit protocols igmp-snooping vlan <i>vlan-name</i> <b>interface</b> <i>interface-name</i> ]                                                                                                                                                  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 11.1 for the QFX Series.                                                                                                                                                                             |
| <b>Description</b>              | Configure an interface to forward IGMP messages to multicast routers.                                                                                                                                                                         |
| <b>Default</b>                  | Disabled. If this statement is disabled, the interface drops IGMP messages it receives.                                                                                                                                                       |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                           |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">show igmp-snooping vlans on page 415</a></li><li>• <a href="#">Example: Configuring IGMP Snooping on page 70</a></li><li>• <a href="#">Configuring IGMP Snooping on page 68</a></li></ul> |

## query-interval (Bridge Domains)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>query-interval seconds;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Hierarchy Level</b>          | <pre>[edit bridge-domains <i>bridge-domain-name</i> protocols mld-snooping ] , [edit bridge-domains <i>bridge-domain-name</i> protocols igmp-snooping <i>interface</i> <i>interface-name</i>], [edit bridge-domains <i>bridge-domain-name</i> protocols igmp-snooping vlan <i>vlan-id</i> <i>interface</i> <i>interface-name</i>], [edit routing-instances <i>routing-instance-name</i> bridge-domains <i>bridge-domain-name</i> protocols igmp-snooping <i>interface</i> <i>interface-name</i>],[ edit routing-instances <i>routing-instance-name</i> bridge-domains <i>bridge-domain-name</i> protocols mld-snooping ] [edit routing-instances <i>routing-instance-name</i> bridge-domains <i>bridge-domain-name</i> protocols igmp-snooping vlan <i>vlan-id</i> <i>interface</i> <i>interface-name</i>] [edit routing-instances <i>routing-instance-name</i> protocols mld-snooping ] [edit protocols igmp-snooping vlan]</pre> |
| <b>Release Information</b>      | <p>Statement introduced before Junos OS Release 8.5.</p> <p>Statement introduced in Junos OS Release 13.2 for the QFX series.</p> <p>Statement introduced in Junos OS Release 14.2 for MX series Routers with MPC.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Description</b>              | Configure the interval for host-query message timeouts.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Options</b>                  | <p><i>seconds</i>—Time interval. This value must be greater than the interval set for <code>query-response-interval</code>.</p> <p><b>Range:</b> 1 through 1024</p> <p><b>Default:</b> 125 seconds</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Required Privilege Level</b> | <p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Example: Configuring IGMP Snooping</i></li> <li>• <a href="#">query-last-member-interval (Bridge Domains) on page 268</a></li> <li>• <a href="#">query-response-interval (Bridge Domains) on page 269</a></li> <li>• <i>mld-snooping</i></li> <li>• <i>igmp-snooping</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

## query-last-member-interval (Bridge Domains)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>query-last-member-interval seconds;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Hierarchy Level</b>          | <pre>[edit bridge-domains <i>bridge-domain-name</i> protocols mld-snooping ] , [edit bridge-domains <i>bridge-domain-name</i> protocols igmp-snooping <a href="#">interface</a> <i>interface-name</i>], [edit bridge-domains <i>bridge-domain-name</i> protocols igmp-snooping vlan <i>vlan-id</i> <a href="#">interface</a> <i>interface-name</i>], [edit routing-instances <i>routing-instance-name</i> bridge-domains <i>bridge-domain-name</i> protocols igmp-snooping <a href="#">interface</a> <i>interface-name</i>], [edit routing-instances <i>routing-instance-name</i> bridge-domains <i>bridge-domain-name</i> protocols mld-snooping ] [edit routing-instances <i>routing-instance-name</i> bridge-domains <i>bridge-domain-name</i> protocols igmp-snooping vlan <i>vlan-id</i> [edit routing-instances <i>routing-instance-name</i> protocols mld-snooping ]<a href="#">interface</a> <i>interface-name</i>] [edit protocols igmp-snooping vlan],</pre> |
| <b>Release Information</b>      | <p>Statement introduced in Junos OS Release 8.5.</p> <p>Statement introduced in Junos OS Release 13.2 for the QFX series.</p> <p>Statement introduced in Junos OS Release 14.2 for MX series Routers with MPC.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Description</b>              | Configure the interval for group-specific query timeouts.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Options</b>                  | <p><b>seconds</b>—Time interval, in fractions of a second or seconds.</p> <p><b>Range:</b> 0.1 through 0.9, then in 1-second intervals 1 through 1024</p> <p><b>Default:</b> 1 second</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Required Privilege Level</b> | <p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Example: Configuring IGMP Snooping</i></li> <li>• <a href="#">query-interval on page 267</a></li> <li>• <a href="#">query-response-interval on page 269</a></li> <li>• <i>mld-snooping</i></li> <li>• <i>igmp-snooping</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

## query-response-interval (Bridge Domains)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>query-response-interval seconds;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Hierarchy Level</b>          | <pre>[edit bridge-domains <i>bridge-domain-name</i> protocols igmp-snooping <a href="#">interface</a> <i>interface-name</i>], [edit bridge-domains <i>bridge-domain-name</i> protocols igmp-snoopingvlan <i>vlan-id</i> <a href="#">interface</a> <i>interface-name</i>], [edit bridge-domains <i>bridge-domain-name</i> protocols mld-snooping ] , [edit routing-instances <i>routing-instance-name</i> bridge-domains <i>bridge-domain-name</i> protocols igmp-snooping <a href="#">interface</a> <i>interface-name</i>], [edit routing-instances <i>routing-instance-name</i> bridge-domains <i>bridge-domain-name</i> protocols igmp-snoopingvlan <i>vlan-id</i> [edit routing-instances <i>routing-instance-name</i> bridge-domains <i>bridge-domain-name</i> protocols mld-snooping ]<a href="#">interface</a> <i>interface-name</i>] [edit routing-instances <i>routing-instance-name</i> protocols mld-snooping ] [edit protocols igmp-snooping vlan],</pre> |
| <b>Release Information</b>      | <p>Statement introduced in Junos OS Release 8.5.</p> <p>Statement introduced in Junos OS Release 13.2 for the QFX series.</p> <p>Statement introduced in Junos OS Release 14.2 for MX series Routers with MPC.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Description</b>              | Specify how long to wait to receive a response to a specific query message from a host.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Options</b>                  | <p><i>seconds</i>—Time interval. This interval should be less than the host-query interval.</p> <p><b>Range:</b> 1 through 1024</p> <p><b>Default:</b> 10 seconds</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Required Privilege Level</b> | <p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Example: Configuring IGMP Snooping</i></li> <li>• <a href="#">query-interval (Bridge Domains) on page 267</a></li> <li>• <a href="#">query-last-member-interval (Bridge Domains) on page 268</a></li> <li>• <i>mld-snooping</i></li> <li>• <i>igmp-snooping</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

## receiver

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|                                 |                                                                                                                                                                                    |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>receiver {<br/>    source-vlans <i>vlan-list</i>;<br/>    install;<br/>}</pre>                                                                                                |
| <b>Hierarchy Level</b>          | [edit protocols igmp-snooping vlan (all   <i>vlan-name</i> ) data-forwarding]                                                                                                      |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.6 for EX Series switches.<br>Statement introduced in Junos OS Release 12.3 for the QFX Series.                                          |
| <b>Description</b>              | Configure a VLAN as a multicast receiver VLAN of the multicast VLAN (MVLAN).<br><br>The remaining statements are explained separately.                                             |
| <b>Default</b>                  | Disabled                                                                                                                                                                           |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Example: Configuring Multicast VLAN Registration</i></li><li>• <i>Configuring Multicast VLAN Registration (CLI Procedure)</i></li></ul> |

## robust-count (IGMP Snooping)

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|                                 |                                                                                                                                                                                                                                               |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>robust-count <i>number</i>;</pre>                                                                                                                                                                                                        |
| <b>Hierarchy Level</b>          | [edit protocols igmp-snooping vlan <i>vlan-name</i> ]                                                                                                                                                                                         |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 11.1 for the QFX Series.                                                                                                                                                                             |
| <b>Description</b>              | Configure the number of intervals the switch waits before removing a multicast group from the multicast forwarding table. Configure the length of each interval using the <b>query-interval</b> statement.                                    |
| <b>Default</b>                  | 2 intervals                                                                                                                                                                                                                                   |
| <b>Options</b>                  | <b><i>number</i></b> —Number of intervals the switch waits before timing out a multicast group.<br><b>Range:</b> 2 through 10                                                                                                                 |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                           |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Example: Configuring IGMP Snooping on page 70</a></li><li>• <a href="#">Configuring IGMP Snooping on page 68</a></li><li>• <a href="#">show igmp-snooping vlans on page 415</a></li></ul> |

## source-address

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|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>source-address <i>ip-address</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Hierarchy Level</b>          | <p>[edit bridge-domains <i>bridge-domain-name</i> protocols igmp-snooping proxy],</p> <p>[edit bridge-domains <i>bridge-domain-name</i> protocols igmp-snooping vlan <i>vlan-id</i> proxy],</p> <p>[edit routing-instances <i>routing-instance-name</i> bridge-domains <i>bridge-domain-name</i> protocols igmp-snooping proxy],</p> <p>[edit routing-instances <i>routing-instance-name</i> bridge-domains <i>bridge-domain-name</i> protocols igmp-snooping vlan <i>vlan-id</i> proxy]</p> |
| <b>Release Information</b>      | <p>Statement introduced in Junos OS Release 8.5.</p> <p>Statement introduced in Junos OS Release 13.2 for the QFX series.</p>                                                                                                                                                                                                                                                                                                                                                                |
| <b>Description</b>              | <p>Specify the IP address to use as the source for IGMP snooping reports in proxy mode. Reports are sent with address 0.0.0.0 as the source address unless there is a source address configured. You can also use this statement to configure the source address to use for IGMP snooping queries.</p>                                                                                                                                                                                       |
| <b>Options</b>                  | <i>ip-address</i> —IP address to use as the source for proxy-mode IGMP snooping reports.                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Required Privilege Level</b> | <p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                               |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Example: Configuring IGMP Snooping</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                |

## src-address (IGMP Querier)

|                                 |                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>src-address source address;</code>                                                                                                                                                                                                                                                                                                                                    |
| <b>Hierarchy Level</b>          | [edit protocols igmp-snooping vlan <i>vlan-name</i> <b>igmp-querier</b> ]<br>[edit protocols igmp-snooping vlan <i>vlan-name</i> <b>l2-querier</b> ]                                                                                                                                                                                                                        |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 12.3 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D15 for QFabric Systems.                                                                                                                                                                                                                              |
| <b>Description</b>              | Configure the address that the switch uses as the source address in the IGMP queries that it sends. If there are any multicast routers on the same local network, make sure the source address for the IGMP querier is smaller (a lower number) than the IP addresses for those routers on the network. This ensures that switch is always the IGMP querier on the network. |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                                                                                                                         |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Example: Configuring IGMP Snooping on page 70</a></li> <li>• <a href="#">Configuring IGMP Snooping on page 68</a></li> <li>• <a href="#">show igmp-snooping vlans on page 415</a></li> <li>• <a href="#">show configuration protocols igmp on page 391</a></li> </ul>                                                  |

## source-vlans

|                                 |                                                                                                                                                                                                         |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>source-vlans <i>vlan-list</i>;</code>                                                                                                                                                             |
| <b>Hierarchy Level</b>          | [edit protocols igmp-snooping vlan (all   <i>vlan-name</i> ) data-forwarding receiver]                                                                                                                  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.6 for EX Series switches.<br>Statement introduced in Junos OS Release 12.3 for the QFX Series.                                                               |
| <b>Description</b>              | Specify a list of multicast VLANs (MVLANS) from which this multicast receiver VLAN receives multicast traffic. Either all of these MVLANS must be in proxy mode or none of them can be in proxy mode.   |
| <b>Default</b>                  | Disabled                                                                                                                                                                                                |
| <b>Options</b>                  | <i>vlan-list</i> —Names of the MVLANS.                                                                                                                                                                  |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                     |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Example: Configuring Multicast VLAN Registration</a></li> <li>• <a href="#">Configuring Multicast VLAN Registration (CLI Procedure)</a></li> </ul> |



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## static (IGMP Snooping)

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|                                 |                                                                                                                                                                                                                                               |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>static {<br/>    group ip-address;<br/>}</pre>                                                                                                                                                                                           |
| <b>Hierarchy Level</b>          | [edit protocols igmp-snooping vlan <i>vlan-name</i> interface <i>interface-name</i> ]                                                                                                                                                         |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 11.1 for the QFX Series.                                                                                                                                                                             |
| <b>Description</b>              | <p>Statically define multicast groups on an interface.</p> <p>The remaining statement is explained separately.</p>                                                                                                                            |
| <b>Default</b>                  | No multicast groups are statically defined.                                                                                                                                                                                                   |
| <b>Required Privilege Level</b> | <p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>                                                                                                                |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Example: Configuring IGMP Snooping on page 70</a></li><li>• <a href="#">Configuring IGMP Snooping on page 68</a></li><li>• <a href="#">show igmp-snooping vlans on page 415</a></li></ul> |

## traceoptions (IGMP Snooping)

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|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <pre>traceoptions {<br/>    file <i>filename</i> &lt;files <i>number</i>&gt; &lt;no-stamp&gt; &lt;size <i>size</i>&gt; &lt;replace&gt; &lt;world-readable  <br/>    no-world-readable&gt;;<br/>    flag <i>flag</i> (detail   disable   receive   send);<br/>}</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Hierarchy Level</b>     | For platforms without ELS:<br><br>[edit protocols igmp-snooping]<br><br>For platforms with ELS:<br><br>[edit protocols igmp-snooping vlan]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Release Information</b> | Statement introduced in Junos OS Release 11.1 for the QFX Series.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Description</b>         | Define tracing operations for IGMP snooping.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Default</b>             | The <b>traceoptions</b> feature is disabled by default.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Options</b>             | <p><b>file <i>filename</i></b>—Name of the file to receive the output of the tracing operation. Enclose the name within quotation marks. All files are placed in the directory <b>/var/log</b>.</p> <p><b>files <i>number</i></b>—(Optional) Maximum number of trace files. When a trace file named <b>trace-file</b> reaches its maximum size, it is renamed <b>trace-file.0</b>, then <b>trace-file.1</b>, and so on, until the maximum number of trace files is reached (<b>xk</b> to specify KB, <b>xm</b> to specify MB, or <b>xg</b> to specify gigabytes), at which point the oldest trace file is overwritten. If you specify a maximum number of files, you also must specify a maximum file size with the <b>size</b> option.</p> <p><b>Range:</b> 2 through 1000</p> <p><b>Default:</b> 3 files</p> <p><b>flag <i>flag</i></b> —Tracing operation to perform. To specify more than one tracing operation, include multiple flag statements. You can include the following flags:</p> <ul style="list-style-type: none"><li>• <b>all</b>—All tracing operations.</li><li>• <b>general</b>—Trace general IGMP snooping protocol events.</li><li>• <b>krt</b>—Trace communication over routing sockets.</li><li>• <b>nexthop</b>— Trace next-hop related events.</li><li>• <b>normal</b>—Trace normal IGMP snooping protocol events.</li><li>• <b>packets</b>—Trace all IGMP packets.</li><li>• <b>policy</b>—Trace policy processing.</li><li>• <b>query</b>—Trace IGMP membership query messages.</li><li>• <b>report</b>—Trace membership report messages.</li></ul> |

- **route**—Trace routing information.
- **state**—Trace IGMP state transitions.
- **task**—Trace routing protocol task processing.
- **timer**—Trace routing protocol timer processing.
- **vlan**—Trace VLAN related events.

**no-stamp**—(Optional) Do not time stamp trace file.

**no-world-readable**—(Optional) Restrict file access to the user who created the file.

**size size** —(Optional) Maximum size of each trace file, in kilobytes (KB), megabytes (MB), or gigabytes (GB). When a trace file named **trace-file** reaches its maximum size, it is renamed **trace-file.0**, then **trace-file.1**, and so on, until the maximum number of trace files is reached. Then the oldest trace file is overwritten. If you specify a maximum number of files, you also must specify a maximum file size with the **files** option. Use **xk** to specify KB, **xm** to specify MB, or **xg** to specify gigabytes.

**Range:** 10 KB through 1 gigabytes

**Default:** 128 KB

**world-readable**—(Optional) Enable unrestricted file access.

|                                 |                                                                                                                                                                                   |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                               |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Example: Configuring IGMP Snooping on page 70</a></li> <li>• <a href="#">Configuring IGMP Snooping on page 68</a></li> </ul> |

## version (IGMP Snooping)

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|                                 |                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>version number;</code>                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Hierarchy Level</b>          | [edit protocols igmp-snooping vlan (all   <i>vlan-name</i> )]                                                                                                                                                                                                                                                                                                                                          |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 11.1 for EX Series switches.<br>Statement introduced in Junos OS Release 12.1 for the QFX Series.                                                                                                                                                                                                                                                             |
| <b>Description</b>              | Specify the IGMP version for the IGMP general query that the switch sends to hosts when an interface comes up. The configured IGMP version affects only the version of the general queries sent by a switch. It does not affect the version of IGMP messages that the switch can snoop. For example, If the switch is configured for IGMP version 1 (IGMPv1), it can snoop IGMPv2 and IGMPv3 messages. |
| <b>Default</b>                  | If you do not configure the <b>version</b> statement, the default is IGMPv2.                                                                                                                                                                                                                                                                                                                           |
| <b>Options</b>                  | <b>version</b> —IGMP version number.<br><b>Range:</b> 1 and 2.                                                                                                                                                                                                                                                                                                                                         |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring IGMP Snooping (CLI Procedure)</a></li><li>• <a href="#">Configuring IGMP Snooping on page 68</a></li></ul>                                                                                                                                                                                                                             |

## vlan (IGMP Snooping)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre> vlan <i>vlan-name</i> {     <i>immediate-leave</i>;     interface <i>interface-name</i> {         <i>group-limit limit</i>;         <i>host-only-interface</i>;         multicast-router-interface;         static {             group <i>mcast-group-address</i> {                 source <i>ip-address</i>;             }         }     }     <i>qualified-vlan</i> ;     proxy {         <i>source-address ip-address</i>;     }     <i>query-interval seconds</i>;     <i>query-last-member-interval seconds</i>;     <i>query-response-interval seconds</i>;     <i>robust-count number</i>; } </pre> |
| <b>Hierarchy Level</b>          | [edit protocols igmp-snooping ],                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.5.<br>Statement introduced in Junos OS Release 13.2 for the QFX series.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Description</b>              | Configure IGMP snooping parameters for a particular VLAN.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Default</b>                  | By default, IGMP snooping options apply to all VLANs.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Options</b>                  | <p><i>vlan-name</i>—Apply the parameters to this VLAN.</p> <p>The remaining statements are explained separately.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Required Privilege Level</b> | <p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring VLAN-Specific IGMP Snooping Parameters on page 69</a></li> <li>• <a href="#">igmp-snooping on page 262</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                           |



## CHAPTER 18

# Configuration Statements (PIM)

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- [version \(PIM\)](#) on page 351
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## address (Anycast RPs)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>address <i>address</i> &lt;forward-msdp-sa&gt;;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Hierarchy Level</b>          | <p>[edit logical-systems <i>logical-system-name</i> protocols pim <b>rp local</b> (inet   inet6) <b>anycast-pim rp-set</b>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols pim <b>rp local</b> (inet   inet6) <b>anycast-pim rp-set</b>],</p> <p>[edit protocols pim <b>rp local</b> (inet   inet6) <b>anycast-pim rp-set</b>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols pim <b>rp local</b> (inet   inet6) <b>anycast-pim rp-set</b>]</p> |
| <b>Release Information</b>      | <p>Statement introduced in Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 11.3 for the QFX Series.</p>                                                                                                                                                                                                                                                                                                                                  |
| <b>Description</b>              | Configure the anycast rendezvous point (RP) addresses in the RP set. Multiple addresses can be configured in an RP set. If the RP has peer Multicast Source Discovery Protocol (MSDP) connections, then the RP must forward MSDP source active (SA) messages.                                                                                                                                                                                                                                                                              |
| <b>Options</b>                  | <p><b><i>address</i></b>—RP address in an RP set.</p> <p><b><i>forward-msdp-sa</i></b>—(Optional) Forward MSDP SAs to this address.</p>                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Required Privilege Level</b> | <p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                             |

## address (Local RPs)

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|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>address <i>address</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Hierarchy Level</b>          | <code>[edit logical-systems <i>logical-system-name</i> protocols pim <b>rp local family</b> (inet   inet6)],</code><br><code>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols</code><br><code>pim <b>rp local family</b> (inet   inet6)],</code><br><code>[edit protocols pim <b>rp local family</b> (inet   inet6)],</code><br><code>[edit routing-instances <i>routing-instance-name</i> protocols pim <b>rp local family</b> (inet   inet6)]</code> |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 11.3 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                                                                                                                                          |
| <b>Description</b>              | Configure the local rendezvous point (RP) address.                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Options</b>                  | <b><i>address</i></b> —Local RP address.                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Local PIM RPs on page 159</a></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                         |

## address (Static RPs)

|                                 |                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre> address address {   group-ranges {     destination-ip-prefix&lt;/prefix-length&gt;;   }   override;   version version; } </pre>                                                                                                                                                                                                                                         |
| <b>Hierarchy Level</b>          | <p>[edit logical-systems <i>logical-system-name</i> protocols pim <b>rp static</b>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols pim <b>rp static</b>],</p> <p>[edit protocols pim <b>static</b>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols pim <b>rp static</b>]</p>       |
| <b>Release Information</b>      | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 11.3 for the QFX Series.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p> |
| <b>Description</b>              | <p>Configure static rendezvous point (RP) addresses. You can configure a static RP in a logical system only if the logical system is not directly connected to a source.</p> <p>For each static RP address, you can optionally specify the PIM version and the groups for which this address can be the RP. The default PIM version is version 1.</p>                         |
| <b>Options</b>                  | <p><b>address</b>—Static RP address.</p> <p><b>Default:</b> 224.0.0.0/4</p> <p>The remaining statements are explained separately.</p>                                                                                                                                                                                                                                         |
| <b>Required Privilege Level</b> | <p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring the Static PIM RP Address on the Non-RP Routing Device on page 161</a></li> </ul>                                                                                                                                                                                                                            |

## algorithm

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|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>algorithm <i>algorithm-name</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Hierarchy Level</b>          | [edit protocols pim interface <i>interface-name</i> bfd-liveness-detection authentication],<br>[edit routing-instances <i>routing-instance-name</i> protocols pim interface <i>interface-name</i> bfd-liveness-detection authentication]                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.6.<br>Statement introduced in Junos OS Release 12.1 for the QFX Series.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Description</b>              | Specify the algorithm to use for BFD authentication.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Options</b>                  | <p><i>algorithm-name</i>—Name of algorithm to use for BFD authentication:</p> <ul style="list-style-type: none"><li>• <b>simple-password</b>—Plain-text password. One to 16 bytes of plain text. One or more passwords can be configured.</li><li>• <b>keyed-md5</b>—Keyed Message Digest 5 hash algorithm for sessions with transmit and receive rates greater than 100 ms.</li><li>• <b>meticulous-keyed-md5</b>—Meticulous keyed Message Digest 5 hash algorithm.</li><li>• <b>keyed-sha-1</b>—Keyed Secure Hash Algorithm I for sessions with transmit and receive rates greater than 100 ms.</li><li>• <b>meticulous-keyed-sha-1</b>—Meticulous keyed Secure Hash Algorithm I.</li></ul> |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Understanding Bidirectional Forwarding Detection Authentication for PIM</a></li><li>• <a href="#">Configuring BFD Authentication for PIM on page 113</a></li><li>• <a href="#">authentication on page 287</a></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                   |

## anycast-pim

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|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>anycast-pim {   rp-set {     address address &lt;forward-msdp-sa&gt;;   } }</pre>                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Hierarchy Level</b>          | <p>[edit logical-systems <i>logical-system-name</i> protocols pim <b>rp local family</b> (inet   inet6)],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols pim <b>rp local family</b> (inet   inet6)],</p> <p>[edit protocols pim <b>rp local family</b> (inet   inet6)],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols pim <b>rp local family</b> (inet   inet6)]</p> |
| <b>Release Information</b>      | <p>Statement introduced in Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 11.3 for the QFX Series.</p>                                                                                                                                                                                                                                                      |
| <b>Description</b>              | <p>Configure properties for anycast RP using PIM.</p> <p>The remaining statements are explained separately.</p>                                                                                                                                                                                                                                                                                                                                                |
| <b>Required Privilege Level</b> | <p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                 |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Example: Configuring PIM Anycast With or Without MSDP on page 166</a></li> </ul>                                                                                                                                                                                                                                                                                                                          |

## assert-timeout

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|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>assert-timeout <i>seconds</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Hierarchy Level</b>          | [edit logical-systems <i>logical-system-name</i> protocols pim],<br>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols pim],<br>[edit protocols pim],<br>[edit routing-instances <i>routing-instance-name</i> protocols pim]                                                                                                                                                                                      |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 11.3 for the QFX Series.                                                                                                                                                                                                                                                                           |
| <b>Description</b>              | Multicast routing devices running PIM sparse mode often forward the same stream of multicast packets onto the same LAN through the rendezvous-point tree (RPT) and shortest-path tree (SPT). PIM assert messages help routing devices determine which routing device forwards the traffic and prunes the RPT for this group. By default, routing devices enter an assert cycle every 180 seconds. You can configure this assert timeout to be between 5 and 210 seconds. |
| <b>Options</b>                  | <b><i>seconds</i></b> —Time for routing device to wait before another assert message cycle.<br><b>Range:</b> 5 through 210 seconds<br><b>Default:</b> 180 seconds                                                                                                                                                                                                                                                                                                        |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Example: Configuring the PIM Assert Timeout on page 202</a></li></ul>                                                                                                                                                                                                                                                                                                                                                |

## authentication

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|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>authentication {   algorithm <i>algorithm-name</i>;   key-chain <i>key-chain-name</i>;   loose-check; }</pre>                                                                                                                                                                                                                                                                                                                                         |
| <b>Hierarchy Level</b>          | [edit protocols pim interface <i>interface-name</i> bfd-liveness-detection],<br>[edit routing-instances <i>routing-instance-name</i> protocols pim interface <i>interface-name</i> bfd-liveness-detection]                                                                                                                                                                                                                                                 |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.6.<br>Statement introduced in Junos OS Release 12.1 for the QFX Series.                                                                                                                                                                                                                                                                                                                                         |
| <b>Description</b>              | Configure the algorithm, security keychain, and level of authentication for BFD sessions running on PIM interfaces.                                                                                                                                                                                                                                                                                                                                        |
| <b>Options</b>                  | The statements are explained separately.                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring BFD Authentication for PIM on page 113</a></li> <li>• <a href="#">Configuring BFD for PIM on page 112</a></li> <li>• <a href="#">Understanding Bidirectional Forwarding Detection Authentication for PIM</a></li> <li>• <a href="#">bfd-liveness-detection on page 289</a></li> <li>• <a href="#">key-chain on page 313</a></li> <li>• <a href="#">loose-check on page 316</a></li> </ul> |

## auto-rp

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|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>auto-rp {<br/>    (announce   discovery   mapping);<br/>    (mapping-agent-election   no-mapping-agent-election);<br/>}</pre>                                                                                                                                                                                                                                                                                                                           |
| <b>Hierarchy Level</b>          | [edit logical-systems <i>logical-system-name</i> protocols pim <b>rp</b> ],<br>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols pim <b>rp</b> ],<br>[edit protocols pim <b>rp</b> ],<br>[edit routing-instances <i>routing-instance-name</i> protocols pim <b>rp</b> ]                                                                                                                              |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 7.5.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 11.3 for the QFX Series.                                                                                                                                                                                                                                                                   |
| <b>Description</b>              | Configure automatic RP announcement and discovery.                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Options</b>                  | <p><b>announce</b>—Configure the routing device to listen only for mapping packets and also to advertise itself if it is an RP.</p> <p><b>discovery</b>—Configure the routing device to listen only for mapping packets.</p> <p><b>mapping</b>—Configures the routing device to announce, listen for and generate mapping packets, and announce that the routing device is eligible to be an RP.</p> <p>The remaining statement is explained separately.</p> |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                          |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring PIM Auto-RP on page 175</a></li></ul>                                                                                                                                                                                                                                                                                                                                                        |



## bfd-liveness-detection

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre> bfd-liveness-detection {   authentication {     algorithm <i>algorithm-name</i>;     key-chain <i>key-chain-name</i>;     loose-check;   }   detection-time {     threshold <i>milliseconds</i>;   }   minimum-interval <i>milliseconds</i>;   minimum-receive-interval <i>milliseconds</i>;   multiplier <i>number</i>;   no-adaptation;   transmit-interval {     minimum-interval <i>milliseconds</i>;     threshold <i>milliseconds</i>;   }   version (0   1   automatic); } </pre> |
| <b>Hierarchy Level</b>          | <p>[edit protocols pim interface <i>interface-name</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols pim interface <i>interface-name</i>]</p>                                                                                                                                                                                                                                                                                                                        |
| <b>Release Information</b>      | <p>Statement introduced in Junos OS Release 8.1.</p> <p><b>authentication</b> option introduced in Junos OS Release 9.6.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 12.1 for the QFX Series.</p>                                                                                                                                                                                                              |
| <b>Description</b>              | <p>Configure bidirectional forwarding detection (BFD) timers and authentication for PIM.</p> <p>The remaining statements are explained separately.</p>                                                                                                                                                                                                                                                                                                                                         |
| <b>Required Privilege Level</b> | <p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring BFD for PIM on page 112</a></li> <li>• <a href="#">Configuring BFD Authentication for PIM on page 113</a></li> </ul>                                                                                                                                                                                                                                                                                                          |

## bootstrap

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|                                 |                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>bootstrap {<br/>    family (inet   inet6) {<br/>        export [ <i>policy-names</i> ];<br/>        import [ <i>policy-names</i> ];<br/>        priority <i>number</i>;<br/>    }<br/>}</pre>                                                                                                                                              |
| <b>Hierarchy Level</b>          | <pre>[edit logical-systems <i>logical-system-name</i> protocols pim <i>rp</i>],<br/>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols<br/>  pim <i>rp</i>],<br/>[edit protocols pim <i>rp</i>],<br/>[edit routing-instances <i>routing-instance-name</i> protocols pim <i>rp</i>]</pre> |
| <b>Release Information</b>      | <p>Statement introduced in Junos OS Release 7.6.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 11.3 for the QFX Series.</p>                                                                                                                                       |
| <b>Description</b>              | <p>Configure parameters to control bootstrap routers and messages.</p> <p>The remaining statements are explained separately.</p>                                                                                                                                                                                                                |
| <b>Required Privilege Level</b> | <p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring PIM Bootstrap Properties for IPv4</i></li><li>• <i>Configuring PIM Bootstrap Properties for IPv4 or IPv6</i></li></ul>                                                                                                                                                                   |

## bootstrap-export

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|                                 |                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>bootstrap-export [ <i>policy-names</i> ];</code>                                                                                                                                                                                                                                                                                                                             |
| <b>Hierarchy Level</b>          | <p>[edit logical-systems <i>logical-system-name</i> protocols pim <a href="#">rp</a>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols pim <a href="#">rp</a>],</p> <p>[edit protocols pim <a href="#">rp</a>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols pim <a href="#">rp</a>]</p> |
| <b>Release Information</b>      | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 11.3 for the QFX Series.</p>                                                                                                                                                                      |
| <b>Description</b>              | Apply one or more export policies to control outgoing PIM bootstrap messages.                                                                                                                                                                                                                                                                                                      |
| <b>Options</b>                  | <i>policy-names</i> —Name of one or more import policies.                                                                                                                                                                                                                                                                                                                          |
| <b>Required Privilege Level</b> | <p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                     |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring PIM Bootstrap Properties for IPv4</i></li> <li>• <i>Configuring PIM Bootstrap Properties for IPv4 or IPv6</i></li> <li>• <a href="#">bootstrap-import on page 292</a></li> </ul>                                                                                                                                           |

## bootstrap-import

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|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>bootstrap-import [ <i>policy-names</i> ];</code>                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Hierarchy Level</b>          | <code>[edit logical-systems <i>logical-system-name</i> protocols pim <a href="#">rp</a>],</code><br><code>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols</code><br><code>pim <a href="#">rp</a>],</code><br><code>[edit protocols pim <a href="#">rp</a>],</code><br><code>[edit routing-instances <i>routing-instance-name</i> protocols pim <a href="#">rp</a>]</code> |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 11.3 for the QFX Series.                                                                                                                                                                                                                                      |
| <b>Description</b>              | Apply one or more import policies to control incoming PIM bootstrap messages.                                                                                                                                                                                                                                                                                                                                                       |
| <b>Options</b>                  | <i>policy-names</i> —Name of one or more import policies.                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                 |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring PIM Bootstrap Properties for IPv4</i></li><li>• <i>Configuring PIM Bootstrap Properties for IPv4 or IPv6</i></li><li>• <a href="#">bootstrap-export on page 291</a></li></ul>                                                                                                                                                                                                |

## bootstrap-priority

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|                                 |                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>bootstrap-priority <i>number</i>;</code>                                                                                                                                                                                                                                                                                                 |
| <b>Hierarchy Level</b>          | <p>[edit logical-systems <i>logical-system-name</i> protocols pim <i>rp</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols pim <i>rp</i>],</p> <p>[edit protocols pim <i>rp</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols pim <i>rp</i>]</p> |
| <b>Release Information</b>      | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 11.3 for the QFX Series.</p>                                                                                                                                  |
| <b>Description</b>              | Configure whether this routing device is eligible to be a bootstrap router. In the case of a tie, the routing device with the highest IP address is elected to be the bootstrap router.                                                                                                                                                        |
| <b>Options</b>                  | <p><i>number</i>—Priority for becoming the bootstrap router. A value of 0 means that the routing device is not eligible to be the bootstrap router.</p> <p><b>Range:</b> 0 through 255</p> <p><b>Default:</b> 0</p>                                                                                                                            |
| <b>Required Privilege Level</b> | <p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                 |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring PIM Bootstrap Properties for IPv4</i></li> </ul>                                                                                                                                                                                                                                       |

## dense-groups

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|                                 |                                                                                                                                                                                                                                                                                     |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>dense-groups {<br/>    addresses;<br/>}</pre>                                                                                                                                                                                                                                  |
| <b>Hierarchy Level</b>          | [edit logical-systems <i>logical-system-name</i> protocols pim],<br>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols pim],<br>[edit protocols pim],<br>[edit routing-instances <i>routing-instance-name</i> protocols pim] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 11.3 for the QFX Series.                                                                                      |
| <b>Description</b>              | Configure which groups are operating in dense mode.                                                                                                                                                                                                                                 |
| <b>Options</b>                  | <b>addresses</b> —Address of groups operating in dense mode.                                                                                                                                                                                                                        |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                                 |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring PIM Sparse-Dense Mode Properties on page 139</a></li></ul>                                                                                                                                                          |

## detection-time (BFD for PIM)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre> detection-time {     <b>threshold</b> <i>milliseconds</i>; } </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Hierarchy Level</b>          | [edit protocols pim interface <i>interface-name</i> bfd-liveness-detection],<br>[edit routing-instances <i>routing-instance-name</i> protocols pim interface <i>interface-name</i> bfd-liveness-detection]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Release Information</b>      | <p>Statement introduced in Junos OS Release 8.2.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Support for BFD authentication introduced in Junos OS Release 9.6.</p> <p>Statement introduced in Junos OS Release 12.1 for the QFX Series.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Description</b>              | <p>Enable BFD failure detection. The BFD failure detection timers are adaptive and can be adjusted to be faster or slower. The lower the BFD failure detection timer value, the faster the failure detection and vice versa. For example, the timers can adapt to a higher value if the adjacency fails (that is, the timer detects failures more slowly). Or a neighbor can negotiate a higher value for a timer than the configured value. The timers adapt to a higher value when a BFD session flap occurs more than three times in a span of 15 seconds. A back-off algorithm increases the receive (Rx) interval by two if the local BFD instance is the reason for the session flap. The transmission (Tx) interval is increased by two if the remote BFD instance is the reason for the session flap. You can use the <b>clear bfd adaptation</b> command to return BFD interval timers to their configured values. The <b>clear bfd adaptation</b> command is hitless, meaning that the command does not affect traffic flow on the routing device.</p> <p>The remaining statement is explained separately.</p> |
| <b>Required Privilege Level</b> | <p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring BFD for PIM on page 112</a></li> <li>• <a href="#">bfd-liveness-detection on page 289</a></li> <li>• <a href="#">threshold on page 344</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

## disable (PIM)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | disable;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Hierarchy Level</b>          | <p>[edit logical-systems <i>logical-system-name</i> protocols pim],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols pim <b>family</b> (inet   inet6)],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols pim interface <i>interface-name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols pim <b>rp local family</b> (inet   inet6)],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols pim],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols pim interface <i>interface-name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols pim <b>rp local family</b> (inet   inet6)],</p> <p>[edit protocols pim],</p> <p>[edit protocols pim <b>family</b> (inet   inet6)],</p> <p>[edit protocols pim interface <i>interface-name</i>],</p> <p>[edit protocols pim <b>rp local family</b> (inet   inet6)],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols pim],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols pim <b>family</b> (inet   inet6)],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols pim interface <i>interface-name</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols pim <b>rp local family</b> (inet   inet6)]</p> |
| <b>Release Information</b>      | <p>Statement introduced before Junos OS Release 7.4.</p> <p><b>disable</b> statement extended to the <b>[family]</b> hierarchy level in Junos OS Release 9.6.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 11.3 for the QFX Series.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Description</b>              | Explicitly disable PIM at the protocol, interface or family hierarchy levels.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Required Privilege Level</b> | <p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Disabling PIM on page 117</a></li> <li>• <a href="#">family (Protocols PIM) on page 302</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |



## dr-election-on-p2p

|                                 |                                                                                                                                                                                                                                                                                     |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | dr-election-on-p2p;                                                                                                                                                                                                                                                                 |
| <b>Hierarchy Level</b>          | [edit logical-systems <i>logical-system-name</i> protocols pim],<br>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols pim],<br>[edit protocols pim],<br>[edit routing-instances <i>routing-instance-name</i> protocols pim] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.1.<br>Statement introduced in Junos OS Release 9.1 for EX Series switches.<br>Statement introduced in Junos OS Release 11.3 for the QFX Series.                                                                                          |
| <b>Description</b>              | Enable PIM designated router (DR) election on point-to-point (P2P) links.                                                                                                                                                                                                           |
| <b>Default</b>                  | No PIM DR election is performed on point-to-point links.                                                                                                                                                                                                                            |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                                 |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring PIM Designated Router Election on Point-to-Point Links on page 111</a></li> </ul>                                                                                                                                  |

## dr-register-policy

|                                 |                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | dr-register-policy [ <i>policy-names</i> ];                                                                                                                                                                                                                                                                                     |
| <b>Hierarchy Level</b>          | [edit logical-systems <i>logical-system-name</i> protocols pim <i>rp</i> ],<br>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols pim <i>rp</i> ],<br>[edit protocols pim <i>rp</i> ],<br>[edit routing-instances <i>routing-instance-name</i> protocols pim <i>rp</i> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 7.6.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 11.3 for the QFX Series.                                                                                                                                      |
| <b>Description</b>              | Apply one or more policies to control outgoing PIM register messages.                                                                                                                                                                                                                                                           |
| <b>Options</b>                  | <i>policy-names</i> —Name of one or more import policies.                                                                                                                                                                                                                                                                       |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Register Message Filters on a PIM RP and DR on page 191</a></li> <li>• <a href="#">rp-register-policy on page 338</a></li> </ul>                                                                                                                               |

## embedded-rp

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|                          |                                                                                                                                                                                                                                                                                                                                                |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax                   | <pre>embedded-rp {<br/>  group-ranges {<br/>    destination-ip-prefix &lt;/prefix-length&gt;;<br/>  }<br/>  maximum-rps limit;<br/>}</pre>                                                                                                                                                                                                     |
| Hierarchy Level          | <p>[edit logical-systems <i>logical-system-name</i> protocols pim <b>rp</b>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols pim <b>rp</b>],</p> <p>[edit protocols pim <b>rp</b>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols pim <b>rp</b>]</p> |
| Release Information      | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 11.3 for the QFX Series.</p>                                                                                                                                  |
| Description              | <p>Configure properties for embedded IP version 6 (IPv6) RPs.</p> <p>The remaining statements are explained separately.</p>                                                                                                                                                                                                                    |
| Required Privilege Level | <p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                 |
| Related Documentation    | <ul style="list-style-type: none"><li>• <i>Configuring PIM Embedded RP for IPv6</i></li></ul>                                                                                                                                                                                                                                                  |

## export (Bootstrap)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>export [ <i>policy-names</i> ];</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Hierarchy Level</b>          | <p>[edit logical-systems <i>logical-system-name</i> protocols pim <a href="#">rp bootstrap family</a> (inet   inet6)],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols pim <a href="#">rp bootstrap family</a> (inet   inet6)],</p> <p>[edit protocols pim <a href="#">rp bootstrap family</a> (inet   inet6)],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols pim <a href="#">rp bootstrap family</a> (inet   inet6)]</p> |
| <b>Release Information</b>      | <p>Statement introduced in Junos OS Release 7.6.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 11.3 for the QFX Series.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>                                                                                                                                                                                                                          |
| <b>Description</b>              | Apply one or more export policies to control outgoing PIM bootstrap messages.                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Options</b>                  | <i>policy-names</i> —Name of one or more import policies.                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Required Privilege Level</b> | <p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring PIM Bootstrap Properties for IPv4</a></li> <li>• <a href="#">Configuring PIM Bootstrap Properties for IPv4 or IPv6</a></li> <li>• <a href="#">import (Protocols PIM Bootstrap) on page 308</a></li> </ul>                                                                                                                                                                                                                                         |

## export (Protocols PIM)

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|                                 |                                                                                                                                                                                                                                                                                     |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>export [ <i>policy-names</i> ];</code>                                                                                                                                                                                                                                        |
| <b>Hierarchy Level</b>          | [edit logical-systems <i>logical-system-name</i> protocols pim],<br>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols pim],<br>[edit protocols pim],<br>[edit routing-instances <i>routing-instance-name</i> protocols pim] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.6.<br>Statement introduced in Junos OS Release 11.3 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                                                                      |
| <b>Description</b>              | Apply one or more export policies to control outgoing PIM join and prune messages. PIM join and prune filters can be applied to PIM-SM and PIM-SSM messages. PIM join and prune filters cannot be applied to PIM-DM messages.                                                       |
| <b>Required Privilege Level</b> | view-level—To view this statement in the configuration.<br>control-level—To add this statement to the configuration.                                                                                                                                                                |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Filtering Outgoing PIM Join Messages on page 188</a></li></ul>                                                                                                                                                                  |

## family (Bootstrap)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>family (inet   inet6) {     export [ <i>policy-names</i> ];     import [ <i>policy-names</i> ];     priority <i>number</i>; }</pre>                                                                                                                                                                                                                                               |
| <b>Hierarchy Level</b>          | <p>[edit logical-systems <i>logical-system-name</i> protocols pim <b>rp bootstrap</b>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols pim <b>rp bootstrap</b>],</p> <p>[edit protocols pim <b>rp bootstrap</b>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols pim <b>rp bootstrap</b>]</p> |
| <b>Release Information</b>      | <p>Statement introduced in Junos OS Release 7.6.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 11.3 for the QFX Series.</p>                                                                                                                                                                              |
| <b>Description</b>              | Configure which IP protocol type bootstrap properties to apply.                                                                                                                                                                                                                                                                                                                        |
| <b>Options</b>                  | <p><b>inet</b>—Apply IP version 4 (IPv4) local RP properties.</p> <p><b>inet6</b>—Apply IPv6 local RP properties.</p> <p>The remaining statements are explained separately.</p>                                                                                                                                                                                                        |
| <b>Required Privilege Level</b> | <p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                         |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring PIM Bootstrap Properties for IPv4</i></li> <li>• <i>Configuring PIM Bootstrap Properties for IPv4 or IPv6</i></li> </ul>                                                                                                                                                                                                       |

## family (Protocols PIM)

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|                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                | <pre>family (inet   inet6) {<br/>    disable;<br/>}</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Hierarchy Level</b>       | <pre>[edit logical-systems <i>logical-system-name</i> protocols pim],<br/>[edit logical-systems <i>logical-system-name</i> protocols pim interface <i>interface-name</i>],<br/>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols<br/>    pim],<br/>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols<br/>    pim interface <i>interface-name</i>],<br/>[edit protocols pim],<br/>[edit protocols pim interface <i>interface-name</i>],<br/>[edit routing-instances <i>routing-instance-name</i> protocols pim],<br/>[edit routing-instances <i>routing-instance-name</i> protocols pim interface <i>interface-name</i>]</pre> |
| <b>Release Information</b>   | Statement introduced in Junos OS Release 9.6.<br>Statement introduced in Junos OS Release 11.3 for the QFX Series.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Description</b>           | Disable the PIM protocol for the specified family.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Options</b>               | <b>inet</b> —Disable the PIM protocol for the IP version 4 (IPv4) address family.<br><br><b>inet6</b> —Disable the PIM protocol for the IP version 6 (IPv6) address family.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Related Documentation</b> | <ul style="list-style-type: none"><li>• <a href="#">Disabling PIM on page 117</a></li><li>• <i>disable (PIM Graceful Restart)</i></li><li>• <a href="#">disable (PIM) on page 296</a></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

## family (Local RP)

|                                 |                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre> family (inet   inet6) {     disable;     address address;     anycast-pim {         local-address address;         rp-set {             address address &lt;forward-msdp-sa&gt;;         }     }     group-ranges {         destination-ip-prefix &lt;/prefix-length&gt;;     }     hold-time seconds;     override;     priority number; } </pre>               |
| <b>Hierarchy Level</b>          | <p>[edit logical-systems <i>logical-system-name</i> protocols pim <b>rp local</b>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols pim <b>rp local</b>],</p> <p>[edit protocols pim <b>rp local</b>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols pim <b>rp local</b>]</p> |
| <b>Release Information</b>      | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 11.3 for the QFX Series.</p>                                                                                                                                                          |
| <b>Description</b>              | Configure which IP protocol type local RP properties to apply.                                                                                                                                                                                                                                                                                                         |
| <b>Options</b>                  | <p><b>inet</b>—Apply IP version 4 (IPv4) local RP properties.</p> <p><b>inet6</b>—Apply IPv6 local RP properties.</p> <p>The remaining statements are explained separately.</p>                                                                                                                                                                                        |
| <b>Required Privilege Level</b> | <p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                         |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Local PIM RPs on page 159</a></li> </ul>                                                                                                                                                                                                                                                              |

## group (RPF Selection)

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|                                 |                                                                                                                                                       |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>group group-address{   source source-address {     next-hop next-hop-address;   }   wildcard-source {     next-hop next-hop-address;   } }</pre> |
| <b>Hierarchy Level</b>          | [edit routing-instances <i>routing-instance-name</i> edit protocols pim rpf-selection]                                                                |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.4.<br>Statement introduced in Junos OS Release 11.3 for the QFX Series.                                   |
| <b>Description</b>              | Configure the PIM group address for which you configure RPF selection <a href="#">group (RPF Selection)</a> .                                         |
| <b>Default</b>                  | By default, PIM RPF selection is not configured.                                                                                                      |
| <b>Options</b>                  | <b>group-address</b> —PIM group address for which you configure RPF selection.                                                                        |
| <b>Required Privilege Level</b> | view-level—To view this statement in the configuration.<br>control-level—To add this statement to the configuration.                                  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Example: Configuring PIM RPF Selection</i></li></ul>                                                       |



## group-ranges

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>group-ranges {     destination-ip-prefix&lt;/prefix-length&gt;; }</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Hierarchy Level</b>          | <p>[edit logical-systems <i>logical-system-name</i> protocols pim rp bidirectional address <i>address</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols pim <a href="#">rp embedded-rp</a>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>instance-name</i> protocols pim rp bidirectional address <i>address</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols pim <a href="#">rp embedded-rp</a>],</p> <p>[edit protocols pim rp bidirectional address <i>address</i>],</p> <p>[edit protocols pim <a href="#">rp embedded-rp</a>],</p> <p>[edit protocols pim <a href="#">rp local family</a> (inet   inet6)],</p> <p>[edit protocols pim <a href="#">rp static address</a> <i>address</i>],</p> <p>[edit routing-instances <i>instance-name</i> protocols pim rp bidirectional address <i>address</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols pim <a href="#">rp embedded-rp</a>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols pim <a href="#">rp local family</a> (inet   inet6)],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols pim <a href="#">rp static address</a> <i>address</i>]</p> |
| <b>Release Information</b>      | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 11.3 for the QFX Series.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p> <p>Support for bidirectional RP addresses introduced in Junos OS Release 12.1.</p> <p>Statement introduced in Junos OS Release 13.3 for the PTX5000 router.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Description</b>              | Configure the address ranges of the multicast groups for which this routing device can be a rendezvous point (RP).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Default</b>                  | The routing device is eligible to be the RP for all IPv4 or IPv6 groups (224.0.0.0/4 or FF70::/12 to FFF0::/12).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Options</b>                  | <i>destination-ip-prefix&lt;/prefix-length&gt;</i> —Addresses or address ranges for which this routing device can be an RP.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Required Privilege Level</b> | <p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Local PIM RPs on page 159</a></li> <li>• <a href="#">Configuring PIM Embedded RP for IPv6</a></li> <li>• <a href="#">Example: Configuring Bidirectional PIM</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

