



Multicast PIM Commands

This chapter describes the commands used to configure and monitor Protocol Independent Multicast (PIM).

For detailed information about multicast routing concepts, configuration tasks, and examples, refer to *Multicast Configuration Guide for Cisco NCS 6000 Series Routers*.

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accept-register

To configure a rendezvous point (RP) router to filter Protocol Independent Multicast (PIM) register messages, use the **accept-register** command in PIM configuration mode. To return to the default behavior, use the **no** form of this command.

```
accept-register access-list-name
no accept-register
```

Syntax Description	<i>access-list-name</i> Access list number or name.
---------------------------	---

Command Default	No default behavior or values
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Command Modes	PIM configuration
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Command History	Release	Modification
	Release 5.0.0	This command was introduced.

Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
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The **accept-register** command prevents unauthorized sources from registering with the rendezvous point. If an unauthorized source sends a register message to the rendezvous point, the rendezvous point immediately sends back a register-stop message.

Task ID	Task ID	Operations
		multicast

Examples

The following example shows how to restrict the rendezvous point. Sources in the Source Specific Multicast (SSM) range of addresses are not allowed to register with the rendezvous point. These statements need to be configured only on the rendezvous point.

```
RP/0/RP0/CPU0:router(config)# router pim
RP/0/RP0/CPU0:router(config-pim-default-ipv4)# accept-register no-ssm-range
RP/0/RP0/CPU0:router(config-pim-default-ipv4)# exit
RP/0/RP0/CPU0:router(config)# ipv4 access-list no-ssm-range
RP/0/RP0/CPU0:router(config-ipv4-acl)# deny ipv4 any 232.0.0.0 0.255.255.255
RP/0/RP0/CPU0:router(config-ipv4-acl)# permit any
```

auto-rp candidate-rp

To configure a router as a Protocol Independent Multicast (PIM) rendezvous point (RP) candidate that sends messages to the well-known CISCO-RP-ANNOUNCE multicast group (224.0.1.39), use the **auto-rp candidate-rp** command in PIM configuration mode. To return to the default behavior, use the **no** form of this command.

auto-rp candidate-rp *type interface-path-id scope ttl-value* [**group-list** *access-list-name*] [**interval** *seconds*]

no auto-rp candidate-rp *type interface-path-id scope ttl-value* [**group-list** *access-list-name*] [**interval** *seconds*]

Syntax Description		
<i>type</i>		Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>		Physical interface or virtual interface. Note Use the show interfaces command in EXEC mode to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (?) online help function.
scope <i>ttl-value</i>		Specifies a time-to-live (TTL) value (in router hops) that limits the scope of the auto-rendezvous point (Auto-RP) announce messages that are sent out of that interface. Range is 1 to 255.
group-list <i>access-list-name</i>	(Optional)	Specifies an access list that describes the group ranges for which this router is the rendezvous point.
interval <i>seconds</i>	(Optional)	Specifies the time between rendezvous point announcements. Range is 1 to 600.

Command Default A router is not configured as a PIM rendezvous point candidate by default.
seconds : 60

Command Modes PIM configuration

Command History	Release	Modification
	Release 5.0.0	This command was introduced.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The **auto-rp candidate-rp** command is used by the rendezvous point for a multicast group range. The router sends an Auto-RP announcement message to the well-known group CISCO-RP-ANNOUNCE (224.0.1.39).

This message announces the router as a candidate rendezvous point for the groups in the range described by the access list.

When the **interval** keyword is specified, the interval between Auto-RP announcements is set to number of *seconds* with the total hold time of the announcements automatically set to three times the interval time. The recommended interval time range is from 1 to 180 seconds.

The hold time of the Auto-RP announcement is the time for which the announcement is valid. After the designated hold time, the announcement expires and the entry is purged from the mapping cache until there is another announcement.

If the optional **group-list** keyword is omitted, the group range advertised is 224.0.0.0/4. This range corresponds to all IP multicast group addresses, which indicates that the router is willing to serve as the rendezvous point for all groups.

A router may be configured to serve as a candidate rendezvous point for more than one group range by a carefully crafted access list in the router configuration.



Note The **auto-rp candidate-rp** command is available for IPv4 address prefixes only.