## hello-interval

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|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>hello-interval <i>seconds</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Hierarchy Level</b>          | [edit logical-systems <i>logical-system-name</i> protocols pim interface <i>interface-name</i> ],<br>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols<br>pim interface <i>interface-name</i> ],<br>[edit protocols pim interface <i>interface-name</i> ],<br>[edit routing-instances <i>routing-instance-name</i> protocols pim interface <i>interface-name</i> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 11.3 for the QFX Series.                                                                                                                                                                                                                             |
| <b>Description</b>              | Specify how often the routing device sends PIM hello packets out of an interface.                                                                                                                                                                                                                                                                                                                                          |
| <b>Options</b>                  | <b><i>seconds</i></b> —Length of time between PIM hello packets.<br><b>Range:</b> 0 through 255<br><b>Default:</b> 30 seconds                                                                                                                                                                                                                                                                                              |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">hold-time (Protocols PIM) on page 307</a></li><li>• <a href="#">Modifying the PIM Hello Interval on page 106</a></li></ul>                                                                                                                                                                                                                                             |

## hold-time (Protocols PIM)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>hold-time seconds;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Hierarchy Level</b>          | <p>[edit logical-systems <i>logical-system-name</i> protocols pim rp bidirectional address <i>address</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>instance-name</i> protocols pim rp bidirectional address <i>address</i>],</p> <p>[edit protocols pim rp bidirectional address <i>address</i>],</p> <p>[edit protocols pim <b>rp local family</b> (inet   inet6)],</p> <p>[edit routing-instances <i>instance-name</i> protocols pim rp bidirectional address <i>address</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols pim <b>rp local family</b> (inet   inet6)]</p> |
| <b>Release Information</b>      | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 11.3 for the QFX Series.</p> <p>Support for bidirectional RP addresses introduced in Junos OS Release 12.1.</p>                                                                                                                                                                                                                                                                                                                                            |
| <b>Description</b>              | Specify the time period for which a neighbor is to consider the sending routing device (this routing device) to be operative (up).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Options</b>                  | <p><b>seconds</b>—Hold time.</p> <p><b>Range:</b> 1 through 255</p> <p><b>Default:</b> 150 seconds</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Required Privilege Level</b> | <p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Local PIM RPs on page 159</a></li> <li>• <i>Example: Configuring Bidirectional PIM</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

## import (Protocols PIM Bootstrap)

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|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>import [ <i>policy-names</i> ];</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Hierarchy Level</b>          | <code>[edit logical-systems <i>logical-system-name</i> protocols pim <b>rp bootstrap</b> (inet   inet6)],</code><br><code>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols</code><br><code>    pim <b>rp bootstrap</b> (inet   inet6)],</code><br><code>[edit protocols pim <b>rp bootstrap</b> (inet   inet6)],</code><br><code>[edit routing-instances <i>routing-instance-name</i> protocols pim <b>rp bootstrap</b> (inet   inet6)]</code> |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 7.6.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 11.3 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                                                                                                                                                                                                                  |
| <b>Description</b>              | Apply one or more import policies to control incoming PIM bootstrap messages.                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Options</b>                  | <i>policy-names</i> —Name of one or more import policies.                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring PIM Bootstrap Properties for IPv4</i></li><li>• <i>Configuring PIM Bootstrap Properties for IPv4 or IPv6</i></li><li>• <a href="#">export (Bootstrap) on page 299</a></li></ul>                                                                                                                                                                                                                                                                  |

## import (Protocols PIM)

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|                                 |                                                                                                                                                                                                                                                                                                        |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>import [ <i>policy-names</i> ];</code>                                                                                                                                                                                                                                                           |
| <b>Hierarchy Level</b>          | <p>[edit logical-systems <i>logical-system-name</i> protocols pim],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols pim],</p> <p>[edit protocols pim],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols pim]</p> |
| <b>Release Information</b>      | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 11.3 for the QFX Series.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>          |
| <b>Description</b>              | Apply one or more policies to routes being imported into the routing table from PIM. Use the <b>import</b> statement to filter PIM join messages and prevent them from entering the network.                                                                                                           |
| <b>Options</b>                  | <i>policy-names</i> —Name of one or more policies.                                                                                                                                                                                                                                                     |
| <b>Required Privilege Level</b> | <p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>                                                                                                                                                                         |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Filtering Incoming PIM Join Messages on page 189</a></li> </ul>                                                                                                                                                                                   |

## infinity

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|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>infinity [ <i>policy-names</i> ];</code>                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Hierarchy Level</b>          | [edit logical-systems <i>logical-system-name</i> protocols pim <a href="#">spt-threshold</a> ],<br>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols pim <a href="#">spt-threshold</a> ],<br>[edit protocols pim <a href="#">spt-threshold</a> ],<br>[edit routing-instances <i>routing-instance-name</i> protocols pim <a href="#">spt-threshold</a> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.0.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 11.3 for the QFX Series.                                                                                                                                                                                                                      |
| <b>Description</b>              | Apply one or more policies to set the SPT threshold to infinity for a source-group address pair. Use the <b>infinity</b> statement to prevent the last-hop routing device from transitioning from the RPT rooted at the RP to an SPT rooted at the source for that source-group address pair.                                                                                                                   |
| <b>Options</b>                  | <i>policy-names</i> —Name of one or more policies.                                                                                                                                                                                                                                                                                                                                                              |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Example: Configuring the PIM SPT Threshold Policy on page 204</a></li></ul>                                                                                                                                                                                                                                                                                 |

## interface

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre> <b>interface</b> (all   <i>interface-name</i>) {   <b>disable</b>;   family (inet   inet6) {     <b>disable</b>;   }   <b>hello-interval</b> <i>seconds</i>;   mode (dense   sparse   sparse-dense);   <b>neighbor-policy</b> [ <i>policy-names</i> ];   <b>override-interval</b> <i>milliseconds</i>;   <b>priority</b> <i>number</i>;   <b>propagation-delay</b> <i>milliseconds</i>;   <b>reset-tracking-bit</b>;   <b>version</b> <i>version</i>; } </pre> |
| <b>Hierarchy Level</b>          | [edit protocols pim],<br>[edit routing-instances <i>routing-instance-name</i> protocols pim]                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 11.3 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                                                                                                                                                                                                                                                                                                        |
| <b>Description</b>              | Enable PIM on an interface and configure interface-specific properties.                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Options</b>                  | <p><b><i>interface-name</i></b>—Name of the interface. Specify the full interface name, including the physical and logical address components. To configure all interfaces, you can specify <b>all</b>.</p> <p>The remaining statements are explained separately.</p>                                                                                                                                                                                                |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">PIM on Aggregated Interfaces on page 106</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                         |

## join-load-balance

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|                                 |                                                                                                                                                                                                                                                                                     |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | join-load-balance {<br>automatic;<br>}                                                                                                                                                                                                                                              |
| <b>Hierarchy Level</b>          | [edit logical-systems <i>logical-system-name</i> protocols pim],<br>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols pim],<br>[edit protocols pim],<br>[edit routing-instances <i>routing-instance-name</i> protocols pim] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.0.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 11.3 for the QFX Series.                                                                                          |
| <b>Description</b>              | Enable load balancing of PIM join messages across interfaces and routing devices.                                                                                                                                                                                                   |
| <b>Options</b>                  | <b>automatic</b> —Enables automatic load balancing of PIM join messages. When a new interface or neighbor is introduced into the network, ECMP joins are redistributed with minimal disruption to traffic.                                                                          |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                                 |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring PIM Join Load Balancing on page 125</a></li><li>• <code>clear pim join-distribution</code> in the <a href="#">CLI Explorer</a></li></ul>                                                                            |



## join-prune-timeout

|                                 |                                                                                                                                                                                                                                                                                     |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>join-prune-timeout <i>seconds</i>;</code>                                                                                                                                                                                                                                     |
| <b>Hierarchy Level</b>          | [edit logical-systems <i>logical-system-name</i> protocols pim],<br>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols pim],<br>[edit protocols pim],<br>[edit routing-instances <i>routing-instance-name</i> protocols pim] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.4.<br>Statement introduced in Junos OS Release 11.3 for the QFX Series.                                                                                                                                                                  |
| <b>Description</b>              | Configure the timeout for the join state. If the periodic join refresh message is not received before the timeout expires, the join state is removed.                                                                                                                               |
| <b>Options</b>                  | <b>seconds</b> —Number of seconds to wait for the periodic join message to arrive.<br><b>Range:</b> 210 through 240 seconds<br><b>Default:</b> 210 seconds                                                                                                                          |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                                 |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Modifying the Join State Timeout on page 129</a></li> </ul>                                                                                                                                                                    |

## key-chain

|                                 |                                                                                                                                                                                                                                                                          |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>key-chain <i>key-chain-name</i>;</code>                                                                                                                                                                                                                            |
| <b>Hierarchy Level</b>          | [edit protocols pim interface <i>interface-name</i> bfd-liveness-detection authentication],<br>[edit routing-instances <i>routing-instance-name</i> protocols pim interface <i>interface-name</i> bfd-liveness-detection authentication]                                 |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.6.<br>Statement introduced in Junos OS Release 12.1 for the QFX Series.                                                                                                                                                       |
| <b>Description</b>              | Specify the security keychain to use for BFD authentication.                                                                                                                                                                                                             |
| <b>Options</b>                  | <b>key-chain-name</b> —Name of the security keychain to use for BFD authentication. The name is a unique integer between 0 and 63. This must match one of the keychains in the <b>authentication-key-chains</b> statement at the <b>[edit security]</b> hierarchy level. |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring BFD Authentication for PIM on page 113</a></li> <li>• <a href="#">Understanding Bidirectional Forwarding Detection Authentication for PIM authentication on page 287</a></li> </ul>                     |

## local

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre> local {   disable;   address address;   family (inet   inet6) {     disable;     address address;     anycast-pim {       local-address address;       rp-set {         address address &lt;forward-msdp-sa&gt;;       }     }     group-ranges {       destination-ip-prefix&lt;/prefix-length&gt;;     }     hold-time seconds;     override;     priority number;   }   group-ranges {     destination-ip-prefix&lt;/prefix-length&gt;;   }   hold-time seconds;   override;   priority number; } </pre> |
| <b>Hierarchy Level</b>          | <p>[edit logical-systems <i>logical-system-name</i> protocols pim <b>rp</b>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols pim <b>rp</b>],</p> <p>[edit protocols pim <b>rp</b>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols pim <b>rp</b>]</p>                                                                                                                                                                    |
| <b>Release Information</b>      | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 11.3 for the QFX Series.</p> <p>The remaining statements are explained separately.</p>                                                                                                                                                                                                                                           |
| <b>Description</b>              | Configure the routing device's RP properties.                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Required Privilege Level</b> | <p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><a href="#">Configuring Local PIM RPs on page 159</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                           |

## local-address (Protocols PIM)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>local-address <i>address</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Hierarchy Level</b>          | <p>[edit logical-systems <i>logical-system-name</i> protocols pim <b>rp local family</b> (inet   inet6) <b>anycast-pim</b>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols pim <b>rp local family</b> (inet   inet6) <b>anycast-pim</b>],</p> <p>[edit protocols pim <b>rp local family</b> (inet   inet6) <b>anycast-pim</b>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols pim <b>rp local family</b> (inet   inet6) <b>anycast-pim</b>]</p> |
| <b>Release Information</b>      | <p>Statement introduced in Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 11.3 for the QFX Series.</p>                                                                                                                                                                                                                                                                                                                                  |
| <b>Description</b>              | Configure the routing device local address for the anycast rendezvous point (RP). If this statement is omitted, the router ID is used as this address.                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Options</b>                  | <b>address</b> —Anycast RP IPv4 or IPv6 address, depending on <b>family</b> configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Required Privilege Level</b> | <p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Example: Configuring PIM Anycast With or Without MSDP on page 166</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                      |

## loose-check

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|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | loose-check;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Hierarchy Level</b>          | [edit protocols pim interface <i>interface-name</i> bfd-liveness-detection authentication],<br>[edit routing-instances <i>routing-instance-name</i> protocols pim interface <i>interface-name</i> bfd-liveness-detection authentication]                                                                                                                                                                                                                                                                                                                                             |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.6.<br>Statement introduced in Junos OS Release 12.1 for the QFX Series.                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Description</b>              | <p>Specify loose authentication checking on the BFD session. Use loose authentication for transitional periods only when authentication might not be configured at both ends of the BFD session.</p> <p>By default, strict authentication is enabled and authentication is checked at both ends of each BFD session. Optionally, to smooth migration from nonauthenticated sessions to authenticated sessions, you can configure <i>loose checking</i>. When loose checking is configured, packets are accepted without authentication being checked at each end of the session.</p> |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring BFD Authentication for PIM on page 113</a></li><li>• <a href="#">Understanding Bidirectional Forwarding Detection Authentication for PIM authentication on page 287</a></li></ul>                                                                                                                                                                                                                                                                                                                                    |

## mapping-agent-election

|                                 |                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | (mapping-agent-election   no-mapping-agent-election);                                                                                                                                                                                                                                                                                                              |
| <b>Hierarchy Level</b>          | [edit logical-systems <i>logical-system-name</i> protocols pim <b>rp auto-rp</b> ],<br>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols<br>pim <b>rp auto-rp</b> ],<br>[edit protocols pim <b>rp auto-rp</b> ],<br>[edit routing-instances <i>routing-instance-name</i> protocols pim <b>rp auto-rp</b> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 7.5.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 11.3 for the QFX Series.                                                                                                                                                                         |
| <b>Description</b>              | Configure the routing device mapping announcements as a mapping agent.                                                                                                                                                                                                                                                                                             |
| <b>Options</b>                  | <b>mapping-agent-election</b> —Mapping agents do not announce mappings when receiving mapping messages from a higher-addressed mapping agent.<br><br><b>no-mapping-agent-election</b> —Mapping agents always announce mappings and do not perform mapping agent election.<br><br><b>Default:</b> mapping-agent-election                                            |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                                                                                                                |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring PIM Auto-RP on page 175</a></li> </ul>                                                                                                                                                                                                                                                            |

## maximum-rps

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|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>maximum-rps <i>limit</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Hierarchy Level</b>          | <code>[edit logical-systems <i>logical-system-name</i> protocols pim <i>rp embedded-rp</i>],</code><br><code>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols</code><br><code>pim <i>rp embedded-rp</i>],</code><br><code>[edit protocols pim <i>rp embedded-rp</i>],</code><br><code>[edit routing-instances <i>routing-instance-name</i> protocols pim <i>rp embedded-rp</i>]</code> |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 11.3 for the QFX Series.                                                                                                                                                                                                                                                  |
| <b>Description</b>              | Limit the number of RPs that the routing device acknowledges.                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Options</b>                  | <i>limit</i> —Number of RPs.<br><b>Range:</b> 1 through 500<br><b>Default:</b> 100                                                                                                                                                                                                                                                                                                                                                              |
| <b>Required Privilege Level</b> | <code>routing</code> —To view this statement in the configuration.<br><code>routing-control</code> —To add this statement to the configuration.                                                                                                                                                                                                                                                                                                 |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Configuring PIM Embedded RP for IPv6</i></li></ul>                                                                                                                                                                                                                                                                                                                                                   |

## minimum-interval (PIM BFD Liveness Detection)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>minimum-interval <i>milliseconds</i>;</code>                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Hierarchy Level</b>          | [edit protocols pim interface <i>interface-name</i> <b>bfd-liveness-detection</b> ],<br>[edit routing-instances <i>routing-instance-name</i> protocols pim interface <i>interface-name</i> <b>bfd-liveness-detection</b> ]                                                                                                                                                                                                 |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.1.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 12.1 for the QFX Series.                                                                                                                                                                                                                                 |
| <b>Description</b>              | Configure the minimum interval after which the local routing device transmits hello packets and then expects to receive a reply from a neighbor with which it has established a BFD session. Optionally, instead of using this statement, you can specify the minimum transmit and receive intervals separately using the <b>transmit-interval</b> <b>minimum-interval</b> and <b>minimum-receive-interval</b> statements. |
| <b>Options</b>                  | <b>milliseconds</b> —Minimum transmit and receive interval.<br><b>Range:</b> 1 through 255,000 milliseconds                                                                                                                                                                                                                                                                                                                |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring BFD for PIM on page 112</a></li> </ul>                                                                                                                                                                                                                                                                                                                    |

## minimum-interval (PIM BFD Transmit Interval)

|                            |                                                                                                                                                                                                                                                                                                                                                                                                     |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <code>minimum-interval <i>milliseconds</i>;</code>                                                                                                                                                                                                                                                                                                                                                  |
| <b>Hierarchy Level</b>     | [edit protocols pim interface <i>interface-name</i> bfd-liveness-detection transmit-interval],<br>[edit routing-instances <i>routing-instance-name</i> protocols pim interface <i>interface-name</i> bfd-liveness-detection transmit-interval]                                                                                                                                                      |
| <b>Release Information</b> | Statement introduced in Junos OS Release 8.2.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Support for BFD authentication introduced in Junos OS Release 9.6.<br>Statement introduced in Junos OS Release 12.1 for the QFX Series.                                                                                                                                    |
| <b>Description</b>         | Configure the minimum interval after which the local routing device transmits hello packets to a neighbor with which it has established a BFD session. Optionally, instead of using this statement, you can configure the minimum transmit interval using the <b>minimum-interval</b> statement at the [edit protocols pim interface <i>interface-name</i> bfd-liveness-detection] hierarchy level. |
| <b>Options</b>             | <i>milliseconds</i> —Minimum transmit interval value.<br><b>Range:</b> 1 through 255,000                                                                                                                                                                                                                                                                                                            |



**NOTE:** The threshold value specified in the **threshold** statement must be greater than the value specified in the **minimum-interval** statement for the **transmit-interval** statement.

|                                 |                                                                                                                                                                                                                                                                                |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring BFD for PIM on page 112</a></li> <li>• <a href="#">bfd-liveness-detection on page 289</a></li> <li>• <a href="#">minimum-interval on page 319</a></li> <li>• <a href="#">threshold on page 345</a></li> </ul> |



## minimum-receive-interval

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>minimum-receive-interval <i>milliseconds</i>;</code>                                                                                                                                                                                                                                                                                                                                                     |
| <b>Hierarchy Level</b>          | <code>[edit protocols pim interface <i>interface-name</i> bfd-liveness-detection],</code><br><code>[edit routing-instances <i>routing-instance-name</i> protocols pim interface <i>interface-name</i> bfd-liveness-detection]</code>                                                                                                                                                                           |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.1.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 12.1 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                                                                                                                         |
| <b>Description</b>              | Configure the minimum interval after which the local routing device must receive a reply from a neighbor with which it has established a BFD session. Optionally, instead of using this statement, you can configure the minimum receive interval using the <b>minimum-interval</b> statement at the <code>[edit protocols pim interface <i>interface-name</i> bfd-liveness-detection]</code> hierarchy level. |
| <b>Options</b>                  | <b><i>milliseconds</i></b> —Minimum receive interval.<br><b>Range:</b> 1 through 255,000 milliseconds                                                                                                                                                                                                                                                                                                          |
| <b>Required Privilege Level</b> | <b>routing</b> —To view this statement in the configuration.<br><b>routing-control</b> —To add this statement to the configuration.                                                                                                                                                                                                                                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring BFD for PIM on page 112</a></li> </ul>                                                                                                                                                                                                                                                                                                        |

## mode (Protocols PIM)

|                                 |                                                                                                                                                                                        |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>mode (dense   sparse   sparse-dense);</code>                                                                                                                                     |
| <b>Hierarchy Level</b>          | <code>[edit protocols pim interface <i>interface-name</i>],</code><br><code>[edit routing-instances <i>routing-instance-name</i> protocols pim interface <i>interface-name</i>]</code> |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 11.3 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                          |
| <b>Description</b>              | Configure PIM to operate in sparse, dense, or sparse-dense mode.                                                                                                                       |
| <b>Options</b>                  | <b>dense</b> —Operate in dense mode.<br><br><b>sparse</b> —Operate in sparse mode.<br><br><b>sparse-dense</b> —Operate in sparse-dense mode.<br><b>Default:</b> sparse                 |
| <b>Required Privilege Level</b> | <b>routing</b> —To view this statement in the configuration.<br><b>routing-control</b> —To add this statement to the configuration.                                                    |

## multiplier

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|                                 |                                                                                                                                                                                                                            |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>multiplier <i>number</i>;</code>                                                                                                                                                                                     |
| <b>Hierarchy Level</b>          | [edit protocols pim interface <i>interface-name</i> <b>bfd-liveness-detection</b> ],<br>[edit routing-instances <i>routing-instance-name</i> protocols pim interface <i>interface-name</i> <b>bfd-liveness-detection</b> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.1.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 12.1 for the QFX Series.                                 |
| <b>Description</b>              | Configure the number of hello packets not received by a neighbor that causes the originating interface to be declared down.                                                                                                |
| <b>Options</b>                  | <b><i>number</i></b> —Number of hello packets.<br><b>Range:</b> 1 through 255<br><b>Default:</b> 3                                                                                                                         |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring BFD for PIM on page 112</a></li></ul>                                                                                                                      |

## neighbor-policy

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|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>neighbor-policy [ <i>policy-names</i> ];</code>                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Hierarchy Level</b>          | [edit logical-systems <i>logical-system-name</i> protocols pim interface <i>interface-name</i> ],<br>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols pim interface <i>interface-name</i> ],<br>[edit protocols pim interface <i>interface-name</i> ],<br>[edit routing-instances <i>routing-instance-name</i> protocols pim interface <i>interface-name</i> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.2.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 11.3 for the QFX Series.                                                                                                                                                                                                                              |
| <b>Description</b>              | Apply a PIM interface-level policy to filter neighbor IP addresses.                                                                                                                                                                                                                                                                                                                                                     |
| <b>Options</b>                  | <b><i>policy-name</i></b> —Name of the policy that filters neighbor IP addresses.                                                                                                                                                                                                                                                                                                                                       |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                     |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Interface-Level PIM Neighbor Policies on page 187</a></li></ul>                                                                                                                                                                                                                                                                                         |

## next-hop (PIM RPF Selection)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>next-hop <i>next-hop-address</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Hierarchy Level</b>          | [edit routing-instances <i>routing-instance-name</i> protocols pim rpf-selection group <i>group-address</i> source <i>source-address</i> ],<br>[edit routing-instances <i>routing-instance-name</i> protocols pim rpf-selection group <i>group-address</i> wildcard-source],<br>[edit routing-instances <i>routing-instance-name</i> protocols pim rpf-selection prefix-list <i>prefix-list-addresses</i> source <i>source-address</i> ],<br>[edit routing-instances <i>routing-instance-name</i> protocols pim rpf-selection prefix-list <i>prefix-list-addresses</i> wildcard-source] |
| <b>Release Information</b>      | Statement introduced in JUNOS Release 10.4.<br>Statement introduced in Junos OS Release 11.3 for the QFX Series.                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Description</b>              | Configure the specific next-hop address for the PIM group source.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Options</b>                  | <i>next-hop-address</i> —Specific next-hop address for the PIM group source.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Required Privilege Level</b> | view-level—To view this statement in the configuration.<br>control-level—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Example: Configuring PIM RPF Selection</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

## no-adaptation (PIM BFD Liveness Detection)

|                                 |                                                                                                                                                                                                                                                                 |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>no-adaptation;</code>                                                                                                                                                                                                                                     |
| <b>Hierarchy Level</b>          | [edit protocols pim interface <i>interface-name</i> bfd-liveness-detection],<br>[edit routing-instances <i>routing-instance-name</i> protocols pim interface <i>interface-name</i> bfd-liveness-detection]                                                      |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.0<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Support for BFD authentication introduced in Junos OS Release 9.6.<br>Statement introduced in Junos OS Release 12.1 for the QFX Series. |
| <b>Description</b>              | Configure BFD sessions not to adapt to changing network conditions. We recommend that you <i>do not</i> disable BFD adaptation unless it is preferable to have BFD adaptation disabled in your network.                                                         |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring BFD for PIM on page 112</a></li> <li>• <a href="#">bfd-liveness-detection on page 289</a></li> </ul>                                                                                           |

## override-interval

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|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>override-interval <i>milliseconds</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Hierarchy Level</b>          | <code>[edit logical-systems <i>logical-system-name</i> protocols pim],</code><br><code>[edit logical-systems <i>logical-system-name</i> protocols pim interface <i>interface-name</i>],</code><br><code>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols</code><br><code>  pim interface <i>interface-name</i>],</code><br><code>[edit protocols pim],</code><br><code>[edit protocols pim interface <i>interface-name</i>],</code><br><code>[edit routing-instances <i>routing-instance-name</i> protocols pim]</code><br><code>[edit routing-instances <i>routing-instance-name</i> protocols pim interface <i>interface-name</i>]</code> |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.1.<br>Statement introduced in Junos OS Release 11.3 for the QFX Series.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Description</b>              | Set the maximum time in milliseconds to delay sending override join messages for a multicast network that has join suppression enabled. When a router or switch sees a prune message for a join it is currently suppressing, it waits for the interval specified by the override timer before it sends an override join message.                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Options</b>                  | This is a random timer with a value in milliseconds.<br><b>Range:</b> 0 through maximum override value<br><b>Default:</b> 2000 milliseconds                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Example: Enabling Join Suppression on page 129</a></li><li>• <a href="#">propagation-delay on page 332</a></li><li>• <a href="#">reset-tracking-bit on page 334</a></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

## pim

```

Syntax  pim {
    disable;
    assert-timeout seconds;
    dense-groups {
        addresses;
    }
    dr-election-on-p2p;
    export;
    family (inet | inet6) {
        disable;
    }
    graceful-restart {
        disable;
        restart-duration seconds;
    }
    import [ policy-names ];
    interface interface-name {
        accept-remote-source;
        disable;
        family (inet | inet6) {
            disable;
        }
        hello-interval seconds;
        mode (dense | sparse | sparse-dense);
        neighbor-policy [ policy-names ];
        override-interval milliseconds;
        priority number;
        propagation-delay milliseconds;
        reset-tracking-bit;
        version version;
    }
    join-load-balance;
    join-prune-timeout;
    nonstop-routing;
    override-interval milliseconds;
    propagation-delay milliseconds;
    reset-tracking-bit;
    rib-group group-name;
    rp {
        auto-rp {
            (announce | discovery | mapping);
            (mapping-agent-election | no-mapping-agent-election);
        }
        bootstrap {
            family (inet | inet6) {
                export [ policy-names ];
                import [ policy-names ];
                priority number;
            }
        }
        bootstrap-import [ policy-names ];
        bootstrap-export [ policy-names ];
    }
}

```

```

bootstrap-priority number;
dr-register-policy [ policy-names ];
embedded-rp {
    group-ranges {
        destination-ip-prefix </prefix-length>;
    }
    maximum-rps limit;
}
local {
    family (inet | inet6) {
        address address;
        anycast-pim {
            disable;
            rp-set {
                address address <forward-msdp-sa>;
            }
            local-address address;
        }
        group-ranges {
            destination-ip-prefix </prefix-length>;
        }
        hold-time seconds;
        priority number;
    }
}
rp-register-policy [ policy-names ];
spt-threshold {
    infinity [ policy-names ];
}
static {
    address address {
        group-ranges {
            version version;
            destination-ip-prefix </prefix-length>;
        }
    }
}
rpf-selection {
    group group-address {
        source source-address {
            next-hop next-hop-address;
        }
        wildcard-source {
            next-hop next-hop-address;
        }
    }
    prefix-list prefix-list-addresses {
        source source-address {
            next-hop next-hop-address;
        }
        wildcard-source {
            next-hop next-hop-address;
        }
    }
}
traceoptions {

```

```

    file filename <files number> <size size> <world-readable | no-world-readable>;
    flag flag <flag-modifier> <disable>;
  }
  tunnel-devices [ mt-fpc/pic/port ];
}

```

|                                 |                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Hierarchy Level</b>          | [edit logical-systems <i>logical-system-name</i> protocols],<br>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols],<br>[edit protocols],<br>[edit routing-instances <i>routing-instance-name</i> protocols]                                                                       |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br><b>family</b> statement introduced in Junos OS Release 9.6.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 11.3 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series. |
| <b>Description</b>              | Enable PIM on the routing device.<br><br>The statements are explained separately.                                                                                                                                                                                                                                                         |
| <b>Default</b>                  | PIM is disabled on the routing device.                                                                                                                                                                                                                                                                                                    |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                                                                                       |

## prefix-list (PIM RPF Selection)

---

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax                   | <pre>prefix-list <i>prefix-list-addresses</i> {<br/>    source <i>source-address</i> {<br/>        next-hop <i>next-hop-address</i>;<br/>    }<br/>    wildcard-source {<br/>        next-hop <i>next-hop-address</i>;<br/>    }<br/>}</pre>                                                                                                                                                                                                                                                                                                                                                                                        |
| Hierarchy Level          | <pre>[edit routing-instances <i>routing-instance-name</i> protocols pim rpf-selection group <i>group-address</i><br/>    source <i>source-address</i>],<br/>[edit routing-instances <i>routing-instance-name</i> protocols pim rpf-selection group <i>group-address</i><br/>    wildcard-source],<br/>[edit routing-instances <i>routing-instance-name</i> protocols pim rpf-selection prefix-list<br/>    <i>prefix-list-addresses</i> source <i>source-address</i>],<br/>[edit routing-instances <i>routing-instance-name</i> protocols pim rpf-selection prefix-list<br/>    <i>prefix-list-addresses</i> wildcard-source]</pre> |
| Release Information      | Statement introduced in Junos OS Release 10.4.<br>Statement introduced in Junos OS Release 11.3 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Description              | (Optional) Configure a list of prefixes (addresses) for multiple PIM groups.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Options                  | <b><i>prefix-list-addresses</i></b> —List of prefixes (addresses) for multiple PIM groups.<br><br>The remaining statements are explained separately.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Required Privilege Level | view-level—To view this statement in the configuration.<br>control-level—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Related Documentation    | <ul style="list-style-type: none"><li>• <i>Example: Configuring PIM RPF Selection</i></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |



## priority (Bootstrap)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>priority <i>number</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Hierarchy Level</b>          | <p>[edit logical-systems <i>logical-system-name</i> protocols pim <b>rp bootstrap</b> (inet   inet6)],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols pim <b>rp bootstrap</b> (inet   inet6)],</p> <p>[edit protocols pim <b>rp bootstrap</b> (inet   inet6)],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols pim <b>rp bootstrap</b> (inet   inet6)]</p> |
| <b>Release Information</b>      | <p>Statement introduced in Junos OS Release 7.6.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 11.3 for the QFX Series.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>                                                                                                                                                          |
| <b>Description</b>              | Configure the routing device's likelihood to be elected as the bootstrap router.                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Options</b>                  | <p><b>number</b>—Routing device's priority for becoming the bootstrap router. A higher value corresponds to a higher priority.</p> <p><b>Range:</b> 0 through a 32-bit number</p> <p><b>Default:</b> 0 (The routing device has the least likelihood of becoming the bootstrap router and sends packets with a priority of 0.)</p>                                                                                                                  |
| <b>Required Privilege Level</b> | <p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                     |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Configuring PIM Bootstrap Properties for IPv4</i></li> <li>• <i>Configuring PIM Bootstrap Properties for IPv4 or IPv6</i></li> <li>• <a href="#">bootstrap-priority on page 293</a></li> </ul>                                                                                                                                                                                                         |

## priority (PIM Interfaces)

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|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>priority <i>number</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Hierarchy Level</b>          | [edit logical-systems <i>logical-system-name</i> protocols pim interface <i>interface-name</i> ],<br>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols<br>pim interface <i>interface-name</i> ],<br>[edit protocols pim interface <i>interface-name</i> ],<br>[edit routing-instances <i>routing-instance-name</i> protocols pim interface <i>interface-name</i> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 11.3 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                                                                                                                                 |
| <b>Description</b>              | Configure the routing device's likelihood to be elected as the designated router.                                                                                                                                                                                                                                                                                                                                          |
| <b>Options</b>                  | <b><i>number</i></b> —Routing device's priority for becoming the designated router. A higher value corresponds to a higher priority.<br><b>Range:</b> 0 through 4294967295<br><b>Default:</b> 1 (Each routing device has an equal probability of becoming the DR.)                                                                                                                                                         |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring Interface Priority for PIM Designated Router Selection on page 110</a></li></ul>                                                                                                                                                                                                                                                                           |

## priority (PIM RPs)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>priority <i>number</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Hierarchy Level</b>          | <p>[edit logical-systems <i>logical-system-name</i> protocols pim rp bidirectional address <i>address</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>instance-name</i> protocols pim rp bidirectional address <i>address</i>],</p> <p>[edit protocols pim rp bidirectional address <i>address</i>],</p> <p>[edit protocols pim <b>rp local family</b> (inet   inet6)],</p> <p>[edit routing-instances <i>instance-name</i> protocols pim rp bidirectional address <i>address</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols pim <b>rp local family</b> (inet   inet6)]</p> |
| <b>Release Information</b>      | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 11.3 for the QFX Series.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p> <p>Support for bidirectional RP addresses introduced in Junos OS Release 12.1.</p> <p>Statement introduced in Junos OS Release 13.3 for the PTX5000 router.</p>                                                                                                                                                                               |
| <b>Description</b>              | <p>For PIM-SM, configure this routing device's priority for becoming an RP.</p> <p>For bidirectional PIM, configure this RP address' priority for becoming an RP.</p> <p>The bootstrap router uses this field when selecting the list of candidate rendezvous points to send in the bootstrap message. A smaller number increases the likelihood that the routing device or RP address becomes the RP. A priority value of 0 means that bootstrap router can override the group range being advertised by the candidate RP.</p>                                                                                                             |
| <b>Options</b>                  | <p><b><i>number</i></b>—Priority for becoming an RP. A lower value corresponds to a higher priority.</p> <p><b>Range:</b> 0 through 255</p> <p><b>Default:</b> 1</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Required Privilege Level</b> | <p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring Local PIM RPs on page 159</a></li> <li>• <a href="#">Example: Configuring Bidirectional PIM</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

## propagation-delay

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>propagation-delay <i>milliseconds</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Hierarchy Level</b>          | [edit protocols pim],<br>[edit protocols pim interface <i>interface-name</i> ],<br>[edit routing-instances <i>routing-instance-name</i> protocols pim],<br>[edit routing-instances <i>routing-instance-name</i> protocols pim interface <i>interface-name</i> ],<br>[edit logical-systems <i>logical-system-name</i> protocols pim],<br>[edit logical-systems <i>logical-system-name</i> protocols pim interface <i>interface-name</i> ],<br>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols<br>pim interface <i>interface-name</i> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.1.<br>Statement introduced in Junos OS Release 11.3 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Description</b>              | Set a delay for implementing a PIM prune message on the upstream routing device on a multicast network for which join suppression has been enabled. The routing device waits for the prune pending period to detect whether a join message is currently being suppressed by another routing device.                                                                                                                                                                                                                                                                                             |
| <b>Options</b>                  | <b><i>milliseconds</i></b> —Interval for the prune pending timer, which is the sum of the <b>propagation-delay</b> value and the <b>override-interval</b> value.<br><b>Range:</b> 250 through 2000 milliseconds<br><b>Default:</b> 500 milliseconds                                                                                                                                                                                                                                                                                                                                             |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Example: Enabling Join Suppression on page 129</a></li><li>• <a href="#">override-interval on page 324</a></li><li>• <a href="#">reset-tracking-bit on page 334</a></li></ul>                                                                                                                                                                                                                                                                                                                                                               |

---

## register-probe-time

---

|                                 |                                                                                                                                                                |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>register-probe-time <i>register-probe-time</i>;</code>                                                                                                   |
| <b>Hierarchy Level</b>          | [edit protocols pim <a href="#">rp</a> ]                                                                                                                       |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 12.2 for EX Series switches.<br>Statement introduced in Junos OS Release 14.1X53-D16 for QFX Series switches.         |
| <b>Description</b>              | Specify the amount of time before the register suppression time (RST) expires when a designated switch can send a NULL-Register to the rendezvous point (RP).  |
| <b>Options</b>                  | <i>register-probe-time</i> —Amount of time before the RST expires.<br><b>Default:</b> 5 seconds<br><b>Range:</b> 5 to 60 seconds                               |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">PIM Overview on page 103</a></li><li>• <a href="#">Understanding PIM Sparse Mode on page 121</a></li></ul> |

## reset-tracking-bit

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | reset-tracking-bit;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Hierarchy Level</b>          | [edit protocols pim],<br>[edit protocols pim interface <i>interface-name</i> ],<br>[edit routing-instances <i>routing-instance-name</i> protocols pim],<br>[edit routing-instances <i>routing-instance-name</i> protocols pim interface <i>interface-name</i> ],<br>[edit logical-systems <i>logical-system-name</i> protocols pim],<br>[edit logical-systems <i>logical-system-name</i> protocols pim interface <i>interface-name</i> ],<br>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols pim interface <i>interface-name</i> ]                                                                      |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.1.<br>Statement introduced in Junos OS Release 11.3 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Description</b>              | Change the value of a tracking bit (T-bit) field in the LAN prune delay hello option from the default of 1 to 0, which enables join suppression for a multicast interface. When the network starts receiving multiple identical join messages, join suppression triggers a random timer with a value of 66 through 84 milliseconds ( $1.1 \times \text{periodic}$ through $1.4 \times \text{periodic}$ , where periodic is 60 seconds). This creates an interval during which no identical join messages are sent. Eventually, only one of the identical messages is sent. Join suppression is triggered each time identical messages are sent for the same join. |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Example: Enabling Join Suppression on page 129</a></li><li>• <a href="#">override-interval on page 324</a></li><li>• <a href="#">propagation-delay on page 332</a></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                  |

## rib-group (Protocols PIM)

---

|                                 |                                                                                                                                                                                                                                                                                     |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre> rib-group {     inet <i>group-name</i>;     inet6 <i>group-name</i>; } </pre>                                                                                                                                                                                                 |
| <b>Hierarchy Level</b>          | [edit logical-systems <i>logical-system-name</i> protocols pim],<br>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols pim],<br>[edit protocols pim],<br>[edit routing-instances <i>routing-instance-name</i> protocols pim] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 11.3 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.          |
| <b>Description</b>              | Associate a routing table group with PIM.                                                                                                                                                                                                                                           |
| <b>Options</b>                  | <i>table-name</i> —Name of the routing table. The name must be one that you defined with the <b>rib-groups</b> statement at the <b>[edit routing-options]</b> hierarchy level.                                                                                                      |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                                 |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Example: Configuring a Dedicated PIM RPF Routing Table</i></li> </ul>                                                                                                                                                                   |

## rp

```

Syntax  register-probe-time {
        auto-rp {
            (announce | discovery | mapping);
            (mapping-agent-election | no-mapping-agent-election);
        }
        bidirectional {
            address address {
                group-ranges {
                    destination-ip-prefix </prefix-length>;
                }
                hold-time seconds;
                priority number;
            }
        }
        bootstrap {
            family (inet | inet6) {
                export [ policy-names ];
                import [ policy-names ];
                priority number;
            }
        }
        bootstrap-export [ policy-names ];
        bootstrap-import [ policy-names ];
        bootstrap-priority number;
        dr-register-policy [ policy-names ];
        embedded-rp {
            group-ranges {
                destination-ip-prefix </prefix-length>;
            }
            maximum-rps limit;
        }
        group-rp-mapping {
            family (inet | inet6) {
                log-interval seconds;
                maximum limit;
                threshold value;
            }
        }
        log-interval seconds;
        maximum limit;
        threshold value;
    }
    local {
        family (inet | inet6) {
            disable;
            address address;
            anycast-pim {
                local-address address;
                address address <forward-msdp-sa>;
                rp-set {
            }
        }
    }

```



```

    }
    group-ranges {
        destination-ip-prefix</prefix-length>;
    }
    hold-time seconds;
    override;
    priority number;
}
}
register-limit {
    family (inet | inet6) {
        log-interval seconds;
        maximum limit;
        threshold value;
    }
}
log-interval seconds;
maximum limit;
threshold value;
}
}
register-probe-time register-probe-time;
}
rp-register-policy [ policy-names ];
static {
    address address {
        override;
        version version;
        group-ranges {
            destination-ip-prefix</prefix-length>;
        }
    }
}
}
}

```

|                            |                                                                                                                                                                                                                                                                                     |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Hierarchy Level</b>     | [edit logical-systems <i>logical-system-name</i> protocols pim],<br>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols pim],<br>[edit protocols pim],<br>[edit routing-instances <i>routing-instance-name</i> protocols pim] |
| <b>Release Information</b> | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 11.3 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.          |
| <b>Description</b>         | <p>Configure the routing device as an actual or potential RP. A routing device can be an RP for more than one group.</p> <p>The remaining statements are explained separately.</p>                                                                                                  |
| <b>Default</b>             | If you do not include the <b>rp</b> statement, the routing device can never become the RP.                                                                                                                                                                                          |

**Required Privilege Level** routing—To view this statement in the configuration.  
routing-control—To add this statement to the configuration.

**Related Documentation**

- [Understanding PIM Sparse Mode on page 121](#)

---

## rp-register-policy

---

**Syntax** `rp-register-policy [ policy-names ];`

**Hierarchy Level** [edit logical-systems *logical-system-name* protocols pim *rp*],  
[edit logical-systems *logical-system-name* routing-instances *routing-instance-name* protocols pim *rp*],  
[edit protocols pim *rp*],  
[edit routing-instances *routing-instance-name* protocols pim *rp*]

**Release Information** Statement introduced in Junos OS Release 7.6.  
Statement introduced in Junos OS Release 9.0 for EX Series switches.  
Statement introduced in Junos OS Release 11.3 for the QFX Series.  
Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

**Description** Apply one or more policies to control incoming PIM register messages.

**Options** *policy-names*—Name of one or more import policies.

**Required Privilege Level** routing—To view this statement in the configuration.  
routing-control—To add this statement to the configuration.

**Related Documentation**

- [Configuring Register Message Filters on a PIM RP and DR on page 191](#)
- [dr-register-policy on page 297](#)

## rp-set

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>rp-set {   address address &lt;forward-msdp-sa&gt;; }</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Hierarchy Level</b>          | <p>[edit logical-systems <i>logical-system-name</i> protocols pim <b>local family</b> (inet   inet6) <b>anycast-pim</b>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols pim <b>local family</b> (inet   inet6) <b>anycast-pim</b>],</p> <p>[edit protocols pim <b>local family</b> (inet   inet6) <b>anycast-pim</b>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols pim <b>local family</b> (inet   inet6) <b>anycast-pim</b>]</p> |
| <b>Release Information</b>      | <p>Statement introduced in Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 11.3 for the QFX Series.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>                                                                                                                                                                                                                                      |
| <b>Description</b>              | <p>Configure a set of rendezvous point (RP) addresses for anycast RP. You can configure up to 15 RPs.</p> <p>The remaining statements are explained separately.</p>                                                                                                                                                                                                                                                                                                                                                            |
| <b>Required Privilege Level</b> | <p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Example: Configuring PIM Anycast With or Without MSDP on page 166</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                          |

## rpf-selection

|                                 |                                                                                                                                                                                                                                                                                                                                                                      |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre> rpf-selection {   group group-address {     source source-address {       next-hop next-hop-address;     }     wildcard-source {       next-hop next-hop-address;     }   }   prefix-list prefix-list-addresses {     source source-address {       next-hop next-hop-address;     }     wildcard-source {       next-hop next-hop-address;     }   } } </pre> |
| <b>Hierarchy Level</b>          | [edit routing-instances <i>routing-instance-name</i> protocols pim]                                                                                                                                                                                                                                                                                                  |
| <b>Release Information</b>      | <p>Statement introduced in JUNOS Release 10.4.</p> <p>Statement introduced in Junos OS Release 11.3 for the QFX Series.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>                                                                                                                                                          |
| <b>Description</b>              | <p>Configure the PIM RPF next-hop neighbor for a specific group and source for a VRF routing instance.</p> <p>The remaining statements are explained separately.</p>                                                                                                                                                                                                 |
| <b>Default</b>                  | If you omit the <b>rpf-selection</b> statement, PIM RPF checks typically choose the best path determined by the unicast protocol for all multicast flows.                                                                                                                                                                                                            |
| <b>Options</b>                  | <b>source-address</b> —Specific source address for the PIM group.                                                                                                                                                                                                                                                                                                    |
| <b>Required Privilege Level</b> | <p>view-level—To view this statement in the configuration.</p> <p>control-level—To add this statement to the configuration.</p>                                                                                                                                                                                                                                      |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><i>Example: Configuring PIM RPF Selection</i></li> </ul>                                                                                                                                                                                                                                                                      |

## source (PIM RPF Selection)

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|                                 |                                                                                                                                                                                                                                               |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>source source-address {     next-hop next-hop-address; }</pre>                                                                                                                                                                           |
| <b>Hierarchy Level</b>          | [edit routing-instances <i>routing-instance-name</i> protocols pim rpf-selection group <i>group-address</i> ],<br>[edit routing-instances <i>routing-instance-name</i> protocols pim rpf-selection prefix-list <i>prefix-list-addresses</i> ] |
| <b>Release Information</b>      | Statement introduced in JUNOS Release 10.4.<br>Statement introduced in Junos OS Release 11.3 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                                  |
| <b>Description</b>              | Configure the source address for the PIM group.                                                                                                                                                                                               |
| <b>Options</b>                  | <p><b>source-address</b>—Specific source address for the PIM group.</p> <p>The remaining statements are explained separately.</p>                                                                                                             |
| <b>Required Privilege Level</b> | view-level—To view this statement in the configuration.<br>control-level—To add this statement to the configuration.                                                                                                                          |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Example: Configuring PIM RPF Selection</i></li> </ul>                                                                                                                                             |

## spt-threshold

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|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>spt-threshold {<br/>    infinity [ <i>policy-names</i> ];<br/>}</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Hierarchy Level</b>          | <pre>[edit logical-systems <i>logical-system-name</i> protocols pim],<br/>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols<br/>    pim],<br/>[edit protocols pim],<br/>[edit routing-instances <i>routing-instance-name</i> protocols pim]</pre>                                                                                                                                                                                                                                                        |
| <b>Release Information</b>      | <p>Statement introduced in Junos OS Release 8.0.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 11.3 for the QFX Series.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>                                                                                                                                                                                                                                                                        |
| <b>Description</b>              | <p>Set the SPT threshold to infinity for a source-group address pair. Last-hop multicast routing devices running PIM sparse mode can forward the same stream of multicast packets onto the same LAN through an RPT rooted at the RP or an SPT rooted at the source. By default, last-hop routing devices transition to a direct SPT to the source. You can configure this routing device to set the SPT transition value to infinity to prevent this transition for any source-group address pair.</p> <p>The remaining statements are explained separately.</p> |
| <b>Required Privilege Level</b> | <p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Example: Configuring the PIM SPT Threshold Policy on page 204</a></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                  |

## static (Protocols PIM)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>static {   address address {     group-ranges {       destination-ip-prefix&lt;/prefix-length&gt;;     }     override;     version version;   } }</pre>                                                                                                                                                                                                                                                                                                                                                            |
| <b>Hierarchy Level</b>          | <p>[edit logical-systems <i>logical-system-name</i> protocols pim <b>rp</b>],<br/>         [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols pim <b>rp</b>],<br/>         [edit protocols pim <b>rp</b>],<br/>         [edit routing-instances <i>routing-instance-name</i> protocols pim <b>rp</b>]</p>                                                                                                                                                        |
| <b>Release Information</b>      | <p>Statement introduced before Junos OS Release 7.4.<br/>         Statement introduced in Junos OS Release 9.0 for EX Series switches.<br/>         Statement introduced in Junos OS Release 11.3 for the QFX Series.<br/>         Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>                                                                                                                                                                                                         |
| <b>Description</b>              | <p>Configure static RP addresses. The default static RP address is 224.0.0.0/4. To configure other addresses, include one or more <b>address</b> statements. You can configure a static RP in a logical system only if the logical system is not directly connected to a source.</p> <p>For each static RP address, you can optionally specify the PIM version and the groups for which this address can be the RP. The default PIM version is version 1.</p> <p>The remaining statements are explained separately.</p> |
| <b>Required Privilege Level</b> | <p>routing—To view this statement in the configuration.<br/>         routing-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring the Static PIM RP Address on the Non-RP Routing Device on page 161</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                      |

## threshold (PIM BFD Detection Time)

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|                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                               |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                                                                                                                                                                                                                                                                                                                                                           | <code>threshold <i>milliseconds</i>;</code>                                                                                                                                                                                                                                                                                                   |
| <b>Hierarchy Level</b>                                                                                                                                                                                                                                                                                                                                                  | [edit protocols pim interface <i>interface-name</i> bfd-liveness-detection detection-time],<br>[edit routing-instances <i>routing-instance-name</i> protocols pim interface <i>interface-name</i> bfd-liveness-detection detection-time]                                                                                                      |
| <b>Release Information</b>                                                                                                                                                                                                                                                                                                                                              | Statement introduced in Junos OS Release 8.2.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Support for BFD authentication introduced in Junos OS Release 9.6.<br>Statement introduced in Junos OS Release 12.1 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.  |
| <b>Description</b>                                                                                                                                                                                                                                                                                                                                                      | Specify the threshold for the adaptation of the BFD session detection time. When the detection time adapts to a value equal to or greater than the threshold, a single trap and a single system log message are sent.                                                                                                                         |
| <div> <b>NOTE:</b> The threshold value must be equal to or greater than the transmit interval.</div> <p>The threshold time must be equal to or greater than the value specified in the <a href="#">minimum-interval</a> or the <a href="#">minimum-receive-interval</a> statement.</p> |                                                                                                                                                                                                                                                                                                                                               |
| <b>Options</b>                                                                                                                                                                                                                                                                                                                                                          | <i>milliseconds</i> —Value for the detection time adaptation threshold.<br><b>Range:</b> 1 through 255,000                                                                                                                                                                                                                                    |
| <b>Required Privilege Level</b>                                                                                                                                                                                                                                                                                                                                         | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                                                                                           |
| <b>Related Documentation</b>                                                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"><li>• <a href="#">Configuring BFD for PIM on page 112</a></li><li>• <a href="#">bfd-liveness-detection on page 289</a></li><li>• <a href="#">detection-time on page 295</a></li><li>• <a href="#">minimum-interval on page 319</a></li><li>• <a href="#">minimum-receive-interval on page 321</a></li></ul> |



## threshold (PIM BFD Transmit Interval)

|                            |                                                                                                                                                                                                                                                                        |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <code>threshold <i>milliseconds</i>;</code>                                                                                                                                                                                                                            |
| <b>Hierarchy Level</b>     | [edit protocols pim interface <i>interface-name</i> bfd-liveness-detection transmit-interval],<br>[edit routing-instances <i>routing-instance-name</i> protocols pim interface <i>interface-name</i> bfd-liveness-detection transmit-interval]                         |
| <b>Release Information</b> | Statement introduced in Junos OS Release 8.2.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 12.1 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series. |
| <b>Description</b>         | Specify the threshold for the adaptation of the BFD session transmit interval. When the transmit interval adapts to a value greater than the threshold, a single trap and a single system message are sent.                                                            |
| <b>Options</b>             | <i>milliseconds</i> —Value for the transmit interval adaptation threshold.<br><b>Range:</b> 0 through 4,294,967,295 ( $2^{32} - 1$ )                                                                                                                                   |



**NOTE:** The threshold value specified in the `threshold` statement must be greater than the value specified in the `minimum-interval` statement for the `transmit-interval` statement.

|                                 |                                                                                                                                                                       |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring BFD for PIM on page 112</a></li> <li>• <a href="#">bfd-liveness-detection on page 289</a></li> </ul> |

## transmit-interval (PIM BFD Liveness Detection)

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|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax                   | <pre>transmit-interval {<br/>    minimum-interval milliseconds;<br/>    threshold milliseconds;<br/>}</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Hierarchy Level          | [edit protocols pim interface <i>interface-name</i> bfd-liveness-detection],<br>[edit routing-instances <i>routing-instance-name</i> protocols pim interface <i>interface-name</i> bfd-liveness-detection]                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Release Information      | Statement introduced in Junos OS Release 8.2.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Support for BFD authentication introduced in Junos OS Release 9.6.<br>Statement introduced in Junos OS Release 12.1 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                                                                                                                                                                                                                                                                                     |
| Description              | <p>Specify the transmit interval for the <b>bfd-liveness-detection</b> statement. The negotiated transmit interval for a peer is the interval between the sending of BFD packets to peers. The receive interval for a peer is the minimum interval between receiving packets sent from its peer; the receive interval is not negotiated between peers. To determine the transmit interval, each peer compares its configured minimum transmit interval with its peer's minimum receive interval. The larger of the two numbers is accepted as the transmit interval for that peer.</p> <p>The remaining statements are explained separately.</p> |
| Required Privilege Level | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Related Documentation    | <ul style="list-style-type: none"><li>• <a href="#">Configuring BFD for PIM on page 112</a></li><li>• <a href="#">bfd-liveness-detection on page 289</a></li><li>• <a href="#">threshold on page 345</a></li><li>• <a href="#">minimum-interval on page 320</a></li><li>• <a href="#">minimum-receive-interval on page 321</a></li></ul>                                                                                                                                                                                                                                                                                                         |

## traceoptions (Protocols PIM)

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <pre>traceoptions {     file <i>filename</i> &lt;files <i>number</i>&gt; &lt;size <i>size</i>&gt; &lt;world-readable   no-world-readable&gt;;     flag <i>flag</i> &lt;flag-modifier&gt; &lt;disable&gt;; }</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Hierarchy Level</b>     | <p>[edit logical-systems <i>logical-system-name</i> protocols pim],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols pim],</p> <p>[edit protocols pim],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols pim]</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Release Information</b> | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 11.3 for the QFX Series.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Description</b>         | <p>Configure PIM tracing options.</p> <p>To specify more than one tracing operation, include multiple <b>flag</b> statements.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Default</b>             | The default PIM trace options are those inherited from the routing protocol's <b>traceoptions</b> statement included at the <b>[edit routing-options]</b> hierarchy level.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Options</b>             | <p><b>disable</b>—(Optional) Disable the tracing operation. You can use this option to disable a single operation when you have defined a broad group of tracing operations, such as <b>all</b>.</p> <p><b>file <i>filename</i></b>—Name of the file to receive the output of the tracing operation. Enclose the name within quotation marks. All files are placed in the directory <b>/var/log</b>. We recommend that you place tracing output in the <b>pim-log</b> file.</p> <p><b>files <i>number</i></b>—(Optional) Maximum number of trace files. When a trace file named <b>trace-file</b> reaches its maximum size, it is renamed <b>trace-file.0</b>, then <b>trace-file.1</b>, and so on, until the maximum number of trace files is reached. Then the oldest trace file is overwritten.</p> <p>If you specify a maximum number of files, you must also include the <b>size</b> statement to specify the maximum file size.</p> <p><b>Range:</b> 2 through 1000 files</p> <p><b>Default:</b> 2 files</p> <p><b>flag <i>flag</i></b>—Tracing operation to perform. To specify more than one tracing operation, include multiple <b>flag</b> statements.</p> <p><b>PIM Tracing Flags</b></p> <ul style="list-style-type: none"> <li><b>assert</b>—Assert messages</li> <li><b>bidirectional-df-election</b>—Bidirectional PIM designated-forwarder (DF) election events</li> </ul> |

- **bootstrap**—Bootstrap messages
- **cache**—Packets in the PIM sparse mode routing cache
- **graft**—Graft and graft acknowledgment messages
- **hello**—Hello packets
- **join**—Join messages
- **mt**—Multicast tunnel messages
- **nsr-synchronization**—Nonstop active routing (NSR) synchronization messages
- **packets**—All PIM packets
- **prune**—Prune messages
- **register**—Register and register stop messages
- **rp**—Candidate RP advertisements
- **all**—All tracing operations
- **general**—A combination of the **normal** and **route** trace operations
- **normal**—All normal operations

**Default:** If you do not specify this option, only unusual or abnormal operations are traced.

- **policy**—Policy operations and actions
- **route**—Routing table changes
- **state**—State transitions
- **task**—Interface transactions and processing
- **timer**—Timer usage

**flag-modifier**—(Optional) Modifier for the tracing flag. You can specify one or more of these modifiers:

- **detail**—Detailed trace information
- **receive**—Packets being received
- **send**—Packets being transmitted

**no-stamp**—(Optional) Do not place timestamp information at the beginning of each line in the trace file.

**Default:** If you omit this option, timestamp information is placed at the beginning of each line of the tracing output.