Task ID

Task ID Operations

multicast read,
write

Examples

The following example shows how to send rendezvous point announcements from all PIM-enabled interfaces for a maximum of 31 hops. The IP address by which the router wants to be identified as a rendezvous point is the IP address associated with GigabitEthernet interface 0/1/0/1. Access list 5 designates the groups that this router serves as the rendezvous point.

```
RP/0/RP0/CPU0:router(config)# ipv4 access-list 5
RP/0/RP0/CPU0:router(config-ipv4-acl)# permit ipv4 any 224.0.0.0 15.255.255.255
RP/0/RP0/CPU0:router(config-ipv4-acl)# exit
RP/0/RP0/CPU0:router(config)# router pim
RP/0/RP0/CPU0:router(config-pim-default-ipv4)# auto-rp candidate-rp GigE 0/1/0/1 scope 31
group-list 5
RP/0/RP0/CPU0:router(config-pim-default-ipv4)# end
```

The router identified in the following example advertises itself as the candidate rendezvous point and is associated with loopback interface 0 for the group ranges 239.254.0.0 to 239.255.255.255 and 224.0.0.0 to 231.255.255.255:

```
RP/0/RP0/CPU0:router(config)# ipv4 access-list 10
RP/0/RP0/CPU0:router(config-ipv4-acl)# permit ipv4 any 239.254.0.0 0.0.255.255
RP/0/RP0/CPU0:router(config-ipv4-acl)# exit
RP/0/RP0/CPU0:router(config)# router pim
RP/0/RP0/CPU0:router(config-pim-default-ipv4)# auto-rp candidate-rp loopback 0 scope 16
group-list 10
RP/0/RP0/CPU0:router(config-pim-default-ipv4)# end
```

auto-rp mapping-agent

To configure the router to be a rendezvous point (RP) mapping agent on a specified interface, use the **auto-rp mapping-agent** command in PIM configuration mode. To return to the default behavior, use the **no** form of this command.

```
auto-rp mapping-agent type interface-path-id scope ttl-value [interval seconds]
no auto-rp mapping-agent
```

Syntax Description	
<i>type</i>	Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	Physical interface or virtual interface.
	<p>Note Use the show interfaces command in EXEC mode to see a list of all interfaces currently configured on the router.</p> <p>For more information about the syntax for the router, use the question mark (?) online help function.</p>
scope <i>ttl-value</i>	Specifies time-to-live (TTL) value in router hops that limits the scope of the rendezvous point discovery messages that are sent from that interface. Range is 1 to 255.
interval <i>seconds</i>	(Optional) Specifies the time, in seconds, between discovery messages. Range is 1 to 600.

Command Default A router is not configured as a Protocol Independent Multicast (PIM) rendezvous point mapping agent by default.

seconds : 60

Command Modes PIM configuration

Command History	Release	Modification
	Release 5.0.0	This command was introduced.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

After the router is configured as a rendezvous point mapping agent and determines the rendezvous point-to-group mappings through the CISCO-RP-ANNOUNCE (224.0.1.39) group, the router sends the mappings in an auto-rendezvous point (Auto-RP) discovery message to the well-known group CISCO-RP-DISCOVERY (224.0.1.40). A PIM designated router (DR) listens to this well-known group to determine which rendezvous point to use.

More than one rendezvous point mapping agent can be configured in a network sending redundant information, for a slight increase in reliability.

The TTL value is used to limit the range, or scope, of a multicast transmission. Therefore, use this value only on border routers.

The mapping packets are always sourced out of the default interface but have the source IP address as the address of the *type* and *instance* arguments. Packets have a TTL of 1 to 255 and are sent out each configured interval. When not specified, the default is 60 seconds.



Note The **auto-rp mapping-agent** command is available for IPv4 address prefixes only.

Task ID

Task ID Operations

multicast read,
write

Examples

The following example shows how to limit Auto-RP discovery messages to 20 hops:

```
RP/0/RP0/CPU0:router(config)# router pim
RP/0/RP0/CPU0:router(config-pim-default-ipv4)# auto-rp mapping-agent pos 0/0/0/1 scope 20
```

Related Commands

Command	Description
auto-rp candidate-rp, on page 4	Configures a router as a Protocol Independent Multicast (PIM) rendezvous point (RP) candidate that sends messages to the well-known CISCO-RP-ANNOUNCE multicast group (224.0.1.39).

bsr candidate-bsr

To configure the router to announce its candidacy as a bootstrap router (BSR), use the **bsr candidate-bsr** command in PIM configuration mode. To return to the default behavior, use the **no** form of this command.

```
bsr candidate-bsr ip-address [hash-mask-len length] [priority value]  
no bsr candidate-bsr
```

Syntax Description

ip-address

IP address of the BSR router for the domain. For IPv4, this is an IP address in four-part dotted-decimal notation.

hash-mask-len *length* (Optional) Specifies the length of a mask that is to be used in the hash function.