**no-world-readable**—(Optional) Do not allow users to read the log file.

**replace**—(Optional) Replace an existing trace file if there is one.

**Default:** If you do not include this option, tracing output is appended to an existing trace file.

**size** *size*—(Optional) Maximum size of each trace file, in kilobytes (KB), megabytes (MB), or gigabytes (GB). When a trace file named **trace-file** reaches this size, it is renamed **trace-file.0**. When **trace-file** again reaches this size, **trace-file.0** is renamed **trace-file.1** and **trace-file** is renamed **trace-file.0**. This renaming scheme continues until the maximum number of trace files is reached. Then the oldest trace file is overwritten.

If you specify a maximum file size, you must also include the **files** statement to specify the maximum number of trace files.

**Syntax:** *xk* to specify KB, *xm* to specify MB, or *xg* to specify GB

**Range:** 0 KB through the maximum file size supported on your system

**Default:** 1 MB

**world-readable**—(Optional) Allow any user to read the log file.

|                                 |                                                                                                                                                                                                                                                                                                                   |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Required Privilege Level</b> | routing and trace—To view this statement in the configuration.<br>routing-control and trace-control—To add this statement to the configuration.                                                                                                                                                                   |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Configuring PIM Trace Options on page 108</a></li> <li>• <a href="#">Tracing DVMRP Protocol Traffic</a></li> <li>• <a href="#">Tracing MSDP Protocol Traffic on page 214</a></li> <li>• <a href="#">Configuring PIM Trace Options on page 108</a></li> </ul> |

## version (BFD)

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|                                 |                                                                                                                                                                                                                                                                        |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | version (0   1   automatic);                                                                                                                                                                                                                                           |
| <b>Hierarchy Level</b>          | [edit protocols piminterface <i>interface-name</i> <b>bfd-liveness-detection</b> ],<br>[edit routing-instances <i>routing-instance-name</i> protocols pim interface <i>interface-name</i> <b>bfd-liveness-detection</b> ]                                              |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 8.1.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 12.1 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series. |
| <b>Description</b>              | Specify the bidirectional forwarding detection (BFD) protocol version that you want to detect.                                                                                                                                                                         |
| <b>Options</b>                  | Configure the BFD version to detect: <b>1</b> (BFD version 1) or <b>automatic</b> (autodetect the BFD version)<br><b>Default:</b> automatic                                                                                                                            |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Configuring BFD for PIM on page 112</a></li></ul>                                                                                                                                                                  |

## version (PIM)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>version <i>version</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Hierarchy Level</b>          | <p>[edit logical-systems <i>logical-system-name</i> protocols pim interface <i>interface-name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols pim <b>rp static address</b> <i>address</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols pim interface <i>interface-name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols pim <b>rp static address</b> <i>address</i>],</p> <p>[edit protocols pim interface <i>interface-name</i>],</p> <p>[edit protocols pim <b>rp static address</b> <i>address</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols pim interface <i>interface-name</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols pim <b>rp static address</b> <i>address</i>]</p> |
| <b>Release Information</b>      | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 11.3 for the QFX Series.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Description</b>              | Specify the version of PIM.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Options</b>                  | <p><b>version</b>—PIM version number.</p> <p><b>Range:</b> 1 or 2</p> <p><b>Default:</b> PIMv1 for rendezvous point (RP) mode (at the [edit protocols pim rp static address <i>address</i>] hierarchy level). PIMv2 for interface mode (at the [edit protocols pim interface <i>interface-name</i>] hierarchy level).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Required Privilege Level</b> | <p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Enabling PIM Sparse Mode on page 124</a></li> <li>• <a href="#">Configuring PIM Dense Mode Properties on page 138</a></li> <li>• <a href="#">Configuring PIM Sparse-Dense Mode Properties on page 139</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

## wildcard-source (PIM RPF Selection)

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|                                 |                                                                                                                                                                                                                                               |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | wildcard-source {<br>next-hop next-hop-address;<br>}                                                                                                                                                                                          |
| <b>Hierarchy Level</b>          | [edit routing-instances <i>routing-instance-name</i> protocols pim rpf-selection group <i>group-address</i> ],<br>[edit routing-instances <i>routing-instance-name</i> protocols pim rpf-selection prefix-list <i>prefix-list-addresses</i> ] |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 10.4.<br>Statement introduced in Junos OS Release 11.3 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                               |
| <b>Description</b>              | Use a wildcard for the multicast source instead of (or in addition to) a specific multicast source.<br><br>The remaining statements are explained separately.                                                                                 |
| <b>Required Privilege Level</b> | view-level—To view this statement in the configuration.<br>control-level—To add this statement to the configuration.                                                                                                                          |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Example: Configuring PIM RPF Selection</i></li></ul>                                                                                                                                               |



## CHAPTER 19

# Configuration Statements (Source-Specific Multicast)

- [asm-override-ssm on page 353](#)
- [policy \(SSM Maps\) on page 354](#)
- [ssm-groups on page 355](#)
- [ssm-map \(Protocols IGMP\) on page 356](#)
- [ssm-map \(Routing Options Multicast\) on page 357](#)
- [ssm-map-policy \(IGMP\) on page 358](#)

### asm-override-ssm

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|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | asm-override-ssm;                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Hierarchy Level</b>          | [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> routing-options multicast],<br>[edit logical-systems <i>logical-system-name</i> routing-options multicast],<br>[edit routing-instances <i>routing-instance-name</i> routing-options multicast],<br>[edit routing-options multicast]                                                                                         |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 9.4.<br>Statement introduced in Junos OS Release 9.5 for EX Series switches.<br>Statement introduced in Junos OS Release 12.1 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.<br>Statement introduced in Junos OS Release 12.3 for ACX Series routers.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series. |
| <b>Description</b>              | Enable the routing device to accept any-source multicast join messages (*G) for group addresses that are within the default or configured range of source-specific multicast groups.                                                                                                                                                                                                                                        |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                         |
| <b>Related Documentation</b>    | • <a href="#">Example: Configuring Source-Specific Multicast Groups with Any-Source Override on page 150</a>                                                                                                                                                                                                                                                                                                                |

## policy (SSM Maps)

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|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>policy [ <i>policy-names</i> ];</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Hierarchy Level</b>          | <code>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> routing-options multicast <b>ssm-map</b> <i>ssm-map-name</i>],</code><br><code>[edit logical-systems <i>logical-system-name</i> routing-options multicast <b>ssm-map</b> <i>ssm-map-name</i>],</code><br><code>[edit routing-instances <i>routing-instance-name</i> routing-options multicast <b>ssm-map</b> <i>ssm-map-name</i>],</code><br><code>[edit routing-options multicast <b>ssm-map</b> <i>ssm-map-name</i>]</code> |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 12.1 for the QFX Series.<br>Statement introduced in Junos OS Release 12.3 for ACX Series routers.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                                                                                                                                                                     |
| <b>Description</b>              | Apply one or more policies to an SSM map.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Options</b>                  | <i>policy-names</i> —Name of one or more policies for SSM mapping.                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Required Privilege Level</b> | <code>routing</code> —To view this statement in the configuration.<br><code>routing-control</code> —To view this statement in the configuration.                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Example: Configuring SSM Mapping on page 147</a></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                      |

## ssm-groups

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>ssm-groups [ <i>ip-addresses</i> ];</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Hierarchy Level</b>          | <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> routing-options multicast],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-options multicast],</p> <p>[edit routing-instances <i>routing-instance-name</i> routing-options multicast],</p> <p>[edit routing-options multicast]</p>                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Release Information</b>      | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 12.1 for the QFX Series.</p> <p>Statement introduced in Junos OS Release 12.3 for ACX Series routers.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Description</b>              | <p>Configure source-specific multicast (SSM) groups.</p> <p>By default, the SSM group multicast address is limited to the IP address range from 232.0.0.0 through 232.255.255.255. However, you can extend SSM operations into another Class D range by including the <b>ssm-groups</b> statement in the configuration. The default SSM address range from 232.0.0.0 through 232.255.255.255 cannot be used in the <b>ssm-groups</b> statement. This statement is for adding other multicast addresses to the default SSM group addresses. This statement does not override the default SSM group address range.</p> <p>IGMPv3 supports SSM groups. By utilizing inclusion lists, only sources that are specified send to the SSM group.</p> |
| <b>Options</b>                  | <i>ip-addresses</i> —List of one or more additional SSM group addresses separated by a space.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Required Privilege Level</b> | <p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Example: Configuring Source-Specific Multicast Groups with Any-Source Override on page 150</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

## ssm-map (Protocols IGMP)

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|                                 |                                                                                                                                                                                                                                                                        |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>ssm-map <i>ssm-map-name</i>;</code>                                                                                                                                                                                                                              |
| <b>Hierarchy Level</b>          | [edit logical-systems <i>logical-system-name</i> protocols <a href="#">igmp interface interface-name</a> ],<br>[edit protocols <a href="#">igmp interface interface-name</a> ]                                                                                         |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.0 for EX Series switches.<br>Statement introduced in Junos OS Release 12.1 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series. |
| <b>Description</b>              | Apply an SSM map to an IGMP interface.                                                                                                                                                                                                                                 |
| <b>Options</b>                  | <i>ssm-map-name</i> —Name of SSM map.                                                                                                                                                                                                                                  |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Example: Configuring SSM Mapping on page 147</a></li></ul>                                                                                                                                                         |

## ssm-map (Routing Options Multicast)

|                                 |                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>ssm-map <i>ssm-map-name</i> {     <i>policy</i> [ <i>policy-names</i> ];     source [ <i>addresses</i> ]; }</pre>                                                                                                                                                                                                                                                 |
| <b>Hierarchy Level</b>          | <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> routing-options multicast],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-options multicast],</p> <p>[edit routing-instances <i>routing-instance-name</i> routing-options multicast],</p> <p>[edit routing-options multicast]</p>                 |
| <b>Release Information</b>      | <p>Statement introduced in Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Statement introduced in Junos OS Release 12.1 for the QFX Series.</p> <p>Statement introduced in Junos OS Release 12.3 for ACX Series routers.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p> |
| <b>Description</b>              | Configure SSM mapping.                                                                                                                                                                                                                                                                                                                                                 |
| <b>Options</b>                  | <p><b><i>ssm-map-name</i></b>—Name of the SSM map.</p> <p>The remaining statements are explained separately.</p>                                                                                                                                                                                                                                                       |
| <b>Required Privilege Level</b> | <p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                         |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Example: Configuring SSM Mapping on page 147</a></li> </ul>                                                                                                                                                                                                                                                       |

## ssm-map-policy (IGMP)

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|                                 |                                                                                                                                                                                                 |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>ssm-map-policy <i>ssm-map-policy-name</i>;</code>                                                                                                                                         |
| <b>Hierarchy Level</b>          | [edit logical-systems <i>logical-system-name</i> protocols <a href="#">igmp interface interface-name</a> ],<br>[edit protocols <a href="#">igmp interface interface-name</a> ]                  |
| <b>Release Information</b>      | Statement introduced in Junos OS Release 11.4.<br>Statement introduced in Junos OS Release 12.1 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series. |
| <b>Description</b>              | Apply an SSM map policy to an IGMP interface.                                                                                                                                                   |
| <b>Options</b>                  | <i>ssm-map-policy-name</i> —Name of SSM map policy.                                                                                                                                             |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Example: Configuring SSM Maps for Different Groups to Different Sources on page 153</a></li></ul>                                           |

## CHAPTER 20

# Configuration Statements (MSDP)

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- [disable \(Protocols MSDP\) on page 364](#)
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- [group \(Protocols MSDP\) on page 366](#)
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- [maximum \(MSDP Active Source Messages\) on page 369](#)
- [mode \(Protocols MSDP\) on page 370](#)
- [msdp on page 371](#)
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- [rib-group \(Protocols MSDP\) on page 374](#)
- [source \(Protocols MSDP\) on page 375](#)
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- [traceoptions \(Protocols MSDP\) on page 377](#)

## active-source-limit

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>active-source-limit {     log-interval <i>seconds</i>;     log-warning <i>value</i>;     maximum <i>number</i>;     threshold <i>number</i>; }</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Hierarchy Level</b>          | <pre>[edit logical-systems <i>logical-system-name</i> protocols <b>msdp</b>], [edit logical-systems <i>logical-system-name</i> protocols <b>msdp group</b> <i>group-name</i> <b>peer</b> <i>address</i>], [edit logical-systems <i>logical-system-name</i> protocols <b>msdp peer</b> <i>address</i>], [edit logical-systems <i>logical-system-name</i> protocols <b>msdp source</b> <i>ip-address/prefix-length</i>], [edit logical-systems <i>logical-system-name</i> routing-instances <i>instance-name</i> protocols <b>msdp</b>], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols <b>msdp group</b> <i>group-name</i> <b>peer</b> <i>address</i>], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols <b>msdp peer</b> <i>address</i>], [edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols <b>msdp source</b> <i>ip-address/prefix-length</i>], [edit protocols <b>msdp</b>], [edit protocols <b>msdp group</b> <i>group-name</i> <b>peer</b> <i>address</i>], [edit protocols <b>msdp peer</b> <i>address</i>], [edit protocols <b>msdp source</b> <i>ip-address/prefix-length</i>], [edit routing-instances <i>routing-instance-name</i> protocols <b>msdp</b>], [edit routing-instances <i>routing-instance-name</i> protocols <b>msdp group</b> <i>group-name</i> <b>peer</b> <i>address</i>], [edit routing-instances <i>routing-instance-name</i> protocols <b>msdp peer</b> <i>address</i>], [edit routing-instances <i>routing-instance-name</i> protocols <b>msdp source</b> <i>ip-address/prefix-length</i>]</pre> |
| <b>Release Information</b>      | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 12.1 for the QFX Series.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Description</b>              | Limit the number of active source messages the routing device accepts.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Default</b>                  | If you do not include this statement, the router accepts any number of MSDP active source messages.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Options</b>                  | The options are explained separately.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Required Privilege Level</b> | <p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Example: Configuring MSDP with Active Source Limits and Mesh Groups on page 218</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |



## authentication-key

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>authentication-key peer-key;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Hierarchy Level</b>          | <p>[edit logical-systems <i>logical-system-name</i> protocols <code>msdp group group-name peer address</code>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols <code>msdp peer address</code>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols <code>msdp group group-name peer address</code>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols <code>msdp peer address</code>],</p> <p>[edit protocols <code>msdp group group-name peer address</code>],</p> <p>[edit protocols <code>msdp peer address</code>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols <code>msdp group group-name peer address</code>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols <code>msdp peer address</code>]</p> |
| <b>Release Information</b>      | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 12.1 for the QFX Series.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Description</b>              | Associate a Message Digest 5 (MD5) signature option authentication key with an MSDP peering session.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Default</b>                  | If you do not include this statement, the routing device accepts any valid MSDP messages from the peer address.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Options</b>                  | <p><b>peer-key</b>—MD5 authentication key. The peer key can be a text string up to 16 letters and digits long. Strings can include any ASCII characters with the exception of ( , ) , &amp; , and [ . If you include spaces in an MSDP authentication key, enclose all characters in quotation marks ( " " ).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Required Privilege Level</b> | <p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Example: Configuring MSDP in a Routing Instance</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

## data-encapsulation

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|                                 |                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>data-encapsulation (disable   enable);</code>                                                                                                                                                                                                                                                                                                         |
| <b>Hierarchy Level</b>          | [edit logical-systems <i>logical-system-name</i> protocols <a href="#">msdp</a> ],<br>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols <a href="#">msdp</a> ],<br>[edit protocols <a href="#">msdp</a> ],<br>[edit routing-instances <i>routing-instance-name</i> protocols <a href="#">msdp</a> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.1 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                                                                                                                                          |
| <b>Description</b>              | Configure a rendezvous point (RP) using MSDP to encapsulate multicast data received in MSDP register messages inside forwarded MSDP source-active messages.                                                                                                                                                                                                 |
| <b>Default</b>                  | If you do not include this statement, the RP encapsulates multicast data.                                                                                                                                                                                                                                                                                   |
| <b>Options</b>                  | <b>disable</b> —(Optional) Do not use MSDP data encapsulation.<br><b>enable</b> —Use MSDP data encapsulation.<br><b>Default:</b> <code>enable</code>                                                                                                                                                                                                        |
| <b>Required Privilege Level</b> | <code>routing</code> —To view this statement in the configuration.<br><code>routing-control</code> —To add this statement to the configuration.                                                                                                                                                                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Example: Configuring MSDP with Active Source Limits and Mesh Groups on page 218</a></li></ul>                                                                                                                                                                                                           |

## default-peer

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | default-peer;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Hierarchy Level</b>          | <p>[edit logical-systems <i>logical-system-name</i> protocols <b>msdp</b>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols <b>msdp group</b> <i>group-name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols <b>msdp group</b> <i>group-name</i> <b>peer</b> <i>address</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols <b>msdp peer</b> <i>address</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols <b>msdp</b>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols <b>msdp group</b> <i>group-name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols <b>msdp group</b> <i>group-name</i> <b>peer</b> <i>address</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols <b>msdp peer</b> <i>address</i>],</p> <p>[edit protocols <b>msdp</b>],</p> <p>[edit protocols <b>msdp group</b> <i>group-name</i>],</p> <p>[edit protocols <b>msdp group</b> <i>group-name</i> <b>peer</b> <i>address</i>],</p> <p>[edit protocols <b>msdp peer</b> <i>address</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols <b>msdp</b>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols <b>msdp group</b> <i>group-name</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols <b>msdp group</b> <i>group-name</i> <b>peer</b> <i>address</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols <b>msdp peer</b> <i>address</i>]</p> |
| <b>Release Information</b>      | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 12.1 for the QFX Series.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Description</b>              | Establish this peer as the default MSDP peer and accept source-active messages from the peer without the usual peer-reverse-path-forwarding (peer-RPF) check.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Required Privilege Level</b> | <p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Example: Configuring MSDP with Active Source Limits and Mesh Groups on page 218</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

## disable (Protocols MSDP)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | disable;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Hierarchy Level</b>          | <p>[edit logical-systems <i>logical-system-name</i> protocols <b>msdp</b>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols <b>msdp group</b> <i>group-name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols <b>msdp group</b> <i>group-name</i> <b>peer</b> <i>address</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols <b>msdp peer</b> <i>address</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols <b>msdp</b>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols <b>msdp group</b> <i>group-name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols <b>msdp group</b> <i>group-name</i> <b>peer</b> <i>address</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols <b>msdp peer</b> <i>address</i>],</p> <p>[edit protocols <b>msdp</b>],</p> <p>[edit protocols <b>msdp group</b> <i>group-name</i>],</p> <p>[edit protocols <b>msdp group</b> <i>group-name</i> <b>peer</b> <i>address</i>],</p> <p>[edit protocols <b>msdp peer</b> <i>address</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols <b>msdp</b>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols <b>msdp group</b> <i>group-name</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols <b>msdp group</b> <i>group-name</i> <b>peer</b> <i>address</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols <b>msdp peer</b> <i>address</i>]</p> |
| <b>Release Information</b>      | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 12.1 for the QFX Series.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Description</b>              | Explicitly disable MSDP.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Required Privilege Level</b> | <p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li><i>Disabling MSDP</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

## export (Protocols MSDP)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>export [ <i>policy-names</i> ];</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Hierarchy Level</b>          | <p>[edit logical-systems <i>logical-system-name</i> protocols <a href="#">msdp</a>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols <a href="#">msdp group</a> <i>group-name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols <a href="#">msdp group</a> <i>group-name</i> <a href="#">peer</a> <i>address</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols <a href="#">msdp peer</a> <i>address</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols <a href="#">msdp</a>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols <a href="#">msdp group</a> <i>group-name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols <a href="#">msdp group</a> <i>group-name</i> <a href="#">peer</a> <i>address</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols <a href="#">msdp peer</a> <i>address</i>],</p> <p>[edit protocols <a href="#">msdp</a>],</p> <p>[edit protocols <a href="#">msdp group</a> <i>group-name</i>],</p> <p>[edit protocols <a href="#">msdp group</a> <i>group-name</i> <a href="#">peer</a> <i>address</i>],</p> <p>[edit protocols <a href="#">msdp peer</a> <i>address</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols <a href="#">msdp</a>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols <a href="#">msdp group</a> <i>group-name</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols <a href="#">msdp group</a> <i>group-name</i> <a href="#">peer</a> <i>address</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols <a href="#">msdp peer</a> <i>address</i>]</p> |
| <b>Release Information</b>      | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 12.1 for the QFX Series.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Description</b>              | Apply one or more policies to routes being exported from the routing table into MSDP.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Options</b>                  | <i>policy-names</i> —Name of one or more policies.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Required Privilege Level</b> | <p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Example: Configuring MSDP in a Routing Instance</i></li> <li>• <a href="#">import on page 367</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

## group (Protocols MSDP)

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <pre> group <i>group-name</i> {     disable;     export [ <i>policy-names</i> ];     import [ <i>policy-names</i> ];     local-address <i>address</i>;     mode (mesh-group   standard);     traceoptions {         file <i>filename</i> &lt;files <i>number</i>&gt; &lt;size <i>size</i>&gt; &lt;world-readable   no-world-readable&gt;;         flag <i>flag</i> &lt;<i>flag-modifier</i>&gt; &lt;disable&gt;;     }     peer <i>address</i>; {         disable;         active-source-limit {             maximum <i>number</i>;             threshold <i>number</i>;         }         authentication-key <i>peer-key</i>;         default-peer;         export [ <i>policy-names</i> ];         import [ <i>policy-names</i> ];         local-address <i>address</i>;         traceoptions {             file <i>filename</i> &lt;files <i>number</i>&gt; &lt;size <i>size</i>&gt; &lt;world-readable   no-world-readable&gt;;             flag <i>flag</i> &lt;<i>flag-modifier</i>&gt; &lt;disable&gt;;         }     } } </pre> |
| <b>Hierarchy Level</b>     | <p>[edit logical-systems <i>logical-system-name</i> protocols <b>msdp</b>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols <b>msdp</b>],</p> <p>[edit protocols <b>msdp</b>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols <b>msdp</b>]</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Release Information</b> | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 12.1 for the QFX Series.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Description</b>         | <p>Define an MSDP peer group. MSDP peers within groups share common tracing options, if present and not overridden for an individual peer with the <b>peer</b> statement. To configure multiple MSDP groups, include multiple <b>group</b> statements.</p> <p>By default, the group's options are identical to the global MSDP options. To override the global options, include group-specific options within the <b>group</b> statement.</p> <p>The group must contain at least one peer.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Options</b>             | <p><b>group-name</b>—Name of the MSDP group.</p> <p>The remaining statements are explained separately.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

|                                 |                                                                                                                     |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------|
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration. |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Example: Configuring MSDP in a Routing Instance</i></li> </ul>          |

## import (Protocols MSDP)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>import [ <i>policy-names</i> ];</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Hierarchy Level</b>          | <p>[edit logical-systems <i>logical-system-name</i> protocols <a href="#">msdp</a>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols <a href="#">msdp group</a> <i>group-name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols <a href="#">msdp group</a> <i>group-name</i> <a href="#">peer</a> <i>address</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols <a href="#">msdp peer</a> <i>address</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols <a href="#">msdp</a>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols <a href="#">msdp group</a> <i>group-name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols <a href="#">msdp group</a> <i>group-name</i> <a href="#">peer</a> <i>address</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols <a href="#">msdp peer</a> <i>address</i>],</p> <p>[edit protocols <a href="#">msdp</a>],</p> <p>[edit protocols <a href="#">msdp group</a> <i>group-name</i>],</p> <p>[edit protocols <a href="#">msdp group</a> <i>group-name</i> <a href="#">peer</a> <i>address</i>],</p> <p>[edit protocols <a href="#">msdp peer</a> <i>address</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols <a href="#">msdp</a>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols <a href="#">msdp group</a> <i>group-name</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols <a href="#">msdp group</a> <i>group-name</i> <a href="#">peer</a> <i>address</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols <a href="#">msdp peer</a> <i>address</i>]</p> |
| <b>Release Information</b>      | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 12.1 for the QFX Series.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Description</b>              | Apply one or more policies to routes being imported into the routing table from MSDP.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Options</b>                  | <i>policy-names</i> —Name of one or more policies.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Example: Configuring MSDP in a Routing Instance</i></li> <li>• <a href="#">export on page 365</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

## local-address (Protocols MSDP)

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>local-address address;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Hierarchy Level</b>          | <p>[edit logical-systems <i>logical-system-name</i> protocols <b>msdp</b>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols <b>msdp group</b> <i>group-name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols <b>msdp group</b> <i>group-name</i> <b>peer</b> <i>address</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols <b>msdp peer</b> <i>address</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols <b>msdp</b>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols <b>msdp group</b> <i>group-name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols <b>msdp group</b> <i>group-name</i> <b>peer</b> <i>address</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols <b>msdp peer</b> <i>address</i>],</p> <p>[edit protocols <b>msdp</b>],</p> <p>[edit protocols <b>msdp group</b> <i>group-name</i>],</p> <p>[edit protocols <b>msdp group</b> <i>group-name</i> <b>peer</b> <i>address</i>],</p> <p>[edit protocols <b>msdp peer</b> <i>address</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols <b>msdp</b>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols <b>msdp group</b> <i>group-name</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols <b>msdp group</b> <i>group-name</i> <b>peer</b> <i>address</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols <b>msdp peer</b> <i>address</i>]</p> |
| <b>Release Information</b>      | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 12.1 for the QFX Series.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Description</b>              | Configure the local end of an MSDP session. You must configure at least one peer for MSDP to function. When configuring a peer, you must include this statement. This address is used to accept incoming connections to the peer and to establish connections to the remote peer.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Options</b>                  | <b>address</b> —IP address of the local end of the connection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Required Privilege Level</b> | <p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <i>Example: Configuring MSDP in a Routing Instance</i></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |



## maximum (MSDP Active Source Messages)

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|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>maximum <i>number</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Hierarchy Level</b>          | <p>[edit logical-systems <i>logical-system-name</i> protocols <a href="#">msdp active-source-limit</a>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols <a href="#">msdp active-source-limit</a>],</p> <p>[edit protocols <a href="#">msdp active-source-limit</a>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols <a href="#">msdp active-source-limit</a>]</p> |
| <b>Release Information</b>      | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 12.1 for the QFX Series.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>                                                                                                                                                                                                                                          |
| <b>Description</b>              | Configure the maximum number of MSDP active source messages the router accepts.                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Options</b>                  | <p><i>number</i>—Maximum number of active source messages.</p> <p><b>Range:</b> 1 through 1,000,000</p> <p><b>Default:</b> 25,000</p>                                                                                                                                                                                                                                                                                                                      |
| <b>Required Privilege Level</b> | <p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                                                                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Example: Configuring MSDP with Active Source Limits and Mesh Groups on page 218</a></li> <li>• <a href="#">threshold (MSDP Active Source Messages) on page 376</a></li> </ul>                                                                                                                                                                                                                         |

## mode (Protocols MSDP)

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|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | mode (mesh-group   standard);                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Hierarchy Level</b>          | [edit logical-systems <i>logical-system-name</i> protocols <b>msdp group</b> <i>group-name</i> ],<br>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols <b>msdp group</b> <i>group-name</i> ],<br>[edit protocols <b>msdp group</b> <i>group-name</i> ],<br>[edit routing-instances <i>routing-instance-name</i> protocols <b>msdp group</b> <i>group-name</i> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.1 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                                                                                                                                                                                                      |
| <b>Description</b>              | Configure groups of peers in a full mesh topology to limit excessive flooding of source-active messages to neighboring peers. The default flooding mode is <b>standard</b> .                                                                                                                                                                                                                                            |
| <b>Default</b>                  | If you do not include this statement, default flooding is applied.                                                                                                                                                                                                                                                                                                                                                      |
| <b>Options</b>                  | <b>mesh-group</b> —Group of peers that are mesh group members.<br><br><b>standard</b> —Use standard MSDP source-active flooding rules.<br><b>Default:</b> standard                                                                                                                                                                                                                                                      |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                     |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Example: Configuring MSDP with Active Source Limits and Mesh Groups on page 218</a></li></ul>                                                                                                                                                                                                                                                                       |

## msdp

```

Syntax  msdp {
        disable;
        active-source-limit {
            log-interval seconds;
            log-warning value;
            maximum number;
            threshold number;
        }
        data-encapsulation (disable | enable);
        export [ policy-names ];
        group group-name {
            ...group-configuration ...
        }
        hold-time seconds;
        import [ policy-names ];
        local-address address;
        keep-alive seconds;
        peer address {
            ...peer-configuration ...
        }
        rib-group group-name;
        source ip-prefix</prefix-length> {
            active-source-limit {
                maximum number;
                threshold number;
            }
        }
        sa-hold-time seconds;
        traceoptions {
            file filename <files number> <size size> <world-readable | no-world-readable>;
            flag flag <flag-modifier> <disable>;
        }
        group group-name {
            disable;
            export [ policy-names ];
            import [ policy-names ];
            local-address address;
            mode (mesh-group | standard);
            peer address {
                ... same statements as at the [edit protocols msdp peer address] hierarchy level shown
                just following ...
            }
            traceoptions {
                file filename <files number> <size size> <world-readable | no-world-readable>;
                flag flag <flag-modifier> <disable>;
            }
        }
        peer address {
            disable;
            active-source-limit {
                maximum number;
                threshold number;
            }
        }
    }

```

```
    }  
    authentication-key peer-key;  
    default-peer;  
    export [ policy-names ];  
    import [ policy-names ];  
    local-address address;  
    traceoptions {  
        file filename <files number> <size size> <world-readable | no-world-readable>;  
        flag flag <flag-modifier> <disable>;  
    }  
}  
}
```

|                                 |                                                                                                                                                                                                                                                                            |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Hierarchy Level</b>          | [edit logical-systems <i>logical-system-name</i> protocols],<br>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols],<br>[edit protocols],<br>[edit routing-instances <i>routing-instance-name</i> protocols]        |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 9.4 for EX Series switches.<br>Statement introduced in Junos OS Release 12.1 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series. |
| <b>Description</b>              | Enable MSDP on the router or switch. You must also configure at least one peer for MSDP to function.                                                                                                                                                                       |
| <b>Default</b>                  | MSDP is disabled on the router or switch.                                                                                                                                                                                                                                  |
| <b>Options</b>                  | The statements are explained separately.                                                                                                                                                                                                                                   |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <i>Example: Configuring MSDP in a Routing Instance</i></li></ul>                                                                                                                                                                   |

## peer (Protocols MSDP)

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <pre> peer address {     disable;     active-source-limit {         maximum number;         threshold number;     }     authentication-key peer-key;     default-peer;     export [ policy-names ];     import [ policy-names ];     local-address address;     traceoptions {         file filename &lt;files number&gt; &lt;size size&gt; &lt;world-readable   no-world-readable&gt;;         flag flag &lt;flag-modifier&gt; &lt;disable&gt;;     } } </pre>                                                                                                                                                                                                                                                                                                                                                              |
| <b>Hierarchy Level</b>     | <p>[edit logical-systems <i>logical-system-name</i> protocols <b>msdp</b>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols <b>msdp group</b> <i>group-name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols <b>msdp</b>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols <b>msdp group</b> <i>group-name</i>],</p> <p>[edit protocols <b>msdp</b>],</p> <p>[edit protocols <b>msdp group</b> <i>group-name</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols <b>msdp</b>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols <b>msdp group</b> <i>group-name</i>]</p>                                               |
| <b>Release Information</b> | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 12.1 for the QFX Series.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Description</b>         | <p>Define an MSDP peering relationship. An MSDP routing device must know which routing devices are its peers. You define the peer relationships explicitly by configuring the neighboring routing devices that are the MSDP peers of the local routing device. After peer relationships are established, the MSDP peers exchange messages to advertise active multicast sources. To configure multiple MSDP peers, include multiple <b>peer</b> statements.</p> <p>By default, the peer's options are identical to the global or group-level MSDP options. To override the global or group-level options, include peer-specific options within the <b>peer (Protocols MSDP)</b> statement.</p> <p>At least one peer must be configured for MSDP to function. You must configure <b>address</b> and <b>local-address</b>.</p> |
| <b>Options</b>             | <p><b>address</b>—Name of the MSDP peer.</p> <p>The remaining statements are explained separately.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

**Required Privilege Level** routing—To view this statement in the configuration.  
routing-control—To add this statement to the configuration.

**Related Documentation**

- *Example: Configuring MSDP in a Routing Instance*

---

## rib-group (Protocols MSDP)

---

**Syntax** `rib-group group-name;`

**Hierarchy Level** [edit logical-systems *logical-system-name* protocols [msdp](#)],  
[edit logical-systems *logical-system-name* routing-instances *routing-instance-name* protocols [msdp](#)],  
[edit protocols [msdp](#)],  
[edit routing-instances *routing-instance-name* protocols [msdp](#)]

**Release Information** Statement introduced before Junos OS Release 7.4.  
Statement introduced in Junos OS Release 12.1 for the QFX Series.  
Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

**Description** Associate a routing table group with MSDP.

**Options** *group-name*—Name of the routing table group. The name must be one that you defined with the **rib-groups** statement at the [edit routing-options] hierarchy level.

**Required Privilege Level** routing—To view this statement in the configuration.  
routing-control—To add this statement to the configuration.

**Related Documentation**

- *Example: Configuring MSDP in a Routing Instance*

## source (Protocols MSDP)

|                                 |                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>source ip-address &lt;/prefix-length&gt; {     active-source-limit {         maximum number;         threshold number;     } }</pre>                                                                                                                                                                                                                                  |
| <b>Hierarchy Level</b>          | <p>[edit logical-systems <i>logical-system-name</i> protocols <a href="#">msdp</a>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols <a href="#">msdp</a>],</p> <p>[edit protocols <a href="#">msdp</a>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols <a href="#">msdp</a>]</p> |
| <b>Release Information</b>      | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 12.1 for the QFX Series.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>                                                                                                                                                          |
| <b>Description</b>              | Limit the number of active source messages the routing device accepts from sources in this address range.                                                                                                                                                                                                                                                                  |
| <b>Default</b>                  | If you do not include this statement, the routing device accepts any number of MSDP active source messages.                                                                                                                                                                                                                                                                |
| <b>Options</b>                  | The other statements are explained separately.                                                                                                                                                                                                                                                                                                                             |
| <b>Required Privilege Level</b> | <p>routing—To view this statement in the configuration.</p> <p>routing-control—To add this statement to the configuration.</p>                                                                                                                                                                                                                                             |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Example: Configuring MSDP with Active Source Limits and Mesh Groups on page 218</a></li> </ul>                                                                                                                                                                                                                        |

## threshold (MSDP Active Source Messages)

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>threshold <i>number</i>;</code>                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Hierarchy Level</b>          | [edit logical-systems <i>logical-system-name</i> protocols <a href="#">msdp active-source-limit</a> ],<br>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols<br><a href="#">msdp active-source-limit</a> ],<br>[edit protocols <a href="#">msdp active-source-limit</a> ],<br>[edit routing-instances <i>routing-instance-name</i> protocols <a href="#">msdp active-source-limit</a> ] |
| <b>Release Information</b>      | Statement introduced before Junos OS Release 7.4.<br>Statement introduced in Junos OS Release 12.1 for the QFX Series.<br>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                                                                                                                                                                                                                             |
| <b>Description</b>              | Configure the random early detection (RED) threshold for MSDP active source messages.<br>This number must be less than the configured or default maximum.                                                                                                                                                                                                                                                                                      |
| <b>Options</b>                  | <b><i>number</i></b> —RED threshold for active source messages.<br><b>Range:</b> 1 through 1,000,000<br><b>Default:</b> 24,000                                                                                                                                                                                                                                                                                                                 |
| <b>Required Privilege Level</b> | routing—To view this statement in the configuration.<br>routing-control—To add this statement to the configuration.                                                                                                                                                                                                                                                                                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">Example: Configuring MSDP with Active Source Limits and Mesh Groups on page 218</a></li><li>• <a href="#">maximum (MSDP Active Source Messages) on page 369</a></li></ul>                                                                                                                                                                                                                  |



## traceoptions (Protocols MSDP)

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <pre> traceoptions {     file <i>filename</i> &lt;files <i>number</i>&gt; &lt;size <i>size</i>&gt; &lt;world-readable   no-world-readable&gt;;     flag <i>flag</i> &lt;flag-modifier&gt; &lt;disable&gt;; } </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Hierarchy Level</b>     | <p>[edit logical-systems <i>logical-system-name</i> protocols <b>msdp</b>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols <b>msdp group</b> <i>group-name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols <b>msdp group</b> <i>group-name</i> <b>peer</b> <i>address</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> protocols <b>msdp peer</b> <i>address</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols <b>msdp</b>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols <b>msdp group</b> <i>group-name</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols <b>msdp group</b> <i>group-name</i> <b>peer</b> <i>address</i>],</p> <p>[edit logical-systems <i>logical-system-name</i> routing-instances <i>routing-instance-name</i> protocols <b>msdp peer</b> <i>address</i>],</p> <p>[edit protocols <b>msdp</b>],</p> <p>[edit protocols <b>msdp group</b> <i>group-name</i>],</p> <p>[edit protocols <b>msdp group</b> <i>group-name</i> <b>peer</b> <i>address</i>],</p> <p>[edit protocols <b>msdp peer</b> <i>address</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols <b>msdp</b>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols <b>msdp group</b> <i>group-name</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols <b>msdp group</b> <i>group-name</i> <b>peer</b> <i>address</i>],</p> <p>[edit routing-instances <i>routing-instance-name</i> protocols <b>msdp peer</b> <i>address</i>]</p> |
| <b>Release Information</b> | <p>Statement introduced before Junos OS Release 7.4.</p> <p>Statement introduced in Junos OS Release 12.1 for the QFX Series.</p> <p>Statement introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Description</b>         | <p>Configure MSDP tracing options.</p> <p>To specify more than one tracing operation, include multiple <b>flag</b> statements.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Default</b>             | <p>The default MSDP trace options are those inherited from the routing protocol's <b>traceoptions</b> statement included at the [edit <b>routing-options</b>] hierarchy level.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Options</b>             | <p><b>disable</b>—(Optional) Disable the tracing operation. You can use this option to disable a single operation when you have defined a broad group of tracing operations, such as <b>all</b>.</p> <p><b>file <i>filename</i></b>—Name of the file to receive the output of the tracing operation. Enclose the name within quotation marks. All files are placed in the directory <b>/var/log</b>. We recommend that you place tracing output in the <b>msdp-log</b> file.</p> <p><b>files <i>number</i></b>—(Optional) Maximum number of trace files. When a trace file named <b><i>trace-file</i></b> reaches its maximum size, it is renamed <b><i>trace-file.0</i></b>, then <b><i>trace-file.1</i></b>, and so on, until the maximum number of trace files is reached. Then the oldest trace file is overwritten.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

If you specify a maximum number of files, you must also include the **size** statement to specify the maximum file size.

**Range:** 2 through 1000 files

**Default:** 2 files

**flag *flag***—Tracing operation to perform. To specify more than one tracing operation, include multiple **flag** statements.

#### MSDP Tracing Flags

- **keepalive**—Keepalive messages
- **packets**—All MSDP packets
- **route**—MSDP changes to the routing table
- **source-active**—Source-active packets
- **source-active-request**—Source-active request packets
- **source-active-response**—Source-active response packets

#### Global Tracing Flags

- **all**—All tracing operations
- **general**—A combination of the **normal** and **route** trace operations
- **normal**—All normal operations

**Default:** If you do not specify this option, only unusual or abnormal operations are traced.

- **policy**—Policy operations and actions
- **route**—Routing table changes
- **state**—State transitions
- **task**—Interface transactions and processing
- **timer**—Timer usage

***flag-modifier***—(Optional) Modifier for the tracing flag. You can specify one or more of these modifiers:

- **detail**—Detailed trace information
- **receive**—Packets being received
- **send**—Packets being transmitted

**no-stamp**—(Optional) Do not place timestamp information at the beginning of each line in the trace file.

**Default:** If you omit this option, timestamp information is placed at the beginning of each line of the tracing output.

**no-world-readable**—(Optional) Do not allow any user to read the log file.

**replace**—(Optional) Replace an existing trace file if there is one.

**Default:** If you do not include this option, tracing output is appended to an existing trace file.

**size size**—(Optional) Maximum size of each trace file, in kilobytes (KB), megabytes (MB), or gigabytes (GB). When a trace file named **trace-file** reaches this size, it is renamed **trace-file.0**. When **trace-file** again reaches this size, **trace-file.0** is renamed **trace-file.1** and **trace-file** is renamed **trace-file.0**. This renaming scheme continues until the maximum number of trace files is reached. Then the oldest trace file is overwritten.

If you specify a maximum file size, you must also include the **files** statement to specify the maximum number of trace files.

**Syntax:** **xk** to specify KB, **xm** to specify MB, or **xg** to specify GB

**Range:** 10 KB through the maximum file size supported on your system

**Default:** 1 MB

**world-readable**—(Optional) Allow any user to read the log file.

|                                 |                                                                                                                                                 |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Required Privilege Level</b> | routing and trace—To view this statement in the configuration.<br>routing-control and trace-control—To add this statement to the configuration. |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Tracing MSDP Protocol Traffic on page 214</a></li> </ul>                                   |



## CHAPTER 21

# Operational Commands (IGMP)

- clear igmp membership
- clear igmp statistics
- show igmp group
- show configuration protocols igmp
- show igmp interface
- show igmp statistics
- show system statistics igmp

## clear igmp membership

---

|                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| List of Syntax                               | <a href="#">Syntax on page 382</a><br><a href="#">Syntax (EX Series Switch and the QFX Series) on page 382</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Syntax                                       | <pre>clear igmp membership &lt;group address-range&gt; &lt;interface interface-name&gt; &lt;logical-system (all   logical-system-name)&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Syntax (EX Series Switch and the QFX Series) | <pre>clear igmp membership &lt;group address-range&gt; &lt;interface interface-name&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Release Information                          | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br>Command introduced in Junos OS Release 11.3 for the QFX Series.<br>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                                                                                                                                                                                                                                                                                       |
| Description                                  | Clear Internet Group Management Protocol (IGMP) group members.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Options                                      | <p><b>none</b>—Clear all IGMP members on all interfaces and for all address ranges.</p> <p><b>group address-range</b>—(Optional) Clear all IGMP members that are in a particular address range. An example of a range is <b>224.2/16</b>. If you omit the destination prefix length, the default is <b>/32</b>.</p> <p><b>interface interface-name</b>—(Optional) Clear all IGMP group members on an interface.</p> <p><b>logical-system (all   logical-system-name)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| Required Privilege Level                     | clear                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Related Documentation                        | <ul style="list-style-type: none"><li>• <a href="#">show igmp group on page 387</a></li><li>• <a href="#">show igmp interface on page 393</a></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                  |
| List of Sample Output                        | <a href="#">clear igmp membership on page 382</a><br><a href="#">clear igmp membership interface on page 383</a><br><a href="#">clear igmp membership group on page 384</a>                                                                                                                                                                                                                                                                                                                                                                                              |
| Output Fields                                | See <a href="#">show igmp group</a> for an explanation of output fields.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

## Sample Output

### clear igmp membership

The following sample output displays IGMP group information before and after the **clear igmp membership** command is entered:

```

user@host> show igmp group
Interface      Group           Last Reported   Timeout
so-0/0/0       224.2.127.253  10.1.128.1      186
so-0/0/0       224.2.127.254  10.1.128.1      186
so-0/0/0       239.255.255.255 10.1.128.1      187
so-0/0/0       224.1.127.255   10.1.128.1      188
local          224.0.0.6        (null)           0
local          224.0.0.5        (null)           0
local          224.2.127.254    (null)           0
local          239.255.255.255  (null)           0
local          224.0.0.2        (null)           0
local          224.0.0.13       (null)           0

```

```

user@host> clear igmp membership
Clearing Group Membership Info for so-0/0/0
Clearing Group Membership Info for so-1/0/0
Clearing Group Membership Info for so-2/0/0

```

```

user@host> show igmp group
Interface      Group           Last Reported   Timeout
local          224.0.0.6        (null)           0
local          224.0.0.5        (null)           0
local          224.2.127.254    (null)           0
local          239.255.255.255  (null)           0
local          224.0.0.2        (null)           0
local          224.0.0.13       (null)           0

```

### clear igmp membership interface

The following sample output displays IGMP group information before and after the **clear igmp membership interface** command is issued:

```

user@host> show igmp group
Interface      Group           Last Reported   Timeout
so-0/0/0       224.2.127.253  10.1.128.1      210
so-0/0/0       239.255.255.255 10.1.128.1      210
so-0/0/0       224.1.127.255   10.1.128.1      215
so-0/0/0       224.2.127.254    10.1.128.1      216
local          224.0.0.6        (null)           0
local          224.0.0.5        (null)           0
local          224.2.127.254    (null)           0
local          239.255.255.255  (null)           0
local          224.0.0.2        (null)           0
local          224.0.0.13       (null)           0

```

```

user@host> clear igmp membership interface so-0/0/0
Clearing Group Membership Info for so-0/0/0

```

```

user@host> show igmp group
Interface      Group           Last Reported   Timeout
local          224.0.0.6        (null)           0
local          224.0.0.5        (null)           0
local          224.2.127.254    (null)           0
local          239.255.255.255  (null)           0
local          224.0.0.2        (null)           0
local          224.0.0.13       (null)           0

```

## clear igmp membership group

The following sample output displays IGMP group information before and after the **clear igmp membership group** command is entered:

```
user@host> show igmp group
```

| Interface | Group           | Last Reported | Timeout |
|-----------|-----------------|---------------|---------|
| so-0/0/0  | 224.2.127.253   | 10.1.128.1    | 210     |
| so-0/0/0  | 239.255.255.255 | 10.1.128.1    | 210     |
| so-0/0/0  | 224.1.127.255   | 10.1.128.1    | 215     |
| so-0/0/0  | 224.2.127.254   | 10.1.128.1    | 216     |
| local     | 224.0.0.6       | (null)        | 0       |
| local     | 224.0.0.5       | (null)        | 0       |
| local     | 224.2.127.254   | (null)        | 0       |
| local     | 239.255.255.255 | (null)        | 0       |
| local     | 224.0.0.2       | (null)        | 0       |
| local     | 224.0.0.13      | (null)        | 0       |

```
user@host> clear igmp membership group 239.225/16
```

```
Clearing Group Membership Range 239.225.0.0/16 on so-0/0/0
Clearing Group Membership Range 239.225.0.0/16 on so-1/0/0
Clearing Group Membership Range 239.225.0.0/16 on so-2/0/0
```

```
user@host> show igmp group
```

| Interface | Group           | Last Reported | Timeout |
|-----------|-----------------|---------------|---------|
| so-0/0/0  | 224.1.127.255   | 10.1.128.1    | 231     |
| so-0/0/0  | 224.2.127.254   | 10.1.128.1    | 233     |
| so-0/0/0  | 224.2.127.253   | 10.1.128.1    | 236     |
| local     | 224.0.0.6       | (null)        | 0       |
| local     | 224.0.0.5       | (null)        | 0       |
| local     | 224.2.127.254   | (null)        | 0       |
| local     | 239.255.255.255 | (null)        | 0       |
| local     | 224.0.0.2       | (null)        | 0       |
| local     | 224.0.0.13      | (null)        | 0       |



## clear igmp statistics

|                                    |                                                                                                                                                                                                                                                                                                                                      |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>              | <a href="#">Syntax on page 385</a><br><a href="#">Syntax (EX Series Switches) on page 385</a>                                                                                                                                                                                                                                        |
| <b>Syntax</b>                      | clear igmp statistics<br><interface <i>interface-name</i> ><br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                                                                                                  |
| <b>Syntax (EX Series Switches)</b> | clear igmp statistics<br><interface <i>interface-name</i> >                                                                                                                                                                                                                                                                          |
| <b>Release Information</b>         | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br>Command introduced in Junos OS Release 11.3 for the QFX Series.                                                                                                                                             |
| <b>Description</b>                 | Clear Internet Group Management Protocol (IGMP) statistics.                                                                                                                                                                                                                                                                          |
| <b>Options</b>                     | <b>none</b> —Clear IGMP statistics on all interfaces.<br><br><b>interface <i>interface-name</i></b> —(Optional) Clear IGMP statistics for the specified interface only.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system. |
| <b>Required Privilege Level</b>    | clear                                                                                                                                                                                                                                                                                                                                |
| <b>List of Sample Output</b>       | <a href="#">clear igmp statistics on page 385</a>                                                                                                                                                                                                                                                                                    |
| <b>Output Fields</b>               | See <a href="#">show igmp statistics</a> for an explanation of output fields.                                                                                                                                                                                                                                                        |

## Sample Output

### clear igmp statistics

The following sample output displays IGMP statistics information before and after the **clear igmp statistics** command is entered:

```

user@host> show igmp statistics
IGMP packet statistics for all interfaces
IGMP Message type      Received      Sent  Rx errors
Membership Query        8883         459      0
V1 Membership Report     0            0        0
DVMRP                   19784       35476      0
PIM V1                  18310         0        0
Cisco Trace              0            0        0
V2 Membership Report     0            0        0
Group Leave              0            0        0
Mtrace Response          0            0        0
Mtrace Request           0            0        0
Domain Wide Report       0            0        0
V3 Membership Report     0            0        0
Other Unknown types      0            0        0

```

```

IGMP v3 unsupported type                0
IGMP v3 source required for SSM         0
IGMP v3 mode not applicable for SSM     0

```

```

IGMP Global Statistics
Bad Length                0
Bad Checksum              0
Bad Receive If            0
Rx non-local              1227

```

```
user@host> clear igmp statistics
```

```
user@host> show igmp statistics
```

```
IGMP packet statistics for all interfaces
```

| IGMP Message type                   | Received | Sent | Rx errors |
|-------------------------------------|----------|------|-----------|
| Membership Query                    | 0        | 0    | 0         |
| V1 Membership Report                | 0        | 0    | 0         |
| DVMRP                               | 0        | 0    | 0         |
| PIM V1                              | 0        | 0    | 0         |
| Cisco Trace                         | 0        | 0    | 0         |
| V2 Membership Report                | 0        | 0    | 0         |
| Group Leave                         | 0        | 0    | 0         |
| Mtrace Response                     | 0        | 0    | 0         |
| Mtrace Request                      | 0        | 0    | 0         |
| Domain Wide Report                  | 0        | 0    | 0         |
| V3 Membership Report                | 0        | 0    | 0         |
| Other Unknown types                 |          |      | 0         |
| IGMP v3 unsupported type            |          |      | 0         |
| IGMP v3 source required for SSM     |          |      | 0         |
| IGMP v3 mode not applicable for SSM |          |      | 0         |
| IGMP Global Statistics              |          |      |           |
| Bad Length                          | 0        |      |           |
| Bad Checksum                        | 0        |      |           |
| Bad Receive If                      | 0        |      |           |
| Rx non-local                        | 0        |      |           |

## show igmp group

|                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                               | <a href="#">Syntax on page 387</a><br><a href="#">Syntax (EX Series Switch and the QFX Series) on page 387</a>                                                                                                                                                                                                                                                                                                            |
| <b>Syntax</b>                                       | <pre>show igmp group &lt;brief   detail&gt; &lt;group-name&gt; &lt;logical-system (all   logical-system-name)&gt;</pre>                                                                                                                                                                                                                                                                                                   |
| <b>Syntax (EX Series Switch and the QFX Series)</b> | <pre>show igmp group &lt;brief   detail&gt; &lt;group-name&gt;</pre>                                                                                                                                                                                                                                                                                                                                                      |
| <b>Release Information</b>                          | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p>                                                                                                                                                                                                                   |
| <b>Description</b>                                  | Display Internet Group Management Protocol (IGMP) group membership information.                                                                                                                                                                                                                                                                                                                                           |
| <b>Options</b>                                      | <p><b>none</b>—Display standard information about membership for all IGMP groups.</p> <p><b>brief   detail</b>—(Optional) Display the specified level of output.</p> <p><b>group-name</b>—(Optional) Display group membership for the specified IP address only.</p> <p><b>logical-system (all   logical-system-name)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b>                     | view                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>List of Sample Output</b>                        | <a href="#">show igmp group (Include Mode) on page 388</a><br><a href="#">show igmp group (Exclude Mode) on page 389</a><br><a href="#">show igmp group brief on page 389</a><br><a href="#">show igmp group detail on page 389</a>                                                                                                                                                                                       |
| <b>Output Fields</b>                                | <p><a href="#">Table 12 on page 387</a> describes the output fields for the <b>show igmp group</b> command. Output fields are listed in the approximate order in which they appear.</p>                                                                                                                                                                                                                                   |

**Table 12: show igmp group Output Fields**

| Field Name        | Field Description                                                                                                                                       | Level of Output |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <b>Interface</b>  | Name of the interface that received the IGMP membership report. A name of <b>local</b> indicates that the local routing device joined the group itself. | All levels      |
| <b>Group</b>      | Group address.                                                                                                                                          | All levels      |
| <b>Group Mode</b> | Mode the SSM group is operating in: <b>Include</b> or <b>Exclude</b> .                                                                                  | All levels      |
| <b>Source</b>     | Source address.                                                                                                                                         | All levels      |

Table 12: show igmp group Output Fields (*continued*)

| Field Name       | Field Description                                                                                                                                                                                                         | Level of Output |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Source timeout   | Time remaining until the group traffic is no longer forwarded. The timer is refreshed when a listener in include mode sends a report. A group in exclude mode or configured as a static group displays a zero timer.      | detail          |
| Last reported by | Address of the host that last reported membership in this group.                                                                                                                                                          | All levels      |
| Timeout          | Time remaining until the group membership is removed.                                                                                                                                                                     | brief none      |
| Group timeout    | Time remaining until a group in exclude mode moves to include mode. The timer is refreshed when a listener in exclude mode sends a report. A group in include mode or configured as a static group displays a zero timer. | detail          |
| Type             | Type of group membership: <ul style="list-style-type: none"> <li>• <b>Dynamic</b>—Host reported the membership.</li> <li>• <b>Static</b>—Membership is configured.</li> </ul>                                             | All levels      |

## Sample Output

### show igmp group (Include Mode)

```

user@host> show igmp group
Interface: t1-0/1/0.0
  Group: 232.1.1.1
    Group mode: Include
    Source: 10.0.0.2
    Last reported by: 10.9.5.2
    Timeout:      24 Type: Dynamic
  Group: 232.1.1.1
    Group mode: Include
    Source: 10.0.0.3
    Last reported by: 10.9.5.2
    Timeout:      24 Type: Dynamic
  Group: 232.1.1.1
    Group mode: Include
    Source: 10.0.0.4
    Last reported by: 10.9.5.2
    Timeout:      24 Type: Dynamic
  Group: 232.1.1.2
    Group mode: Include
    Source: 10.0.0.4
    Last reported by: 10.9.5.2
    Timeout:      24 Type: Dynamic
Interface: t1-0/1/1.0
Interface: ge-0/2/2.0
Interface: ge-0/2/0.0
Interface: local
  Group: 224.0.0.2
    Source: 0.0.0.0
    Last reported by: Local
    Timeout:      0 Type: Dynamic
  Group: 224.0.0.22
    Source: 0.0.0.0

```

```

Last reported by: Local
Timeout:          0 Type: Dynamic

```

### show igmp group (Exclude Mode)

```

user@host> show igmp group
Interface: t1-0/1/0.0
Interface: t1-0/1/1.0
Interface: ge-0/2/2.0
Interface: ge-0/2/0.0
Interface: local
  Group: 224.0.0.2
    Source: 0.0.0.0
    Last reported by: Local
    Timeout:          0 Type: Dynamic
  Group: 224.0.0.22
    Source: 0.0.0.0
    Last reported by: Local
    Timeout:          0 Type: Dynamic

```

### show igmp group brief

The output for the **show igmp group brief** command is identical to that for the **show igmp group** command.

### show igmp group detail

```

user@host> show igmp group detail
Interface: t1-0/1/0.0
  Group: 232.1.1.1
    Group mode: Include
    Source: 10.0.0.2
    Source timeout: 12
    Last reported by: 10.9.5.2
    Group timeout:          0 Type: Dynamic
  Group: 232.1.1.1
    Group mode: Include
    Source: 10.0.0.3
    Source timeout: 12
    Last reported by: 10.9.5.2
    Group timeout:          0 Type: Dynamic
  Group: 232.1.1.1
    Group mode: Include
    Source: 10.0.0.4
    Source timeout: 12
    Last reported by: 10.9.5.2
    Group timeout:          0 Type: Dynamic
  Group: 232.1.1.2
    Group mode: Include
    Source: 10.0.0.4
    Source timeout: 12
    Last reported by: 10.9.5.2
    Group timeout:          0 Type: Dynamic
Interface: t1-0/1/1.0
Interface: ge-0/2/2.0
Interface: ge-0/2/0.0
Interface: local
  Group: 224.0.0.2
    Group mode: Exclude
    Source: 0.0.0.0
    Source timeout: 0

```

```
      Last reported by: Local
      Group timeout:      0 Type: Dynamic
Group: 224.0.0.22
      Group mode: Exclude
      Source: 0.0.0.0
      Source timeout: 0
      Last reported by: Local
      Group timeout:      0 Type: Dynamic
```

## show configuration protocols igmp

|                                 |                                                                                                                                                                       |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show configuration protocols igmp                                                                                                                                     |
| <b>Release Information</b>      | Command introduced in Junos OS Release 11.3 for the QFX Series.<br>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                             |
| <b>Description</b>              | Display Internet Group Management Protocol (IGMP) information.                                                                                                        |
| <b>Required Privilege Level</b> | view                                                                                                                                                                  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">IGMP Snooping Overview on page 65</a></li> <li>• <a href="#">Configuring IGMP Snooping on page 68</a></li> </ul> |
| <b>List of Sample Output</b>    | <a href="#">show configuration protocols igmp on page 391</a>                                                                                                         |
| <b>Output Fields</b>            | <a href="#">Table 12 on page 387</a> describes the output fields for the <b>show configuration protocols igmp</b> command that relate to IGMP querying.               |

**Table 13: show igmp group Output Fields**

| Field Name              | Field Description                                                                                        | Level of Output |
|-------------------------|----------------------------------------------------------------------------------------------------------|-----------------|
| accounting              | Enables notification for join and leave events.                                                          | All levels      |
| igmp-querier            | Configured source address for the IGMP querier.                                                          | All levels      |
| interface               | Name of the interface that receives IGMP membership reports.                                             | All levels      |
| query-interval          | Interval at which the IGMP querier sends general host-query messages to solicit membership information.  | All levels      |
| query-response-interval | How long the IGMP querier waits to receive a response from a query message before sending another query. | All levels      |
| src-address             | Source address of IGMP queries.                                                                          |                 |
| version                 | IGMP version.                                                                                            | All levels      |

## Sample Output

### show configuration protocols igmp

```

user@switch> show configuration protocols igmp
query-interval 150;
query-response-interval 50;
accounting;
interface vlan.43 {
  version 2;
}
igmp-querier {

```

```
src-address 10.0.0.2;  
}
```



## show igmp interface

|                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                               | <a href="#">Syntax on page 393</a><br><a href="#">Syntax (EX Series Switch and the QFX Series) on page 393</a>                                                                                                                                                                                                                                                                                                                      |
| <b>Syntax</b>                                       | <pre>show igmp interface &lt;brief   detail&gt; &lt;interface-name&gt; &lt;logical-system (all   logical-system-name)&gt;</pre>                                                                                                                                                                                                                                                                                                     |
| <b>Syntax (EX Series Switch and the QFX Series)</b> | <pre>show igmp interface &lt;brief   detail&gt; &lt;interface-name&gt;</pre>                                                                                                                                                                                                                                                                                                                                                        |
| <b>Release Information</b>                          | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p>                                                                                                                                                                                                                             |
| <b>Description</b>                                  | Display information about Internet Group Management Protocol (IGMP)-enabled interfaces.                                                                                                                                                                                                                                                                                                                                             |
| <b>Options</b>                                      | <p><b>none</b>—Display standard information about all IGMP-enabled interfaces.</p> <p><b>brief   detail</b>—(Optional) Display the specified level of output.</p> <p><b>interface-name</b>—(Optional) Display information about the specified IGMP-enabled interface only.</p> <p><b>logical-system (all   logical-system-name)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b>                     | view                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Related Documentation</b>                        | <ul style="list-style-type: none"> <li>• <a href="#">clear igmp membership on page 382</a></li> </ul>                                                                                                                                                                                                                                                                                                                               |
| <b>List of Sample Output</b>                        | <a href="#">show igmp interface on page 395</a><br><a href="#">show igmp interface brief on page 395</a><br><a href="#">show igmp interface detail on page 396</a>                                                                                                                                                                                                                                                                  |
| <b>Output Fields</b>                                | <p><a href="#">Table 14 on page 393</a> describes the output fields for the <b>show igmp interface</b> command. Output fields are listed in the approximate order in which they appear.</p>                                                                                                                                                                                                                                         |

Table 14: show igmp interface Output Fields

| Field Name | Field Description                                                               | Level of Output |
|------------|---------------------------------------------------------------------------------|-----------------|
| Interface  | Name of the interface.                                                          | All levels      |
| Querier    | Address of the routing device that has been elected to send membership queries. | All levels      |

Table 14: show igmp interface Output Fields (*continued*)

| Field Name              | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Level of Output |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <b>State</b>            | State of the interface: <b>Up</b> or <b>Down</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | All levels      |
| <b>SSM Map Policy</b>   | Name of the source-specific multicast (SSM) map policy that has been applied to the IGMP interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | All levels      |
| <b>Timeout</b>          | How long until the IGMP querier is declared to be unreachable, in seconds.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | All levels      |
| <b>Version</b>          | IGMP version being used on the interface: <b>1</b> , <b>2</b> , or <b>3</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | All levels      |
| <b>Groups</b>           | Number of groups on the interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | All levels      |
| <b>Immediate Leave</b>  | State of the immediate leave option: <ul style="list-style-type: none"> <li><b>On</b>—Indicates that the router removes a host from the multicast group as soon as the router receives a leave group message from a host associated with the interface.</li> <li><b>Off</b>—Indicates that after receiving a leave group message, instead of removing a host from the multicast group immediately, the router sends a group query to determine if another receiver responds.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                   | All levels      |
| <b>Promiscuous Mode</b> | State of the promiscuous mode option: <ul style="list-style-type: none"> <li><b>On</b>—Indicates that the router can accept IGMP reports from subnetworks that are not associated with its interfaces.</li> <li><b>Off</b>—Indicates that the router can accept IGMP reports only from subnetworks that are associated with its interfaces.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | All levels      |
| <b>Passive</b>          | State of the passive mode option: <ul style="list-style-type: none"> <li><b>On</b>—Indicates that the router can run IGMP on the interface but not send or receive control traffic such as IGMP reports, queries, and leaves.</li> <li><b>Off</b>—Indicates that the router can run IGMP on the interface and send or receive control traffic such as IGMP reports, queries, and leaves.</li> </ul> <p>The <b>passive</b> statement enables you to selectively activate up to two out of a possible three available query or control traffic options. When enabled, the following options appear after the <b>on</b> state declaration:</p> <ul style="list-style-type: none"> <li><b>send-general-query</b>—The interface sends general queries.</li> <li><b>send-group-query</b>—The interface sends group-specific and group-source-specific queries.</li> <li><b>allow-receive</b>—The interface receives control traffic.</li> </ul> | All levels      |
| <b>OIF map</b>          | Name of the OIF map (if configured) associated with the interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | All levels      |
| <b>SSM map</b>          | Name of the source-specific multicast (SSM) map (if configured) used on the interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | All levels      |

Table 14: show igmp interface Output Fields (*continued*)

| Field Name                   | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Level of Output |
|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <b>Configured Parameters</b> | Information configured by the user: <ul style="list-style-type: none"> <li>• <b>IGMP Query Interval</b>—Interval (in seconds) at which this router sends membership queries when it is the querier.</li> <li>• <b>IGMP Query Response Interval</b>—Time (in seconds) that the router waits for a report in response to a general query.</li> <li>• <b>IGMP Last Member Query Interval</b>—Time (in seconds) that the router waits for a report in response to a group-specific query.</li> <li>• <b>IGMP Robustness Count</b>—Number of times the router retries a query.</li> </ul> | All levels      |
| <b>Derived Parameters</b>    | Derived information: <ul style="list-style-type: none"> <li>• <b>IGMP Membership Timeout</b>—Timeout period (in seconds) for group membership. If no report is received for these groups before the timeout expires, the group membership is removed.</li> <li>• <b>IGMP Other Querier Present Timeout</b>—Time (in seconds) that the router waits for the IGMP querier to send a query.</li> </ul>                                                                                                                                                                                  | All levels      |

## Sample Output

### show igmp interface

```

user@host> show igmp interface
Interface: at-0/3/1.0
  Querier: 10.111.30.1
  State:      Up Timeout:  None Version:  2 Groups:    4
  SSM Map Policy: ssm-policy-A
Interface: so-1/0/0.0
  Querier: 10.111.10.1
  State:      Up Timeout:  None Version:  2 Groups:    2
  SSM Map Policy: ssm-policy-B
Interface: so-1/0/1.0
  Querier: 10.111.20.1
  State:      Up Timeout:  None Version:  2 Groups:    4
  SSM Map Policy: ssm-policy-C
Immediate Leave: On
Promiscuous Mode: Off

Configured Parameters:
IGMP Query Interval: 125.0
IGMP Query Response Interval: 10.0
IGMP Last Member Query Interval: 1.0
IGMP Robustness Count: 2

Derived Parameters:
IGMP Membership Timeout: 260.0
IGMP Other Querier Present Timeout: 255.0

```

### show igmp interface brief

The output for the **show igmp interface brief** command is identical to that for the **show igmp interface** command. For sample output, see [show igmp interface on page 395](#).

### **show igmp interface detail**

The output for the **show igmp interface detail** command is identical to that for the **show igmp interface** command. For sample output, see [show igmp interface on page 395](#).

## show igmp statistics

|                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                               | <a href="#">Syntax on page 397</a><br><a href="#">Syntax (EX Series Switch and the QFX Series) on page 397</a>                                                                                                                                                                                                                                                                                                              |
| <b>Syntax</b>                                       | show igmp statistics<br><brief   detail><br><interface <i>interface-name</i> ><br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                                                                                                                                                                      |
| <b>Syntax (EX Series Switch and the QFX Series)</b> | show igmp statistics<br><brief   detail><br><interface <i>interface-name</i> >                                                                                                                                                                                                                                                                                                                                              |
| <b>Release Information</b>                          | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br>Command introduced in Junos OS Release 11.3 for the QFX Series.                                                                                                                                                                                                                                    |
| <b>Description</b>                                  | Display Internet Group Management Protocol (IGMP) statistics.                                                                                                                                                                                                                                                                                                                                                               |
| <b>Options</b>                                      | <b>none</b> —Display IGMP statistics for all interfaces.<br><br><b>brief   detail</b> —(Optional) Display the specified level of output.<br><br><b>interface <i>interface-name</i></b> —(Optional) Display IGMP statistics about the specified interface only.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system. |
| <b>Required Privilege Level</b>                     | view                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Related Documentation</b>                        | <ul style="list-style-type: none"> <li>• <a href="#">clear igmp statistics on page 385</a></li> </ul>                                                                                                                                                                                                                                                                                                                       |
| <b>List of Sample Output</b>                        | <a href="#">show igmp statistics on page 398</a><br><a href="#">show igmp statistics interface on page 399</a>                                                                                                                                                                                                                                                                                                              |
| <b>Output Fields</b>                                | Table 15 on page 397 describes the output fields for the <b>show igmp statistics</b> command.<br>Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                    |

Table 15: show igmp statistics Output Fields

| Field Name             | Field Description                                                                          |
|------------------------|--------------------------------------------------------------------------------------------|
| IGMP packet statistics | Heading for IGMP packet statistics for all interfaces or for the specified interface name. |

Table 15: show igmp statistics Output Fields (*continued*)

| Field Name                    | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>IGMP Message type</b>      | <p>Summary of IGMP statistics:</p> <ul style="list-style-type: none"> <li>• <b>Membership Query</b>—Number of membership queries sent and received.</li> <li>• <b>V1 Membership Report</b>—Number of version 1 membership reports sent and received.</li> <li>• <b>DVMRP</b>—Number of DVMRP messages sent or received.</li> <li>• <b>PIM V1</b>—Number of PIM version 1 messages sent or received.</li> <li>• <b>Cisco Trace</b>—Number of Cisco trace messages sent or received.</li> <li>• <b>V2 Membership Report</b>—Number of version 2 membership reports sent or received.</li> <li>• <b>Group Leave</b>—Number of group leave messages sent or received.</li> <li>• <b>Mtrace Response</b>—Number of Mtrace response messages sent or received.</li> <li>• <b>Mtrace Request</b>—Number of Mtrace request messages sent or received.</li> <li>• <b>Domain Wide Report</b>—Number of domain-wide reports sent or received.</li> <li>• <b>V3 Membership Report</b>—Number of version 3 membership reports sent or received.</li> <li>• <b>Other Unknown types</b>—Number of unknown message types received.</li> <li>• <b>IGMP v3 unsupported type</b>—Number of messages received with unknown and unsupported IGMP version 3 message types.</li> <li>• <b>IGMP v3 source required for SSM</b>—Number of IGMP version 3 messages received that contained no source.</li> <li>• <b>IGMP v3 mode not applicable for SSM</b>—Number of IGMP version 3 messages received that did not contain a mode applicable for source-specific multicast (SSM).</li> </ul> |
| <b>Received</b>               | Number of messages received.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Sent</b>                   | Number of messages sent.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Rx errors</b>              | Number of received packets that contained errors.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>IGMP Global Statistics</b> | <p>Summary of IGMP statistics for all interfaces.</p> <ul style="list-style-type: none"> <li>• <b>Bad Length</b>—Number of messages received with length errors so severe that further classification could not occur.</li> <li>• <b>Bad Checksum</b>—Number of messages received with a bad IP checksum. No further classification was performed.</li> <li>• <b>Bad Receive If</b>—Number of messages received on an interface not enabled for IGMP.</li> <li>• <b>Rx non-local</b>—Number of messages received from senders that are not local.</li> <li>• <b>Timed out</b>—Number of groups that timed out as a result of not receiving an explicit leave message.</li> <li>• <b>Rejected Report</b>—Number of reports dropped because of the IGMP group policy.</li> <li>• <b>Total Interfaces</b>—Number of interfaces configured to support IGMP.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

## Sample Output

### show igmp statistics

```

user@host> show igmp statistics
IGMP packet statistics for all interfaces
IGMP Message type      Received      Sent  Rx errors
Membership Query        8883         459      0
V1 Membership Report     0            0        0

```

|                                     |      |   |   |
|-------------------------------------|------|---|---|
| DVMRP                               | 0    | 0 | 0 |
| PIM V1                              | 0    | 0 | 0 |
| Cisco Trace                         | 0    | 0 | 0 |
| V2 Membership Report                | 0    | 0 | 0 |
| Group Leave                         | 0    | 0 | 0 |
| Mtrace Response                     | 0    | 0 | 0 |
| Mtrace Request                      | 0    | 0 | 0 |
| Domain Wide Report                  | 0    | 0 | 0 |
| V3 Membership Report                | 0    | 0 | 0 |
| Other Unknown types                 |      |   | 0 |
| IGMP v3 unsupported type            |      |   | 0 |
| IGMP v3 source required for SSM     |      |   | 0 |
| IGMP v3 mode not applicable for SSM |      |   | 0 |
| IGMP Global Statistics              |      |   |   |
| Bad Length                          | 0    |   |   |
| Bad Checksum                        | 0    |   |   |
| Bad Receive If                      | 0    |   |   |
| Rx non-local                        | 1227 |   |   |
| Timed out                           | 0    |   |   |
| Rejected Report                     | 0    |   |   |
| Total Interfaces                    | 2    |   |   |

#### show igmp statistics interface

```

user@host> show igmp statistics interface fe-1/0/1.0
IGMP interface packet statistics for fe-1/0/1.0
IGMP Message type      Received      Sent  Rx errors
Membership Query        0           230      0
V1 Membership Report    0           0        0

```

## show system statistics igmp

---

|                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                 | <a href="#">Syntax on page 400</a><br><a href="#">Syntax (EX Series Switches) on page 400</a><br><a href="#">Syntax (TX Matrix Router) on page 400</a><br><a href="#">Syntax (TX Matrix Plus Router) on page 400</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Syntax</b>                         | show system statistics igmp                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Syntax (EX Series Switches)</b>    | show system statistics igmp<br><all-members><br><local><br><member <i>member-id</i> >                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Syntax (TX Matrix Router)</b>      | show system statistics igmp<br><all-chassis   all-lcc   lcc <i>number</i>   scc>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Syntax (TX Matrix Plus Router)</b> | show system statistics igmp<br><all-chassis   all-lcc   lcc <i>number</i>   sfc <i>number</i> >                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Release Information</b>            | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br><b>sfc</b> option introduced for the TX Matrix Plus router in Junos OS Release 9.6.<br>Command introduced in Junos OS Release 12.1 for the QFX Series.<br>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Description</b>                    | Display system-wide Internet Group Management Protocol (IGMP) statistics.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Options</b>                        | <b>none</b> —Display system statistics for IGMP.<br><br><b>all-chassis</b> —(TX Matrix routers and TX Matrix Plus routers only) (Optional) Display system statistics for IGMP for all the routers in the chassis.<br><br><b>all-lcc</b> —(TX Matrix routers and TX Matrix Plus routers only) (Optional) On a TX Matrix router, display system statistics for IGMP for all T640 routers (or line-card chassis) connected to the TX Matrix router. On a TX Matrix Plus router, display system statistics for IGMP for all connected T1600 or T4000 LCCs.<br><br><b>all-members</b> —(EX4200 switches only) (Optional) Display IGMP statistics for all members of the Virtual Chassis configuration.<br><br><b>lcc <i>number</i></b> —(TX Matrix routers and TX Matrix Plus routers only) (Optional) On a TX Matrix router, display system statistics for IGMP for a specific T640 router that is connected to the TX Matrix router. On a TX Matrix Plus router, display system statistics for IGMP for a specific router that is connected to the TX Matrix Plus router. |



Replace *number* with the following values depending on the LCC configuration:

- 0 through 3, when T640 routers are connected to a TX Matrix router in a routing matrix.
- 0 through 3, when T1600 routers are connected to a TX Matrix Plus router in a routing matrix.
- 0 through 7, when T1600 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.
- 0, 2, 4, or 6, when T4000 routers are connected to a TX Matrix Plus router with 3D SIBs in a routing matrix.

**local**—(EX4200 switches only) (Optional) Display IGMP statistics for the local Virtual Chassis member.

**member *member-id***—(EX4200 switches only) (Optional) Display IGMP statistics for the specified member of the Virtual Chassis configuration. Replace *member-id* with a value from 0 through 9.

**scc**—(TX Matrix routers only) (Optional) Display system statistics for IGMP for the TX Matrix router (or switch-card chassis).

**sfc *number***—(TX Matrix Plus routers only) (Optional) Display system statistics for IGMP for the TX Matrix Plus router. Replace *number* with 0.

**Additional Information** By default, when you issue the **show system statistics igmp** command on the master Routing Engine of a TX Matrix router or a TX Matrix Plus router, the command is broadcast to all the master Routing Engines of the LCCs connected to it in the routing matrix. Likewise, if you issue the same command on the backup Routing Engine of a TX Matrix or a TX Matrix Plus router, the command is broadcast to all backup Routing Engines of the LCCs that are connected to it in the routing matrix.

**Required Privilege Level** view

**Related Documentation** • [Routing Matrix with a TX Matrix Plus Router Solutions Page](#)

**List of Sample Output** [show system statistics igmp on page 401](#)  
[show system statistics igmp \(EX Series Switches\) on page 402](#)  
[show system statistics igmp \(TX Matrix Plus Router\) on page 402](#)

## Sample Output

**show system statistics igmp**

```
user@host> show system statistics igmp
igmp:
    17178 messages received
    0 messages received with too few bytes
    0 messages received with bad checksum
    0 membership queries received
```

```
0 membership queries received with invalid field(s)
0 membership reports received
0 membership reports received with invalid field(s)
0 membership reports received for groups to which we belong
0 membership reports sent
```

### show system statistics igmp (EX Series Switches)

```
user@host> show system statistics igmp
igmp:
    0 messages received
    0 messages received with too few bytes
    0 messages received with bad checksum
    0 membership queries received
    0 membership queries received with invalid fields
    0 membership reports received
    0 membership reports received with invalid fields
    0 membership reports received for groups to which we belong
    0 Membership reports sent
```

### show system statistics igmp (TX Matrix Plus Router)

```
user@host> show system statistics igmp
sfc0-re0:
-----
igmp:
    0 messages received
    0 messages received with too few bytes
    0 messages received with bad checksum
    0 membership queries received
    0 membership queries received with invalid field(s)
    0 membership reports received
    0 membership reports received with invalid field(s)
    0 membership reports received for groups to which we belong
    0 membership reports sent
```

```
lcc0-re0:
-----
igmp:
    0 messages received
    0 messages received with too few bytes
    0 messages received with bad checksum
    0 membership queries received
    0 membership queries received with invalid field(s)
    0 membership reports received
    0 membership reports received with invalid field(s)
    0 membership reports received for groups to which we belong
    0 membership reports sent
```

```
lcc1-re0:
-----
igmp:
    0 messages received
    0 messages received with too few bytes
    0 messages received with bad checksum
    0 membership queries received
    0 membership queries received with invalid field(s)
    0 membership reports received
    0 membership reports received with invalid field(s)
    0 membership reports received for groups to which we belong
    0 membership reports sent
```

lcc2-re0:

-----  
igmp:

0 messages received  
0 messages received with too few bytes  
0 messages received with bad checksum  
0 membership queries received  
0 membership queries received with invalid field(s)  
0 membership reports received  
0 membership reports received with invalid field(s)  
0 membership reports received for groups to which we belong  
0 membership reports sent

lcc3-re0:

-----  
igmp:

0 messages received  
0 messages received with too few bytes  
0 messages received with bad checksum  
0 membership queries received  
0 membership queries received with invalid field(s)  
0 membership reports received  
0 membership reports received with invalid field(s)  
0 membership reports received for groups to which we belong  
0 membership reports sent



## CHAPTER 22

# Operational Commands (IGMP Snooping)

- clear igmp-snooping membership
- clear igmp-snooping statistics
- show igmp-snooping membership
- show igmp-snooping route
- show igmp-snooping statistics
- show igmp-snooping vlans

## clear igmp-snooping membership

---

|                                 |                                                                                                             |
|---------------------------------|-------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>clear igmp-snooping membership</code><br><code>&lt;vlan <i>vlan-name</i>&gt;</code>                   |
| <b>Release Information</b>      | Command introduced in Junos OS Release 11.1 for the QFX Series.                                             |
| <b>Description</b>              | Clear IGMP snooping membership information.                                                                 |
| <b>Options</b>                  | <code>vlan <i>vlan-name</i></code> —(Optional) Name of the VLAN.                                            |
| <b>Required Privilege Level</b> | view                                                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">show igmp-snooping membership on page 408</a></li></ul> |
| <b>List of Sample Output</b>    | <a href="#">clear igmp-snooping membership on page 406</a>                                                  |

### Sample Output

#### clear igmp-snooping membership

```
user@switch> clear igmp-snooping membership vlan employee-vlan
```

---

## clear igmp-snooping statistics

---

|                                 |                                                                                                             |
|---------------------------------|-------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>clear igmp-snooping statistics</code>                                                                 |
| <b>Release Information</b>      | Command introduced in Junos OS Release 11.1 for the QFX Series.                                             |
| <b>Description</b>              | Clear IGMP snooping statistics.                                                                             |
| <b>Required Privilege Level</b> | view                                                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">show igmp-snooping statistics on page 413</a></li></ul> |
| <b>List of Sample Output</b>    | <a href="#">clear igmp-snooping statistics on page 407</a>                                                  |

### Sample Output

#### clear igmp-snooping statistics

```
user@switch> clear igmp-snooping statistics
```

## show igmp-snooping membership

|                                 |                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>show igmp-snooping membership &lt;brief   detail&gt; &lt;interface <i>interface-name</i>&gt; &lt;vlan <i>vlan-id</i>   <i>vlan-name</i>&gt;</pre>                                                                                                                                                                                                                          |
| <b>Release Information</b>      | <p>Command introduced in Junos OS Release 11.1 for the QFX Series.</p> <p>IGMPv3 output introduced in Junos OS Release 12.1 for the QFX Series.</p>                                                                                                                                                                                                                             |
| <b>Description</b>              | Display IGMP snooping membership information.                                                                                                                                                                                                                                                                                                                                   |
| <b>Options</b>                  | <p><b>none</b>—Display general parameters.</p> <p><b>brief   detail</b>—(Optional) Display the specified level of output.</p> <p><b>interface <i>interface-name</i></b>—(Optional) Display IGMP snooping information for the specified interface.</p> <p><b>vlan <i>vlan-id</i>   <i>vlan-name</i></b>—(Optional) Display IGMP snooping information for the specified VLAN.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Monitoring IGMP Snooping on page 72</a></li> <li>• <a href="#">Configuring IGMP Snooping on page 68</a></li> <li>• <a href="#">show igmp-snooping route on page 411</a></li> <li>• <a href="#">show igmp-snooping statistics on page 413</a></li> <li>• <a href="#">show igmp-snooping vlans on page 415</a></li> </ul>    |
| <b>List of Sample Output</b>    | <p><a href="#">show igmp-snooping membership on page 409</a></p> <p><a href="#">show igmp-snooping membership detail on page 410</a></p>                                                                                                                                                                                                                                        |
| <b>Output Fields</b>            | <p><a href="#">Table 16 on page 408</a> lists the output fields for the <b>show igmp-snooping membership</b> command. Output fields are listed in the approximate order in which they appear.</p>                                                                                                                                                                               |

**Table 16: show igmp-snooping membership Output Fields**

| Field Name | Field Description                 | Level of Output |
|------------|-----------------------------------|-----------------|
| VLAN       | Name of the VLAN.                 | All             |
| Interfaces | Interfaces assigned to the VLAN.  | All             |
| Tag        | Numerical identifier of the VLAN. | <b>detail</b>   |



Table 16: show igmp-snooping membership Output Fields (*continued*)

| Field Name          | Field Description                                                                                                                                                                                     | Level of Output |
|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Router interfaces   | Names of multicast router interfaces.                                                                                                                                                                 | <b>detail</b>   |
| • static or dynamic | Whether the multicast router interface is <b>static</b> or <b>dynamic</b> .                                                                                                                           | <b>detail</b>   |
| • Uptime            | For static interfaces, length of time since the interface was configured as a multicast router interface; for dynamic interfaces, length of time since the first query was received on the interface. | <b>detail</b>   |
| • timeout           | Query timeout in seconds.                                                                                                                                                                             | <b>detail</b>   |
| Group               | IP multicast address of the multicast group.                                                                                                                                                          | <b>detail</b>   |
| Receiver count      | Number of interfaces that have membership in a multicast group.                                                                                                                                       | <b>detail</b>   |
| Flags               | IGMP version of the host sending a join message.                                                                                                                                                      | <b>detail</b>   |
| Uptime              | Length of time a multicast group has been active on the interface.                                                                                                                                    | <b>detail</b>   |
| timeout             | Time (in seconds) left until the entry for the multicast group is removed.                                                                                                                            | All             |
| Last reporter       | Last host to report membership for the multicast group.                                                                                                                                               | <b>detail</b>   |
| Include source      | Source addresses from which multicast streams are allowed based on IGMPv3 reports.                                                                                                                    | <b>detail</b>   |

## Sample Output

### show igmp-snooping membership

```

user@switch> show igmp-snooping membership
VLAN: v1
  224.1.1.1      *           258 secs
    Interfaces: ge-0/0/0.0
  224.1.1.3      *           258 secs
    Interfaces: ge-0/0/0.0
  224.1.1.5      *           258 secs
    Interfaces: ge-0/0/0.0
  224.1.1.7      *           258 secs

```

```
Interfaces: ge-0/0/0.0
224.1.1.9      *           258 secs
Interfaces: ge-0/0/0.0
224.1.1.11    *           258 secs
Interfaces: ge-0/0/0.0
```

### show igmp-snooping membership detail

```
user@switch> show igmp-snooping membership detail
VLAN: v43 Tag: 43 (Index: 4)
Group: 225.0.0.2
Receiver count: 1, Flags: <V3-hosts>
  ge-0/0/15.0 Uptime: 00:00:11 timeout: 248 Last reporter: 10.2.10.16
  Include source: 1.2.1.1, 1.3.1.1
VLAN: v44 Tag: 44 (Index: 5)
Group: 225.0.0.1
Receiver count: 1, Flags: <V2-hosts>
  ge-0/0/21.0 Uptime: 00:00:02 timeout: 257
VLAN: v110 Tag: 110 (Index: 4)
Router interfaces:
  ge-0/0/3.0 static Uptime: 00:08:45
  ge-0/0/2.0 static Uptime: 00:08:45
  ge-0/0/4.0 dynamic Uptime: 00:16:41 timeout: 254
Group: 225.0.0.3
Receiver count: 1, Flags: <V3-hosts>
  ge-0/0/5.0 Uptime: 00:00:19 timeout: 259
Group: 225.1.1.1
Receiver count: 1, Flags: <V2-hosts>
  ge-0/0/5.0 Uptime: 00:22:43 timeout: 96
Group: 225.2.2.2
Receiver count: 1, Flags: <V2-hosts Static>
  ge-0/0/5.0 Uptime: 00:23:13
```

## show igmp-snooping route

|                                 |                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>show igmp-snooping route &lt;brief   detail&gt; &lt;ethernet-switching &lt;brief   detail   vlan (vlan-id   vlan-name )&gt;&gt; &lt;inet &lt;brief   detail   vlan vlan-name&gt;&gt; &lt;vlan vlan-name&gt;</pre>                                                                                                                                                     |
| <b>Release Information</b>      | Command introduced in Junos OS Release 11.1 for the QFX Series.                                                                                                                                                                                                                                                                                                            |
| <b>Description</b>              | Display IGMP snooping route information.                                                                                                                                                                                                                                                                                                                                   |
| <b>Options</b>                  | <p><b>none</b>—Display general parameters.</p> <p><b>brief   detail</b>—(Optional) Display the specified level of output.</p> <p><b>ethernet-switching</b>—(Optional) Display Ethernet switching information.</p> <p><b>inet</b>—(Optional) Display <b>inet</b> information.</p> <p><b>vlan vlan-name</b>—(Optional) Display route information for the specified VLAN.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Monitoring IGMP Snooping on page 72</a></li> <li>• <a href="#">Configuring IGMP Snooping on page 68</a></li> <li>• <a href="#">show igmp-snooping statistics on page 413</a></li> <li>• <a href="#">show igmp-snooping vlans on page 415</a></li> </ul>                                                               |
| <b>List of Sample Output</b>    | <p><a href="#">show igmp-snooping route on page 412</a></p> <p><a href="#">show igmp-snooping route vlan v1 on page 412</a></p>                                                                                                                                                                                                                                            |
| <b>Output Fields</b>            | <p><a href="#">Table 17 on page 411</a> lists the output fields for the <b>show igmp-snooping route</b> command. Output fields are listed in the approximate order in which they appear.</p>                                                                                                                                                                               |

**Table 17: show igmp-snooping route Output Fields**

| Field Name | Field Description                              |
|------------|------------------------------------------------|
| Table      | (For internal use only. Value is always 0.)    |
| VLAN       | Name of the VLAN.                              |
| Group      | Multicast group address.                       |
| Interfaces | Interfaces on which IGMP packets were snooped. |
| Next-hop   | ID associated with the next-hop device.        |

## Sample Output

### show igmp-snooping route

```
user@switch> show igmp-snooping route
VLAN          Group          Next-hop
V11           224.1.1.1, *      533
               Interfaces: ge-0/0/13.0, ge-0/0/1.0
VLAN          Group          Next-hop
v12           224.1.1.3, *      534
               Interfaces: ge-0/0/13.0, ge-0/0/0.0
```

### show igmp-snooping route vlan v1

```
user@switch> show igmp-snooping route vlan v1
Table: 0
VLAN          Group          Next-hop
v1           224.1.1.1, *      1266
               Interfaces: ge-0/0/0.0
v1           224.1.1.3, *      1266
               Interfaces: ge-0/0/0.0
v1           224.1.1.5, *      1266
               Interfaces: ge-0/0/0.0
v1           224.1.1.7, *      1266
               Interfaces: ge-0/0/0.0
v1           224.1.1.9, *      1266
               Interfaces: ge-0/0/0.0
v1           224.1.1.11, *     1266
               Interfaces: ge-0/0/0.0
```

## show igmp-snooping statistics

|                                 |                                                                                                                                                                                                                                                                                                         |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <b>show igmp-snooping statistics</b>                                                                                                                                                                                                                                                                    |
| <b>Release Information</b>      | Command introduced in Junos OS Release 11.1 for the QFX Series.                                                                                                                                                                                                                                         |
| <b>Description</b>              | Display IGMP snooping statistics.                                                                                                                                                                                                                                                                       |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                    |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Monitoring IGMP Snooping on page 72</a></li> <li>• <a href="#">Configuring IGMP Snooping on page 68</a></li> <li>• <a href="#">show igmp-snooping route on page 411</a></li> <li>• <a href="#">show igmp-snooping vlans on page 415</a></li> </ul> |
| <b>List of Sample Output</b>    | <a href="#">show igmp-snooping statistics on page 414</a>                                                                                                                                                                                                                                               |
| <b>Output Fields</b>            | Table 18 on page 413 lists the output fields for the <b>show igmp-snooping statistics</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                              |

**Table 18: show igmp-snooping statistics Output Fields**

| Field Name        | Field Description                                                                           |
|-------------------|---------------------------------------------------------------------------------------------|
| Bad length        | IGMP packet has illegal or bad length.                                                      |
| Bad checksum      | IGMP or IP checksum is incorrect.                                                           |
| Invalid interface | Packet was received through an invalid interface.                                           |
| Not local         | Number of packets received from senders that are not local.                                 |
| Receive unknown   | Unknown IGMP type.                                                                          |
| Timed out         | Number of timeouts for all multicast groups.                                                |
| IGMP Type         | Type of IGMP message ( <b>Queries</b> , <b>Reports</b> , <b>Leaves</b> , or <b>Other</b> ). |
| Received          | Number of IGMP packets received.                                                            |
| Transmitted       | Number of IGMP packets transmitted.                                                         |
| Recv Errors       | Number of general receive errors.                                                           |

## Sample Output

### show igmp-snooping statistics

```
user@switch> show igmp-snooping statistics
```

```
Bad length: 0 Bad checksum: 0 Invalid interface: 0
```

```
Not local: 0 Receive unknown: 0 Timed out: 58
```

| IGMP Type | Received | Transmitted | Recv Errors |
|-----------|----------|-------------|-------------|
| Queries:  | 74295    | 0           | 0           |
| Reports:  | 18148423 | 0           | 16333523    |
| Leaves:   | 0        | 0           | 0           |
| Other:    | 0        | 0           | 0           |

## show igmp-snooping vlans

|                                 |                                                                                                                                                                                                                                                                                                              |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>show igmp-snooping vlans</code><br><code>&lt;brief   detail&gt;</code><br><code>&lt;vlan <i>vlan-id</i>   <i>vlan-name</i>&gt;</code>                                                                                                                                                                  |
| <b>Release Information</b>      | Command introduced in Junos OS Release 11.1 for the QFX Series.                                                                                                                                                                                                                                              |
| <b>Description</b>              | Display IGMP snooping VLAN information.                                                                                                                                                                                                                                                                      |
| <b>Options</b>                  | <p><b>none</b>—Display general parameters.</p> <p><b>brief   detail</b>—(Optional) Display the specified level of output.</p> <p><b>vlan <i>vlan-id</i>   vlan <i>vlan-number</i></b>—(Optional) Display VLAN information for the specified VLAN.</p>                                                        |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                         |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">Monitoring IGMP Snooping on page 72</a></li> <li>• <a href="#">Configuring IGMP Snooping on page 68</a></li> <li>• <a href="#">show igmp-snooping route on page 411</a></li> <li>• <a href="#">show igmp-snooping statistics on page 413</a></li> </ul> |
| <b>List of Sample Output</b>    | <p><a href="#">show igmp-snooping vlans on page 416</a></p> <p><a href="#">show igmp-snooping vlans vlan on page 416</a></p> <p><a href="#">show igmp-snooping vlans vlan detail on page 416</a></p>                                                                                                         |
| <b>Output Fields</b>            | Table 19 on page 415 lists the output fields for the <b>show igmp-snooping vlans</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                        |

Table 19: show igmp-snooping vlans Output Fields

| Field Name      | Field Description                                                       | Level of Output |
|-----------------|-------------------------------------------------------------------------|-----------------|
| VLAN            | Name of the VLAN.                                                       | All levels      |
| IGMP-L2-Querier | Source address for IGMP snooping queries (if switch is an IGMP querier) | All levels      |
| Interfaces      | Number of interfaces in the VLAN.                                       | All levels      |
| Groups          | Number of groups in the VLAN.                                           | All levels      |
| MRouters        | Number of multicast routers associated with the VLAN.                   | All levels      |
| Receivers       | Number of host receivers in the VLAN.                                   | All levels      |

Table 19: show igmp-snooping vlans Output Fields (*continued*)

| Field Name         | Field Description                                                                                                                                                                                          | Level of Output |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Tag                | Numerical identifier of the VLAN.                                                                                                                                                                          | detail          |
| tagged   untagged  | Interface participates in a tagged (802.1Q) or untagged (native) VLAN.                                                                                                                                     | detail          |
| vlan-interface     | Internal VLAN interface identifier.                                                                                                                                                                        | detail          |
| Membership timeout | Membership timeout value.                                                                                                                                                                                  | detail          |
| Querier timeout    | Timeout value for interfaces dynamically marked as router or switch interfaces (interfaces that receive queries). When the querier timeout is reached, the switch marks the interface as a host interface. | detail          |
| Interface          | Name of the interface.                                                                                                                                                                                     | detail          |
| Reporters          | Number of dynamic groups on an interface.                                                                                                                                                                  | detail          |