- All groups with the same seed hash (correspond) to the same rendezvous point (RP). For example, if this value is 24, only the first 24 bits of the group addresses matter. This fact allows you to get one RP for multiple groups.
- For IPv4 addresses, we recommend a value of 30. The range is 0 to 32.

priority *value*

(Optional) Specifies the priority of the candidate BSR. Range is 1 to 255. We recommend the BSR with the higher priority. If the priority values are the same, the router with the higher IP address is the BSR.

Command Default

- *value* : 1
- Default C-RP cache state limit in both Candidate BSR and Elected BSR is 100.
- Configurable maximum C-RP cache in both BSR and Elected BSR is in the range of 1 - 100000.
- Default RP-group mapping state limit in PIMv2 router is 100.
- Configurable maximum RP-group mapping state in PIMv2 router is in the range of 1 - 100000.

Command Modes

PIM configuration

Command History

Release	Modification
Release 3.2	This command was introduced.
Release 4.3	PIM BSR limits were introduced for this command.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The **bsr candidate-bsr** command causes the router to send bootstrap messages to all its Protocol Independent Multicast (PIM) neighbors, with the address of the designated interface as the BSR address. Each neighbor compares the BSR address with the address it had from previous bootstrap messages (not necessarily received on the same interface). If the current address is the same or higher address, the PIM neighbor caches the current address and forwards the bootstrap message. Otherwise, the bootstrap message is dropped.

This router continues to be the BSR until it receives a bootstrap message from another candidate BSR saying that it has a higher priority (or if the same priority, a higher IP address).



Note Use the **bsr candidate-bsr** command only in backbone routers with good connectivity to all parts of the PIM domain. A subrouter that relies on an on-demand dial-up link to connect to the rest of the PIM domain is not a good candidate BSR.

Task ID

Task ID Operations

multicast read,
write

Examples

The following example shows how to configure the router as a candidate BSR with a hash mask length of 30:

```
RP/0/RP0/CPU0:router(config)# router pim
RP/0/RP0/CPU0:router(config-pim-default-ipv4)# bsr candidate-bsr 10.0.0.1 hash-mask-len 30
```

clear pim counters

To clear Protocol Independent Multicast (PIM) counters and statistics, use the **clear pim counters** command in EXEC mode.

```
clear pim [{ipv4|ipv6}] counters
```

Syntax Description	ipv4 (Optional) Specifies IPv4 address prefixes.
---------------------------	---

ipv6 (Optional) Specifies IPv6 address prefixes.

Command Default	No default behavior or values
------------------------	-------------------------------

Command Modes	EXEC XR EXEC
----------------------	-----------------

Command History	Release	Modification
	Release 5.0.0	This command was introduced.
	Release 5.2.1	IPv6 support was added on this command.

Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

Task ID	Task ID	Operations
	multicast	read, write

Examples	The following example shows sample output before and after clearing PIM counters and statistics:
-----------------	--

```
RP/0/RP0/CPU0:router# show pim traffic
PIM Traffic Counters
Elapsed time since counters cleared: 1d01h

Valid PIM Packets  Received          Sent
Hello              9207              12336
Join-Prune         1076805           531981
Data Register      14673205           0
Null Register      73205              0
Register Stop      0                  14673205
Assert             0                  0
Batched Assert     0                  0
Bidir DF Election  0                  0
```

```

BSR Message                0
Candidate-RP Adv.         0

Join groups sent           0
Prune groups sent         0
Output JP bytes            0
Output hello bytes        4104

Errors:
Malformed Packets         0
Bad Checksums             0
Socket Errors             0
Subnet Errors             0
Packets dropped since send queue was full 0
Packets dropped due to invalid socket      0
Packets which couldn't be accessed        0
Packets sent on Loopback Errors           6
Packets received on PIM-disabled Interface 0
Packets received with Unknown PIM Version 0

```

This table describes the significant fields shown in the display.