## Sample Output

### show igmp-snooping vlans

```

user@switch> show igmp-snooping vlans
VLAN      Interfaces Groups MRouters Receivers
default   0          0      0        0
v1        11         50      0        0
v10       1          0      0        0
v11       1          0      0        0
v180      3          0      1        0
v181      3          0      0        0
v182      3          0      0        0

```

### show igmp-snooping vlans vlan

```

user@switch> show igmp-snooping vlans vlan v10
user@switch> show igmp-snooping vlans vlan v10
VLAN      Interfaces Groups MRouters Receivers
v10       1          0      0        0

```

### show igmp-snooping vlans vlan detail

```

user@switch> show igmp-snooping vlans vlan v10 detail
VLAN: v10, Tag: 10, vlan-interface: vlan.10
      Interface: ge-0/0/10.0, tagged, Groups: 0
IGMP-L2-Querier: Stopped, SourceAddress: 10.10.1.2

```



## CHAPTER 23

# Operational Commands (PIM)

- clear multicast bandwidth-admission
- clear multicast scope
- clear multicast sessions
- clear multicast statistics
- clear pim join
- clear pim register
- clear pim statistics
- mtrace
- mtrace from-source
- mtrace monitor
- mtrace to-gateway
- show multicast flow-map
- show multicast interface
- show multicast mrinfo
- show multicast next-hops
- show multicast pim-to-igmp-proxy
- show multicast pim-to-mld-proxy
- show multicast route
- show multicast rpf
- show multicast scope
- show multicast sessions
- show multicast usage
- show pim bootstrap
- show pim interfaces
- show pim join
- show pim neighbors
- show pim rps

- `show pim source`
- `show pim statistics`

## clear multicast bandwidth-admission

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>clear multicast bandwidth-admission &lt;group <i>group-address</i>&gt; &lt;inet   inet6&gt; &lt;instance <i>instance-name</i>&gt; &lt;interface <i>interface-name</i>&gt; &lt;source <i>source-address</i>&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Release Information</b>      | <p>Command introduced in Junos OS Release 8.3.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p><b>inet6</b> and <b>instance</b> options introduced in Junos OS Release 10.0 for EX Series switches.</p> <p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Description</b>              | Reapply IP multicast bandwidth admissions.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Options</b>                  | <p><b>none</b>—Reapply multicast bandwidth admissions for all IPv4 forwarding entries in the master routing instance.</p> <p><b>group <i>group-address</i></b>—(Optional) Reapply multicast bandwidth admissions for the specified group.</p> <p><b>inet</b>—(Optional) Reapply multicast bandwidth admission settings for IPv4 flows.</p> <p><b>inet6</b>—(Optional) Reapply multicast bandwidth admission settings for IPv6 flows.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Reapply multicast bandwidth admission settings for the specified instance. If you do not specify an instance, the command applies to the master routing instance.</p> <p><b>interface <i>interface-name</i></b>—(Optional) Examines the corresponding outbound interface in the relevant entries and acts as follows:</p> <ul style="list-style-type: none"> <li>• If the interface is congested, and it was admitted previously, it is removed.</li> <li>• If the interface was rejected previously, the <b>clear multicast bandwidth-admission</b> command enables the interface to be admitted as long as enough bandwidth exists on the interface.</li> <li>• If you do not specify an interface, issuing the <b>clear multicast bandwidth-admission</b> command readmits any previously rejected interface for the relevant entries as long as enough bandwidth exists on the interface.</li> </ul> <p>To manually reject previously admitted outbound interfaces, you must specify the interface.</p> <p><b>source <i>source-address</i></b>—(Optional) Use with the <b>group</b> option to reapply multicast bandwidth admission settings for the specified (source, group) entry.</p> |
| <b>Required Privilege Level</b> | clear                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

**Related Documentation** • [show multicast interface on page 444](#)

**List of Sample Output** [clear multicast bandwidth-admission on page 420](#)

**Output Fields** When you enter this command, you are provided feedback on the status of your request.

## Sample Output

[clear multicast bandwidth-admission](#)

```
user@host> clear multicast bandwidth-admission
```

## clear multicast scope

|                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                               | <a href="#">Syntax on page 421</a><br><a href="#">Syntax (EX Series Switch and the QFX Series) on page 421</a>                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Syntax</b>                                       | <pre>clear multicast scope &lt;inet   inet6&gt; &lt;interface <i>interface-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Syntax (EX Series Switch and the QFX Series)</b> | <pre>clear multicast scope &lt;inet   inet6&gt; &lt;interface <i>interface-name</i>&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Release Information</b>                          | <p>Command introduced in Junos OS Release 7.6.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p><b>inet6</b> option introduced in Junos OS Release 10.0 for EX Series switches.</p> <p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p>                                                                                                                                                                                                                                                                   |
| <b>Description</b>                                  | Clear IP multicast scope statistics.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Options</b>                                      | <p><b>none</b>—(Same as <b>logical-system all</b>) Clear multicast scope statistics.</p> <p><b>inet</b>—(Optional) Clear multicast scope statistics for IPv4 family addresses.</p> <p><b>inet6</b>—(Optional) Clear multicast scope statistics for IPv6 family addresses.</p> <p><b>interface <i>interface-name</i></b>—(Optional) Clear multicast scope statistics on a specific interface.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b>                     | clear                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Related Documentation</b>                        | <ul style="list-style-type: none"> <li>• <a href="#">show multicast scope on page 465</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>List of Sample Output</b>                        | <a href="#">clear multicast scope on page 421</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Output Fields</b>                                | When you enter this command, you are provided feedback on the status of your request.                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

## Sample Output

### clear multicast scope

```
user@host> clear multicast scope
```

## clear multicast sessions

---

|                                                     |                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                               | <a href="#">Syntax on page 422</a><br><a href="#">Syntax (EX Series Switch and the QFX Series) on page 422</a>                                                                                                                                                                                                                                                            |
| <b>Syntax</b>                                       | clear multicast sessions<br><logical-system (all   <i>logical-system-name</i> )><br>< <i>regular-expression</i> >                                                                                                                                                                                                                                                         |
| <b>Syntax (EX Series Switch and the QFX Series)</b> | clear multicast sessions<br>< <i>regular-expression</i> >                                                                                                                                                                                                                                                                                                                 |
| <b>Release Information</b>                          | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br>Command introduced in Junos OS Release 11.3 for the QFX Series.                                                                                                                                                                                  |
| <b>Description</b>                                  | Clear IP multicast sessions.                                                                                                                                                                                                                                                                                                                                              |
| <b>Options</b>                                      | <b>none</b> —(Same as <b>logical-system all</b> ) Clear multicast sessions.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system.<br><br><b><i>regular-expression</i></b> —(Optional) Clear only multicast sessions that contain the specified regular expression. |
| <b>Required Privilege Level</b>                     | clear                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Related Documentation</b>                        | <ul style="list-style-type: none"><li>• <a href="#">show multicast sessions on page 467</a></li></ul>                                                                                                                                                                                                                                                                     |
| <b>List of Sample Output</b>                        | <a href="#">clear multicast sessions on page 422</a>                                                                                                                                                                                                                                                                                                                      |
| <b>Output Fields</b>                                | When you enter this command, you are provided feedback on the status of your request.                                                                                                                                                                                                                                                                                     |

## Sample Output

### clear multicast sessions

```
user@host> clear multicast sessions
```

## clear multicast statistics

|                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                               | <a href="#">Syntax on page 423</a><br><a href="#">Syntax (EX Series Switch and the QFX Series) on page 423</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Syntax</b>                                       | clear multicast statistics<br><inet   inet6><br><instance <i>instance-name</i> ><br><interface <i>interface-name</i> ><br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Syntax (EX Series Switch and the QFX Series)</b> | clear multicast statistics<br><inet   inet6><br><instance <i>instance-name</i> ><br><interface <i>interface-name</i> >                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Release Information</b>                          | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br><b>inet6</b> and <b>instance</b> options introduced in Junos OS Release 10.0 for EX Series switches.<br>Command introduced in Junos OS Release 11.3 for the QFX Series.                                                                                                                                                                                                                                                                                                                                               |
| <b>Description</b>                                  | Clear IP multicast statistics.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Options</b>                                      | <b>none</b> —Clear multicast statistics for all supported address families on all interfaces.<br><b>inet</b> —(Optional) Clear multicast statistics for IPv4 family addresses.<br><b>inet6</b> —(Optional) Clear multicast statistics for IPv6 family addresses.<br><b>instance <i>instance-name</i></b> —(Optional) Clear multicast statistics for the specified instance.<br><b>interface <i>interface-name</i></b> —(Optional) Clear multicast statistics on a specific interface.<br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system. |
| <b>Required Privilege Level</b>                     | clear                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Related Documentation</b>                        | <ul style="list-style-type: none"> <li><a href="#">show multicast statistics</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>List of Sample Output</b>                        | <a href="#">clear multicast statistics on page 423</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Output Fields</b>                                | When you enter this command, you are provided feedback on the status of your request.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

## Sample Output

### clear multicast statistics

```
user@host> clear multicast statistics
```

## clear pim join

---

|                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                               | <a href="#">Syntax on page 424</a><br><a href="#">Syntax (EX Series Switch and the QFX Series) on page 424</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Syntax</b>                                       | <pre>clear pim join &lt;group-address&gt; &lt;inet   inet6&gt; &lt;instance instance-name&gt; &lt;logical-system (all   logical-system-name)&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Syntax (EX Series Switch and the QFX Series)</b> | <pre>clear pim join &lt;group-address&gt; &lt;inet   inet6&gt; &lt;instance instance-name&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Release Information</b>                          | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br><b>inet6</b> and <b>instance</b> options introduced in Junos OS Release 10.0 for EX Series switches.<br>Command introduced in Junos OS Release 11.3 for the QFX Series.                                                                                                                                                                                                                                                                                                                     |
| <b>Description</b>                                  | Clear the Protocol Independent Multicast (PIM) join and prune states.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Options</b>                                      | <p><b>none</b>—Clear the PIM join and prune states for all groups, family addresses, and instances.</p> <p><b>group-address</b>—(Optional) Clear the PIM join and prune states for a group address.</p> <p><b>inet   inet6</b>—(Optional) Clear the PIM join and prune states for IPv4 or IPv6 family addresses, respectively.</p> <p><b>instance instance-name</b>—(Optional) Clear the join and prune states for a specific PIM-enabled routing instance.</p> <p><b>logical-system (all   logical-system-name)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Additional Information</b>                       | The <b>clear pim join</b> command cannot be used to clear the PIM join and prune state on a backup Routing Engine when nonstop active routing is enabled.                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Required Privilege Level</b>                     | clear                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Related Documentation</b>                        | <ul style="list-style-type: none"><li>• <a href="#">show pim join on page 478</a></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>List of Sample Output</b>                        | <a href="#">clear pim join on page 425</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Output Fields</b>                                | When you enter this command, you are provided feedback on the status of your request.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |



## Sample Output

clear pim join

```
user@host> clear pim join
```

## clear pim register

---

|                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                               | <a href="#">Syntax on page 426</a><br><a href="#">Syntax (EX Series Switch and the QFX Series) on page 426</a><br><a href="#">Syntax (PTX Series) on page 426</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Syntax</b>                                       | <pre>clear pim register &lt;inet   inet6&gt; &lt;instance <i>instance-name</i>&gt; &lt;interface <i>interface-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Syntax (EX Series Switch and the QFX Series)</b> | <pre>clear pim register &lt;inet   inet6&gt; &lt;instance <i>instance-name</i>&gt; &lt;interface <i>interface-name</i>&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Syntax (PTX Series)</b>                          | <pre>clear pim register &lt;inet   inet6&gt; &lt;instance <i>instance-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Release Information</b>                          | Command introduced in Junos OS Release 7.6.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br><b>inet6</b> and <b>instance</b> options introduced in Junos OS Release 10.0 for EX Series switches.<br>Command introduced in Junos OS Release 11.3 for the QFX Series.                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Description</b>                                  | Clear Protocol Independent Multicast (PIM) register message counters.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Options</b>                                      | <p><b>none</b>—Clear PIM register message counters for all family addresses, instances, and interfaces.</p> <p><b>inet   inet6</b>—(Optional) Clear PIM register message counters for IPv4 or IPv6 family addresses, respectively.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Clear register message counters for a specific PIM-enabled routing instance.</p> <p><b>interface <i>interface-name</i></b>—(Optional) Clear PIM register message counters for a specific interface.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Additional Information</b>                       | The <b>clear pim register</b> command cannot be used to clear the PIM register state on a backup Routing Engine when nonstop active routing is enabled.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Required Privilege Level</b>                     | clear                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

- Related Documentation** • [show pim statistics on page 513](#)
- List of Sample Output** [clear pim register on page 427](#)
- Output Fields** When you enter this command, you are provided feedback on the status of your request.

## Sample Output

### clear pim register

```
user@host> clear pim register
```

## clear pim statistics

---

|                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                               | <a href="#">Syntax on page 428</a><br><a href="#">Syntax (EX Series Switch and the QFX Series) on page 428</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Syntax</b>                                       | <pre>clear pim statistics &lt;inet   inet6&gt; &lt;instance <i>instance-name</i>&gt; &lt;interface <i>interface-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Syntax (EX Series Switch and the QFX Series)</b> | <pre>clear pim statistics &lt;inet   inet6&gt; &lt;instance <i>instance-name</i>&gt; &lt;interface <i>interface-name</i>&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Release Information</b>                          | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br><b>inet6</b> and <b>instance</b> options introduced in Junos OS Release 10.0 for EX Series switches.<br>Command introduced in Junos OS Release 11.3 for the QFX Series.                                                                                                                                                                                                                                                                                                  |
| <b>Description</b>                                  | Clear Protocol Independent Multicast (PIM) statistics.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Options</b>                                      | <p><b>none</b>—Clear PIM statistics for all family addresses, instances, and interfaces.</p> <p><b>inet   inet6</b>—(Optional) Clear PIM statistics for IPv4 or IPv6 family addresses, respectively.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Clear statistics for a specific PIM-enabled routing instance.</p> <p><b>interface <i>interface-name</i></b>—(Optional) Clear PIM statistics for a specific interface.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Additional Information</b>                       | The <b>clear pim statistics</b> command cannot be used to clear the PIM statistics on a backup Routing Engine when nonstop active routing is enabled.                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Required Privilege Level</b>                     | clear                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Related Documentation</b>                        | <ul style="list-style-type: none"><li>• <a href="#">show pim statistics on page 513</a></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>List of Sample Output</b>                        | <a href="#">clear pim statistics on page 429</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Output Fields</b>                                | See <a href="#">show pim statistics</a> for an explanation of output fields.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

## Sample Output

### clear pim statistics

The following sample output displays PIM statistics before and after the **clear pim statistics** command is entered:

```
user@host> show pim statistics
PIM statistics on all interfaces:
PIM Message type      Received      Sent  Rx errors
Hello                  0             0      0
Register               0             0      0
Register Stop          0             0      0
Join Prune             0             0      0
Bootstrap              0             0      0
Assert                 0             0      0
Graft                  0             0      0
Graft Ack              0             0      0
Candidate RP           0             0      0
V1 Query               2111          4222      0
V1 Register            0             0      0
V1 Register Stop       0             0      0
V1 Join Prune          14200         13115      0
V1 RP Reachability     0             0      0
V1 Assert              0             0      0
V1 Graft               0             0      0
V1 Graft Ack           0             0      0
PIM statistics summary for all interfaces:
Unknown type           0
V1 Unknown type        0
Unknown Version        0
Neighbor unknown       0
Bad Length             0
Bad Checksum           0
Bad Receive If         0
Rx Intf disabled       2007
Rx V1 Require V2       0
Rx Register not RP     0
RP Filtered Source     0
Unknown Reg Stop       0
Rx Join/Prune no state 1040
Rx Graft/Graft Ack no state 0
...
```

```
user@host> clear pim statistics
user@host> show pim statistics
PIM statistics on all interfaces:
PIM Message type      Received      Sent  Rx errors
Hello                  0             0      0
Register               0             0      0
Register Stop          0             0      0
Join Prune             0             0      0
Bootstrap              0             0      0
Assert                 0             0      0
Graft                  0             0      0
Graft Ack              0             0      0
Candidate RP           0             0      0
V1 Query               1             0      0
V1 Register            0             0      0
...
```



## mtrace

|                                 |                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>mtrace source</code><br><logical-system <i>logical-system-name</i> ><br><routing-instance <i>routing-instance-name</i> >                                                                                                                                                                                                                                         |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br>Command introduced in Junos OS Release 9.5 for SRX1400, SRX3400, SRX3600, SRX5600, and SRX5800 devices.<br>Command introduced in Junos OS Release 11.3 for the QFX Series.<br>Command introduced in Junos OS Release 12.3 for the PTX Series. |
| <b>Description</b>              | Display trace information about an IP multicast path.                                                                                                                                                                                                                                                                                                                  |
| <b>Options</b>                  | <i>source</i> —Source hostname or address.<br><br><i>logical-system (logical-system-name)</i> —(Optional) Perform this operation on a logical system.<br><br><i>routing-instance routing-instance-name</i> —(Optional) Trace a particular routing instance.                                                                                                            |
| <b>Additional Information</b>   | The <b>mtrace</b> command for multicast traffic is similar to the <b>traceroute</b> command used for unicast traffic. Unlike <b>traceroute</b> , <b>mtrace</b> traces traffic backwards, from the receiver to the source.                                                                                                                                              |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                   |
| <b>List of Sample Output</b>    | <a href="#">mtrace source on page 433</a>                                                                                                                                                                                                                                                                                                                              |
| <b>Output Fields</b>            | <a href="#">Table 20 on page 431</a> describes the output fields for the <b>mtrace</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                |

**Table 20: mtrace Output Fields**

| Field Name                        | Field Description                                             |
|-----------------------------------|---------------------------------------------------------------|
| <b>Mtrace from</b>                | IP address of the receiver.                                   |
| <b>to</b>                         | IP address of the source.                                     |
| <b>via group</b>                  | IP address of the multicast group (if any).                   |
| <b>Querying full reverse path</b> | Indicates the full reverse path query has begun.              |
| <i>number-of-hops</i>             | Number of hops from the source to the named router or switch. |
| <i>router-name</i>                | Name of the router or switch for this hop.                    |
| <i>address</i>                    | Address of the router or switch for this hop.                 |

Table 20: mtrace Output Fields (*continued*)

| Field Name      | Field Description                              |
|-----------------|------------------------------------------------|
| <i>protocol</i> | Protocol used (for example, PIM).              |
| Round trip time | Average round-trip time, in milliseconds (ms). |
| total ttl of    | Time-to-live (TTL) threshold.                  |



## Sample Output

### mtrace source

```
user@host> mtrace 192.1.4.2
Mtrace from 192.1.4.2 to 192.1.1.2 via group 0.0.0.0
Querying full reverse path... * *
 0 routerA.lab.mycompany.net (192.1.1.2)
-1 routerB.lab.mycompany.net (192.1.2.2) PIM thresh^ 1
-2 routerC.lab.mycompany.net (192.1.3.2) PIM thresh^ 1
-3 hostA.lab.mycompany.net (192.1.4.2)
Round trip time 2 ms; total ttl of 2 required.
```

## mtrace from-source

---

**Syntax**    `mtrace from-source source source`  
              `<brief | detail>`  
              `<extra-hops extra-hops>`  
              `<group group>`  
              `<interval interval>`  
              `<loop>`  
              `<max-hops max-hops>`  
              `<max-queries max-queries>`  
              `<multicast-response | unicast-response>`  
              `<no-resolve>`  
              `<no-router-alert>`  
              `<response response>`  
              `<routing-instance routing-instance-name>`  
              `<ttl tll>`  
              `<wait-time wait-time>`

**Release Information**    Command introduced before Junos OS Release 7.4.  
                              Command introduced in Junos OS Release 9.0 for EX Series switches.  
                              Command introduced in Junos OS Release 11.3 for the QFX Series.

**Description**    Display trace information about an IP multicast path from a source to this router or switch. If you specify a group address with this command, Junos OS returns additional information, such as packet rates and losses.

**Options**    **brief | detail**—(Optional) Display the specified level of output.

**extra-hops *extra-hops***—(Optional) Number of hops to take after reaching a nonresponsive router. You can specify a number between **0** and **255**.

**group *group***—(Optional) Group address for which to trace the path. The default group address is **0.0.0.0**.

**interval *interval***—(Optional) Number of seconds to wait before gathering statistics again. The default value is **10** seconds.

**loop**—(Optional) Loop indefinitely, displaying rate and loss statistics.

**max-hops *max-hops***—(Optional) Maximum hops to trace toward the source. The range of values is **0** through **255**. The default value is **32** hops.

**max-queries *max-queries***—(Optional) Maximum number of query attempts for any hop. The range of values is 1 through **32**. The default is **3**.

**multicast-response**—(Optional) Always request the response using multicast.

**no-resolve**—(Optional) Do not attempt to display addresses symbolically.

**no-router-alert**—(Optional) Do not use the router-alert IP option.

**response *response***—(Optional) Send trace response to a host or multicast address.

**routing-instance** *routing-instance-name*—(Optional) Trace a particular routing instance.

**source** *source*—Source hostname or address.

**ttl** *tll*—(Optional) IP time-to-live (TTL) value. You can specify a number between 0 and 255. Local queries to the multicast group use a value of 1. Otherwise, the default value is 127.

**unicast-response**—(Optional) Always request the response using unicast.

**wait-time** *wait-time*—(Optional) Number of seconds to wait for a response. The default value is 3.

**Required Privilege Level** view

**List of Sample Output** [mtrace from-source on page 436](#)

**Output Fields** [Table 21 on page 435](#) describes the output fields for the **mtrace from-source** command. Output fields are listed in the approximate order in which they appear.

**Table 21: mtrace from-source Output Fields**

| Field Name                        | Field Description                                             |
|-----------------------------------|---------------------------------------------------------------|
| <b>Mtrace from</b>                | IP address of the receiver.                                   |
| <b>to</b>                         | IP address of the source.                                     |
| <b>via group</b>                  | IP address of the multicast group (if any).                   |
| <b>Querying full reverse path</b> | Indicates the full reverse path query has begun.              |
| <b>number-of-hops</b>             | Number of hops from the source to the named router or switch. |
| <b>router-name</b>                | Name of the router or switch for this hop.                    |
| <b>address</b>                    | Address of the router or switch for this hop.                 |
| <b>protocol</b>                   | Protocol used (for example, PIM).                             |
| <b>Round trip time</b>            | Average round-trip time, in milliseconds (ms).                |
| <b>total ttl of</b>               | Time-to-live (TTL) threshold.                                 |
| <b>source</b>                     | Source address.                                               |
| <b>Response Dest</b>              | Response destination address.                                 |
| <b>Overall</b>                    | Average packet rate for all traffic at each hop.              |

Table 21: mtrace from-source Output Fields (*continued*)

| Field Name                                | Field Description                                                                                                |
|-------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| <b>Packet Statistics for Traffic From</b> | Number of packets lost, number of packets sent, percentage of packets lost, and average packet rate at each hop. |
| <b>Receiver</b>                           | IP address receiving the multicast.                                                                              |
| <b>Query source</b>                       | IP address sending the mtrace query.                                                                             |

## Sample Output

### mtrace from-source

```

user@host> mtrace from-source source 192.1.4.2 group 225.1.1.1
Mtrace from 192.1.4.2 to 192.1.1.2 via group 225.1.1.1
Querying full reverse path... * *
 0 routerA.lab.mycompany.net (192.1.1.2)
-1 routerB.lab.mycompany.net (192.1.2.2) PIM thresh^ 1
-2 routerC.lab.mycompany.net (192.1.3.2) PIM thresh^ 1
-3 hostA.lab.mycompany.net (192.1.4.2)
Round trip time 2 ms; total ttl of 2 required.

Waiting to accumulate statistics...Results after 10 seconds:

Source      Response Dest    Overall    Packet Statistics For Traffic From
192.1.4.2   192.1.1.2  Packet    192.1.4.2 To 225.1.1.1
  v         ___/ rtt    2 ms      Rate      Lost/Sent = Pct  Rate
192.1.2.1
192.1.3.2   routerC.lab.mycompany.net
  v         ^      ttl    2              0/0    = --    0 pps
192.1.4.1
192.1.2.2   routerB.lab.mycompany.net
  v         \__  ttl    3              ?/0          0 pps
192.1.1.2   192.1.1.2
Receiver      Query Source

```

mtrace monitor

|                          |                                                                                                                                                                                          |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Syntax                   | mtrace monitor                                                                                                                                                                           |
| Release Information      | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br>Command introduced in Junos OS Release 11.3 for the QFX Series. |
| Description              | Listen passively for IP multicast responses. To exit the <b>mtrace monitor</b> command, type Ctrl+c.                                                                                     |
| Options                  | <b>none</b> —Trace the master instance.                                                                                                                                                  |
| Required Privilege Level | view                                                                                                                                                                                     |
| List of Sample Output    | <a href="#">mtrace monitor on page 438</a>                                                                                                                                               |
| Output Fields            | <a href="#">Table 22 on page 437</a> describes the output fields for the <b>mtrace monitor</b> command. Output fields are listed in the approximate order in which they appear.          |

Table 22: mtrace monitor Output Fields

| Field Name       | Field Description                                             |
|------------------|---------------------------------------------------------------|
| Mtrace query at  | Date and time of the query.                                   |
| by               | Address of the host issuing the query.                        |
| resp to          | Response destination.                                         |
| qid              | Query ID number.                                              |
| packet from...to | IP address of the query source and default group destination. |
| from...to        | IP address of the multicast source and the response address.  |
| via group        | IP address of the group to trace.                             |
| mxhop            | Maximum hop setting.                                          |

## Sample Output

### mtrace monitor

```
user@host> mtrace monitor
Mtrace query at Oct 22 13:36:14 by 192.1.3.2, resp to 224.0.1.32, qid 74a5b8
packet from 192.1.3.2 to 224.0.0.2
from 192.1.3.2 to 192.1.3.38 via group 224.1.1.1 (mxhop=60)

Mtrace query at Oct 22 13:36:17 by 192.1.3.2, resp to 224.0.1.32, qid 1d07ba
packet from 192.1.3.2 to 224.0.0.2
from 192.1.3.2 to 192.1.3.38 via group 224.1.1.1 (mxhop=60)

Mtrace query at Oct 22 13:36:20 by 192.1.3.2, resp to same, qid 2fea1d
packet from 192.1.3.2 to 224.0.0.2
from 192.1.3.2 to 192.1.3.38 via group 224.1.1.1 (mxhop=60)

Mtrace query at Oct 22 13:36:30 by 192.1.3.2, resp to same, qid 7c88ad
packet from 192.1.3.2 to 224.0.0.2
from 192.1.3.2 to 192.1.3.38 via group 224.1.1.1 (mxhop=60)
```

## mtrace to-gateway

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>              | <pre> mtrace to-gateway gateway gateway &lt;brief   detail&gt; &lt;extra-hops extra-hops&gt; &lt;group group&gt; &lt;interface interface-name&gt; &lt;interval interval&gt; &lt;loop&gt; &lt;max-hops max-hops&gt; &lt;max-queries max-queries&gt; &lt;multicast-response   unicast-response&gt; &lt;no-resolve&gt; &lt;no-router-alert&gt; &lt;response response&gt; &lt;routing-instance routing-instance-name&gt; &lt;tll ttl&gt; &lt;unicast-response&gt; &lt;wait-time wait-time&gt; </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Release Information</b> | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Description</b>         | Display trace information about a multicast path from this router or switch to a gateway router or switch.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Options</b>             | <p><b>gateway gateway</b>—Send the trace query to a gateway multicast address.</p> <p><b>brief   detail</b>—(Optional) Display the specified level of output.</p> <p><b>extra-hops extra-hops</b>—(Optional) Number of hops to take after reaching a nonresponsive router or switch. You can specify a number between <b>0</b> and <b>255</b>.</p> <p><b>group group</b>—(Optional) Group address for which to trace the path. The default group address is <b>0.0.0.0</b>.</p> <p><b>interface interface-name</b>—(Optional) Source address for sending the trace query.</p> <p><b>interval interval</b>—(Optional) Number of seconds to wait before gathering statistics again. The default value is <b>10</b>.</p> <p><b>loop</b>—(Optional) Loop indefinitely, displaying rate and loss statistics.</p> <p><b>max-hops max-hops</b>—(Optional) Maximum hops to trace toward the source. You can specify a number between <b>0</b> and <b>255</b>. The default value is <b>32</b>.</p> <p><b>max-queries max-queries</b>—(Optional) Maximum number of query attempts for any hop. You can specify a number between <b>0</b> and <b>255</b>. The default value is <b>3</b>.</p> <p><b>multicast-response</b>—(Optional) Always request the response using multicast.</p> <p><b>no-resolve</b>—(Optional) Do not attempt to display addresses symbolically.</p> |

**no-router-alert**—(Optional) Do not use the router-alert IP option.

**response** *response*—(Optional) Send trace response to a host or multicast address.

**routing-instance** *routing-instance-name*—(Optional) Trace a particular routing instance.

**ttl** *tll*—(Optional) IP time-to-live value. You can specify a number between 0 and 225.

Local queries to the multicast group use TTL 1. Otherwise, the default value is 127.

**unicast-response**—(Optional) Always request the response using unicast.

**wait-time** *wait-time*—(Optional) Number of seconds to wait for a response. The default value is 3.

**Required Privilege Level** view

**List of Sample Output** [mtrace to-gateway on page 440](#)

**Output Fields** [Table 23 on page 440](#) describes the output fields for the **mtrace to-gateway** command. Output fields are listed in the approximate order in which they appear.

**Table 23: mtrace to-gateway Output Fields**

| Field Name                        | Field Description                                             |
|-----------------------------------|---------------------------------------------------------------|
| <b>Mtrace from</b>                | IP address of the receiver.                                   |
| <b>to</b>                         | IP address of the source.                                     |
| <b>via group</b>                  | IP address of the multicast group (if any).                   |
| <b>Querying full reverse path</b> | Indicates the full reverse path query has begun.              |
| <b><i>number-of-hops</i></b>      | Number of hops from the source to the named router or switch. |
| <b><i>router-name</i></b>         | Name of the router or switch for this hop.                    |
| <b><i>address</i></b>             | Address of the router or switch for this hop.                 |
| <b><i>protocol</i></b>            | Protocol used (for example, PIM).                             |
| <b>Round trip time</b>            | Average round-trip time, in milliseconds (ms).                |
| <b>total ttl of</b>               | Time-to-live (TTL) threshold.                                 |

## Sample Output

### mtrace to-gateway

```
user@host> mtrace to-gateway gateway 192.1.3.2 group 225.1.1.1 interface 192.1.1.73 brief
```

```
Mtrace from 192.1.1.73 to 192.1.1.2 via group 225.1.1.1
```



```
Querying full reverse path... * *
 0 routerA.lab.mycompany.net (192.1.1.2)
-1 routerA.lab.mycompany.net (192.1.1.2) PIM thresh^ 1
-2 routerB.lab.mycompany.net (192.1.2.2) PIM thresh^ 1
-3 routerC.lab.mycompany.net (192.1.3.2) PIM thresh^ 1
Round trip time 2 ms; total ttl of 3 required.
```

## show multicast flow-map

|                                                     |                                                                                                                                                                                                                                                                                                                                          |
|-----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                               | <a href="#">Syntax on page 442</a><br><a href="#">Syntax (EX Series Switch and the QFX Series) on page 442</a>                                                                                                                                                                                                                           |
| <b>Syntax</b>                                       | show multicast flow-map<br><brief   detail><br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                                                                                                                      |
| <b>Syntax (EX Series Switch and the QFX Series)</b> | show multicast flow-map<br><brief   detail>                                                                                                                                                                                                                                                                                              |
| <b>Release Information</b>                          | Command introduced in Junos OS Release 8.2.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br>Command introduced in Junos OS Release 11.3 for the QFX Series.                                                                                                                                                     |
| <b>Description</b>                                  | Display configuration information about IP multicast flow maps.                                                                                                                                                                                                                                                                          |
| <b>Options</b>                                      | <b>none</b> —Display configuration information about IP multicast flow maps on all systems.<br><br><b>brief   detail</b> —(Optional) Display the specified level of output.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system. |
| <b>Required Privilege Level</b>                     | view                                                                                                                                                                                                                                                                                                                                     |
| <b>List of Sample Output</b>                        | <a href="#">show multicast flow-map on page 443</a><br><a href="#">show multicast flow-map detail on page 443</a>                                                                                                                                                                                                                        |
| <b>Output Fields</b>                                | <a href="#">Table 24 on page 442</a> describes the output fields for the <b>show multicast flow-map</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                 |

**Table 24: show multicast flow-map Output Fields**

| Field Name           | Field Description                                         | Levels of Output |
|----------------------|-----------------------------------------------------------|------------------|
| <b>Name</b>          | Name of the flow map.                                     | All levels       |
| <b>Policy</b>        | Name of the policy associated with the flow map.          | All levels       |
| <b>Cache-timeout</b> | Cache timeout value assigned to the flow map.             | All levels       |
| <b>Bandwidth</b>     | Bandwidth setting associated with the flow map.           | All levels       |
| <b>Adaptive</b>      | Whether or not adaptive mode is enabled for the flow map. | none             |
| <b>Flow-map</b>      | Name of the flow map.                                     | <b>detail</b>    |

Table 24: show multicast flow-map Output Fields (*continued*)

| Field Name         | Field Description                                         | Levels of Output |
|--------------------|-----------------------------------------------------------|------------------|
| Adaptive Bandwidth | Whether or not adaptive mode is enabled for the flow map. | detail           |
| Redundant Sources  | Redundant sources defined for the same destination group. | detail           |

Sample Output

show multicast flow-map

```
user@host> show multicast flow-map
Instance: master
Name      Policy      Cache timeout  Bandwidth Adaptive
map2      policy2     never          2000000 no
map1      policy1     60 seconds    2000000 no
```

Sample Output

show multicast flow-map detail

```
user@host> show multicast flow-map detail
Instance: master
Flow-map: map1
  Policy:      policy1
  Cache Timeout: 600 seconds
  Bandwidth:   2000000
  Adaptive Bandwidth: yes
  Redundant Sources: 11.11.11.11
  Redundant Sources: 11.11.11.12
  Redundant Sources: 11.11.11.13
```

## show multicast interface

|                                                     |                                                                                                                                                                                                                   |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                               | <a href="#">Syntax on page 444</a><br><a href="#">Syntax (EX Series Switch and the QFX Series) on page 444</a>                                                                                                    |
| <b>Syntax</b>                                       | show multicast interface<br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                  |
| <b>Syntax (EX Series Switch and the QFX Series)</b> | show multicast interface                                                                                                                                                                                          |
| <b>Release Information</b>                          | Command introduced in Junos OS Release 8.3.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br>Command introduced in Junos OS Release 11.3 for the QFX Series.                              |
| <b>Description</b>                                  | Display bandwidth information about IP multicast interfaces.                                                                                                                                                      |
| <b>Options</b>                                      | none—Display all interfaces that have multicast configured.<br><br>logical-system (all   <i>logical-system-name</i> )—(Optional) Perform this operation on all logical systems or on a particular logical system. |
| <b>Required Privilege Level</b>                     | view                                                                                                                                                                                                              |
| <b>List of Sample Output</b>                        | <a href="#">show multicast interface on page 445</a>                                                                                                                                                              |
| <b>Output Fields</b>                                | <a href="#">Table 25 on page 444</a> describes the output fields for the <b>show multicast interface</b> command. Output fields are listed in the approximate order in which they appear.                         |

**Table 25: show multicast interface Output Fields**

| Field Name                       | Field Description                                                                                                                                                                                                                                                                                                                                           |
|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Interface                        | Name of the multicast interface.                                                                                                                                                                                                                                                                                                                            |
| Maximum bandwidth (bps)          | Maximum bandwidth setting, in bits per second, for this interface.                                                                                                                                                                                                                                                                                          |
| Remaining bandwidth (bps)        | Amount of bandwidth, in bits per second, remaining on the interface.                                                                                                                                                                                                                                                                                        |
| Mapped bandwidth deduction (bps) | Amount of bandwidth, in bits per second, used by any flows that are mapped to the interface.<br><br><b>NOTE:</b> Adding the mapped bandwidth deduction value to the local bandwidth deduction value results in the total deduction value for the interface.<br><br>This field does not appear in the output when the no QoS adjustment feature is disabled. |

Table 25: show multicast interface Output Fields (*continued*)

| Field Name                                   | Field Description                                                                                                                                                                                                                                                                                                                                                          |
|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Local bandwidth deduction (bps)</b>       | <p>Amount of bandwidth, in bits per second, used by any mapped flows that are traversing the interface.</p> <p><b>NOTE:</b> Adding the mapped bandwidth deduction value to the local bandwidth deduction value results in the total deduction value for the interface.</p> <p>This field does not appear in the output when the no QoS adjustment feature is disabled.</p> |
| <b>Reverse OIF mapping</b>                   | <p>State of the reverse OIF mapping feature (<b>on</b> or <b>off</b>).</p> <p><b>NOTE:</b> This field does not appear in the output when the no QoS adjustment feature is disabled.</p>                                                                                                                                                                                    |
| <b>Reverse OIF mapping no QoS adjustment</b> | <p>State of the no QoS adjustment feature (<b>on</b> or <b>off</b>) for interfaces that are using reverse OIF mapping.</p> <p><b>NOTE:</b> This field does not appear in the output when the no QoS adjustment feature is disabled.</p>                                                                                                                                    |
| <b>Leave timer</b>                           | <p>Amount of time a mapped interface remains active after the last mapping ends.</p> <p><b>NOTE:</b> This field does not appear in the output when the no QoS adjustment feature is disabled.</p>                                                                                                                                                                          |
| <b>No QoS adjustment</b>                     | <p>State (<b>on</b>) of the no QoS adjustment feature when this feature is enabled.</p> <p><b>NOTE:</b> This field does not appear in the output when the no QoS adjustment feature is disabled.</p>                                                                                                                                                                       |

## Sample Output

### show multicast interface

```

user@host> show multicast interface
Interface           Maximum bandwidth (bps) Remaining bandwidth (bps)
fe-0/0/3            10000000                0
fe-0/0/3.210        10000000                -2000000
fe-0/0/3.220        100000000               100000000
fe-0/0/3.230        20000000                18000000
fe-0/0/2.200        100000000               100000000

```

## show multicast minfo

|                                 |                                                                                                                                                                                                                           |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>show multicast minfo</code><br><code>&lt;host&gt;</code>                                                                                                                                                            |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br>Command introduced in Junos OS Release 11.3 for the QFX Series.                                  |
| <b>Description</b>              | Display configuration information about IP multicast networks, including neighboring multicast router addresses.                                                                                                          |
| <b>Options</b>                  | <b>none</b> —Display configuration information about all multicast networks.<br><br><b>host</b> —(Optional) Display configuration information about a particular host. Replace <i>host</i> with a hostname or IP address. |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                      |
| <b>List of Sample Output</b>    | <a href="#">show multicast minfo on page 447</a>                                                                                                                                                                          |
| <b>Output Fields</b>            | <a href="#">Table 26 on page 446</a> describes the output fields for the <b>show multicast minfo</b> command. Output fields are listed in the approximate order in which they appear.                                     |

Table 26: show multicast minfo Output Fields

| Field Name                           | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>source-address</i>                | Query address, hostname (DNS name or IP address of the source address), and multicast protocol version or the software version of another vendor.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <i>ip-address-1—&gt;ip-address-2</i> | Queried router interface address and directly attached neighbor interface address, respectively.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <i>(name or ip-address)</i>          | Name or IP address of neighbor.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <i>[metric/threshold/type/flags]</i> | Neighbor's multicast profile: <ul style="list-style-type: none"> <li><b>metric</b>—Always has a value of 1, because <b>minfo</b> queries the directly connected interfaces of a device.</li> <li><b>threshold</b>—Multicast threshold time-to-live (TTL). The range of values is 0 through 255.</li> <li><b>type</b>—Multicast connection type: <b>pim</b> or <b>tunnel</b>.</li> <li><b>flags</b>—Flags for this route: <ul style="list-style-type: none"> <li><b>querier</b>—Queried router is the designated router for the neighboring session.</li> <li><b>leaf</b>—Link is a leaf in the multicast network.</li> <li><b>down</b>—Link status indicator.</li> </ul> </li> </ul> |

## Sample Output

show multicast mrinfo

```
user@host> show multicast mrinfo 10.35.4.1
10.35.4.1 (10.35.4.1) [version 12.0]:
  192.168.195.166 -> 0.0.0.0 (local) [1/0/pim/querier/leaf]
  10.38.20.1 -> 0.0.0.0 (local) [1/0/pim/querier/leaf]
  10.47.1.1 -> 10.47.1.2 (10.47.1.2) [1/5/pim]
  0.0.0.0 -> 0.0.0.0 (local) [1/0/pim/down]
```

## show multicast next-hops

---

|                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                               | <a href="#">Syntax on page 448</a><br><a href="#">Syntax (EX Series Switch and the QFX Series) on page 448</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Syntax</b>                                       | <pre>show multicast next-hops &lt;brief   detail&gt; &lt;identifier-number&gt; &lt;inet   inet6&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Syntax (EX Series Switch and the QFX Series)</b> | <pre>show multicast next-hops &lt;brief   detail&gt; &lt;identifier-number&gt; &lt;inet   inet6&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Release Information</b>                          | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p><b>inet6</b> option introduced in Junos OS Release 10.0 for EX Series switches.</p> <p><b>detail</b> option display of next-hop ID number introduced in Junos OS Release 11.1 for M Series and T Series routers and EX Series switches.</p> <p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p> <p>Support for bidirectional PIM added in Junos OS Release 12.1.</p>                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Description</b>                                  | Display the entries in the IP multicast next-hop table.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Options</b>                                      | <p><b>none</b>—Display standard information about all entries in the multicast next-hop table for all supported address families.</p> <p><b>brief   detail</b>—(Optional) Display the specified level of output.</p> <p>When you include the <b>detail</b> option on M Series and T Series routers and EX Series switches, the downstream interface name includes the next-hop ID number in parentheses, in the form <b>fe-0/1/2.0-(1048574)</b> where <b>1048574</b> is the next-hop ID number.</p> <p><b>identifier-number</b>—(Optional) Show a particular next hop by ID number. The range of values is 1 through <b>65,535</b>.</p> <p><b>inet   inet6</b>—(Optional) Display entries for IPv4 or IPv6 family addresses, respectively.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b>                     | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>List of Sample Output</b>                        | <a href="#">show multicast next-hops on page 449</a><br><a href="#">show multicast next-hops (Bidirectional PIM on page 449</a><br><a href="#">show multicast next-hops brief on page 450</a><br><a href="#">show multicast next-hops detail on page 450</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |



**Output Fields** Table 27 on page 449 describes the output fields for the **show multicast next-hops** command. Output fields are listed in the approximate order in which they appear.

**Table 27: show multicast next-hops Output Fields**

| Field Name                     | Field Description                                                                                                                                      |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Family</b>                  | Protocol family (such as <b>INET</b> ).                                                                                                                |
| <b>ID</b>                      | Next-hop identifier of the prefix. The identifier is returned by the routing device's Packet Forwarding Engine.                                        |
| <b>Refcount</b>                | Number of cache entries that are using this next hop.                                                                                                  |
| <b>KRefcount</b>               | Kernel reference count for the next hop.                                                                                                               |
| <b>Downstream interface</b>    | Interface names associated with each multicast next-hop ID.                                                                                            |
| <b>Incoming interface list</b> | List of interfaces that accept incoming traffic. Only shown for routes that do not use strict RPF-based forwarding, for example for bidirectional PIM. |

## Sample Output

### show multicast next-hops

```
user@host> show multicast next-hops
Family: INET
ID      Refcount  KRefcount Downstream interface
262142      4          2 so-1/0/0.0
262143      2          1 mt-1/1/0.49152
262148      2          1 mt-1/1/0.32769
```

### show multicast next-hops (Bidirectional PIM)

```
user@host> show multicast next-hops
Family: INET
ID      Refcount  KRefcount Downstream interface
2097151      8          4 ge-0/0/1.0

Family: INET6
ID      Refcount  KRefcount Downstream interface
2097157      2          1 ge-0/0/1.0

Family: Incoming interface list
ID      Refcount  KRefcount Downstream interface
513      5          2 lo0.0
           ge-0/0/1.0
514      5          2 lo0.0
           ge-0/0/1.0
           xe-4/1/0.0
515      3          1 lo0.0
           ge-0/0/1.0
           xe-4/1/0.0
544      1          0 lo0.0
           xe-4/1/0.0
```

### show multicast next-hops brief

The output for the **show multicast next-hops brief** command is identical to that for the **show multicast next-hops** command. For sample output, see [show multicast next-hops on page 449](#).

### show multicast next-hops detail

```
user@host> show multicast next-hops detail
Family: INET
ID          Refcount KRefCount Downstream interface
1048577      2          1 fe-0/1/2.0-(1048574)
              ge-0/2/3.0-(1048576)
```

## show multicast pim-to-igmp-proxy

|                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                               | <a href="#">Syntax on page 451</a><br><a href="#">Syntax (EX Series Switch and the QFX Series) on page 451</a>                                                                                                                                                                                                                                                                                                                                      |
| <b>Syntax</b>                                       | <pre>show multicast pim-to-igmp-proxy &lt;instance <i>instance-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt;</pre>                                                                                                                                                                                                                                                                                                         |
| <b>Syntax (EX Series Switch and the QFX Series)</b> | <pre>show multicast pim-to-igmp-proxy &lt;instance <i>instance-name</i>&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Release Information</b>                          | <p>Command introduced in Junos OS Release 9.6.</p> <p>Command introduced in Junos OS Release 9.6 for EX Series switches.</p> <p><b>instance</b> option introduced in Junos OS Release 10.0.</p> <p><b>instance</b> option introduced in Junos OS Release 10.0 for EX Series switches.</p> <p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p>                                                                                    |
| <b>Description</b>                                  | Display configuration information about PIM-to-IGMP message translation, also known as PIM-to-IGMP proxy.                                                                                                                                                                                                                                                                                                                                           |
| <b>Options</b>                                      | <p><b>none</b>—Display configuration information about PIM-to-IGMP message translation for all routing instances.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display configuration information about PIM-to-IGMP message translation for a specific multicast instance.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b>                     | view                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>List of Sample Output</b>                        | <a href="#">show multicast pim-to-igmp-proxy on page 452</a><br><a href="#">show multicast pim-to-igmp-proxy instance on page 452</a>                                                                                                                                                                                                                                                                                                               |
| <b>Output Fields</b>                                | <a href="#">Table 28 on page 451</a> describes the output fields for the <b>show multicast pim-to-igmp-proxy</b> command. Output fields are listed in the order in which they appear.                                                                                                                                                                                                                                                               |

**Table 28: show multicast pim-to-igmp-proxy Output Fields**

| Field Name                   | Field Description                                                                                                                                     |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Instance</b>              | Routing instance. Default instance is <b>master</b> (inet.0 routing table).                                                                           |
| <b>Proxy state</b>           | State of PIM-to-IGMP message translation, also known as PIM-to-IGMP proxy, on the configured upstream interfaces: <b>enabled</b> or <b>disabled</b> . |
| <b><i>interface-name</i></b> | Name of upstream interface (no more than two allowed) on which PIM-to-IGMP message translation is configured.                                         |

## Sample Output

### show multicast pim-to-igmp-proxy

```
user@host> show multicast pim-to-igmp-proxy
Instance: master Proxy state: enabled
ge-0/1/0.1
ge-0/1/0.2
```

### show multicast pim-to-igmp-proxy instance

```
user@host> show multicast pim-to-igmp-proxy instance VPN-A
Instance: VPN-A Proxy state: enabled
ge-0/1/0.1
```

## show multicast pim-to-mld-proxy

|                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                               | <a href="#">Syntax on page 453</a><br><a href="#">Syntax (EX Series Switch and the QFX Series) on page 453</a>                                                                                                                                                                                                                                                                                                                                    |
| <b>Syntax</b>                                       | <pre>show multicast pim-to-mld-proxy &lt;instance <i>instance-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt;</pre>                                                                                                                                                                                                                                                                                                        |
| <b>Syntax (EX Series Switch and the QFX Series)</b> | <pre>show multicast pim-to-mld-proxy &lt;instance <i>instance-name</i>&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Release Information</b>                          | <p>Command introduced in Junos OS Release 9.6.</p> <p>Command introduced in Junos OS Release 9.6 for EX Series switches.</p> <p><b>instance</b> option introduced in Junos OS Release 10.3.</p> <p><b>instance</b> option introduced in Junos OS Release 10.3 for EX Series switches.</p> <p>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p> <p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p>    |
| <b>Description</b>                                  | Display configuration information about PIM-to-MLD message translation, also known as PIM-to-MLD proxy.                                                                                                                                                                                                                                                                                                                                           |
| <b>Options</b>                                      | <p><b>none</b>—Display configuration information about PIM-to-MLD message translation for all routing instances.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display configuration information about PIM-to-MLD message translation for a specific multicast instance.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b>                     | view                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>List of Sample Output</b>                        | <a href="#">show multicast pim-to-mld-proxy on page 454</a><br><a href="#">show multicast pim-to-mld-proxy instance on page 454</a>                                                                                                                                                                                                                                                                                                               |
| <b>Output Fields</b>                                | <a href="#">Table 29 on page 453</a> describes the output fields for the <b>show multicast pim-to-mld-proxy</b> command. Output fields are listed in the order in which they appear.                                                                                                                                                                                                                                                              |

**Table 29: show multicast pim-to-mld-proxy Output Fields**

| Field Name                   | Field Description                                                                                                                                   |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Proxy state</b>           | State of PIM-to-MLD message translation, also known as PIM-to-MLD proxy, on the configured upstream interfaces: <b>enabled</b> or <b>disabled</b> . |
| <b><i>interface-name</i></b> | Name of upstream interface (no more than two allowed) on which PIM-to-MLD message translation is configured.                                        |

## Sample Output

### show multicast pim-to-mld-proxy

```
user@host> show multicast pim-to-mld-proxy
Instance: master Proxy state: enabled
ge-0/5/0.1
ge-0/5/0.2
```

### show multicast pim-to-mld-proxy instance

```
user@host> show multicast pim-to-mld-proxy instance VPN-A
Instance: VPN-A Proxy state: enabled
ge-0/5/0.1
```

## show multicast route

**List of Syntax**   [Syntax on page 455](#)  
[Syntax \(EX Series Switch and the QFX Series\) on page 455](#)

**Syntax**   `show multicast route`  
                   `<brief | detail | extensive | summary>`  
                   `<active | all | inactive>`  
                   `<group group>`  
                   `<inet | inet6>`  
                   `<instance instance name>`  
                   `<logical-system (all | logical-system-name)>`  
                   `<regular-expression>`  
                   `<source-prefix source-prefix>`

**Syntax (EX Series Switch and the QFX Series)**   `show multicast route`  
                   `<brief | detail | extensive | summary>`  
                   `<active | all | inactive>`  
                   `<group group>`  
                   `<inet | inet6>`  
                   `<instance instance name>`  
                   `<regular-expression>`  
                   `<source-prefix source-prefix>`

**Release Information**   Command introduced before Junos OS Release 7.4.  
                                   Command introduced in Junos OS Release 9.0 for EX Series switches.  
                                   inet6 and **instance** options introduced in Junos OS Release 10.0 for EX Series switches.  
                                   Command introduced in Junos OS Release 11.3 for the QFX Series.  
                                   Support for bidirectional PIM added in Junos OS Release 12.1.  
                                   Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

**Description**   Display the entries in the IP multicast forwarding table. You can display similar information with the **show route table inet.1** command.



**NOTE:** On all SRX Series devices, when a multicast route is not available, pending sessions are not torn down, and subsequent packets are queued. If no multicast route resolve comes back, then the traffic flow has to wait for the pending session to timed out. Then packets can trigger new pending session create and route resolve.

**Options**   **none**—Display standard information about all entries in the multicast forwarding table for all routing instances.

**brief | detail | extensive | summary**—(Optional) Display the specified level of output.

**active | all | inactive**—(Optional) Display all active entries, all entries, or all inactive entries, respectively, in the multicast forwarding table.

**group group**—(Optional) Display the cache entries for a particular group.

**inet | inet6**—(Optional) Display multicast forwarding table entries for IPv4 or IPv6 family addresses, respectively.

**instance *instance-name***—(Optional) Display entries in the multicast forwarding table for a specific multicast instance.

**logical-system (all | *logical-system-name*)**—(Optional) Perform this operation on all logical systems or on a particular logical system.

***regular-expression***—(Optional) Display information about the multicast forwarding table entries that match a UNIX OS-style regular expression.

**source-prefix *source-prefix***—(Optional) Display the cache entries for a particular source prefix.

**Required Privilege Level**

view

**Related Documentation**

- [Example: Configuring Bidirectional PIM](#)

**List of Sample Output**

[show multicast route on page 458](#)  
[show multicast route \(Bidirectional PIM\) on page 458](#)  
[show multicast route brief on page 459](#)  
[show multicast route detail on page 459](#)  
[show multicast route extensive \(Bidirectional PIM\) on page 459](#)  
[show multicast route instance <instance-name> extensive on page 460](#)  
[show multicast route summary on page 460](#)

**Output Fields** [Table 30 on page 456](#) describes the output fields for the **show multicast route** command. Output fields are listed in the approximate order in which they appear.

**Table 30: show multicast route Output Fields**

| Field Name                  | Field Description                                                                                                                                                                               | Level of Output |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| family                      | IPv4 address family ( <b>INET</b> ) or IPv6 address family ( <b>INET6</b> ).                                                                                                                    | All levels      |
| Group                       | Group address.<br><br>For any-source multicast routes, for example for bidirectional PIM, the group address includes the prefix length.                                                         | All levels      |
| Source                      | Prefix and length of the source as it is in the multicast forwarding table.                                                                                                                     | All levels      |
| Incoming interface list     | List of interfaces that accept incoming traffic. Only shown for routes that do not use strict RPF-based forwarding, for example for bidirectional PIM.                                          | All levels      |
| Upstream interface          | Name of the interface on which the packet with this source prefix is expected to arrive.                                                                                                        | All levels      |
| Upstream rpf interface list | When multicast-only fast reroute (MoFRR) is enabled, a PIM router propagates join messages on two upstream RPF interfaces to receive multicast traffic on both links for the same join request. | All levels      |



Table 30: show multicast route Output Fields (*continued*)

| Field Name                             | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                             | Level of Output   |
|----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| Downstream interface list              | List of interface names to which the packet with this source prefix is forwarded.                                                                                                                                                                                                                                                                                                                                                                             | All levels        |
| Number of outgoing interfaces          | Total number of outgoing interfaces for each (S,G) entry.                                                                                                                                                                                                                                                                                                                                                                                                     | extensive         |
| Session description                    | Name of the multicast session.                                                                                                                                                                                                                                                                                                                                                                                                                                | detail extensive  |
| Statistics                             | Rate at which packets are being forwarded for this source and group entry (in Kbps and pps), and number of packets that have been forwarded to this prefix. If one or more of the kilobits per second packet forwarding statistic queries fails or times out, the statistics field displays <b>Forwarding statistics are not available</b> .<br><br><b>NOTE:</b> On QFX Series switches and OCX Series switches, this field does not report valid statistics. | detail extensive  |
| Next-hop ID                            | Next-hop identifier of the prefix. The identifier is returned by the routing device's Packet Forwarding Engine and is also displayed in the output of the <b>show multicast nexthops</b> command.                                                                                                                                                                                                                                                             | detail extensive  |
| Incoming interface list ID             | For bidirectional PIM, incoming interface list identifier.<br><br>Identifiers for interfaces that accept incoming traffic. Only shown for routes that do not use strict RPF-based forwarding, for example for bidirectional PIM.                                                                                                                                                                                                                              | detail extensive  |
| Upstream protocol                      | The protocol that maintains the active multicast forwarding route for this group or source.<br><br>When the <b>show multicast route extensive</b> command is used with the <b>display-origin-protocol</b> option, the field name is only <b>Protocol</b> and not <b>Upstream Protocol</b> . However, this field also displays the protocol that installed the active route.                                                                                   | detail extensive  |
| Route type                             | Type of multicast route. Values can be (S,G) or (*G).                                                                                                                                                                                                                                                                                                                                                                                                         | summary           |
| Route state                            | Whether the group is <b>Active</b> or <b>Inactive</b> .                                                                                                                                                                                                                                                                                                                                                                                                       | summary extensive |
| Route count                            | Number of multicast routes.                                                                                                                                                                                                                                                                                                                                                                                                                                   | summary           |
| Forwarding state                       | Whether the prefix is pruned or forwarding.                                                                                                                                                                                                                                                                                                                                                                                                                   | extensive         |
| Cache lifetime/timeout                 | Number of seconds until the prefix is removed from the multicast forwarding table. A value of <b>never</b> indicates a permanent forwarding entry. A value of <b>forever</b> indicates routes that do not have keepalive times.                                                                                                                                                                                                                               | extensive         |
| Wrong incoming interface notifications | Number of times that the upstream interface was not available.                                                                                                                                                                                                                                                                                                                                                                                                | extensive         |
| Uptime                                 | Time since the creation of a multicast route.                                                                                                                                                                                                                                                                                                                                                                                                                 | extensive         |

## Sample Output

### show multicast route

```
user@host> show multicast route
Family: INET

Group: 228.0.0.0
  Source: 10.255.14.144/32
  Upstream interface: local
  Downstream interface list:
    so-1/0/0.0

Group: 239.1.1.1
  Source: 10.255.14.144/32
  Upstream interface: local
  Downstream interface list:
    so-1/0/0.0

Group: 239.1.1.1
  Source: 10.255.70.15/32
  Upstream interface: so-1/0/0.0
  Downstream interface list:
    mt-1/1/0.1081344

Family: INET6
```

### show multicast route (Bidirectional PIM)

```
user@host> show multicast route
Family: INET

Group: 224.1.1.0/24
  Source: *
  Incoming interface list:
    lo0.0 ge-0/0/1.0
  Downstream interface list:
    ge-0/0/1.0

Group: 224.1.3.0/24
  Source: *
  Incoming interface list:
    lo0.0 ge-0/0/1.0 xe-4/1/0.0
  Downstream interface list:
    ge-0/0/1.0

Group: 225.1.1.0/24
  Source: *
  Incoming interface list:
    lo0.0 ge-0/0/1.0
  Downstream interface list:
    ge-0/0/1.0

Group: 225.1.3.0/24
  Source: *
  Incoming interface list:
    lo0.0 ge-0/0/1.0 xe-4/1/0.0
  Downstream interface list:
    ge-0/0/1.0

Family: INET6
```

### show multicast route brief

The output for the **show multicast route brief** command is identical to that for the **show multicast route** command. For sample output, see [show multicast route on page 458](#) or [show multicast route \(Bidirectional PIM\) on page 458](#).

### show multicast route detail

```

user@host> show multicast route detail
Family: INET

Group: 228.0.0.0
  Source: 10.255.14.144/32
  Upstream interface: local
  Downstream interface list:
    so-1/0/0.0
  Session description: Unknown
  Statistics: 8 kbps, 100 pps, 45272 packets
  Next-hop ID: 262142
  Upstream protocol: PIM

Group: 239.1.1.1
  Source: 10.255.14.144/32
  Upstream interface: local
  Downstream interface list:
    so-1/0/0.0
  Session description: Administratively Scoped
  Statistics: 0 kbps, 0 pps, 13404 packets
  Next-hop ID: 262142
  Upstream protocol: PIM

Group: 239.1.1.1
  Source: 10.255.70.15/32
  Upstream interface: so-1/0/0.0
  Downstream interface list:
    mt-1/1/0.1081344
  Session description: Administratively Scoped
  Statistics: 46 kbps, 1000 pps, 921077 packets

  Next-hop ID: 262143
  Upstream protocol: PIM

Family: INET6

```

### show multicast route extensive (Bidirectional PIM)

```

user@host> show multicast route extensive
Family: INET

Group: 224.1.1.0/24
  Source: *
  Incoming interface list:
    lo0.0 ge-0/0/1.0
  Downstream interface list:
    ge-0/0/1.0
  Number of outgoing interfaces: 1
  Session description: NOB Cross media facilities
  Statistics: 0 kbps, 0 pps, 0 packets
  Next-hop ID: 2097153
  Incoming interface list ID: 585

```

```

Upstream protocol: PIM
Route state: Active
Forwarding state: Forwarding
Cache lifetime/timeout: forever
Wrong incoming interface notifications: 0

Group: 224.1.3.0/24
Source: *
Incoming interface list:
  lo0.0 ge-0/0/1.0 xe-4/1/0.0
Downstream interface list:
  ge-0/0/1.0
Number of outgoing interfaces: 1
Session description: NOB Cross media facilities
Statistics: 0 kbps, 0 pps, 0 packets
Next-hop ID: 2097153
Incoming interface list ID: 589
Upstream protocol: PIM
Route state: Active
Forwarding state: Forwarding
Cache lifetime/timeout: forever
Wrong incoming interface notifications: 0

Family: INET6

```

#### show multicast route instance <instance-name> extensive

```

user@host> show multicast route instance mvpn extensive
Family: INET

Group: 239.10.10.10
Source: 2.0.0.2/32
Upstream interface: xe-0/0/0.102
Downstream interface list:
  xe-10/3/0.0 xe-0/3/0.0 xe-0/0/0.106 xe-0/0/0.105
  xe-0/0/0.103 xe-0/0/0.104 xe-0/0/0.107 xe-0/0/0.108
Session description: Administratively Scoped
Statistics: 256 kbps, 3998 pps, 670150 packets
Next-hop ID: 1048579
Upstream protocol: MVPN
Route state: Active
Forwarding state: Forwarding
Cache lifetime/timeout: forever
Wrong incoming interface notifications: 58
Uptime: 00:00:04

```

#### show multicast route summary

```

user@host> show multicast route summary
Instance: master Family: INET

Route type   Route state   Route count
(S,G)        Active       2
(S,G)        Inactive     3

Instance: master Family: INET6

```

## show multicast rpf

|                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                               | <a href="#">Syntax on page 461</a><br><a href="#">Syntax (EX Series Switch and the QFX Series) on page 461</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Syntax</b>                                       | <pre>show multicast rpf &lt;inet   inet6&gt; &lt;instance <i>instance-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt; &lt;prefix&gt; &lt;summary&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Syntax (EX Series Switch and the QFX Series)</b> | <pre>show multicast rpf &lt;inet   inet6&gt; &lt;instance <i>instance-name</i>&gt; &lt;prefix&gt; &lt;summary&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Release Information</b>                          | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p><b>inet6</b> and <b>instance</b> options introduced in Junos OS Release 10.0 for EX Series switches.</p> <p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p>                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Description</b>                                  | Display information about multicast reverse-path-forwarding (RPF) calculations.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Options</b>                                      | <p><b>none</b>—Display RPF calculation information for all supported address families.</p> <p><b>inet   inet6</b>—(Optional) Display the RPF calculation information for IPv4 or IPv6 family addresses, respectively.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display information about multicast RPF calculations for a specific multicast instance.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p><b>prefix</b>—(Optional) Display the RPF calculation information for the specified prefix.</p> <p><b>summary</b>—(Optional) Display a summary of all multicast RPF information.</p> |
| <b>Required Privilege Level</b>                     | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>List of Sample Output</b>                        | <a href="#">show multicast rpf on page 462</a><br><a href="#">show multicast rpf inet6 on page 463</a><br><a href="#">show multicast rpf prefix on page 464</a><br><a href="#">show multicast rpf summary on page 464</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

**Output Fields** Table 31 on page 462 describes the output fields for the **show multicast rpf** command. Output fields are listed in the approximate order in which they appear.

**Table 31: show multicast rpf Output Fields**

| Field Name           | Field Description                                                                                                                                                                                                                                                                                                                                                                                             |
|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Instance</b>      | Name of the routing instance. (Displayed when multicast is configured within a routing instance.)                                                                                                                                                                                                                                                                                                             |
| <b>Source prefix</b> | Prefix and length of the source as it exists in the multicast forwarding table.                                                                                                                                                                                                                                                                                                                               |
| <b>Protocol</b>      | How the route was learned.                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Interface</b>     | Upstream RPF interface.<br><br><b>NOTE:</b> The displayed interface information does not apply to bidirectional PIM RP addresses. This is because the <b>show multicast rpf</b> command does not take into account equal-cost paths or the designated forwarder. For accurate upstream RPF interface information, always use the <b>show pim join extensive</b> command when bidirectional PIM is configured. |
| <b>Neighbor</b>      | Upstream RPF neighbor.<br><br><b>NOTE:</b> The displayed neighbor information does not apply to bidirectional PIM. This is because the <b>show multicast rpf</b> command does not take into account equal-cost paths or the designated forwarder. For accurate upstream RPF neighbor information, always use the <b>show pim join extensive</b> command when bidirectional PIM is configured.                 |

## Sample Output

### show multicast rpf

```

user@host> show multicast rpf

Multicast RPF table: inet.0, 12 entries

0.0.0.0/0
  Protocol: Static

10.255.14.132/32
  Protocol: Direct
  Interface: lo0.0

10.255.245.91/32
  Protocol: IS-IS
  Interface: so-1/1/1.0
  Neighbor: 192.168.195.21

127.0.0.1/32
Inactive172.16.0.0/12
Protocol: Static
Interface: fxp0.0

```

```

Neighbor: 192.168.14.254

192.168.0.0/16
Protocol: Static
Interface: fxp0.0
Neighbor: 192.168.14.254

192.168.14.0/24
Protocol: Direct
Interface: fxp0.0

192.168.14.132/32
Protocol: Local

192.168.195.20/30
Protocol: Direct
Interface: so-1/1/1.0

192.168.195.22/32
Protocol: Local

192.168.195.36/30
Protocol: IS-IS
Interface: so-1/1/1.0
Neighbor: 192.168.195.21

```

### show multicast rpf inet6

```

user@host> show multicast rpf inet6

Multicast RPF table: inet6.0, 12 entries

::10.255.14.132/128
  Protocol: Direct
  Interface: lo0.0

::10.255.245.91/128
  Protocol: IS-IS
  Interface: so-1/1/1.0
  Neighbor: fe80::2a0:a5ff:fe28:2e8c

::192.168.195.20/126
  Protocol: Direct
  Interface: so-1/1/1.0

::192.168.195.22/128
  Protocol: Local

::192.168.195.36/126
  Protocol: IS-IS
  Interface: so-1/1/1.0
  Neighbor: fe80::2a0:a5ff:fe28:2e8c

::192.168.195.76/126
  Protocol: Direct
  Interface: fe-2/2/0.0

::192.168.195.77/128
  Protocol: Local

```

```
fe80::/64
Protocol: Direct
Interface: so-1/1/1.0

fe80::290:69ff:fe0c:993a/128
Protocol: Local

fe80::2a0:a5ff:fe12:84f/128
Protocol: Direct
Interface: lo0.0

ff02::2/128
Protocol: PIM

ff02::d/128
Protocol: PIM
```

#### show multicast rpf prefix

```
user@host> show multicast rpf ff02::/16

Multicast RPF table: inet6.0, 13 entries

ff02::2/128
    Protocol: PIM

ff02::d/128
    Protocol: PIM

...
```

#### show multicast rpf summary

```
user@host> show multicast rpf summary

Multicast RPF table: inet.0, 16 entries
Multicast RPF table: inet6.0, 12 entries
```



## show multicast scope

|                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                               | <a href="#">Syntax on page 465</a><br><a href="#">Syntax (EX Series Switch and the QFX Series) on page 465</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Syntax</b>                                       | <pre>show multicast scope &lt;inet   inet6&gt; &lt;instance <i>instance-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Syntax (EX Series Switch and the QFX Series)</b> | <pre>show multicast scope &lt;inet   inet6&gt; &lt;instance <i>instance-name</i>&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Release Information</b>                          | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p><b>inet6</b> and <b>instance</b> options introduced in Junos OS Release 10.0 for EX Series switches.</p> <p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p>                                                                                                                                                                                                                                                                            |
| <b>Description</b>                                  | Display administratively scoped IP multicast information.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Options</b>                                      | <p><b>none</b>—Display standard information about administratively scoped multicast information for all supported address families in all routing instances.</p> <p><b>inet   inet6</b>—(Optional) Display scoped multicast information for IPv4 or IPv6 family addresses, respectively.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display administratively scoped information for a specific multicast instance.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b>                     | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>List of Sample Output</b>                        | <a href="#">show multicast scope on page 466</a><br><a href="#">show multicast scope inet on page 466</a><br><a href="#">show multicast scope inet6 on page 466</a>                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Output Fields</b>                                | <p><a href="#">Table 32 on page 465</a> describes the output fields for the <b>show multicast scope</b> command. Output fields are listed in the approximate order in which they appear.</p>                                                                                                                                                                                                                                                                                                                                                                                                   |

**Table 32: show multicast scope Output Fields**

| Field Name   | Field Description                                           |
|--------------|-------------------------------------------------------------|
| Scope name   | Name of the multicast scope.                                |
| Group Prefix | Range of multicast groups that are scoped.                  |
| Interface    | Interface that is the boundary of the administrative scope. |

Table 32: show multicast scope Output Fields (*continued*)

| Field Name      | Field Description                 |
|-----------------|-----------------------------------|
| Resolve Rejects | Number of kernel resolve rejects. |

## Sample Output

### show multicast scope

```
user@host> show multicast scope
```

| Scope name | Group Prefix   | Interface  | Resolve Rejects |
|------------|----------------|------------|-----------------|
| 232-net    | 232.232.0.0/16 | fe-0/0/0.1 | 0               |
| local      | 239.255.0.0/16 | fe-0/0/0.1 | 0               |
| local      | ff05::/16      | fe-0/0/0.1 | 0               |
| larry      | ff05::1234/128 | fe-0/0/0.1 | 0               |

### show multicast scope inet

```
user@host> show multicast scope inet
```

| Scope name | Group Prefix   | Interface  | Resolve Rejects |
|------------|----------------|------------|-----------------|
| 232-net    | 232.232.0.0/16 | fe-0/0/0.1 | 0               |
| local      | 239.255.0.0/16 | fe-0/0/0.1 | 0               |

### show multicast scope inet6

```
user@host> show multicast scope inet6
```

| Scope name | Group Prefix   | Interface  | Resolve Rejects |
|------------|----------------|------------|-----------------|
| local      | ff05::/16      | fe-0/0/0.1 | 0               |
| larry      | ff05::1234/128 | fe-0/0/0.1 | 0               |

## show multicast sessions

**List of Syntax** [Syntax on page 467](#)  
[Syntax \(EX Series Switch and the QFX Series\) on page 467](#)

**Syntax** show multicast sessions  
 <brief | detail | extensive>  
 <logical-system (all | *logical-system-name*)>  
 <*regular-expression*>

**Syntax (EX Series Switch and the QFX Series)** show multicast sessions  
 <brief | detail | extensive>  
 <*regular-expression*>

**Release Information** Command introduced before Junos OS Release 7.4.  
 Command introduced in Junos OS Release 9.0 for EX Series switches.  
 Command introduced in Junos OS Release 11.3 for the QFX Series.

**Description** Display information about announced IP multicast sessions.



**NOTE:** On all SRX Series devices, only 100 packets can be queued during pending (S, G) route. However, when multiple multicast sessions enter the route resolve process at the same time, buffer resources are not sufficient to queue 100 packets for each session.

**Options** none—Display standard information about all multicast sessions for all routing instances.

**brief | detail | extensive**—(Optional) Display the specified level of output.

**logical-system (all | *logical-system-name*)**—(Optional) Perform this operation on all logical systems or on a particular logical system.

***regular-expression***—(Optional) Display information about announced sessions that match a UNIX-style regular expression.

**Required Privilege Level** view

**List of Sample Output** [show multicast sessions on page 468](#)  
[show multicast sessions regular-expression detail on page 468](#)

**Output Fields** [Table 33 on page 467](#) describes the output fields for the **show multicast sessions** command. Output fields are listed in the approximate order in which they appear.

**Table 33: show multicast sessions Output Fields**

| Field Name          | Field Description                               |
|---------------------|-------------------------------------------------|
| <i>session-name</i> | Name of the known announced multicast sessions. |

## Sample Output

### show multicast sessions

```

user@host> show multicast sessions
1-Department of Biological Sciences, LSU
...
Monterey Bay - DockCam
Monterey Bay - JettyCam
Monterey Bay - StandCam
Monterey DockCam
Monterey DockCam / ROV cam
...
NASA TV (MPEG-1)
...
UO Broadcast - NASA Videos - 25 Years of Progress
UO Broadcast - NASA Videos - Journey through the Solar System
UO Broadcast - NASA Videos - Life in the Universe
UO Broadcast - NASA Videos - Nasa and the Airplane
UO Broadcasts OPB's Oregon Story
UO DOD News Clips
UO Medical Management of Biological Casualties (1)
UO Medical Management of Biological Casualties (2)
UO Medical Management of Biological Casualties (3)
...
376 active sessions.

```

### show multicast sessions regular-expression detail

```

user@host> show multicast sessions "NASA TV" detail
SDP Version: 0  Originated by: -@128.223.83.33
Session: NASA TV (MPEG-1)
Description: NASA television in MPEG-1 format, provided by Private University.
Please contact the UO if you have problems with this feed.
Email: Your Name Here <multicast@lists.private.edu>
Phone: Your Name Here <888/555-1212>
Bandwidth: AS:1000
Start time: permanent
Stop time: none
Attribute: type:broadcast
Attribute: tool:IP/TV Content Manager 3.4.14
Attribute: live:capture:1
Attribute: x-iptv-capture:mp1s
Media: video 54302 RTP/AVP 32 31 96 97
Connection Data: 224.2.231.45 ttl 127
Attribute: quality:8
Attribute: framerate:30
Attribute: rtpmap:96 WBIH/90000
Attribute: rtpmap:97 MP4V-ES/90000
Attribute: x-iptv-svr:video 128.223.91.191 live
Attribute: fmtp:32 type=mpeg1
Media: audio 28848 RTP/AVP 14 0 96 3 5 97 98 99 100 101 102 10 11 103 104 105 106
Connection Data: 224.2.145.37 ttl 127
Attribute: rtpmap:96 X-WAVE/8000
Attribute: rtpmap:97 L8/8000/2
Attribute: rtpmap:98 L8/8000
Attribute: rtpmap:99 L8/22050/2
Attribute: rtpmap:100 L8/22050
Attribute: rtpmap:101 L8/11025/2
Attribute: rtpmap:102 L8/11025
Attribute: rtpmap:103 L16/22050/2

```

Attribute: rtpmap:104 L16/22050

1 matching sessions.

## show multicast usage

---

|                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                               | <a href="#">Syntax on page 470</a><br><a href="#">Syntax (EX Series Switch and the QFX Series) on page 470</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Syntax</b>                                       | <code>show multicast usage</code><br><code>&lt;brief   detail&gt;</code><br><code>&lt;inet   inet6&gt;</code><br><code>&lt;instance <i>instance-name</i>&gt;</code><br><code>&lt;logical-system (all   <i>logical-system-name</i>)&gt;</code>                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Syntax (EX Series Switch and the QFX Series)</b> | <code>show multicast usage</code><br><code>&lt;brief   detail&gt;</code><br><code>&lt;inet   inet6&gt;</code><br><code>&lt;instance <i>instance-name</i>&gt;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Release Information</b>                          | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br><b>inet6</b> and <b>instance</b> options introduced in Junos OS Release 10.0 for EX Series switches.<br>Command introduced in Junos OS Release 11.3 for the QFX Series.                                                                                                                                                                                                                                                                                                                                       |
| <b>Description</b>                                  | Display usage information about the 10 most active Distance Vector Multicast Routing Protocol (DVMRP) or Protocol Independent Multicast (PIM) groups.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Options</b>                                      | <b>none</b> —Display multicast usage information for all supported address families for all routing instances.<br><br><b>brief   detail</b> —(Optional) Display the specified level of output.<br><br><b>inet   inet6</b> —(Optional) Display usage information for IPv4 or IPv6 family addresses, respectively.<br><br><b>instance <i>instance-name</i></b> —(Optional) Display information about the most active DVMRP or PIM groups for a specific multicast instance.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system. |
| <b>Required Privilege Level</b>                     | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>List of Sample Output</b>                        | <a href="#">show multicast usage on page 471</a><br><a href="#">show multicast usage brief on page 471</a><br><a href="#">show multicast usage instance on page 471</a><br><a href="#">show multicast usage detail on page 472</a>                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Output Fields</b>                                | <a href="#">Table 34 on page 471</a> describes the output fields for the <b>show multicast usage</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

Table 34: show multicast usage Output Fields

| Field Name      | Field Description                                                                                                                                                                        |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Instance</b> | Name of the routing instance. (Displayed when multicast is configured within a routing instance.)                                                                                        |
| <b>Group</b>    | Group address.                                                                                                                                                                           |
| <b>Sources</b>  | Number of sources.                                                                                                                                                                       |
| <b>Packets</b>  | Number of packets that have been forwarded to this prefix. If one or more of the packets forwarded statistic queries fails or times out, the packets field displays <b>unavailable</b> . |
| <b>Bytes</b>    | Number of bytes that have been forwarded to this prefix. If one or more of the packets forwarded statistic queries fails or times out, the bytes field displays <b>unavailable</b> .     |
| <b>Prefix</b>   | IP address.                                                                                                                                                                              |
| <b>/len</b>     | Prefix length.                                                                                                                                                                           |
| <b>Groups</b>   | Number of multicast groups.                                                                                                                                                              |

## Sample Output

### show multicast usage

```

user@host> show multicast usage
Group          Sources  Packets      Bytes
228.0.0.0      1        52847      4439148
239.1.1.1      2        13450      1125530

Prefix         /len  Groups  Packets      Bytes
10.255.14.144  /32   2        66254      5561304
10.255.70.15   /32   1         43        3374...
```

### show multicast usage brief

The output for the **show multicast usage brief** command is identical to that for the **show multicast usage** command. For sample output, see [show multicast usage on page 471](#).

### show multicast usage instance

```

user@host> show multicast usage instance VPN-A
Group          Sources  Packets      Bytes
224.2.127.254  1        5538      509496
224.0.1.39     1         13         624
224.0.1.40     1         13         624

Prefix         /len  Groups  Packets      Bytes
192.168.195.34 /32   1        5538      509496
10.255.14.30   /32   1         13         624
```

```
10.255.245.91 /32 1 13 624
...
```

#### show multicast usage detail

```
user@host> show multicast usage detail
```

| Group                                                   | Sources | Packets | Bytes   |
|---------------------------------------------------------|---------|---------|---------|
| 228.0.0.0                                               | 1       | 53159   | 4465356 |
| Source: 10.255.14.144 /32 Packets: 53159 Bytes: 4465356 |         |         |         |
| 239.1.1.1                                               | 2       | 13450   | 1125530 |
| Source: 10.255.14.144 /32 Packets: 13407 Bytes: 1122156 |         |         |         |
| Source: 10.255.70.15 /32 Packets: 43 Bytes: 3374        |         |         |         |

| Prefix           | /len | Groups         | Packets        | Bytes   |
|------------------|------|----------------|----------------|---------|
| 10.255.14.144    | /32  | 2              | 66566          | 5587512 |
| Group: 228.0.0.0 |      | Packets: 53159 | Bytes: 4465356 |         |
| Group: 239.1.1.1 |      | Packets: 13407 | Bytes: 1122156 |         |
| 10.255.70.15     | /32  | 1              | 43             | 3374    |
| Group: 239.1.1.1 |      | Packets: 43    | Bytes: 3374    |         |



## show pim bootstrap

|                                                     |                                                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                               | <a href="#">Syntax on page 473</a><br><a href="#">Syntax (EX Series Switch and the QFX Series) on page 473</a>                                                                                                                                                                                                                                                                                     |
| <b>Syntax</b>                                       | <pre>show pim bootstrap &lt;instance <i>instance-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt;</pre>                                                                                                                                                                                                                                                                      |
| <b>Syntax (EX Series Switch and the QFX Series)</b> | <pre>show pim bootstrap &lt;instance <i>instance-name</i>&gt;</pre>                                                                                                                                                                                                                                                                                                                                |
| <b>Release Information</b>                          | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p><b>instance</b> option introduced in Junos OS Release 10.0 for EX Series switches.</p> <p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p>                                                                                                  |
| <b>Description</b>                                  | For sparse mode only, display information about Protocol Independent Multicast (PIM) bootstrap routers.                                                                                                                                                                                                                                                                                            |
| <b>Options</b>                                      | <p><b>none</b>—Display PIM bootstrap router information for all routing instances.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display information about bootstrap routers for a specific PIM-enabled routing instance.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b>                     | view                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>List of Sample Output</b>                        | <a href="#">show pim bootstrap on page 474</a><br><a href="#">show pim bootstrap instance on page 474</a>                                                                                                                                                                                                                                                                                          |
| <b>Output Fields</b>                                | <p><a href="#">Table 35 on page 473</a> describes the output fields for the <b>show pim bootstrap</b> command. Output fields are listed in the approximate order in which they appear.</p>                                                                                                                                                                                                         |

**Table 35: show pim bootstrap Output Fields**

| Field Name           | Field Description                                                            |
|----------------------|------------------------------------------------------------------------------|
| <b>Instance</b>      | Name of the routing instance.                                                |
| <b>BSR</b>           | Bootstrap router.                                                            |
| <b>Pri</b>           | Priority of the routing device as elected to be the bootstrap router.        |
| <b>Local address</b> | Local routing device address.                                                |
| <b>Pri</b>           | Local routing device address priority to be elected as the bootstrap router. |

Table 35: show pim bootstrap Output Fields (*continued*)

| Field Name     | Field Description                                                                                    |
|----------------|------------------------------------------------------------------------------------------------------|
| <b>State</b>   | Local routing device election state: <b>Candidate</b> , <b>Elected</b> , or <b>Ineligible</b> .      |
| <b>Timeout</b> | How long until the local routing device declares the bootstrap router to be unreachable, in seconds. |

## Sample Output

### show pim bootstrap

```
user@host> show pim bootstrap
Instance: PIM.master
```

| BSR                     | Pri | Local address           | Pri | State      | Timeout |
|-------------------------|-----|-------------------------|-----|------------|---------|
| None                    | 0   | 10.255.71.46            | 0   | InEligible | 0       |
| feco:1:1:1:1:0:aff:785c | 34  | feco:1:1:1:1:0:aff:7c12 | 0   | InEligible | 0       |

### show pim bootstrap instance

```
user@host> show pim bootstrap instance VPN-A
Instance: PIM.VPN-A
```

| BSR  | Pri | Local address   | Pri | State      | Timeout |
|------|-----|-----------------|-----|------------|---------|
| None | 0   | 192.168.196.105 | 0   | InEligible | 0       |

## show pim interfaces

|                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                               | <a href="#">Syntax on page 475</a><br><a href="#">Syntax (EX Series Switch and the QFX Series) on page 475</a>                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Syntax</b>                                       | <pre>show pim interfaces &lt;inet   inet6&gt; &lt;instance <i>instance-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Syntax (EX Series Switch and the QFX Series)</b> | <pre>show pim interfaces &lt;inet   inet6&gt; &lt;instance <i>instance-name</i>&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Release Information</b>                          | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p><b>inet6</b> and <b>instance</b> options introduced in Junos OS Release 10.0 for EX Series switches.</p> <p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p> <p>Support for bidirectional PIM added in Junos OS Release 12.1.</p>                                                                                                                                       |
| <b>Description</b>                                  | Display information about the interfaces on which Protocol Independent Multicast (PIM) is configured.                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Options</b>                                      | <p><b>none</b>—Display interface information for all family addresses for all routing instances.</p> <p><b>inet   inet6</b>—(Optional) Display interface information for IPv4 or IPv6 family addresses, respectively.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display information about interfaces for a specific PIM-enabled routing instance.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b>                     | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>List of Sample Output</b>                        | <a href="#">show pim interfaces on page 476</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Output Fields</b>                                | <p><a href="#">Table 36 on page 475</a> describes the output fields for the <b>show pim interfaces</b> command. Output fields are listed in the approximate order in which they appear.</p>                                                                                                                                                                                                                                                                                                                                    |

**Table 36: show pim interfaces Output Fields**

| Field Name      | Field Description                                                                          |
|-----------------|--------------------------------------------------------------------------------------------|
| <b>Instance</b> | Name of the routing instance.                                                              |
| <b>Name</b>     | Interface name.                                                                            |
| <b>State</b>    | State of the interface. The state also is displayed in the <b>show interfaces</b> command. |

Table 36: show pim interfaces Output Fields (*continued*)

| Field Name          | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Mode</b>         | <p>PIM mode running on the interface:</p> <ul style="list-style-type: none"> <li>• <b>B</b>—In bidirectional mode, multicast groups are carried across the network over bidirectional shared trees. This type of tree minimizes PIM routing state, which is especially important in networks with numerous and dispersed senders and receivers.</li> <li>• <b>S</b>—In sparse mode, routing devices must join and leave multicast groups explicitly. Upstream routing devices do not forward multicast traffic to this routing device unless this device has sent an explicit request (using a join message) to receive multicast traffic.</li> <li>• <b>Dense</b>—Unlike sparse mode, where data is forwarded only to routing devices sending an explicit request, dense mode implements a flood-and-prune mechanism, similar to DVMRP (the first multicast protocol used to support the multicast backbone). (Not supported on QFX Series.)</li> <li>• <b>Sparse-Dense</b>—Sparse-dense mode allows the interface to operate on a per-group basis in either sparse or dense mode. A group specified as <b>dense</b> is not mapped to a rendezvous point (RP). Instead, data packets destined for that group are forwarded using PIM-Dense Mode (PIM-DM) rules. A group specified as <b>sparse</b> is mapped to an RP, and data packets are forwarded using PIM-Sparse Mode (PIM-SM) rules. (Not supported on QFX Series.)</li> </ul> <p>When sparse-dense mode is configured, the output includes both <b>S</b> and <b>D</b>. When bidirectional-sparse mode is configured, the output includes <b>S</b> and <b>B</b>. When bidirectional-sparse-dense mode is configured, the output includes <b>B</b>, <b>S</b>, and <b>D</b>.</p> |
| <b>IP</b>           | Version number of the address family on the interface: <b>4</b> (IPv4) or <b>6</b> (IPv6).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>V</b>            | PIM version running on the interface: 1 or 2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>State</b>        | <p>State of PIM on the interface:</p> <ul style="list-style-type: none"> <li>• <b>Active</b>—Bidirectional mode is enabled on the interface and on all PIM neighbors.</li> <li>• <b>DR</b>—Designated router.</li> <li>• <b>NotCap</b>—Bidirectional mode is not enabled on the interface. This can happen when bidirectional PIM is not configured locally, when one of the neighbors is not configured for bidirectional PIM, or when one of the neighbors has not implemented the bidirectional PIM protocol.</li> <li>• <b>NotDR</b>—Not the designated router.</li> <li>• <b>P2P</b>—Point to point.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>NbrCnt</b>       | Number of neighbors that have been seen on the interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>JoinCnt(sg)</b>  | Number of (s,g) join messages that have been seen on the interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>JointCnt(*g)</b> | Number of (*g) join messages that have been seen on the interface.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>DR address</b>   | Address of the designated router.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

## Sample Output

### show pim interfaces

```

user@host> show pim interfaces
Stat = Status, V = Version, NbrCnt = Neighbor Count,
S = Sparse, D = Dense, B = Bidirectional,
DR = Designated Router, P2P = Point-to-point link,

```

Active = Bidirectional is active, NotCap = Not Bidirectional Capable

| Name           | Stat | Mode | IP | V | State        | NbrCnt | JoinCnt(sg/*g) | DR address |
|----------------|------|------|----|---|--------------|--------|----------------|------------|
| ge-0/3/0.0     | Up   | S    | 4  | 2 | NotDR,NotCap | 1      | 0/0            | 40.0.0.3   |
| ge-0/3/3.50    | Up   | S    | 4  | 2 | DR,NotCap    | 1      | 9901/100       | 50.0.0.2   |
| ge-0/3/3.51    | Up   | S    | 4  | 2 | DR,NotCap    | 1      | 0/0            | 51.0.0.2   |
| pe-1/2/0.32769 | Up   | S    | 4  | 2 | P2P,NotCap   | 0      | 0/0            |            |

## show pim join

**List of Syntax**    [Syntax on page 478](#)  
                          [Syntax \(EX Series Switch and the QFX Series\) on page 478](#)

**Syntax**    show pim join  
                  <brief | detail | extensive | summary>  
                  <bidirectional | dense | sparse>  
                  <exact>  
                  <inet | inet6>  
                  <instance *instance-name*>  
                  <logical-system (all | *logical-system-name*)>  
                  <range>  
                  <rp *ip-address/prefix* | source *ip-address/prefix*>  
                  <sg | star-g>

**Syntax (EX Series Switch and the QFX Series)**    show pim join  
                  <brief | detail | extensive | summary>  
                  <dense | sparse>  
                  <exact>  
                  <inet | inet6>  
                  <instance *instance-name*>  
                  <range>  
                  <rp *ip-address/prefix* | source *ip-address/prefix*>  
                  <sg | star-g>

**Release Information**    Command introduced before Junos OS Release 7.4.  
                                  Command introduced in Junos OS Release 9.0 for EX Series switches.  
                                  **summary** option introduced in Junos OS Release 9.6.  
                                  **inet6** and **instance** options introduced in Junos OS Release 10.0 for EX Series switches.  
                                  Support for bidirectional PIM added in Junos OS Release 12.1.  
                                  Command introduced in Junos OS Release 11.3 for the QFX Series.  
                                  Multiple new filter options introduced in Junos OS Release 13.2.  
                                  Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.

**Description**    Display information about Protocol Independent Multicast (PIM) groups for all PIM modes.

For bidirectional PIM, display information about PIM group ranges (\*G-range) for each active bidirectional RP group range, in addition to each of the joined (\*G) routes.

**Options**    **none**—Display the standard information about PIM groups for all supported family addresses for all routing instances.

**brief | detail | extensive | summary**—(Optional) Display the specified level of output.

**bidirectional | dense | sparse**—(Optional) Display information about PIM bidirectional mode, dense mode, or sparse and source-specific multicast (SSM) mode entries.

**exact**—(Optional) Display information about only the group that exactly matches the specified group address.

**inet | inet6**—(Optional) Display PIM group information for IPv4 or IPv6 family addresses, respectively.

**instance *instance-name***—(Optional) Display information about groups for the specified PIM-enabled routing instance only.

**logical-system (all | *logical-system-name*)**—(Optional) Perform this operation on all logical systems or on a particular logical system.

**range**—(Optional) Address range of the group, specified as *prefix/prefix-length*.

**rp *ip-address/prefix* | source *ip-address/prefix***—(Optional) Display information about the PIM entries with a specified rendezvous point (RP) address and prefix or with a specified source address and prefix. You can omit the prefix.

**sg | star-g**—(Optional) Display information about PIM (S,G) or (\*,G) entries.

**Required Privilege Level**

view

**Related Documentation**

- [clear pim join on page 424](#)
- *Example: Configuring Bidirectional PIM*

**List of Sample Output**

[show pim join summary on page 483](#)  
[show pim join \(PIM Sparse Mode\) on page 483](#)  
[show pim join \(Bidirectional PIM\) on page 484](#)  
[show pim join inet6 on page 484](#)  
[show pim join inet6 star-g on page 485](#)  
[show pim join instance <instance-name> on page 485](#)  
[show pim join detail on page 485](#)  
[show pim join extensive \(PIM Sparse Mode\) on page 486](#)  
[show pim join extensive \(Bidirectional PIM\) on page 487](#)  
[show pim join extensive \(Bidirectional PIM with a Directly Connected Phantom RP\) on page 488](#)  
[show pim join instance <instance-name> extensive on page 488](#)  
[show pim join extensive \(Ingress Node with Multipoint LDP Inband Signaling for Point-to-Multipoint LSPs\) on page 489](#)  
[show pim join extensive \(Egress Node with Multipoint LDP Inband Signaling for Point-to-Multipoint LSPs\) on page 490](#)  
[show pim join summary on page 491](#)  
[show pim join \(PIM Sparse Mode\) on page 492](#)  
[show pim join \(Bidirectional PIM\) on page 492](#)  
[show pim join inet6 on page 493](#)  
[show pim join inet6 star-g on page 493](#)  
[show pim join instance <instance-name> on page 493](#)  
[show pim join detail on page 494](#)  
[show pim join extensive \(PIM Sparse Mode\) on page 494](#)  
[show pim join extensive \(Bidirectional PIM\) on page 495](#)

[show pim join extensive \(Bidirectional PIM with a Directly Connected Phantom RP\) on page 496](#)

[show pim join instance <instance-name> extensive on page 496](#)

[show pim join extensive \(Ingress Node with Multipoint LDP Inband Signaling for Point-to-Multipoint LSPs\) on page 497](#)

[show pim join extensive \(Multipoint LDP with Multicast-Only Fast Reroute\) on page 498](#)

**Output Fields** [Table 37 on page 480](#) describes the output fields for the **show pim join** command. Output fields are listed in the approximate order in which they appear.