Table 1: show pim traffic Field Descriptions

Field	Description
Elapsed time since counters cleared	Time (in days and hours) that had elapsed since the counters were cleared with the clear pim counters command.
Valid PIM Packets	Total PIM packets that were received and sent.
HelloJoin-PruneRegisterRegister StopAssert Bidir DF Election	Specific type of PIM packets that were received and sent.
Malformed Packets	Invalid packets due to format errors that were received and sent.
Bad Checksums	Packets received or sent due to invalid checksums.
Socket Errors	Packets received or sent due to errors from the router's IP host stack sockets.
Packets dropped due to invalid socket	Packets received or sent due to invalid sockets in the router's IP host stack.
Packets which couldn't be accessed	Packets received or sent due to errors when accessing packet memory.
Packets sent on Loopback Errors	Packets received or sent due to use of loopback interfaces.
Packets received on PIM-disabled Interface	Packets received or sent due to use of interfaces not enabled for PIM.
Packets received with Unknown PIM Version	Packets received or sent due to invalid PIM version numbers in the packet header.

```

RP/0/RP0/CPU0:router# clear pim counters
RP/0/RP0/CPU0:router# show pim traffic

```

clear pim counters

```

PIM Traffic Counters
Elapsed time since counters cleared: 00:00:04

BSR Message                0  0
Candidate-RP Adv.          0  0

Join groups sent           0
Prune groups sent         0
Output JP bytes           0
Output hello bytes        0

Errors:
Malformed Packets         0
Bad Checksums             0
Socket Errors             0
Subnet Errors             0
Packets dropped since send queue was full 0
Packets dropped due to invalid socket     0
Packets which couldn't be accessed       0
Packets sent on Loopback Errors          0
Packets received on PIM-disabled Interface 0
Packets received with Unknown PIM Version 0

```

Related Commands	Command	Description
	show pim traffic, on page 64	Displays Protocol Independent Multicast (PIM) traffic counter information.

clear pim topology

To clear group entries from the Protocol Independent Multicast (PIM) topology table and reset the Multicast Routing Information Base (MRIB) connection, use the **clear pim topology** command in EXEC mode.

```
clear pim [{ipv4|ipv6}] topology [{ip-address-name|reset}]
```

Syntax Description	
ipv4	(Optional) Specifies IPv4 address prefixes.
ipv6	(Optional) Specifies IPv6 address prefixes.
<i>ip-address-name</i>	(Optional) Can be either one of the following: <ul style="list-style-type: none"> Name of the multicast group, as defined in the Domain Name System (DNS) hosts table or with the domain IPv4 host command. IP address of the multicast group, in IPv4 format according to the specified address family.
reset	(Optional) Deletes all entries from the topology table and resets the MRIB connection.

Command Default No default behavior or values

Command Modes EXEC
XR EXEC

Command History	Release	Modification
	Release 5.0.0	This command was introduced.
	Release 5.2.1	IPv6 support was added on this command.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The **clear pim topology** command clears existing PIM routes from the PIM topology table. Information obtained from the MRIB table, such as Internet Group Management Protocol (IGMP) local membership, is retained. If a multicast group is specified, only those group entries are cleared.

When the command is used with no arguments, all group entries located in the PIM topology table are cleared of PIM protocol information.

If the **reset** keyword is specified, all information from the topology table is cleared and the MRIB connections are automatically reset. This form of the command can be used to synchronize state between the PIM topology table and the MRIB database. The **reset** keyword should be strictly reserved to force synchronized PIM and MRIB entries when communication between the two components is malfunctioning.

clear pim topology**Task ID****Task ID Operations**

multicast read,
 write

Examples

The following example shows how to clear the PIM topology table:

```
RP/0/RP0/CPU0:router# clear pim topology
```

dr-priority

To configure the designated router (DR) priority on a Protocol Independent Multicast (PIM) router, use the **dr-priority** command in the appropriate configuration mode. To return to the default behavior, use the **no** form of this command.

dr-priority *value*
no dr-priority

Syntax Description	<i>value</i> An integer value to represent DR priority. Range is from 0 to 4294967295.
---------------------------	--

Command Default	If this command is not specified in interface configuration mode, the interface adopts the DR priority value specified in PIM configuration mode.
------------------------	---

If this command is not specified in PIM configuration mode, the DR priority value is 1.

Command Modes	PIM interface configuration
----------------------	-----------------------------

Command History	Release	Modification
	Release 5.0.0	This command was introduced.

Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

If all the routers on the LAN support the DR priority option in the PIM Version 2 (PIMv2) hello message that they send, you can force the DR election by use of the **dr-priority** command so that a specific router on the subnet is elected as DR. The router with the highest DR priority becomes the DR.

When PIMv2 routers receive a hello message without the DR priority option (or when the message has priority of 0), the receiver knows that the sender of the hello message does not support DR priority and that DR election on the LAN segment should be based on IP address alone.



Note	If this command is configured in PIM configuration mode, parameters are inherited by all new and existing interfaces. You can override these parameters on individual interfaces from PIM interface configuration mode.
-------------	---

Task ID	Task ID Operations
	multicast read, write

Examples	The following example shows how to configure the router to use DR priority 4 for Packet-over-SONET/SDH (POS) interface 0/1/0/0, but other interfaces will inherit DR priority 2:
-----------------	--

```
RP/0/RP0/CPU0:router(config)# router pim  
RP/0/RP0/CPU0:router(config-pim-default-ipv4)# dr-priority 2  
RP/0/RP0/CPU0:router(config-pim-default-ipv4)# interface pos 0/1/0/0  
RP/0/RP0/CPU0:router(config-pim-ipv4-if)# dr-priority 4
```

global maximum bsr crp-cache threshold

To configure the global maximum bsr crp-cache threshold limit that are allowed by Protocol Independent Multicast (PIM) for all VRFs, use the **global maximum bsr crp-cache threshold** command in PIM configuration mode. To return to the default behavior, use the **no** form of this command.

```
[global] maximum [{bsr crp-cache threshold}]
no [global] maximum [{bsr crp-cache threshold}]
```

Syntax Description	global	(Optional) Configures the maximum value for CRP cache and threshold limit to the sum of the caches in all VRFs.
	crp-cache	Specifies the CRP cache value. The range is from 1 to 10000.
	threshold	Specifies the threshold value for the crp-cache value. Range is between 1 to the set crp-cache value.

Command Default No default behavior or values.

Command Modes PIM configuration

Command History	Release	Modification
	Release 4.2.0	This command was introduced.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The **global maximum bsr** command is used to the threshold limits for the crp-cache levels.

Use the **global** keyword to configure the maximum value for CRP cache and threshold limit to the sum of the caches in all VRF. However, each VRF, including the default, will still have its own smaller maximum and threshold values. To set the maximum and threshold values in the default VRF, you should omit the **global** keyword.

Task ID	Task ID	Operations
	multicast	read, write

Examples

The following example shows how to set a crp-cache of 2000 and the threshold level to 500 for the crp-cache in the router PIM configuration mode.

```
RP/0/RP0/CPU0:router# router pim
RP/0/RP0/CPU0:router(config-pim)# global maximum bsr crp-cache 2000 ?
    threshold Set threshold to print warning
    <cr>
RP/0/RP0/CPU0:router(config-pim)# global maximum bsr crp-cache 2000 threshold ?
    <1-2000> Threshold value
RP/0/RP0/CPU0:router(config-pim)# global maximum bsr crp-cache 2000 threshold 500
RP/0/RP0/CPU0:router(config-pim)#
```

The following example shows how to set a crp-cache of 2000 and the threshold level to 500 for the crp-cache in the router PIM configuration mode in VRF sub-mode.

```
RP/0/RP0/CPU0:router# router pim
RP/0/RP0/CPU0:router(config-pim)# address-family ipv4
RP/0/RP0/CPU0:router(config-pim-default-ipv4)# global maximum bsr crp-cache 2000 threshold
    500
RP/0/RP0/CPU0:router(config-pim-default-ipv4)# maximum bsr crp-cache 1800 threshold 450
RP/0/RP0/CPU0:router(config-pim-default-ipv4)#
```

The following configuration shows how to set the maximum and threshold level in the default VRF, while all VRFs together have a larger global maximum and threshold level:

```
RP/0/RP0/CPU0:router# router pim
RP/0/RP0/CPU0:router(config-pim)# address-family ipv4
RP/0/RP0/CPU0:router(config-pim-default-ipv4)# global maximum bsr crp-cache 600 threshold
    550
RP/0/RP0/CPU0:router(config-pim-default-ipv4)# maximum bsr crp-cache 500 threshold 450
RP/0/RP0/CPU0:router(config-pim-default-ipv4)#
```

hello-interval (PIM)