**Table 37: show pim join Output Fields**

| Field Name                               | Field Description                                                                                                                                                                                                                                                                                                                                                                                    | Level of Output                            |
|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|
| <b>Instance</b>                          | Name of the routing instance.                                                                                                                                                                                                                                                                                                                                                                        | <b>brief detail extensive summary none</b> |
| <b>Family</b>                            | Name of the address family: <b>inet</b> (IPv4) or <b>inet6</b> (IPv6).                                                                                                                                                                                                                                                                                                                               | <b>brief detail extensive summary none</b> |
| <b>Route type</b>                        | Type of multicast route: (S,G) or (*G).                                                                                                                                                                                                                                                                                                                                                              | <b>summary</b>                             |
| <b>Route count</b>                       | Number of (S,G) routes and number of (*G) routes.                                                                                                                                                                                                                                                                                                                                                    | <b>summary</b>                             |
| <b>R</b>                                 | Rendezvous Point Tree.                                                                                                                                                                                                                                                                                                                                                                               | <b>brief detail extensive none</b>         |
| <b>S</b>                                 | Sparse.                                                                                                                                                                                                                                                                                                                                                                                              | <b>brief detail extensive none</b>         |
| <b>W</b>                                 | Wildcard.                                                                                                                                                                                                                                                                                                                                                                                            | <b>brief detail extensive none</b>         |
| <b>Group</b>                             | Group address.                                                                                                                                                                                                                                                                                                                                                                                       | <b>brief detail extensive none</b>         |
| <b>Bidirectional group prefix length</b> | For bidirectional PIM, length of the IP prefix for RP group ranges.                                                                                                                                                                                                                                                                                                                                  | <b>All levels</b>                          |
| <b>Source</b>                            | Multicast source: <ul style="list-style-type: none"> <li>• * (wildcard value)</li> <li>• <i>ipv4-address</i></li> <li>• <i>ipv6-address</i></li> </ul>                                                                                                                                                                                                                                               | <b>brief detail extensive none</b>         |
| <b>RP</b>                                | Rendezvous point for the PIM group.                                                                                                                                                                                                                                                                                                                                                                  | <b>brief detail extensive none</b>         |
| <b>Flags</b>                             | PIM flags: <ul style="list-style-type: none"> <li>• <b>bidirectional</b>—Bidirectional mode entry.</li> <li>• <b>dense</b>—Dense mode entry.</li> <li>• <b>rptree</b>—Entry is on the rendezvous point tree.</li> <li>• <b>sparse</b>—Sparse mode entry.</li> <li>• <b>spt</b>—Entry is on the shortest-path tree for the source.</li> <li>• <b>wildcard</b>—Entry is on the shared tree.</li> </ul> | <b>brief detail extensive none</b>         |



Table 37: show pim join Output Fields (*continued*)

| Field Name                             | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Level of Output                    |
|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| <b>Upstream interface</b>              | <p>RPF interface toward the source address for the source-specific state (S,G) or toward the rendezvous point (RP) address for the non-source-specific state (*G).</p> <p>For bidirectional PIM, <b>RP Link</b> means that the interface is directly connected to a subnet that contains a phantom RP address.</p> <p>A pseudo multipoint LDP (M-LDP) interface appears on egress nodes in M-LDP point-to-multipoint LSPs with inband signaling.</p>                                            | <b>brief detail extensive none</b> |
| <b>Upstream neighbor</b>               | <p>Information about the upstream neighbor: <b>Direct</b>, <b>Local</b>, <b>Unknown</b>, or a specific IP address.</p> <p>For bidirectional PIM, <b>Direct</b> means that the interface is directly connected to a subnet that contains a phantom RP address.</p> <p>The multipoint LDP (M-LDP) root appears on egress nodes in M-LDP point-to-multipoint LSPs with inband signaling.</p>                                                                                                       | <b>extensive</b>                   |
| <b>Upstream state</b>                  | <p>When multicast-only fast reroute (MoFRR) is configured in a PIM domain, the upstream interface for the active path. A PIM router propagates join messages on two upstream RPF interfaces to receive multicast traffic on both links for the same join request. Preference is given to two paths that do not converge to the same immediate upstream router. PIM installs appropriate multicast routes with upstream neighbors as RPF next hops with two (primary and backup) interfaces.</p> | <b>extensive</b>                   |
| <b>Active upstream neighbor</b>        | <p>On the MoFRR primary path, the IP address of the neighbor that is directly connected to the active upstream interface.</p>                                                                                                                                                                                                                                                                                                                                                                   | <b>extensive</b>                   |
| <b>MoFRR Backup upstream interface</b> | <p>The MoFRR upstream interface that is used when the primary path fails.</p> <p>When the primary path fails, the backup path is upgraded to primary, and traffic is forwarded accordingly. If there are alternate paths available, a new backup path is calculated and the appropriate multicast route is updated or installed.</p>                                                                                                                                                            | <b>extensive</b>                   |

Table 37: show pim join Output Fields (*continued*)

| Field Name                  | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Level of Output  |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>Upstream state</b>       | <p>Information about the upstream interface:</p> <ul style="list-style-type: none"> <li>• <b>Join to RP</b>—Sending a join to the rendezvous point.</li> <li>• <b>Join to Source</b>—Sending a join to the source.</li> <li>• <b>Local RP</b>—Sending neither join messages nor prune messages toward the RP, because this routing device is the rendezvous point.</li> <li>• <b>Local Source</b>—Sending neither join messages nor prune messages toward the source, because the source is locally attached to this routing device.</li> <li>• <b>No Prune to RP</b>—Automatically sent to RP when SPT and RPT are on the same path.</li> <li>• <b>Prune to RP</b>—Sending a prune to the rendezvous point.</li> <li>• <b>Prune to Source</b>—Sending a prune to the source.</li> </ul> <p><b>NOTE:</b> RP group range entries have <b>None</b> in the <b>Upstream state</b> field because RP group ranges do not trigger actual PIM join messages between routing devices.</p>              | <b>extensive</b> |
| <b>Downstream neighbors</b> | <p>Information about downstream interfaces:</p> <ul style="list-style-type: none"> <li>• <b>Interface</b>—Interface name for the downstream neighbor.<br/>A pseudo PIM-SM interface appears for all IGMP-only interfaces.<br/>A pseudo multipoint LDP (M-LDP) interface appears on ingress root nodes in M-LDP point-to-multipoint LSPs with inband signaling.</li> <li>• <b>Interface address</b>—Address of the downstream neighbor.</li> <li>• <b>State</b>—Information about the downstream neighbor: <b>join</b> or <b>prune</b>.</li> <li>• <b>Flags</b>—PIM join flags: <b>R (RPtree)</b>, <b>S (Sparse)</b>, <b>W (Wildcard)</b>, or <b>zero</b>.</li> <li>• <b>Uptime</b>—Time since the downstream interface joined the group.</li> <li>• <b>Time since last Join</b>—Time since the last join message was received from the downstream interface.</li> <li>• <b>Time since last Prune</b>—Time since the last prune message was received from the downstream interface.</li> </ul> | <b>extensive</b> |
| <b>Assert Timeout</b>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                  |
| <b>Assert Timeout</b>       | Length of time between assert cycles on the downstream interface. Not displayed if the assert timer is null.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>extensive</b> |

Table 37: show pim join Output Fields (*continued*)

| Field Name                                | Field Description                                                                                                                                                                                                                                                                                                             | Level of Output  |
|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>Keepalive timeout</b>                  | Time remaining until the downstream join state is updated (in seconds). If the downstream join state is not updated before this keepalive timer reaches zero, the entry is deleted. If there is a directly connected host, <b>Keepalive timeout</b> is <b>Infinity</b> .                                                      | <b>extensive</b> |
| <b>Uptime</b>                             | Time since the creation of (S,G) or (*,G) state. The uptime is not refreshed every time a PIM join message is received for an existing (S,G) or (*,G) state.                                                                                                                                                                  | <b>extensive</b> |
| <b>Bidirectional accepting interfaces</b> | <p>Interfaces on the router that forward bidirectional PIM traffic.</p> <p>The reasons for forwarding bidirectional PIM traffic are that the interface is the winner of the designated forwarder election (<b>DF Winner</b>), or the interface is the reverse path forwarding (RPF) interface toward the RP (<b>RPF</b>).</p> | <b>extensive</b> |

## Sample Output

### show pim join summary

```

user@host> show pim join summary
Instance: PIM.master Family: INET

Route type          Route count
(s,g)                2
(*,g)                1

Instance: PIM.master Family: INET6

```

### show pim join (PIM Sparse Mode)

```

user@host> show pim join
Instance: PIM.master Family: INET
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

Group: 239.1.1.1
  Source: *
  RP: 10.255.14.144
  Flags: sparse,rptree,wildcard
  Upstream interface: Local

Group: 239.1.1.1
  Source: 10.255.14.144
  Flags: sparse,spt
  Upstream interface: Local

Group: 239.1.1.1
  Source: 10.255.70.15
  Flags: sparse,spt
  Upstream interface: so-1/0/0.0

```

```
Instance: PIM.master Family: INET6
R = Rendezvous Point Tree, S = Sparse, W = Wildcard
```

#### show pim join (Bidirectional PIM)

```
user@host> show pim join
Instance: PIM.master Family: INET
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

Group: 224.1.1.0
  Bidirectional group prefix length: 24
  Source: *
  RP: 10.10.13.2
  Flags: bidirectional,rptree,wildcard
  Upstream interface: ge-0/0/1.0

Group: 224.1.3.0
  Bidirectional group prefix length: 24
  Source: *
  RP: 10.10.1.3
  Flags: bidirectional,rptree,wildcard
  Upstream interface: ge-0/0/1.0 (RP Link)

Group: 225.1.1.0
  Bidirectional group prefix length: 24
  Source: *
  RP: 10.10.13.2
  Flags: bidirectional,rptree,wildcard
  Upstream interface: ge-0/0/1.0

Group: 225.1.3.0
  Bidirectional group prefix length: 24
  Source: *
  RP: 10.10.1.3
  Flags: bidirectional,rptree,wildcard
  Upstream interface: ge-0/0/1.0 (RP Link)

Instance: PIM.master Family: INET6
R = Rendezvous Point Tree, S = Sparse, W = Wildcard
```

#### show pim join inet6

```
user@host> show pim join inet6
Instance: PIM.master Family: INET6
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

Group: ff04::e000:101
  Source: *
  RP: ::46.0.0.13
  Flags: sparse,rptree,wildcard
  Upstream interface: Local

Group: ff04::e000:101
  Source: ::1.1.1.1
  Flags: sparse
  Upstream interface: unknown (no neighbor)

Group: ff04::e800:101
  Source: ::1.1.1.1
  Flags: sparse
  Upstream interface: unknown (no neighbor)
```

```

Group: ff04::e800:101
Source: ::1.1.1.2
Flags: sparse
Upstream interface: unknown (no neighbor)

```

### show pim join inet6 star-g

```

user@host> show pim join inet6 star-g
Instance: PIM.master Family: INET6
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

Group: ff04::e000:101
Source: *
RP: ::46.0.0.13
Flags: sparse,rptree,wildcard
Upstream interface: Local

```

### show pim join instance <instance-name>

```

user@host> show pim join instance VPN-A
Instance: PIM.VPN-A Family: INET
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

Group: 235.1.1.2
Source: *
RP: 10.10.47.100
Flags: sparse,rptree,wildcard
Upstream interface: Local

Group: 235.1.1.2
Source: 192.168.195.74
Flags: sparse,spt
Upstream interface: at-0/3/1.0

Group: 235.1.1.2
Source: 192.168.195.169
Flags: sparse
Upstream interface: so-1/0/1.0

Instance: PIM.VPN-A Family: INET6
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

```

### show pim join detail

```

user@host> show pim join detail
Instance: PIM.master Family: INET
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

Group: 239.1.1.1
Source: *
RP: 10.255.14.144
Flags: sparse,rptree,wildcard
Upstream interface: Local

Group: 239.1.1.1
Source: 10.255.14.144
Flags: sparse,spt
Upstream interface: Local

Group: 239.1.1.1
Source: 10.255.70.15

```

```
Flags: sparse,spt
Upstream interface: so-1/0/0.0
```

```
Instance: PIM.master Family: INET6
R = Rendezvous Point Tree, S = Sparse, W = Wildcard
```

### show pim join extensive (PIM Sparse Mode)

```
user@host> show pim join extensive
Instance: PIM.master Family: INET
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

Group: 239.1.1.1
  Source: *
  RP: 10.255.14.144
  Flags: sparse,rptree,wildcard
  Upstream interface: Local
  Upstream neighbor: Local
  Upstream state: Local RP
  Uptime: 00:03:49
  Downstream neighbors:
    Interface: so-1/0/0.0
      10.111.10.2 State: Join Flags: SRW Timeout: 174
      Uptime: 00:03:49 Time since last Join: 00:01:49
    Interface: mt-1/1/0.32768
      10.10.47.100 State: Join Flags: SRW Timeout: Infinity
      Uptime: 00:03:49 Time since last Join: 00:01:49
  Number of downstream interfaces: 2

Group: 239.1.1.1
  Source: 10.255.14.144
  Flags: sparse,spt
  Upstream interface: Local
  Upstream neighbor: Local
  Upstream state: Local Source, Local RP
  Keepalive timeout: 344
  Uptime: 00:03:49
  Downstream neighbors:
    Interface: so-1/0/0.0
      10.111.10.2 State: Join Flags: S Timeout: 174
      Uptime: 00:03:49 Time since last Prune: 00:01:49
    Interface: mt-1/1/0.32768
      10.10.47.100 State: Join Flags: S Timeout: Infinity
      Uptime: 00:03:49 Time since last Prune: 00:01:49
  Number of downstream interfaces: 2

Group: 239.1.1.1
  Source: 10.255.70.15
  Flags: sparse,spt
  Upstream interface: so-1/0/0.0
  Upstream neighbor: 10.111.10.2
  Upstream state: Local RP, Join to Source
  Keepalive timeout: 344
  Uptime: 00:03:49
  Downstream neighbors:
    Interface: Pseudo-GMP
      fe-0/0/0.0 fe-0/0/1.0 fe-0/0/3.0
    Interface: so-1/0/0.0 (pruned)
      10.111.10.2 State: Prune Flags: SR Timeout: 174
      Uptime: 00:03:49 Time since last Prune: 00:01:49
    Interface: mt-1/1/0.32768
```

```

10.10.47.100 State: Join Flags: S   Timeout: Infinity
Uptime: 00:03:49 Time since last Prune: 00:01:49
Number of downstream interfaces: 3

```

```

Instance: PIM.master Family: INET6
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

```

### show pim join extensive (Bidirectional PIM)

```

user@host> show pim join extensive
Instance: PIM.master Family: INET
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

```

```

Group: 224.1.1.0
  Bidirectional group prefix length: 24
  Source: *
  RP: 10.10.13.2
  Flags: bidirectional,rptree,wildcard
  Upstream interface: ge-0/0/1.0
  Upstream neighbor: 10.10.1.2
  Upstream state: None
  Uptime: 00:03:49
  Bidirectional accepting interfaces:
    Interface: ge-0/0/1.0      (RPF)
    Interface: lo0.0          (DF Winner)
  Number of downstream interfaces: 0

Group: 225.1.1.0
  Bidirectional group prefix length: 24
  Source: *
  RP: 10.10.13.2
  Flags: bidirectional,rptree,wildcard
  Upstream interface: ge-0/0/1.0
  Upstream neighbor: 10.10.1.2
  Upstream state: None
  Uptime: 00:03:49
  Bidirectional accepting interfaces:
    Interface: ge-0/0/1.0      (RPF)
    Interface: lo0.0          (DF Winner)
  Downstream neighbors:
    Interface: lt-1/0/10.24
      10.0.24.4 State: Join   RW   Timeout: 185
    Interface: lt-1/0/10.23
      10.0.23.3 State: Join   RW   Timeout: 184
  Number of downstream interfaces: 2

Group: 225.1.3.0
  Bidirectional group prefix length: 24
  Source: *
  RP: 10.10.1.3
  Flags: bidirectional,rptree,wildcard
  Upstream interface: ge-0/0/1.0 (RP Link)
  Upstream neighbor: Direct
  Upstream state: Local RP
  Uptime: 00:03:49
  Bidirectional accepting interfaces:
    Interface: ge-0/0/1.0      (RPF)
    Interface: lo0.0          (DF Winner)
    Interface: xe-4/1/0.0      (DF Winner)
  Number of downstream interfaces: 0

```

```
Instance: PIM.master Family: INET6
R = Rendezvous Point Tree, S = Sparse, W = Wildcard
```

### show pim join extensive (Bidirectional PIM with a Directly Connected Phantom RP)

```
user@host> show pim join extensive
Instance: PIM.master Family: INET
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

Group: 224.1.1.1
  Bidirectional group prefix length: 24
  Source: *
  RP: 10.10.1.3
  Flags: bidirectional,rptree,wildcard
  Upstream interface: ge-0/0/1.0 (RP Link)
  Upstream neighbor: Direct
  Upstream state: Local RP
  Uptime: 00:03:49
  Bidirectional accepting interfaces:
    Interface: ge-0/0/1.0      (RPF)
    Interface: lo0.0          (DF Winner)
    Interface: xe-4/1/0.0      (DF Winner)
  Number of downstream interfaces: 0
```

### show pim join instance <instance-name> extensive

```
user@host> show pim join instance VPN-A extensive
Instance: PIM.VPN-A Family: INET
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

Group: 235.1.1.2
  Source: *
  RP: 10.10.47.100
  Flags: sparse,rptree,wildcard
  Upstream interface: Local
  Upstream neighbor: Local
  Upstream state: Local RP
  Uptime: 00:03:49
  Downstream neighbors:
    Interface: mt-1/1/0.32768
    10.10.47.101 State: Join Flags: SRW Timeout: 156
    Uptime: 00:03:49 Time since last Join: 00:01:49
  Number of downstream interfaces: 1

Group: 235.1.1.2
  Source: 192.168.195.74
  Flags: sparse,spt
  Upstream interface: at-0/3/1.0
  Upstream neighbor: 10.111.30.2
  Upstream state: Local RP, Join to Source
  Keepalive timeout: 156
  Uptime: 00:14:52

Group: 235.1.1.2
  Source: 192.168.195.169
  Flags: sparse
  Upstream interface: so-1/0/1.0
  Upstream neighbor: 10.111.20.2
  Upstream state: Local RP, Join to Source
  Keepalive timeout: 156
  Uptime: 00:14:52
```



**show pim join extensive (Ingress Node with Multipoint LDP Inband Signaling for Point-to-Multipoint LSPs)**

```

user@host> show pim join extensive
Instance: PIM.master Family: INET
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

Group: 232.1.1.1
  Source: 192.168.219.11
  Flags: sparse,spt
  Upstream interface: fe-1/3/1.0
  Upstream neighbor: Direct
  Upstream state: Local Source
  Keepalive timeout:
  Uptime: 11:27:55
  Downstream neighbors:
    Interface: Pseudo-MLDP
    Interface: lt-1/2/0.25
      1.2.5.2 State: Join Flags: S   Timeout: Infinity
      Uptime: 11:27:55 Time since last Join: 11:27:55

Group: 232.1.1.2
  Source: 192.168.219.11
  Flags: sparse,spt
  Upstream interface: fe-1/3/1.0
  Upstream neighbor: Direct
  Upstream state: Local Source
  Keepalive timeout:
  Uptime: 11:27:41
  Downstream neighbors:
    Interface: Pseudo-MLDP

Group: 232.1.1.3
  Source: 192.168.219.11
  Flags: sparse,spt
  Upstream interface: fe-1/3/1.0
  Upstream neighbor: Direct
  Upstream state: Local Source
  Keepalive timeout:
  Uptime: 11:27:41
  Downstream neighbors:
    Interface: Pseudo-MLDP

Group: 232.2.2.2
  Source: 1.2.7.7
  Flags: sparse,spt
  Upstream interface: lt-1/2/0.27
  Upstream neighbor: Direct
  Upstream state: Local Source
  Keepalive timeout:
  Uptime: 11:27:25
  Downstream neighbors:
    Interface: Pseudo-MLDP

Instance: PIM.master Family: INET6
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

Group: ff3e::1:2
  Source: abcd::1:2:7:7
  Flags: sparse,spt
  Upstream interface: lt-1/2/0.27
  Upstream neighbor: Direct

```

```

Upstream state: Local Source
Keepalive timeout:
Uptime: 11:27:26
Downstream neighbors:
    Interface: Pseudo-MLDP

```

### show pim join extensive (Egress Node with Multipoint LDP Inband Signaling for Point-to-Multipoint LSPs)

```

user@host> show pim join extensive
Instance: PIM.master Family: INET
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

Group: 227.1.1.1
  Source: *
  RP: 1.1.1.1
  Flags: sparse,rptree,wildcard
  Upstream interface: Local
  Upstream neighbor: Local
  Upstream state: Local RP
  Uptime: 11:31:33
  Downstream neighbors:
    Interface: fe-1/3/0.0
      192.168.209.9 State: Join Flags: SRW Timeout: Infinity
      Uptime: 11:31:33 Time since last Join: 11:31:32

Group: 232.1.1.1
  Source: 192.168.219.11
  Flags: sparse,spt
  Upstream protocol: MLDP
  Upstream interface: Pseudo MLDP
  Upstream neighbor: MLDP LSP root <1.1.1.2>
  Upstream state: Join to Source
  Keepalive timeout:
  Uptime: 11:31:32
  Downstream neighbors:
    Interface: so-0/1/3.0
      192.168.92.9 State: Join Flags: S Timeout: Infinity
      Uptime: 11:31:30 Time since last Join: 11:31:30
    Downstream neighbors:
      Interface: fe-1/3/0.0
        192.168.209.9 State: Join Flags: S Timeout: Infinity
        Uptime: 11:31:32 Time since last Join: 11:31:32

Group: 232.1.1.2
  Source: 192.168.219.11
  Flags: sparse,spt
  Upstream protocol: MLDP
  Upstream interface: Pseudo MLDP
  Upstream neighbor: MLDP LSP root <1.1.1.2>
  Upstream state: Join to Source
  Keepalive timeout:
  Uptime: 11:31:32
  Downstream neighbors:
    Interface: so-0/1/3.0
      192.168.92.9 State: Join Flags: S Timeout: Infinity
      Uptime: 11:31:30 Time since last Join: 11:31:30
    Downstream neighbors:
      Interface: lt-1/2/0.14
        1.1.4.4 State: Join Flags: S Timeout: 177
        Uptime: 11:30:33 Time since last Join: 00:00:33
    Downstream neighbors:

```

```

Interface: fe-1/3/0.0
  192.168.209.9 State: Join Flags: S   Timeout: Infinity
  Uptime: 11:31:32 Time since last Join: 11:31:32

Group: 232.1.1.3
  Source: 192.168.219.11
  Flags: sparse,spt
  Upstream protocol: MLDP
  Upstream interface: Pseudo MLDP
  Upstream neighbor: MLDP LSP root <1.1.1.2>
  Upstream state: Join to Source
  Keepalive timeout:
  Uptime: 11:31:32
  Downstream neighbors:
    Interface: fe-1/3/0.0
      192.168.209.9 State: Join Flags: S   Timeout: Infinity
      Uptime: 11:31:32 Time since last Join: 11:31:32

Group: 232.2.2.2
  Source: 1.2.7.7
  Flags: sparse,spt
  Upstream protocol: MLDP
  Upstream interface: Pseudo MLDP
  Upstream neighbor: MLDP LSP root <1.1.1.2>
  Upstream state: Join to Source
  Keepalive timeout:
  Uptime: 11:31:30
  Downstream neighbors:
    Interface: so-0/1/3.0
      192.168.92.9 State: Join Flags: S   Timeout: Infinity
      Uptime: 11:31:30 Time since last Join: 11:31:30

Instance: PIM.master Family: INET6
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

Group: ff3e::1:2
  Source: abcd::1:2:7:7
  Flags: sparse,spt
  Upstream protocol: MLDP
  Upstream interface: Pseudo MLDP
  Upstream neighbor: MLDP LSP root <1.1.1.2>
  Upstream state: Join to Source
  Keepalive timeout:
  Uptime: 11:31:32
  Downstream neighbors:
    Interface: fe-1/3/0.0
      fe80::21f:12ff:fea5:c4db State: Join Flags: S   Timeout: Infinity
      Uptime: 11:31:32 Time since last Join: 11:31:32

```

## Sample Output

### show pim join summary

```

user@host> show pim join summary
Instance: PIM.master Family: INET

Route type      Route count
(s,g)           2
(*,g)           1

Instance: PIM.master Family: INET6

```

### show pim join (PIM Sparse Mode)

```
user@host> show pim join
Instance: PIM.master Family: INET
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

Group: 239.1.1.1
Source: *
RP: 10.255.14.144
Flags: sparse,rptree,wildcard
Upstream interface: Local

Group: 239.1.1.1
Source: 10.255.14.144
Flags: sparse,spt
Upstream interface: Local

Group: 239.1.1.1
Source: 10.255.70.15
Flags: sparse,spt
Upstream interface: so-1/0/0.0

Instance: PIM.master Family: INET6
R = Rendezvous Point Tree, S = Sparse, W = Wildcard
```

### show pim join (Bidirectional PIM)

```
user@host> show pim join
Instance: PIM.master Family: INET
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

Group: 224.1.1.0
Bidirectional group prefix length: 24
Source: *
RP: 10.10.13.2
Flags: bidirectional,rptree,wildcard
Upstream interface: ge-0/0/1.0

Group: 224.1.3.0
Bidirectional group prefix length: 24
Source: *
RP: 10.10.1.3
Flags: bidirectional,rptree,wildcard
Upstream interface: ge-0/0/1.0 (RP Link)

Group: 225.1.1.0
Bidirectional group prefix length: 24
Source: *
RP: 10.10.13.2
Flags: bidirectional,rptree,wildcard
Upstream interface: ge-0/0/1.0

Group: 225.1.3.0
Bidirectional group prefix length: 24
Source: *
RP: 10.10.1.3
Flags: bidirectional,rptree,wildcard
Upstream interface: ge-0/0/1.0 (RP Link)

Instance: PIM.master Family: INET6
R = Rendezvous Point Tree, S = Sparse, W = Wildcard
```

**show pim join inet6**

```

user@host> show pim join inet6
Instance: PIM.master Family: INET6
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

Group: ff04::e000:101
  Source: *
  RP: ::46.0.0.13
  Flags: sparse,rptree,wildcard
  Upstream interface: Local

Group: ff04::e000:101
  Source: ::1.1.1.1
  Flags: sparse
  Upstream interface: unknown (no neighbor)

Group: ff04::e800:101
  Source: ::1.1.1.1
  Flags: sparse
  Upstream interface: unknown (no neighbor)

Group: ff04::e800:101
  Source: ::1.1.1.2
  Flags: sparse
  Upstream interface: unknown (no neighbor)

```

**show pim join inet6 star-g**

```

user@host> show pim join inet6 star-g
Instance: PIM.master Family: INET6
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

Group: ff04::e000:101
  Source: *
  RP: ::46.0.0.13
  Flags: sparse,rptree,wildcard
  Upstream interface: Local

```

**show pim join instance <instance-name>**

```

user@host> show pim join instance VPN-A
Instance: PIM.VPN-A Family: INET
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

Group: 235.1.1.2
  Source: *
  RP: 10.10.47.100
  Flags: sparse,rptree,wildcard
  Upstream interface: Local

Group: 235.1.1.2
  Source: 192.168.195.74
  Flags: sparse,spt
  Upstream interface: at-0/3/1.0

Group: 235.1.1.2
  Source: 192.168.195.169
  Flags: sparse
  Upstream interface: so-1/0/1.0

```

```
Instance: PIM.VPN-A Family: INET6
R = Rendezvous Point Tree, S = Sparse, W = Wildcard
```

#### show pim join detail

```
user@host> show pim join detail
Instance: PIM.master Family: INET
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

Group: 239.1.1.1
  Source: *
  RP: 10.255.14.144
  Flags: sparse,rptree,wildcard
  Upstream interface: Local

Group: 239.1.1.1
  Source: 10.255.14.144
  Flags: sparse,spt
  Upstream interface: Local

Group: 239.1.1.1
  Source: 10.255.70.15
  Flags: sparse,spt
  Upstream interface: so-1/0/0.0

Instance: PIM.master Family: INET6
R = Rendezvous Point Tree, S = Sparse, W = Wildcard
```

#### show pim join extensive (PIM Sparse Mode)

```
user@host> show pim join extensive
Instance: PIM.master Family: INET
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

Group: 239.1.1.1
  Source: *
  RP: 10.255.14.144
  Flags: sparse,rptree,wildcard
  Upstream interface: Local
  Upstream neighbor: Local
  Upstream state: Local RP
  Uptime: 00:03:49
  Downstream neighbors:
    Interface: so-1/0/0.0
      10.111.10.2 State: Join Flags: SRW Timeout: 174
      Uptime: 00:03:49 Time since last Join: 00:01:49
    Interface: mt-1/1/0.32768
      10.10.47.100 State: Join Flags: SRW Timeout: Infinity
      Uptime: 00:03:49 Time since last Join: 00:01:49
  Number of downstream interfaces: 2

Group: 239.1.1.1
  Source: 10.255.14.144
  Flags: sparse,spt
  Upstream interface: Local
  Upstream neighbor: Local
  Upstream state: Local Source, Local RP
  Keepalive timeout: 344
  Uptime: 00:03:49
  Downstream neighbors:
    Interface: so-1/0/0.0
```

```

    10.111.10.2 State: Join Flags: S Timeout: 174
    Uptime: 00:03:49 Time since last Prune: 00:01:49
    Interface: mt-1/1/0.32768
    10.10.47.100 State: Join Flags: S   Timeout: Infinity
    Uptime: 00:03:49 Time since last Prune: 00:01:49
    Number of downstream interfaces: 2

Group: 239.1.1.1
Source: 10.255.70.15
Flags: sparse,spt
Upstream interface: so-1/0/0.0
Upstream neighbor: 10.111.10.2
Upstream state: Local RP, Join to Source
Keepalive timeout: 344
Uptime: 00:03:49
Downstream neighbors:
  Interface: Pseudo-GMP
    fe-0/0/0.0 fe-0/0/1.0 fe-0/0/3.0
  Interface: so-1/0/0.0 (pruned)
    10.111.10.2 State: Prune Flags: SR Timeout: 174
    Uptime: 00:03:49 Time since last Prune: 00:01:49
  Interface: mt-1/1/0.32768
    10.10.47.100 State: Join Flags: S   Timeout: Infinity
    Uptime: 00:03:49 Time since last Prune: 00:01:49
  Number of downstream interfaces: 3

Instance: PIM.master Family: INET6
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

```

#### show pim join extensive (Bidirectional PIM)

```

user@host> show pim join extensive
Instance: PIM.master Family: INET
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

Group: 224.1.1.0
  Bidirectional group prefix length: 24
  Source: *
  RP: 10.10.13.2
  Flags: bidirectional,rptree,wildcard
  Upstream interface: ge-0/0/1.0
  Upstream neighbor: 10.10.1.2
  Upstream state: None
  Uptime: 00:03:49
  Bidirectional accepting interfaces:
    Interface: ge-0/0/1.0      (RPF)
    Interface: lo0.0           (DF Winner)
  Number of downstream interfaces: 0

Group: 225.1.1.0
  Bidirectional group prefix length: 24
  Source: *
  RP: 10.10.13.2
  Flags: bidirectional,rptree,wildcard
  Upstream interface: ge-0/0/1.0
  Upstream neighbor: 10.10.1.2
  Upstream state: None
  Uptime: 00:03:49
  Bidirectional accepting interfaces:
    Interface: ge-0/0/1.0      (RPF)
    Interface: lo0.0           (DF Winner)

```

```

Downstream neighbors:
  Interface: lt-1/0/10.24
    10.0.24.4 State: Join   RW   Timeout: 185
  Interface: lt-1/0/10.23
    10.0.23.3 State: Join   RW   Timeout: 184
Number of downstream interfaces: 2

Group: 225.1.3.0
Bidirectional group prefix length: 24
Source: *
RP: 10.10.1.3
Flags: bidirectional,rptree,wildcard
Upstream interface: ge-0/0/1.0 (RP Link)
Upstream neighbor: Direct
Upstream state: Local RP
Uptime: 00:03:49
Bidirectional accepting interfaces:
  Interface: ge-0/0/1.0      (RPF)
  Interface: lo0.0           (DF Winner)
  Interface: xe-4/1/0.0      (DF Winner)
Number of downstream interfaces: 0

Instance: PIM.master Family: INET6
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

```

#### show pim join extensive (Bidirectional PIM with a Directly Connected Phantom RP)

```

user@host> show pim join extensive
Instance: PIM.master Family: INET
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

Group: 224.1.3.0
Bidirectional group prefix length: 24
Source: *
RP: 10.10.1.3
Flags: bidirectional,rptree,wildcard
Upstream interface: ge-0/0/1.0 (RP Link)
Upstream neighbor: Direct
Upstream state: Local RP
Uptime: 00:03:49
Bidirectional accepting interfaces:
  Interface: ge-0/0/1.0      (RPF)
  Interface: lo0.0           (DF Winner)
  Interface: xe-4/1/0.0      (DF Winner)
Number of downstream interfaces: 0

```

#### show pim join instance <instance-name> extensive

```

user@host> show pim join instance VPN-A extensive
Instance: PIM.VPN-A Family: INET
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

Group: 235.1.1.2
Source: *
RP: 10.10.47.100
Flags: sparse,rptree,wildcard
Upstream interface: Local
Upstream neighbor: Local
Upstream state: Local RP
Uptime: 00:03:49
Downstream neighbors:

```



```

Interface: mt-1/1/0.32768
10.10.47.101 State: Join Flags: SRW Timeout: 156
Uptime: 00:03:49 Time since last Join: 00:01:49
Number of downstream interfaces: 1

```

```

Group: 235.1.1.2
Source: 192.168.195.74
Flags: sparse,spt
Upstream interface: at-0/3/1.0
Upstream neighbor: 10.111.30.2
Upstream state: Local RP, Join to Source
Keepalive timeout: 156
Uptime: 00:14:52

```

```

Group: 235.1.1.2
Source: 192.168.195.169
Flags: sparse
Upstream interface: so-1/0/1.0
Upstream neighbor: 10.111.20.2
Upstream state: Local RP, Join to Source
Keepalive timeout: 156
Uptime: 00:14:52

```

#### show pim join extensive (Ingress Node with Multipoint LDP Inband Signaling for Point-to-Multipoint LSPs)

```

user@host> show pim join extensive
Instance: PIM.master Family: INET
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

Group: 232.1.1.1
Source: 192.168.219.11
Flags: sparse,spt
Upstream interface: fe-1/3/1.0
Upstream neighbor: Direct
Upstream state: Local Source
Keepalive timeout:
Uptime: 11:27:55
Downstream neighbors:
Interface: Pseudo-MLDP
Interface: lt-1/2/0.25
1.2.5.2 State: Join Flags: S Timeout: Infinity
Uptime: 11:27:55 Time since last Join: 11:27:55

Group: 232.1.1.2
Source: 192.168.219.11
Flags: sparse,spt
Upstream interface: fe-1/3/1.0
Upstream neighbor: Direct
Upstream state: Local Source
Keepalive timeout:
Uptime: 11:27:41
Downstream neighbors:
Interface: Pseudo-MLDP

Group: 232.1.1.3
Source: 192.168.219.11
Flags: sparse,spt
Upstream interface: fe-1/3/1.0
Upstream neighbor: Direct
Upstream state: Local Source
Keepalive timeout:

```

```
Uptime: 11:27:41
Downstream neighbors:
  Interface: Pseudo-MLDP

Group: 232.2.2.2
Source: 1.2.7.7
Flags: sparse,spt
Upstream interface: lt-1/2/0.27
Upstream neighbor: Direct
Upstream state: Local Source
Keepalive timeout:
Uptime: 11:27:25
Downstream neighbors:
  Interface: Pseudo-MLDP

Instance: PIM.master Family: INET6
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

Group: ff3e::1:2
Source: abcd::1:2:7:7
Flags: sparse,spt
Upstream interface: lt-1/2/0.27
Upstream neighbor: Direct
Upstream state: Local Source
Keepalive timeout:
Uptime: 11:27:26
Downstream neighbors:
  Interface: Pseudo-MLDP
```

#### show pim join extensive (Multipoint LDP with Multicast-Only Fast Reroute)

```
user@host> show pim join 225.1.1.1 extensive sg
Instance: PIM.master Family: INET
R = Rendezvous Point Tree, S = Sparse, W = Wildcard

Group: 225.1.1.1
Source: 10.0.0.1
Flags: sparse,spt
Active upstream interface: fe-1/2/13.0
Active upstream neighbor: 10.0.0.9
MoFRR Backup upstream interface: fe-1/2/14.0
MoFRR Backup upstream neighbor: 10.0.0.21
Upstream state: Join to Source, No Prune to RP
Keepalive timeout: 354
Uptime: 00:00:06
Downstream neighbors:
  Interface: fe-1/2/15.0
    10.0.0.13 State: Join Flags: S   Timeout: Infinity
    Uptime: 00:00:06 Time since last Join: 00:00:06
Number of downstream interfaces: 1
```

## show pim neighbors

|                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                               | <a href="#">Syntax on page 499</a><br><a href="#">Syntax (EX Series Switch and the QFX Series) on page 499</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Syntax</b>                                       | <pre>show pim neighbors &lt;brief   detail&gt; &lt;inet   inet6&gt; &lt;instance <i>instance-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Syntax (EX Series Switch and the QFX Series)</b> | <pre>show pim neighbors &lt;brief   detail&gt; &lt;inet   inet6&gt; &lt;instance <i>instance-name</i>&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Release Information</b>                          | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p><b>inet6</b> and <b>instance</b> options introduced in Junos OS Release 10.0 for EX Series switches.</p> <p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p> <p>Support for bidirectional PIM added in Junos OS Release 12.1.</p> <p>Support for the <b>instance all</b> option added in Junos OS Release 12.1.</p> <p>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>                                                                                                                                                       |
| <b>Description</b>                                  | Display information about Protocol Independent Multicast (PIM) neighbors.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Options</b>                                      | <p><b>none</b>—(Same as <b>brief</b>) Display standard information about PIM neighbors for all supported family addresses for the main instance.</p> <p><b>brief   detail</b>—(Optional) Display the specified level of output.</p> <p><b>inet   inet6</b>—(Optional) Display information about PIM neighbors for IPv4 or IPv6 family addresses, respectively.</p> <p><b>instance (<i>instance-name</i>   all)</b>—(Optional) Display information about neighbors for the specified PIM-enabled routing instance or for all routing instances.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b>                     | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>List of Sample Output</b>                        | <a href="#">show pim neighbors on page 501</a><br><a href="#">show pim neighbors brief on page 501</a><br><a href="#">show pim neighbors instance on page 501</a><br><a href="#">show pim neighbors detail on page 501</a><br><a href="#">show pim neighbors detail (With BFD) on page 502</a>                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Output Fields</b>                                | <p><a href="#">Table 38 on page 500</a> describes the output fields for the <b>show pim neighbors</b> command. Output fields are listed in the approximate order in which they appear.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

Table 38: show pim neighbors Output Fields

| Field Name                                       | Field Description                                                                                                                                                                                                                                                                                                                                | Level of Output   |
|--------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| <b>Instance</b>                                  | Name of the routing instance.                                                                                                                                                                                                                                                                                                                    | All levels        |
| <b>Interface</b>                                 | Interface through which the neighbor is reachable.                                                                                                                                                                                                                                                                                               | All levels        |
| <b>Neighbor addr</b>                             | Address of the neighboring PIM routing device.                                                                                                                                                                                                                                                                                                   | All levels        |
| <b>IP</b>                                        | IP version: 4 or 6.                                                                                                                                                                                                                                                                                                                              | All levels        |
| <b>V</b>                                         | PIM version running on the neighbor: 1 or 2.                                                                                                                                                                                                                                                                                                     | All levels        |
| <b>Mode</b>                                      | PIM mode of the neighbor: <b>Sparse</b> , <b>Dense</b> , <b>SparseDense</b> , or <b>Unknown</b> . When the neighbor is running PIM version 2, this mode is always <b>Unknown</b> .                                                                                                                                                               | All levels        |
| <b>Option</b>                                    | Can be one or more of the following: <ul style="list-style-type: none"> <li>• <b>B</b>—Bidirectional Capable.</li> <li>• <b>G</b>—Generation Identifier.</li> <li>• <b>H</b>—Hello Option Holdtime.</li> <li>• <b>L</b>—Hello Option LAN Prune Delay.</li> <li>• <b>P</b>—Hello Option DR Priority.</li> <li>• <b>T</b>—Tracking bit.</li> </ul> | <b>brief</b> none |
| <b>Uptime</b>                                    | Time the neighbor has been operational since the PIM process was last initialized, in the format <b>dd:hh:mm:ss ago</b> for less than a week and <b>nwnd:hh:mm:ss ago</b> for more than a week.                                                                                                                                                  | All levels        |
| <b>Address</b>                                   | Address of the neighboring PIM routing device.                                                                                                                                                                                                                                                                                                   | <b>detail</b>     |
| <b>BFD</b>                                       | Status and operational state of the Bidirectional Forwarding Detection (BFD) protocol on the interface: <b>Enabled</b> , <b>Operational state is up</b> , or <b>Disabled</b> .                                                                                                                                                                   | <b>detail</b>     |
| <b>Hello Option Holdtime</b>                     | Time for which the neighbor is available, in seconds. The range of values is 0 through 65,535.                                                                                                                                                                                                                                                   | <b>detail</b>     |
| <b>Hello Default Holdtime</b>                    | Default holdtime and the time remaining if the <b>holdtime</b> option is not in the received hello message.                                                                                                                                                                                                                                      | <b>detail</b>     |
| <b>Hello Option DR Priority</b>                  | Designated router election priority. The range of values is 0 through 255.                                                                                                                                                                                                                                                                       | <b>detail</b>     |
| <b>Hello Option Generation ID</b>                | 9-digit or 10-digit number used to tag hello messages.                                                                                                                                                                                                                                                                                           | <b>detail</b>     |
| <b>Hello Option Bi-Directional PIM supported</b> | Neighbor can process bidirectional PIM messages.                                                                                                                                                                                                                                                                                                 | <b>detail</b>     |
| <b>Hello Option LAN Prune Delay</b>              | Time to wait before the neighbor receives prune messages, in the format <b>delay nnn ms override nnnn ms</b> .                                                                                                                                                                                                                                   | <b>detail</b>     |

Table 38: show pim neighbors Output Fields (*continued*)

| Field Name                 | Field Description                                                                                                                                                                                                                                                                   | Level of Output |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Join Suppression supported | Neighbor is capable of join suppression.                                                                                                                                                                                                                                            | detail          |
| Rx Join                    | Information about joins received from the neighbor. <ul style="list-style-type: none"> <li><b>Group</b>—Group addresses in the join message.</li> <li><b>Source</b>—Address of the source in the join message.</li> <li><b>Timeout</b>—Time for which the join is valid.</li> </ul> | detail          |

## Sample Output

### show pim neighbors

```

user@host> show pim neighbors
Instance: PIM.master
B = Bidirectional Capable, G = Generation Identifier,
H = Hello Option Holdtime, L = Hello Option LAN Prune Delay,
P = Hello Option DR Priority, T = Tracking bit

Interface      IP V Mode      Option      Uptime Neighbor addr
so-1/0/0.0      4 2            HPLG        00:07:10 10.111.10.2

```

### show pim neighbors brief

The output for the **show pim neighbors brief** command is identical to that for the **show pim neighbors** command. For sample output, see [show pim neighbors on page 501](#).

### show pim neighbors instance

```

user@host> show pim neighbors instance VPN-A
Instance: PIM.VPN-A
B = Bidirectional Capable, G = Generation Identifier,
H = Hello Option Holdtime, L = Hello Option LAN Prune Delay,
P = Hello Option DR Priority, T = Tracking bit

Interface      IP V Mode      Option      Uptime Neighbor addr
at-0/3/1.0      4 2            HPLG        00:07:54 10.111.30.2
mt-1/1/0.32768  4 2            HPLG        00:07:22 10.10.47.101
so-1/0/1.0      4 2            HPLG        00:07:50 10.111.20.2

```

### show pim neighbors detail

```

user@host> show pim neighbors detail
Instance: PIM.master
Interface: ge-0/0/1.0

Address: 10.10.1.1, IPv4, PIM v2, Mode: SparseDense, sg Join Count: 0, tsf
Join Count: 2
Hello Option Holdtime: 65535 seconds
Hello Option DR Priority: 1
Hello Option Generation ID: 2053759302
Hello Option Bi-Directional PIM supported
Hello Option LAN Prune Delay: delay 500 ms override 2000 ms
Join Suppression supported

```

```
Address: 10.10.1.2, IPv4, PIM v2, sg Join Count: 0, tsg Join Count: 2
BFD: Disabled
Hello Option Holdtime: 105 seconds 93 remaining
Hello Option DR Priority: 1
Hello Option Generation ID: 1734018161
Hello Option Bi-Directional PIM supported
Hello Option LAN Prune Delay: delay 500 ms override 2000 ms
Join Suppression supported
```

Interface: lo0.0

```
Address: 10.255.179.246, IPv4, PIM v2, Mode: SparseDense, sg Join Count:
0, tsg Join Count: 0
Hello Option Holdtime: 65535 seconds
Hello Option DR Priority: 1
Hello Option Generation ID: 1997462267
Hello Option Bi-Directional PIM supported
Hello Option LAN Prune Delay: delay 500 ms override 2000 ms
Join Suppression supported
```

#### show pim neighbors detail (With BFD)

```
user@host> show pim neighbors detail
```

Instance: PIM.master

Interface: fe-1/0/0.0

```
Address: 192.168.11.1, IPv4, PIM v2, Mode: Sparse
Hello Option Holdtime: 65535 seconds
Hello Option DR Priority: 1
Hello Option Generation ID: 836607909
Hello Option LAN Prune Delay: delay 500 ms override 2000 ms
```

```
Address: 192.168.11.2, IPv4, PIM v2
BFD: Enabled, Operational state is up
Hello Default Holdtime: 105 seconds 104 remaining
Hello Option DR Priority: 1
Hello Option Generation ID: 1907549685
Hello Option LAN Prune Delay: delay 500 ms override 2000 ms
```

Interface: fe-1/0/1.0

```
Address: 192.168.12.1, IPv4, PIM v2
BFD: Disabled
Hello Default Holdtime: 105 seconds 80 remaining
Hello Option DR Priority: 1
Hello Option Generation ID: 1971554705
Hello Option LAN Prune Delay: delay 500 ms override 2000 ms
```

## show pim rps

|                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                               | <a href="#">Syntax on page 503</a><br><a href="#">Syntax (EX Series Switch and the QFX Series) on page 503</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Syntax</b>                                       | <pre>show pim rps &lt;brief   detail   extensive&gt; &lt;group-address&gt; &lt;inet   inet6&gt; &lt;instance instance-name&gt; &lt;logical-system (all   logical-system-name)&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Syntax (EX Series Switch and the QFX Series)</b> | <pre>show pim rps &lt;brief   detail   extensive&gt; &lt;group-address&gt; &lt;inet   inet6&gt; &lt;instance instance-name&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Release Information</b>                          | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p><b>inet6</b> and <b>instance</b> options introduced in Junos OS Release 10.0 for EX Series switches.</p> <p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p> <p>Support for bidirectional PIM added in Junos OS Release 12.1.</p> <p>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>                                                                                                                                                                                                                                                                                                                               |
| <b>Description</b>                                  | Display information about Protocol Independent Multicast (PIM) rendezvous points (RPs).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Options</b>                                      | <p><b>none</b>—Display standard information about PIM RPs for all groups and family addresses for all routing instances.</p> <p><b>brief   detail   extensive</b>—(Optional) Display the specified level of output.</p> <p><b>group-address</b>—(Optional) Display the RPs for a particular group. If you specify a group address, the output lists the routing device that is the RP for that group.</p> <p><b>inet   inet6</b>—(Optional) Display information for IPv4 or IPv6 family addresses, respectively.</p> <p><b>instance instance-name</b>—(Optional) Display information about RPs for a specific PIM-enabled routing instance.</p> <p><b>logical-system (all   logical-system-name)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b>                     | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Related Documentation</b>                        | <ul style="list-style-type: none"> <li>• <a href="#">Example: Configuring Bidirectional PIM</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>List of Sample Output</b>                        | <a href="#">show pim rps on page 506</a><br><a href="#">show pim rps brief on page 506</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

[show pim rps <group-address> on page 506](#)  
[show pim rps <group-address> \(Bidirectional PIM\) on page 506](#)  
[show pim rps <group-address> \(PIM Dense Mode\) on page 507](#)  
[show pim rps <group-address> \(SSM Range Without asm-override-ssm Configured\) on page 507](#)  
[show pim rps <group-address> \(SSM Range With asm-override-ssm Configured and a Sparse-Mode RP\) on page 507](#)  
[show pim rps <group-address> \(SSM Range With asm-override-ssm Configured and a Bidirectional RP\) on page 507](#)  
[show pim rps instance on page 507](#)  
[show pim rps extensive \(PIM Sparse Mode\) on page 507](#)  
[show pim rps extensive \(Bidirectional PIM\) on page 508](#)  
[show pim rps extensive \(PIM Anycast RP in Use\) on page 508](#)

**Output Fields** [Table 39 on page 504](#) describes the output fields for the **show pim rps** command. Output fields are listed in the approximate order in which they appear.

**Table 39: show pim rps Output Fields**

| Field Name                      | Field Description                                                                                                                                                                                                                                                                                                                                                                                  | Level of Output         |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>Instance</b>                 | Name of the routing instance.                                                                                                                                                                                                                                                                                                                                                                      | All levels              |
| <b>Family or Address family</b> | Name of the address family: <b>inet</b> (IPv4) or <b>inet6</b> (IPv6).                                                                                                                                                                                                                                                                                                                             | All levels              |
| <b>RP address</b>               | Address of the rendezvous point.                                                                                                                                                                                                                                                                                                                                                                   | All levels              |
| <b>Type</b>                     | Type of RP: <ul style="list-style-type: none"> <li>• <b>auto-rp</b>—Address of the RP known through the Auto-RP protocol.</li> <li>• <b>bootstrap</b>—Address of the RP known through the bootstrap router protocol (BSR).</li> <li>• <b>embedded</b>—Address of the RP known through an embedded RP (IPv6).</li> <li>• <b>static</b>—Address of RP known through static configuration.</li> </ul> | <b>brief none</b>       |
| <b>Holdtime</b>                 | How long to keep the RP active, with time remaining, in seconds.                                                                                                                                                                                                                                                                                                                                   | All levels              |
| <b>Timeout</b>                  | How long until the local routing device determines the RP to be unreachable, in seconds.                                                                                                                                                                                                                                                                                                           | All levels              |
| <b>Groups</b>                   | Number of groups currently using this RP.                                                                                                                                                                                                                                                                                                                                                          | All levels              |
| <b>Group prefixes</b>           | Addresses of groups that this RP can span.                                                                                                                                                                                                                                                                                                                                                         | <b>brief none</b>       |
| <b>Learned via</b>              | Address and method by which the RP was learned.                                                                                                                                                                                                                                                                                                                                                    | <b>detail extensive</b> |
| <b>Mode</b>                     | The PIM mode of the RP: bidirectional or sparse.<br><br>If a sparse and bidirectional RPs are configured with the same RP address, they appear as separate entries in both formats.                                                                                                                                                                                                                | All levels              |



Table 39: show pim rps Output Fields (*continued*)

| Field Name                    | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Level of Output                              |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| <b>Time Active</b>            | How long the RP has been active, in the format <i>hh:mm:ss</i> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | detail extensive                             |
| <b>Device Index</b>           | Index value of the order in which Junos OS finds and initializes the interface.<br><br>For bidirectional RPs, the <b>Device Index</b> output field is omitted because bidirectional RPs do not require encapsulation and de-encapsulation interfaces.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | detail extensive                             |
| <b>Subunit</b>                | Logical unit number of the interface.<br><br>For bidirectional RPs, the <b>Subunit</b> output field is omitted because bidirectional RPs do not require encapsulation and de-encapsulation interfaces.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | detail extensive                             |
| <b>Interface</b>              | Either the encapsulation or the de-encapsulation logical interface, depending on whether this routing device is a designated router (DR) facing an RP router, or is the local RP, respectively.<br><br>For bidirectional RPs, the <b>Interface</b> output field is omitted because bidirectional RPs do not require encapsulation and de-encapsulation interfaces.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | detail extensive                             |
| <b>Group Ranges</b>           | Addresses of groups that this RP spans.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | detail extensive<br><br><i>group-address</i> |
| <b>Active groups using RP</b> | Number of groups currently using this RP.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | detail extensive                             |
| <b>total</b>                  | Total number of active groups for this RP.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | detail extensive                             |
| <b>Register State for RP</b>  | Current register state for each group: <ul style="list-style-type: none"> <li>• <b>Group</b>—Multicast group address.</li> <li>• <b>Source</b>—Multicast source address for which the PIM register is sent or received, depending on whether this router is a designated router facing an RP router, or is the local RP, respectively:</li> <li>• <b>First Hop</b>—PIM-designated routing device that sent the Register message (the source address in the IP header).</li> <li>• <b>RP Address</b>—RP to which the Register message was sent (the destination address in the IP header).</li> <li>• <b>State</b>: <ul style="list-style-type: none"> <li>On the designated router: <ul style="list-style-type: none"> <li>• <b>Send</b>—Sending Register messages.</li> <li>• <b>Probe</b>—Sent a null register. If a Register-Stop message does not arrive in 5 seconds, the designated router resumes sending Register messages.</li> <li>• <b>Suppress</b>—Received a Register-Stop message. The designated router is waiting for the timer to resume before changing to <b>Probe</b> state.</li> </ul> </li> <li>On the RP: <ul style="list-style-type: none"> <li>• <b>Receive</b>—Receiving Register messages.</li> </ul> </li> </ul> </li> </ul> | extensive                                    |
| <b>Anycast-PIM rpset</b>      | If anycast RP is configured, the addresses of the RPs in the set.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | extensive                                    |

Table 39: show pim rps Output Fields (*continued*)

| Field Name                     | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Level of Output      |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| Anycast-PIM local address used | If anycast RP is configured, the local address used by the RP.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | extensive            |
| Anycast-PIM Register State     | <p>If anycast RP is configured, the current register state for each group:</p> <ul style="list-style-type: none"> <li>• <b>Group</b>—Multicast group address.</li> <li>• <b>Source</b>—Multicast source address for which the PIM register is sent or received, depending on whether this routing device is a designated router facing an RP router, or is the local RP, respectively.</li> <li>• <b>Origin</b>—How the information was obtained: <ul style="list-style-type: none"> <li>• <b>DIRECT</b>—From a local attachment</li> <li>• <b>MSDP</b>—From the Multicast Source Discovery Protocol (MSDP)</li> <li>• <b>DR</b>—From the designated router</li> </ul> </li> </ul> | extensive            |
| RP selected                    | For sparse mode and bidirectional mode, the identity of the RP for the specified group address.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <i>group-address</i> |

## Sample Output

### show pim rps

```

user@host> show pim rps
Instance: PIM.master
Address family INET
RP address      Type      Mode    Holdtime Timeout Groups  Group prefixes
10.10.1.3       static    bidir   150      None     2  224.1.3.0/24
                                   225.1.3.0/24
10.10.13.2      static    bidir   150      None     2  224.1.1.0/24
                                   225.1.1.0/24

```

### show pim rps brief

The output for the **show pim rps brief** command is identical to that for the **show pim rps** command. For sample output, see [show pim rps on page 506](#).