To configure the frequency of Protocol Independent Multicast (PIM) hello messages, use the **hello-interval** command in the appropriate configuration mode. To return to the default behavior, use the **no** form of this command.

hello-interval *seconds*
no hello-interval

Syntax Description	<i>seconds</i> Interval at which PIM hello messages are sent. Range is 1 to 3600.
---------------------------	---

Command Default	Default is 30 seconds.
------------------------	------------------------

Command Modes	PIM interface configuration
----------------------	-----------------------------

Command History	Release	Modification
	Release 5.0.0	This command was introduced.

Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

Routers configured for IP multicast send PIM hello messages to establish PIM neighbor adjacencies and to determine which router is the designated router (DR) for each LAN segment (subnet).

To establish these adjacencies, at every hello period, a PIM multicast router multicasts a PIM router-query message to the All-PIM-Routers (224.0.0.13) multicast address on each of its multicast-enabled interfaces.

PIM hello messages contain a hold-time value that tells the receiver when the neighbor adjacency associated with the sender should expire if no further PIM hello messages are received. Typically the value of the hold-time field is 3.5 times the interval time value, or 120 seconds if the interval time is 30 seconds.

Use the **show pim neighbor** command to display PIM neighbor adjacencies and elected DRs.



Note	If you configure the hello-interval command in PIM configuration mode, parameters are inherited by all new and existing interfaces. You can override these parameters on individual interfaces from PIM interface configuration mode.
-------------	--

Task ID	Task ID Operations
	multicast read, write

Examples

The following example shows how to configure the PIM hello message interval to 45 seconds. This setting is adopted by all interfaces excluding the 60 second interval time set for Packet-over-SONET/SDH (POS) interface 0/1/0/0:

```
RP/0/RP0/CPU0:router(config)# router pim
RP/0/RP0/CPU0:router(config-pim-default-ipv4)# hello-interval 45
RP/0/RP0/CPU0:router(config-pim-default-ipv4)# interface pos 0/1/0/0
RP/0/RP0/CPU0:router(config-pim-ipv4-if)# hello-interval 60
```

Related Commands

Command	Description
dr-priority, on page 15	Configures the designated router (DR) priority on a Protocol Independent Multicast (PIM) router.

interface (PIM)

To configure Protocol Independent Multicast (PIM) interface properties, use the **interface** command in PIM configuration mode. To disable multicast routing on an interface, use the **no** form of this command.

```
interface type interface-path-id
no interface type interface-path-id
```

Syntax Description

type Interface type. For more information, use the question mark (?) online help function.

interface-path-id Physical interface or virtual interface.

Note Use the **show interfaces** command in EXEC mode to see a list of all interfaces currently configured on the router.

For more information about the syntax for the router, use the question mark (?) online help function.

Command Default

No default behavior or values

Command Modes

PIM configuration

Command History

Release	Modification
Release 5.0.0	This command was introduced.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Use the **interface** command to configure PIM routing properties for specific interfaces. Specifically, this command can be used to override the global settings for the following commands:

- dr-priority
- hello-interval
- join-prune-interval

Use the **interface** command also to enter PIM interface configuration mode.

Task ID

Task ID	Operations
multicast	read, write

Examples

The following example shows how to enter interface configuration mode to configure PIM routing properties for specific interfaces:

```
RP/0/RP0/CPU0:router(config)# router pim
```

interface (PIM)

```
RP/0/RP0/CPU0:router(config-pim-default-ipv4)# interface pos 0/1/0/0
RP/0/RP0/CPU0:router
/CPU0:router(config-pim-ipv4-if)#
```

Related Commands	Command	Description
	dr-priority, on page 15	Configures the designated router (DR) priority on a Protocol Independent Multicast (PIM) router.
	hello-interval (PIM), on page 19	Configures the frequency of Protocol Independent Multicast (PIM) hello messages.
	join-prune-interval, on page 23	Configures the join and prune interval time for Protocol Independent Multicast (PIM) protocol traffic.

join-prune-interval

To configure the join and prune interval time for Protocol Independent Multicast (PIM) protocol traffic, use the **join-prune-interval** command in the appropriate configuration mode. To return to the default behavior, use the **no** form of this command.

join-prune-interval *seconds*
no join-prune-interval

Syntax Description	<i>seconds</i> Interval, in seconds, at which PIM multicast traffic can join or be removed from the shortest path tree (SPT) or rendezvous point tree (RPT). Range is 10 to 600.
---------------------------	--

Command Default	If this command is not specified in PIM interface configuration mode, the interface adopts the join and prune interval parameter specified in PIM configuration mode.
------------------------	---

If this command is not specified in PIM configuration mode, the join and prune interval is 60 seconds.