### show pim rps <group-address>

```

user@host> show pim rps 235.100.100.0
Instance: PIM.master
Instance: PIM.master

RP selected: 100.100.100.100

```

### show pim rps <group-address> (Bidirectional PIM)

```

user@host> show pim rps 224.1.1.1
Instance: PIM.master

224.1.0.0/16
11.4.12.75 (Bidirectional)

RP selected: 11.4.12.75

```

**show pim rps <group-address> (PIM Dense Mode)**

```

user@host> show pim rps 224.1.1.1
Instance: PIM.master

Dense Mode active for group 224.1.1.1

```

**show pim rps <group-address> (SSM Range Without asm-override-ssm Configured)**

```

user@host> show pim rps 224.1.1.1
Instance: PIM.master

Source-specific Mode (SSM) active for group 224.1.1.1

```

**show pim rps <group-address> (SSM Range With asm-override-ssm Configured and a Sparse-Mode RP)**

```

user@host> show pim rps 224.1.1.1
Instance: PIM.master

Source-specific Mode (SSM) active with Sparse Mode ASM override for group 224.1.1.1

224.1.0.0/16
    11.4.12.75

RP selected: 11.4.12.75

```

**show pim rps <group-address> (SSM Range With asm-override-ssm Configured and a Bidirectional RP)**

```

user@host> show pim rps 224.1.1.1
Instance: PIM.master

Source-specific Mode (SSM) active with Sparse Mode ASM override for group 224.1.1.1

224.1.0.0/16
    11.4.12.75 (Bidirectional)

RP selected: (null)

```

**show pim rps instance**

```

user@host> show pim rps instance VPN-A
Instance: PIM.VPN-A
Address family INET
RP address          Type          Holdtime Timeout Groups Group prefixes
10.10.47.100        static         0      None      1 224.0.0.0/4

Address family INET6

```

**show pim rps extensive (PIM Sparse Mode)**

```

user@host> show pim rps extensive
Instance: PIM.master

Family: INET
RP: 10.255.245.91
Learned via: static configuration
Time Active: 00:05:48
Holdtime: 45 with 36 remaining
Device Index: 122
Subunit: 32768
Interface: pd-6/0/0.32768
Group Ranges:

```

```
224.0.0.0/4, 36s remaining
Active groups using RP:
225.1.1.1
```

```
total 1 groups active
```

```
Register State for RP:
```

| Group     | Source         | FirstHop      | RP Address    | State   | Timeout |
|-----------|----------------|---------------|---------------|---------|---------|
| 225.1.1.1 | 192.168.195.78 | 10.255.14.132 | 10.255.245.91 | Receive | 0       |

#### show pim rps extensive (Bidirectional PIM)

```
user@host> show pim rps extensive
```

```
Instance: PIM.master
```

```
Address family INET
```

```
RP: 10.10.1.3
```

```
Learned via: static configuration
```

```
Mode: Bidirectional
```

```
Time Active: 01:58:07
```

```
Holdtime: 150
```

```
Group Ranges:
```

```
224.1.3.0/24
```

```
225.1.3.0/24
```

```
RP: 10.10.13.2
```

```
Learned via: static configuration
```

```
Mode: Bidirectional
```

```
Time Active: 01:58:07
```

```
Holdtime: 150
```

```
Group Ranges:
```

```
224.1.1.0/24
```

```
225.1.1.0/24
```

#### show pim rps extensive (PIM Anycast RP in Use)

```
user@host> show pim rps extensive
```

```
Instance: PIM.master
```

```
Family: INET
```

```
RP: 10.10.10.2
```

```
Learned via: static configuration
```

```
Time Active: 00:54:52
```

```
Holdtime: 0
```

```
Device Index: 130
```

```
Subunit: 32769
```

```
Interface: pimd.32769
```

```
Group Ranges:
```

```
224.0.0.0/4
```

```
Active groups using RP:
```

```
224.10.10.10
```

```
total 1 groups active
```

```
Anycast-PIM rpset:
```

```
10.100.111.34
```

```
10.100.111.17
```

```
10.100.111.55
```

```
Anycast-PIM local address used: 10.100.111.1
```

```
Anycast-PIM Register State:
```

| Group        | Source     | Origin |
|--------------|------------|--------|
| 224.1.1.1    | 10.10.95.2 | DIRECT |
| 224.1.1.2    | 10.10.95.2 | DIRECT |
| 224.10.10.10 | 10.10.70.1 | MSDP   |
| 224.10.10.11 | 10.10.70.1 | MSDP   |
| 224.20.20.1  | 10.10.71.1 | DR     |

Address family INET6

Anycast-PIM rpset:

ab::1

ab::2

Anycast-PIM local address used: cd::1

Anycast-PIM Register State:

| Group         | Source       | Origin |
|---------------|--------------|--------|
| ::224.1.1.1   | ::10.10.95.2 | DIRECT |
| ::224.1.1.2   | ::10.10.95.2 | DIRECT |
| ::224.20.20.1 | ::10.10.71.1 | DR     |

## show pim source

---

|                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                               | <a href="#">Syntax on page 510</a><br><a href="#">Syntax (EX Series Switch and the QFX Series) on page 510</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Syntax</b>                                       | <pre>show pim source &lt;brief   detail&gt; &lt;inet   inet6&gt; &lt;instance <i>instance-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt; &lt;source-prefix&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Syntax (EX Series Switch and the QFX Series)</b> | <pre>show pim source &lt;brief   detail&gt; &lt;inet   inet6&gt; &lt;instance <i>instance-name</i>&gt; &lt;source-prefix&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Release Information</b>                          | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 9.0 for EX Series switches.<br><b>inet6</b> and <b>instance</b> options introduced in Junos OS Release 10.0 for EX Series switches.<br>Command introduced in Junos OS Release 11.3 for the QFX Series.                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Description</b>                                  | Display information about the Protocol Independent Multicast (PIM) source reverse path forwarding (RPF) state.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Options</b>                                      | <p><b>none</b>—Display standard information about the PIM RPF state for all supported family addresses for all routing instances.</p> <p><b>brief   detail</b>—(Optional) Display the specified level of output.</p> <p><b>inet   inet6</b>—(Optional) Display information for IPv4 or IPv6 family addresses, respectively.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display information about the RPF state for a specific PIM-enabled routing instance.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p><b>source-prefix</b>—(Optional) Display the state for source RPF states in the given range.</p> |
| <b>Required Privilege Level</b>                     | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>List of Sample Output</b>                        | <a href="#">show pim source on page 511</a><br><a href="#">show pim source brief on page 511</a><br><a href="#">show pim source detail on page 511</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Output Fields</b>                                | <a href="#">Table 40 on page 511</a> describes the output fields for the <b>show pim source</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

Table 40: show pim source Output Fields

| Field Name         | Field Description                                                     |
|--------------------|-----------------------------------------------------------------------|
| Instance           | Name of the routing instance.                                         |
| Source             | Address of the source or reverse path.                                |
| Prefix/length      | Prefix and prefix length for the route used to reach the RPF address. |
| Upstream interface | RPF interface toward the source address.                              |
| Upstream Neighbor  | Address of the RPF neighbor used to reach the source address.         |

## Sample Output

### show pim source

```

user@host> show pim source
Instance: PIM.master Family: INET

Source 10.255.14.144
  Prefix 10.255.14.144/32
  Upstream interface Local
  Upstream neighbor Local

Source 10.255.70.15
  Prefix 10.255.70.15/32
  Upstream interface so-1/0/0.0
  Upstream neighbor 10.111.10.2

Instance: PIM.master Family: INET6

```

### show pim source brief

The output for the **show pim source brief** command is identical to that for the **show pim source** command. For sample output, see [show pim source on page 511](#).

### show pim source detail

```

user@host> show pim source detail
Instance: PIM.master Family: INET

Source 10.255.14.144
  Prefix 10.255.14.144/32
  Upstream interface Local
  Upstream neighbor Local
  Active groups:228.0.0.0
    239.1.1.1
    239.1.1.1

Source 10.255.70.15
  Prefix 10.255.70.15/32
  Upstream interface so-1/0/0.0
  Upstream neighbor 10.111.10.2
  Active groups:239.1.1.1

```

Instance: PIM.master Family: INET6



## show pim statistics

|                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>List of Syntax</b>                               | <a href="#">Syntax on page 513</a><br><a href="#">Syntax (EX Series Switch and the QFX Series) on page 513</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Syntax</b>                                       | <pre>show pim statistics &lt;inet   inet6&gt; &lt;instance <i>instance-name</i>&gt; &lt;interface <i>interface-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Syntax (EX Series Switch and the QFX Series)</b> | <pre>show pim statistics &lt;inet   inet6&gt; &lt;instance <i>instance-name</i>&gt; &lt;interface <i>interface-name</i>&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Release Information</b>                          | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 9.0 for EX Series switches.</p> <p><b>inet6</b> and <b>instance</b> options introduced in Junos OS Release 10.0 for EX Series switches.</p> <p>Command introduced in Junos OS Release 11.3 for the QFX Series.</p> <p>Support for bidirectional PIM added in Junos OS Release 12.1.</p>                                                                                                                                                                              |
| <b>Description</b>                                  | Display Protocol Independent Multicast (PIM) statistics.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Options</b>                                      | <p><b>none</b>—Display PIM statistics.</p> <p><b>inet   inet6</b>—(Optional) Display IPv4 or IPv6 PIM statistics, respectively.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display statistics for a specific routing instance enabled by Protocol Independent Multicast (PIM).</p> <p><b>interface <i>interface-name</i></b>—(Optional) Display statistics about the specified interface.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b>                     | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Related Documentation</b>                        | <ul style="list-style-type: none"> <li>• <a href="#">clear pim statistics on page 428</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>List of Sample Output</b>                        | <a href="#">show pim statistics on page 519</a><br><a href="#">show pim statistics inet interface &lt;interface-name&gt; on page 520</a><br><a href="#">show pim statistics inet6 interface &lt;interface-name&gt; on page 521</a><br><a href="#">show pim statistics interface &lt;interface-name&gt; on page 521</a>                                                                                                                                                                                                                                                |
| <b>Output Fields</b>                                | <p><a href="#">Table 41 on page 514</a> describes the output fields for the <b>show pim statistics</b> command. Output fields are listed in the approximate order in which they appear.</p>                                                                                                                                                                                                                                                                                                                                                                           |

Table 41: show pim statistics Output Fields

| Field Name              | Field Description                                                                                                                                                                                                                                                                                                                                                                                                       |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Instance</b>         | <p>Name of the routing instance.</p> <p>This field only appears if you specify an interface, for example:</p> <ul style="list-style-type: none"> <li>• <b>inet interface <i>interface-name</i></b></li> <li>• <b>inet6 interface <i>interface-name</i></b></li> <li>• <b>interface <i>interface-name</i></b></li> </ul>                                                                                                 |
| <b>Family</b>           | <p>Output is for IPv4 or IPv6 PIM statistics. <b>INET</b> indicates IPv4 statistics, and <b>INET6</b> indicates IPv6 statistics.</p> <p>This field only appears if you specify an interface, for example:</p> <ul style="list-style-type: none"> <li>• <b>inet interface <i>interface-name</i></b></li> <li>• <b>inet6 interface <i>interface-name</i></b></li> <li>• <b>interface <i>interface-name</i></b></li> </ul> |
| <b>PIM statistics</b>   | PIM statistics for all interfaces or for the specified interface.                                                                                                                                                                                                                                                                                                                                                       |
| <b>PIM message type</b> | Message type for which statistics are displayed.                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Received</b>         | Number of received statistics.                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Sent</b>             | Number of messages sent of a certain type.                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Rx errors</b>        | Number of received packets that contained errors.                                                                                                                                                                                                                                                                                                                                                                       |
| <b>V2 Hello</b>         | PIM version 2 hello packets.                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>V2 Register</b>      | PIM version 2 register packets.                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>V2 Register Stop</b> | PIM version 2 register stop packets.                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>V2 Join Prune</b>    | PIM version 2 join and prune packets.                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>V2 Bootstrap</b>     | PIM version 2 bootstrap packets.                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>V2 Assert</b>        | PIM version 2 assert packets.                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>V2 Graft</b>         | PIM version 2 graft packets.                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>V2 Graft Ack</b>     | PIM version 2 graft acknowledgment packets.                                                                                                                                                                                                                                                                                                                                                                             |
| <b>V2 Candidate RP</b>  | PIM version 2 candidate RP packets.                                                                                                                                                                                                                                                                                                                                                                                     |

Table 41: show pim statistics Output Fields (*continued*)

| Field Name                              | Field Description                                                                                                                                              |
|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>V2 State Refresh</b>                 | PIM version 2 control messages related to PIM dense mode (PIM-DM) state refresh.<br><br>State refresh is an extension to PIM-DM. It not supported in Junos OS. |
| <b>V2 DF Election</b>                   | PIM version 2 send and receive messages associated with bidirectional PIM designated forwarder election.                                                       |
| <b>V1 Query</b>                         | PIM version 1 query packets.                                                                                                                                   |
| <b>V1 Register</b>                      | PIM version 1 register packets.                                                                                                                                |
| <b>V1 Register Stop</b>                 | PIM version 1 register stop packets.                                                                                                                           |
| <b>V1 Join Prune</b>                    | PIM version 1 join and prune packets.                                                                                                                          |
| <b>V1 RP Reachability</b>               | PIM version 1 RP reachability packets.                                                                                                                         |
| <b>V1 Assert</b>                        | PIM version 1 assert packets.                                                                                                                                  |
| <b>V1 Graft</b>                         | PIM version 1 graft packets.                                                                                                                                   |
| <b>V1 Graft Ack</b>                     | PIM version 1 graft acknowledgment packets.                                                                                                                    |
| <b>AutoRP Announce</b>                  | Auto-RP announce packets.                                                                                                                                      |
| <b>AutoRP Mapping</b>                   | Auto-RP mapping packets.                                                                                                                                       |
| <b>AutoRP Unknown type</b>              | Auto-RP packets with an unknown type.                                                                                                                          |
| <b>Anycast Register</b>                 | Auto-RP announce packets.                                                                                                                                      |
| <b>Anycast Register Stop</b>            | Auto-RP announce packets.                                                                                                                                      |
| <b>Global Statistics</b>                | Summary of PIM statistics for all interfaces.                                                                                                                  |
| <b>Hello dropped on neighbor policy</b> | Number of hello packets dropped because of a configured neighbor policy.                                                                                       |
| <b>Unknown type</b>                     | Number of PIM control packets received with an unknown type.                                                                                                   |
| <b>V1 Unknown type</b>                  | Number of PIM version 1 control packets received with an unknown type.                                                                                         |
| <b>Unknown Version</b>                  | Number of PIM control packets received with an unknown version. The version is not version 1 or version 2.                                                     |

Table 41: show pim statistics Output Fields (*continued*)

| Field Name                             | Field Description                                                                                                         |
|----------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| <b>Neighbor unknown</b>                | Number of PIM control packets received (excluding PIM hello) without first receiving the hello packet.                    |
| <b>Bad Length</b>                      | Number of PIM control packets received for which the packet size does not match the PIM length field in the packet.       |
| <b>Bad Checksum</b>                    | Number of PIM control packets received for which the calculated checksum does not match the checksum field in the packet. |
| <b>Bad Receive If</b>                  | Number of PIM control packets received on an interface that does not have PIM configured.                                 |
| <b>Rx Bad Data</b>                     | Number of PIM control packets received that contain data for TCP Bad register packets.                                    |
| <b>Rx Intf disabled</b>                | Number of PIM control packets received on an interface that has PIM disabled.                                             |
| <b>Rx V1 Require V2</b>                | Number of PIM version 1 control packets received on an interface configured for PIM version 2.                            |
| <b>Rx V2 Require V1</b>                | Number of PIM version 2 control packets received on an interface configured for PIM version 1.                            |
| <b>Rx Register not RP</b>              | Number of PIM register packets received when the router is not the RP for the group.                                      |
| <b>Rx Register no route</b>            | Number of PIM register packets received when the RP does not have a unicast route back to the source.                     |
| <b>Rx Register no decap if</b>         | Number of PIM register packets received when the RP does not have a de-encapsulation interface.                           |
| <b>Null Register Timeout</b>           | Number of NULL register timeout packets.                                                                                  |
| <b>RP Filtered Source</b>              | Number of PIM packets received when the router has a source address filter configured for the RP.                         |
| <b>Rx Unknown Reg Stop</b>             | Number of register stop messages received with an unknown type.                                                           |
| <b>Rx Join/Prune no state</b>          | Number of join and prune messages received for which the router has no state.                                             |
| <b>Rx Join/Prune on upstream if</b>    | Number of join and prune messages received on the interface used to reach the upstream router, toward the RP.             |
| <b>Rx Join/Prune for invalid group</b> | Number of join or prune messages received for invalid multicast group addresses.                                          |

Table 41: show pim statistics Output Fields (*continued*)

| Field Name                            | Field Description                                                                                                                                           |
|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Rx Join/Prune messages dropped</b> | Number of join and prune messages received and dropped.                                                                                                     |
| <b>Rx sparse join for dense group</b> | Number of PIM sparse mode join messages received for a group that is configured for dense mode.                                                             |
| <b>Rx Graft/Graft Ack no state</b>    | Number of graft and graft acknowledgment messages received for which the router or switch has no state.                                                     |
| <b>Rx Graft on upstream if</b>        | Number of graft messages received on the interface used to reach the upstream router, toward the RP.                                                        |
| <b>Rx CRP not BSR</b>                 | Number of BSR messages received in which the PIM message type is Candidate-RP-Advertisement, not Bootstrap.                                                 |
| <b>Rx BSR when BSR</b>                | Number of BSR messages received in which the PIM message type is Bootstrap.                                                                                 |
| <b>Rx BSR not RPF if</b>              | Number of BSR messages received on an interface that is not the RPF interface.                                                                              |
| <b>Rx unknown hello opt</b>           | Number of PIM hello packets received with options that Junos OS does not support.                                                                           |
| <b>Rx data no state</b>               | Number of PIM control packets received for which the router has no state for the data type.                                                                 |
| <b>Rx RP no state</b>                 | Number of PIM control packets received for which the router has no state for the RP.                                                                        |
| <b>Rx aggregate</b>                   | Number of PIM aggregate MDT packets received.                                                                                                               |
| <b>Rx malformed packet</b>            | Number of PIM control packets received with a malformed IP unicast or multicast address family.                                                             |
| <b>No RP</b>                          | Number of PIM control packets received with no RP address.                                                                                                  |
| <b>No register encaps if</b>          | Number of PIM register packets received when the first-hop router does not have an encapsulation interface.                                                 |
| <b>No route upstream</b>              | Number of PIM control packets received when the router does not have a unicast route to the the interface used to reach the upstream router, toward the RP. |
| <b>Nexthop Unusable</b>               | Number of PIM control packets with an unusable nexthop. A path can be unusable if the route is hidden or the link is down.                                  |
| <b>RP mismatch</b>                    | Number of PIM control packets received for which the router has an RP mismatch.                                                                             |

Table 41: show pim statistics Output Fields (*continued*)

| Field Name                                 | Field Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>RP mode mismatch</b>                    | RP mode (sparse or bidirectional) mismatches encountered when processing join and prune messages.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>RPF neighbor unknown</b>                | Number of PIM control packets received for which the router has an unknown RPF neighbor for the source.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Rx Joins/Prunes filtered</b>            | The number of join and prune messages filtered because of configured route filters and source address filters.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Tx Joins/Prunes filtered</b>            | The number of join and prune messages filtered because of configured route filters and source address filters.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Embedded-RP invalid addr</b>            | Number of packets received with an invalid embedded RP address in PIM join messages and other types of messages sent between routing domains.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Embedded-RP limit exceed</b>            | Number of times the limit configured with the <b>maximum-rps</b> statement is exceeded. The <b>maximum-rps</b> statement limits the number of embedded RPs created in a specific routing instance. The range is from 1 through 500. The default is 100.                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Embedded-RP added</b>                   | <p>Number of packets in which the embedded RP for IPv6 is added.</p> <p>The following receive events trigger extraction of an IPv6 embedded RP address on the router:</p> <ul style="list-style-type: none"> <li>• Multicast Listener Discovery (MLD) report for an embedded RP multicast group address</li> <li>• PIM join message with an embedded RP multicast group address</li> <li>• Static embedded RP multicast group address associated with an interface</li> <li>• Packets sent to an embedded RP multicast group address received on the DR</li> </ul> <p>An embedded RP node discovered through these receive events is added if it does not already exist on the routing platform.</p> |
| <b>Embedded-RP removed</b>                 | Number of packets in which the embedded RP for IPv6 is removed. The embedded RP is removed whenever all PIM join states using this RP are removed or the configuration changes to remove the embedded RP feature.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Rx Register msgs filtering drop</b>     | Number of received register messages dropped because of a filter configured for PIM register messages.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Tx Register msgs filtering drop</b>     | Number of register messages dropped because of a filter configured for PIM register messages.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Rx Bidir Join/Prune on non-Bidir if</b> | Error counter for join and prune messages received on non-bidirectional PIM interfaces.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

Table 41: show pim statistics Output Fields (*continued*)

| Field Name                              | Field Description                                                                          |
|-----------------------------------------|--------------------------------------------------------------------------------------------|
| <b>Rx Bidir Join/Prune on non-DF if</b> | Error counter for join and prune messages received on non-designated forwarder interfaces. |

## Sample Output

### show pim statistics

```

user@host> show pim statistics
PIM Message type      Received      Sent  Rx errors
V2 Hello               15           32      0
V2 Register            0           362     0
V2 Register Stop       483          0      0
V2 Join Prune          18          518     0
V2 Bootstrap           0            0      0
V2 Assert              0            0      0
V2 Graft               0            0      0
V2 Graft Ack           0            0      0
V2 Candidate RP        0            0      0
V2 State Refresh       0            0      0
V2 DF Election         0            0      0
V1 Query               0            0      0
V1 Register            0            0      0
V1 Register Stop       0            0      0
V1 Join Prune          0            0      0
V1 RP Reachability     0            0      0
V1 Assert              0            0      0
V1 Graft               0            0      0
V1 Graft Ack           0            0      0
AutoRP Announce        0            0      0
AutoRP Mapping         0            0      0
AutoRP Unknown type    0            0      0
Anycast Register       0            0      0
Anycast Register Stop  0            0      0

```

#### Global Statistics

```

Hello dropped on neighbor policy 0
Unknown type                     0
V1 Unknown type                  0
Unknown Version                  0
Neighbor unknown                 0
Bad Length                       0
Bad Checksum                     0
Bad Receive If                   0
Rx Bad Data                      0
Rx Intf disabled                 0
Rx V1 Require V2                 0
Rx V2 Require V1                 0
Rx Register not RP               0
Rx Register no route             0
Rx Register no decap if          0
Null Register Timeout            0
RP Filtered Source               0
Rx Unknown Reg Stop              0
Rx Join/Prune no state           0

```

|                                     |   |
|-------------------------------------|---|
| Rx Join/Prune on upstream if        | 0 |
| Rx Join/Prune for invalid group     | 5 |
| Rx Join/Prune messages dropped      | 0 |
| Rx sparse join for dense group      | 0 |
| Rx Graft/Graft Ack no state         | 0 |
| Rx Graft on upstream if             | 0 |
| Rx CRP not BSR                      | 0 |
| Rx BSR when BSR                     | 0 |
| Rx BSR not RPF if                   | 0 |
| Rx unknown hello opt                | 0 |
| Rx data no state                    | 0 |
| Rx RP no state                      | 0 |
| Rx aggregate                        | 0 |
| Rx malformed packet                 | 0 |
| Rx illegal TTL                      | 0 |
| Rx illegal destination address      | 0 |
| No RP                               | 0 |
| No register encap if                | 0 |
| No route upstream                   | 0 |
| Nexthop Unusable                    | 0 |
| RP mismatch                         | 0 |
| RP mode mismatch                    | 0 |
| RPF neighbor unknown                | 0 |
| Rx Joins/Prunes filtered            | 0 |
| Tx Joins/Prunes filtered            | 0 |
| Embedded-RP invalid addr            | 0 |
| Embedded-RP limit exceed            | 0 |
| Embedded-RP added                   | 0 |
| Embedded-RP removed                 | 0 |
| Rx Register msgs filtering drop     | 0 |
| Tx Register msgs filtering drop     | 0 |
| Rx Bidir Join/Prune on non-Bidir if | 0 |
| Rx Bidir Join/Prune on non-DF if    | 0 |

## Sample Output

**show pim statistics inet interface <interface-name>**

```
user@host> show pim statistics inet interface ge-0/3/0.0
Instance: PIM.master Family: INET
```

PIM Interface statistics for ge-0/3/0.0

| PIM Message type   | Received | Sent | Rx errors |
|--------------------|----------|------|-----------|
| V2 Hello           | 0        | 4    | 0         |
| V2 Register        | 0        | 0    | 0         |
| V2 Register Stop   | 0        | 0    | 0         |
| V2 Join Prune      | 0        | 0    | 0         |
| V2 Bootstrap       | 0        | 0    | 0         |
| V2 Assert          | 0        | 0    | 0         |
| V2 Graft           | 0        | 0    | 0         |
| V2 Graft Ack       | 0        | 0    | 0         |
| V2 Candidate RP    | 0        | 0    | 0         |
| V1 Query           | 0        | 0    | 0         |
| V1 Register        | 0        | 0    | 0         |
| V1 Register Stop   | 0        | 0    | 0         |
| V1 Join Prune      | 0        | 0    | 0         |
| V1 RP Reachability | 0        | 0    | 0         |
| V1 Assert          | 0        | 0    | 0         |
| V1 Graft           | 0        | 0    | 0         |
| V1 Graft Ack       | 0        | 0    | 0         |



|                       |   |   |   |
|-----------------------|---|---|---|
| AutoRP Announce       | 0 | 0 | 0 |
| AutoRP Mapping        | 0 | 0 | 0 |
| AutoRP Unknown type   | 0 |   |   |
| Anycast Register      | 0 | 0 | 0 |
| Anycast Register Stop | 0 | 0 | 0 |

## Sample Output

**show pim statistics inet6 interface <interface-name>**

```
user@host> show pim statistics inet6 interface ge-0/3/0.0
Instance: PIM.master Family: INET6
```

PIM Interface statistics for ge-0/3/0.0

| PIM Message type      | Received | Sent | Rx errors |
|-----------------------|----------|------|-----------|
| V2 Hello              | 0        | 4    | 0         |
| V2 Register           | 0        | 0    | 0         |
| V2 Register Stop      | 0        | 0    | 0         |
| V2 Join Prune         | 0        | 0    | 0         |
| V2 Bootstrap          | 0        | 0    | 0         |
| V2 Assert             | 0        | 0    | 0         |
| V2 Graft              | 0        | 0    | 0         |
| V2 Graft Ack          | 0        | 0    | 0         |
| V2 Candidate RP       | 0        | 0    | 0         |
| Anycast Register      | 0        | 0    | 0         |
| Anycast Register Stop | 0        | 0    | 0         |

## Sample Output

**show pim statistics interface <interface-name>**

```
user@host> show pim statistics interface ge-0/3/0.0
Instance: PIM.master Family: INET
```

PIM Interface statistics for ge-0/3/0.0

| PIM Message type      | Received | Sent | Rx errors |
|-----------------------|----------|------|-----------|
| V2 Hello              | 0        | 3    | 0         |
| V2 Register           | 0        | 0    | 0         |
| V2 Register Stop      | 0        | 0    | 0         |
| V2 Join Prune         | 0        | 0    | 0         |
| V2 Bootstrap          | 0        | 0    | 0         |
| V2 Assert             | 0        | 0    | 0         |
| V2 Graft              | 0        | 0    | 0         |
| V2 Graft Ack          | 0        | 0    | 0         |
| V2 Candidate RP       | 0        | 0    | 0         |
| V1 Query              | 0        | 0    | 0         |
| V1 Register           | 0        | 0    | 0         |
| V1 Register Stop      | 0        | 0    | 0         |
| V1 Join Prune         | 0        | 0    | 0         |
| V1 RP Reachability    | 0        | 0    | 0         |
| V1 Assert             | 0        | 0    | 0         |
| V1 Graft              | 0        | 0    | 0         |
| V1 Graft Ack          | 0        | 0    | 0         |
| AutoRP Announce       | 0        | 0    | 0         |
| AutoRP Mapping        | 0        | 0    | 0         |
| AutoRP Unknown type   | 0        |      |           |
| Anycast Register      | 0        | 0    | 0         |
| Anycast Register Stop | 0        | 0    | 0         |

Instance: PIM.master Family: INET6

PIM Interface statistics for ge-0/3/0.0

| PIM Message type      | Received | Sent | Rx errors |
|-----------------------|----------|------|-----------|
| V2 Hello              | 0        | 3    | 0         |
| V2 Register           | 0        | 0    | 0         |
| V2 Register Stop      | 0        | 0    | 0         |
| V2 Join Prune         | 0        | 0    | 0         |
| V2 Bootstrap          | 0        | 0    | 0         |
| V2 Assert             | 0        | 0    | 0         |
| V2 Graft              | 0        | 0    | 0         |
| V2 Graft Ack          | 0        | 0    | 0         |
| V2 Candidate RP       | 0        | 0    | 0         |
| Anycast Register      | 0        | 0    | 0         |
| Anycast Register Stop | 0        | 0    | 0         |

## CHAPTER 24

# Operational Commands (MSDP)

- `clear msdp cache`
- `clear msdp statistics`
- `show msdp`
- `show msdp source`
- `show msdp source-active`
- `show msdp statistics`
- `test msdp`

## clear msdp cache

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>clear msdp cache</code><br><code>&lt;all&gt;</code><br><code>&lt;instance <i>instance-name</i>&gt;</code><br><code>&lt;logical-system (all   <i>logical-system-name</i>)&gt;</code><br><code>&lt;peer <i>peer-address</i>&gt;</code>                                                                                                                                                                                                                                    |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 12.1 for the QFX Series.<br>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                                                                                                                                                                                                                                                                  |
| <b>Description</b>              | Clear the entries in the Multicast Source Discovery Protocol (MSDP) source-active cache.                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Options</b>                  | <b>all</b> — Clear all MSDP source-active cache entries in the master instance..<br><br><b>instance <i>instance-name</i></b> —(Optional) Clear entries for a specific MSDP instance.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system.<br><br><b>peer <i>peer-address</i></b> —(Optional) Clear the MSDP source-active cache entries learned from a specific peer. |
| <b>Required Privilege Level</b> | clear                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">show msdp source-active on page 530</a></li></ul>                                                                                                                                                                                                                                                                                                                                                                         |
| <b>List of Sample Output</b>    | <a href="#">clear msdp cache all on page 524</a>                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Output Fields</b>            | When you enter this command, you are provided feedback on the status of your request.                                                                                                                                                                                                                                                                                                                                                                                         |

### Sample Output

#### clear msdp cache all

```
user@host> clear msdp cache all
```

## clear msdp statistics

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | clear msdp statistics<br><instance <i>instance-name</i> ><br><logical-system (all   <i>logical-system-name</i> )><br><peer <i>peer-address</i> >                                                                                                                                                                                                                                                                       |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 12.1 for the QFX Series.                                                                                                                                                                                                                                                                                                     |
| <b>Description</b>              | Clear Multicast Source Discovery Protocol (MSDP) peer statistics.                                                                                                                                                                                                                                                                                                                                                      |
| <b>Options</b>                  | <p><b>none</b>—Clear MSDP statistics for all peers.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Clear statistics for the specified instance.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p><b>peer <i>peer-address</i></b>—(Optional) Clear the statistics for the specified peer.</p> |
| <b>Required Privilege Level</b> | clear                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">show msdp statistics on page 533</a></li> </ul>                                                                                                                                                                                                                                                                                                                   |
| <b>List of Sample Output</b>    | <a href="#">clear msdp statistics on page 525</a>                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Output Fields</b>            | When you enter this command, you are provided feedback on the status of your request.                                                                                                                                                                                                                                                                                                                                  |

## Sample Output

### clear msdp statistics

```
user@host> clear msdp statistics
```

## show msdp

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <pre>show msdp &lt;brief   detail&gt; &lt;instance <i>instance-name</i>&gt; &lt;logical-system (all   <i>logical-system-name</i>)&gt; &lt;peer <i>peer-address</i>&gt;</pre>                                                                                                                                                                                                                                                                                                                                                                |
| <b>Release Information</b>      | <p>Command introduced before Junos OS Release 7.4.</p> <p>Command introduced in Junos OS Release 12.1 for the QFX Series.</p> <p>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.</p>                                                                                                                                                                                                                                                                                                                                 |
| <b>Description</b>              | Display Multicast Source Discovery Protocol (MSDP) information.                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Options</b>                  | <p><b>none</b>—Display standard MSDP information for all routing instances.</p> <p><b>brief   detail</b>—(Optional) Display the specified level of output.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Display information for the specified instance only.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> <p><b>peer <i>peer-address</i></b>—(Optional) Display information about the specified peer only.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">show msdp source on page 528</a></li> <li>• <a href="#">show msdp source-active on page 530</a></li> <li>• <a href="#">show msdp statistics on page 533</a></li> </ul>                                                                                                                                                                                                                                                                                                                 |
| <b>List of Sample Output</b>    | <p><a href="#">show msdp on page 527</a></p> <p><a href="#">show msdp brief on page 527</a></p> <p><a href="#">show msdp detail on page 527</a></p>                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Output Fields</b>            | Table 42 on page 526 describes the output fields for the <b>show msdp</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                                                                                                                                  |

Table 42: show msdp Output Fields

| Field Name    | Field Description                                                                        | Level of Output |
|---------------|------------------------------------------------------------------------------------------|-----------------|
| Peer address  | IP address of the peer.                                                                  | All levels      |
| Local address | Local address of the peer.                                                               | All levels      |
| State         | Status of the MSDP connection: <b>Listen</b> , <b>Established</b> , or <b>Inactive</b> . | All levels      |
| Last up/down  | Time at which the most recent peer-state change occurred.                                | All levels      |

Table 42: show msdp Output Fields (*continued*)

| Field Name           | Field Description                                                                                                                                                                   | Level of Output |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Peer-Group           | Peer group name.                                                                                                                                                                    | All levels      |
| SA Count             | Number of source-active cache entries advertised by each peer that were accepted, compared to the number that were received, in the format <i>number-accepted/number-received</i> . | All levels      |
| Peer Connect Retries | Number of peer connection retries.                                                                                                                                                  | detail          |
| State timer expires  | Number of seconds before another message is sent to a peer.                                                                                                                         | detail          |
| Peer Times out       | Number of seconds to wait for a response from the peer before the peer is declared unavailable.                                                                                     | detail          |
| SA accepted          | Number of entries in the source-active cache accepted from the peer.                                                                                                                | detail          |
| SA received          | Number of entries in the source-active cache received by the peer.                                                                                                                  | detail          |

## Sample Output

### show msdp

```

user@host> show msdp
Peer address    Local address  State      Last up/down Peer-Group SA Count
198.32.8.193    198.32.8.195  Established 5d 19:25:44 North23 120/150
198.32.8.194    198.32.8.195  Established 3d 19:27:27 North23 300/345
198.32.8.196    198.32.8.195  Established 5d 19:39:36 North23 10/13
198.32.8.197    198.32.8.195  Established 5d 19:32:27 North23 5/6
198.32.8.198    198.32.8.195  Established 3d 19:33:04 North23 2305/3000

```

### show msdp brief

The output for the **show msdp brief** command is identical to that for the **show msdp** command. For sample output, see [show msdp on page 527](#).

### show msdp detail

```

user@host> show msdp detail
Peer: 10.255.70.15
Local address: 10.255.70.19
State: Established
Peer Connect Retries: 0
State timer expires: 22
Peer Times out: 49
SA accepted: 0
SA received: 0

```

## show msdp source

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>show msdp source</code><br><code>&lt;instance <i>instance-name</i>&gt;</code><br><code>&lt;logical-system (all   <i>logical-system-name</i>)&gt;</code><br><code>&lt;source-address&gt;</code>                                                                                                                                                                                                                                                                                                  |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 12.1 for the QFX Series.<br>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                                                                                                                                                                                                                                                                                          |
| <b>Description</b>              | Display multicast sources learned from Multicast Source Discovery Protocol (MSDP).                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Options</b>                  | <b>none</b> —Display standard MSDP source information for all routing instances.<br><br><b>instance <i>instance-name</i></b> —(Optional) Display information for the specified instance only.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system.<br><br><b>source-address</b> —(Optional) IP address and optional prefix length. Display information for the specified source address only. |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">show msdp on page 526</a></li><li>• <a href="#">show msdp source-active on page 530</a></li><li>• <a href="#">show msdp statistics on page 533</a></li></ul>                                                                                                                                                                                                                                                                                      |
| <b>List of Sample Output</b>    | <a href="#">show msdp source on page 529</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                          |



**Output Fields** Table 43 on page 529 describes the output fields for the **show msdp source** command. Output fields are listed in the approximate order in which they appear.

**Table 43: show msdp source Output Fields**

| Field Name     | Field Description                                                                                                                                                                                                                                                       |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Source address | IP address of the source.                                                                                                                                                                                                                                               |
| /Len           | Length of the prefix for this IP address.                                                                                                                                                                                                                               |
| Type           | Discovery method for this multicast source: <ul style="list-style-type: none"> <li>• <b>Configured</b>—Source-active limit explicitly configured for this source.</li> <li>• <b>Dynamic</b>—Source-active limit established when this source was discovered.</li> </ul> |
| Maximum        | Source-active limit applied to this source.                                                                                                                                                                                                                             |
| Threshold      | Source-active threshold applied to this source.                                                                                                                                                                                                                         |
| Exceeded       | Number of source-active messages received from this source exceeding the established maximum.                                                                                                                                                                           |

## Sample Output

**show msdp source**

```

user@host> show msdp source
Source address /Len  Type      Maximum  Threshold  Exceeded
0.0.0.0       /0    Configured    5         none        0
10.1.0.0      /16   Configured    500       none        0
10.1.1.1      /32   Configured    10000     none        0
10.1.1.2      /32   Dynamic       6936     none        0
10.1.5.5      /32   Dynamic       500       none        123
10.2.1.1      /32   Dynamic       2         none        0

```

## show msdp source-active

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | <code>show msdp source-active</code><br><code>&lt;brief   detail&gt;</code><br><code>&lt;group <i>group</i>&gt;</code><br><code>&lt;instance <i>instance-name</i>&gt;</code><br><code>&lt;local&gt;</code><br><code>&lt;logical-system (all   <i>logical-system-name</i>)&gt;</code><br><code>&lt;originator <i>originator</i>&gt;</code><br><code>&lt;peer <i>peer-address</i>&gt;</code><br><code>&lt;source <i>source-address</i>&gt;</code>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 12.1 for the QFX Series.<br>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Description</b>              | Display the Multicast Source Discovery Protocol (MSDP) source-active cache.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Options</b>                  | <b>none</b> —Display standard MSDP source-active cache information for all routing instances.<br><br><b>brief   detail</b> —(Optional) Display the specified level of output.<br><br><b>group <i>group</i></b> —(Optional) Display source-active cache information for the specified group.<br><br><b>instance <i>instance-name</i></b> —(Optional) Display information for the specified instance.<br><br><b>local</b> —(Optional) Display all source-active caches originated by this router.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system.<br><br><b>originator <i>originator</i></b> —(Optional) Display information about the peer that originated the source-active cache entries.<br><br><b>peer <i>peer-address</i></b> —(Optional) Display the source-active cache of the specified peer.<br><br><b>source <i>source-address</i></b> —(Optional) Display the source-active cache of the specified source. |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"><li>• <a href="#">show msdp on page 526</a></li><li>• <a href="#">show msdp source on page 528</a></li><li>• <a href="#">show msdp statistics on page 533</a></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>List of Sample Output</b>    | <a href="#">show msdp source-active on page 531</a><br><a href="#">show msdp source-active brief on page 532</a><br><a href="#">show msdp source-active detail on page 532</a><br><a href="#">show msdp source-active source on page 532</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

**Output Fields** Table 44 on page 531 describes the output fields for the **show msdp source-active** command. Output fields are listed in the approximate order in which they appear.

**Table 44: show msdp source-active Output Fields**

| Field Name                              | Field Description                                                                                                                                          |
|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Global active source limit exceeded     | Number of times all peers have exceeded configured active source limits.                                                                                   |
| Global active source limit maximum      | Configured number of active source messages accepted by the device.                                                                                        |
| Global active source limit threshold    | Configured threshold for applying random early discard (RED) to drop some but not all MSDP active source messages.                                         |
| Global active source limit log-warning  | Threshold at which a warning message is logged (percentage of the number of active source messages accepted by the device).                                |
| Global active source limit log interval | Time (in seconds) between consecutive log messages.                                                                                                        |
| Group address                           | Multicast address of the group.                                                                                                                            |
| Source address                          | IP address of the source.                                                                                                                                  |
| Peer address                            | IP address of the peer.                                                                                                                                    |
| Originator                              | Router ID configured on the source of the rendezvous point (RP) that originated the message, or the loopback address when the router ID is not configured. |
| Flags                                   | Flags: <b>Accept</b> , <b>Reject</b> , or <b>Filtered</b> .                                                                                                |

## Sample Output

### show msdp source-active

```

user@host> show msdp source-active
Group address  Source address  Peer address  Originator  Flags
230.0.0.0     192.168.195.46  local        10.255.14.30  Accept
230.0.0.1     192.168.195.46  local        10.255.14.30  Accept
230.0.0.2     192.168.195.46  local        10.255.14.30  Accept
230.0.0.3     192.168.195.46  local        10.255.14.30  Accept
230.0.0.4     192.168.195.46  local        10.255.14.30  Accept

```

### show msdp source-active brief

The output for the **show msdp source-active brief** command is identical to that for the **show msdp source-active** command. For sample output, see [show msdp source-active on page 531](#).

### show msdp source-active detail

The output for the **show msdp source-active detail** command is identical to that for the **show msdp source-active** command. For sample output, see [show msdp source-active on page 531](#).

### show msdp source-active source

```
user@host> show msdp source-active source 192.168.215.246
```

```
Global active source limit exceeded: 0
```

```
Global active source limit maximum: 25000
```

```
Global active source limit threshold: 24000
```

```
Global active source limit log-warning: 100
```

```
Global active source limit log interval: 0
```

| Group address | Source address  | Peer address   | Originator     | Flags  |
|---------------|-----------------|----------------|----------------|--------|
| 226.2.2.1     | 192.168.215.246 | 10.255.182.140 | 10.255.182.140 | Accept |
| 226.2.2.3     | 192.168.215.246 | 10.255.182.140 | 10.255.182.140 | Accept |
| 226.2.2.4     | 192.168.215.246 | 10.255.182.140 | 10.255.182.140 | Accept |
| 226.2.2.5     | 192.168.215.246 | 10.255.182.140 | 10.255.182.140 | Accept |
| 226.2.2.7     | 192.168.215.246 | 10.255.182.140 | 10.255.182.140 | Accept |
| 226.2.2.10    | 192.168.215.246 | 10.255.182.140 | 10.255.182.140 | Accept |
| 226.2.2.11    | 192.168.215.246 | 10.255.182.140 | 10.255.182.140 | Accept |
| 226.2.2.13    | 192.168.215.246 | 10.255.182.140 | 10.255.182.140 | Accept |
| 226.2.2.14    | 192.168.215.246 | 10.255.182.140 | 10.255.182.140 | Accept |
| 226.2.2.15    | 192.168.215.246 | 10.255.182.140 | 10.255.182.140 | Accept |

## show msdp statistics

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | show msdp statistics<br><instance <i>instance-name</i> ><br><logical-system (all   <i>logical-system-name</i> )><br><peer <i>peer-address</i> >                                                                                                                                                                                                                                                                                                             |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 12.1 for the QFX Series.<br>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                                                                                                                                                                                                                                                |
| <b>Description</b>              | Display statistics about Multicast Source Discovery Protocol (MSDP) peers.                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Options</b>                  | <b>none</b> —Display statistics about all MSDP peers for all routing instances.<br><br><b>instance <i>instance-name</i></b> —(Optional) Display statistics about a specific MSDP instance.<br><br><b>logical-system (all   <i>logical-system-name</i>)</b> —(Optional) Perform this operation on all logical systems or on a particular logical system.<br><br><b>peer <i>peer-address</i></b> —(Optional) Display statistics about a particular MSDP peer. |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Related Documentation</b>    | <ul style="list-style-type: none"> <li>• <a href="#">clear msdp statistics on page 525</a></li> </ul>                                                                                                                                                                                                                                                                                                                                                       |
| <b>List of Sample Output</b>    | <a href="#">show msdp statistics on page 535</a><br><a href="#">show msdp statistics peer on page 535</a>                                                                                                                                                                                                                                                                                                                                                   |
| <b>Output Fields</b>            | <a href="#">Table 45 on page 533</a> describes the output fields for the <b>show msdp statistics</b> command. Output fields are listed in the approximate order in which they appear.                                                                                                                                                                                                                                                                       |

**Table 45: show msdp statistics Output Fields**

| Field Name                              | Field Description                                                                                                           |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| Global active source limit exceeded     | Number of times all peers have exceeded configured active source limits.                                                    |
| Global active source limit maximum      | Configured number of active source messages accepted by the device.                                                         |
| Global active source limit threshold    | Configured threshold for applying random early discard (RED) to drop some but not all MSDP active source messages.          |
| Global active source limit log-warning  | Threshold at which a warning message is logged (percentage of the number of active source messages accepted by the device). |
| Global active source limit log interval | Time (in seconds) between consecutive log messages.                                                                         |

Table 45: show msdp statistics Output Fields (*continued*)

| Field Name                                        | Field Description                                                                                                                                                                                     |
|---------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Peer</b>                                       | Address of peer.                                                                                                                                                                                      |
| <b>Last State Change</b>                          | How long ago the peer state changed.                                                                                                                                                                  |
| <b>Last message received from the peer</b>        | How long ago the last message was received from the peer.                                                                                                                                             |
| <b>RPF Failures</b>                               | Number of reverse path forwarding (RPF) failures.                                                                                                                                                     |
| <b>Remote Closes</b>                              | Number of times the remote peer closed.                                                                                                                                                               |
| <b>Peer Timeouts</b>                              | Number of peer timeouts.                                                                                                                                                                              |
| <b>SA messages sent</b>                           | Number of source-active messages sent.                                                                                                                                                                |
| <b>SA messages received</b>                       | Number of source-active messages received.                                                                                                                                                            |
| <b>SA request messages sent</b>                   | Number of source-active request messages sent.                                                                                                                                                        |
| <b>SA request messages received</b>               | Number of source-active request messages received.                                                                                                                                                    |
| <b>SA response messages sent</b>                  | Number of source-active response messages sent.                                                                                                                                                       |
| <b>SA response messages received</b>              | Number of source-active response messages received.                                                                                                                                                   |
| <b>SA messages with zero Entry Count received</b> | Entry Count is a field within SA message that defines how many source/group tuples are present in the SA message. The counter is incremented each time an SA with an Entry Count of zero is received. |
| <b>Active source exceeded</b>                     | Number of times this peer has exceeded configured source-active limits.                                                                                                                               |
| <b>Active source Maximum</b>                      | Configured number of active source messages accepted by this peer.                                                                                                                                    |
| <b>Active source threshold</b>                    | Configured threshold on this peer for applying random early discard (RED) to drop some but not all MSDP active source messages.                                                                       |
| <b>Active source log-warning</b>                  | Configured threshold on this peer at which a warning message is logged (percentage of the number of active source messages accepted by the device).                                                   |
| <b>Active source log-interval</b>                 | Time (in seconds) between consecutive log messages on this peer.                                                                                                                                      |
| <b>Keepalive messages sent</b>                    | Number of keepalive messages sent.                                                                                                                                                                    |

Table 45: show msdp statistics Output Fields (*continued*)

| Field Name                  | Field Description                      |
|-----------------------------|----------------------------------------|
| Keepalive messages received | Number of keepalive messages received. |
| Unknown messages received   | Number of unknown messages received.   |
| Error messages received     | Number of error messages received.     |

## Sample Output

### show msdp statistics

```

user@host> show msdp statistics
Global active source limit exceeded: 0
Global active source limit maximum: 10
Global active source limit threshold: 8
Global active source limit log-warning: 60
Global active source limit log interval: 60

Peer: 10.255.245.39
Last State Change: 11:54:49 (00:24:59)
Last message received from peer: 11:53:32 (00:26:16)
RPF Failures: 0
Remote Closes: 0
Peer Timeouts: 0
SA messages sent: 376
SA messages received: 459
SA messages with zero Entry Count received: 0
SA request messages sent: 0
SA request messages received: 0
SA response messages sent: 0
SA response messages received: 0
Active source exceeded: 0
Active source Maximum: 10
Active source threshold: 8
Active source log-warning: 60
Active source log-interval 120
Keepalive messages sent: 17
Keepalive messages received: 19
Unknown messages received: 0
Error messages received: 0

```

### show msdp statistics peer

```

user@host> show msdp statistics peer 10.255.182.140
Peer: 10.255.182.140
  Last State Change: 8:19:23 (00:01:08)
  Last message received from peer: 8:20:05 (00:00:26)
  RPF Failures: 0
  Remote Closes: 0
  Peer Timeouts: 0
  SA messages sent: 17
  SA messages received: 16
  SA request messages sent: 0
  SA request messages received: 0

```

SA response messages sent: 0  
SA response messages received: 0  
Active source exceeded: 20  
Active source Maximum: 10  
Active source threshold: 8  
Active source log-warning: 60  
Active source log-interval: 120  
Keepalive messages sent: 0  
Keepalive messages received: 0  
Unknown messages received: 0  
Error messages received: 0



## test msdp

---

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Syntax</b>                   | test msdp (dependent-peers <i>prefix</i>   rpf-peer <i>originator</i> )<br><instance <i>instance-name</i> ><br><logical-system (all   <i>logical-system-name</i> )>                                                                                                                                                                                                                                                                                                    |
| <b>Release Information</b>      | Command introduced before Junos OS Release 7.4.<br>Command introduced in Junos OS Release 12.1 for the QFX Series.<br>Command introduced in Junos OS Release 14.1X53-D20 for the OCX Series.                                                                                                                                                                                                                                                                           |
| <b>Description</b>              | Find Multicast Source Discovery Protocol (MSDP) peers.                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Options</b>                  | <p><b>dependent-peers <i>prefix</i></b>—Find downstream dependent MSDP peers.</p> <p><b>rpf-peer <i>originator</i></b>—Find the MSDP reverse-path-forwarding (RPF) peer for the originator.</p> <p><b>instance <i>instance-name</i></b>—(Optional) Find MDSP peers for the specified routing instance.</p> <p><b>logical-system (all   <i>logical-system-name</i>)</b>—(Optional) Perform this operation on all logical systems or on a particular logical system.</p> |
| <b>Required Privilege Level</b> | view                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>List of Sample Output</b>    | <a href="#">test msdp dependent-peers on page 537</a>                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Output Fields</b>            | When you enter this command, you are provided feedback on the status of your request.                                                                                                                                                                                                                                                                                                                                                                                  |

## Sample Output

### test msdp dependent-peers

```
user@host> test msdp dependent-peers 10.0.0.1/24
```



## PART 2

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