Command Modes	PIM interface configuration PIM configuration
----------------------	--

Command History	Release	Modification
	Release 5.0.0	This command was introduced.

Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---



Note	If this command is configured in PIM configuration mode, parameters are inherited by all new and existing interfaces. You can override these parameters on individual interfaces from PIM interface configuration mode.
-------------	---

The **join-prune-interval** command is used to configure the frequency at which a PIM sparse-mode router sends periodic join and prune messages.

Task ID	Task ID	Operations
	multicast	read, write

Examples

The following example shows how to change the join and prune interval time to 90 seconds on Packet-over-SONET/SDH (POS) interface 0/1/0/0:

```
RP/0/RP0/CPU0:router(config)# router pim
```

join-prune-interval

```
RP/0/RP0/CPU0:router(config-pim-default-ipv4)# interface pos 0/1/0/0  
RP/0/RP0/CPU0:router(config-pim-ipv4-if)# join-prune-interval 90
```

join-prune-mtu

To configure the maximum size of a PIM Join/Prune message, use the **join-prune-mtu** command in the appropriate mode. To return to the default value, use the **no** form of the command.

join-prune-mtu *value*
no join-prune-mtu *value*

Syntax Description	<i>value</i> Join-prune MTU in bytes. Range is 576 to 65535.
---------------------------	--

Command Default	65535 bytes
------------------------	-------------

Command Modes	Router PIM configuration mode
----------------------	-------------------------------

Command History	Release	Modification
	Release 4.3.1	This command was introduced.

Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

The actual maximum size used for PIM Join/Prune messages is the smaller of the, IP MTU value of the interface and the join-prune-mtu value. In normal operation without this configuration, the PIM Join/Prune packet is packed with Join/Prune messages until the interface MTU size limit is reached. This can lead to large PIM Join/Prune message packets getting sent out, which may affect the processing efficiency on some neighboring routers. Configuring the maximum size of a PIM Join/Prune message helps controlling the MTU size of the PIM Join/Prune packet getting sent out.

Task ID	Task ID	Operation
	multicast	read, write

Example

This example shows how to use the **join-prune mtu** command:

```
RP/0/RP0/CPU0:router (config-pim) # join-prune-mtu 1000
```

maximum register-states

To configure the maximum number of sparse-mode source register states that is allowed by Protocol Independent Multicast (PIM), use the **maximum register-states** command in PIM configuration mode. To return to the default behavior, use the **no** form of this command.

maximum register-states *number*
no maximum register-states

Syntax Description	<i>number</i> Maximum number of PIM sparse-mode source register states. Range is 0 to 75000.
---------------------------	--

Command Default	<i>number</i> : 20000
------------------------	-----------------------

Command Modes	PIM configuration
----------------------	-------------------

Command History	Release	Modification
	Release 5.0.0	This command was introduced.

Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

The **maximum register-states** command is used to set an upper limit for PIM register states. When the limit is reached, PIM discontinues route creation from PIM register messages.

Task ID	Task ID	Operations
	multicast	read, write

Examples

The following example shows how to set the upper limit for PIM register states to 10000:

```
RP/0/RP0/CPU0:router# router pim
RP/0/RP0/CPU0:router(config-pim-default-ipv4)# maximum register-states 10000
```

maximum route-interfaces

To configure the maximum number of route interface states that is allowed by Protocol Independent Multicast (PIM), use the **maximum route-interfaces** command in PIM configuration mode. To return to the default behavior, use the **no** form of this command.

maximum route-interfaces *number*
no maximum route-interfaces

Syntax Description	<i>number</i> Maximum number of PIM route interface states. Range is 1 to 600000.
---------------------------	---

Command Default	<i>number</i> : 30000
------------------------	-----------------------

Command Modes	PIM configuration
----------------------	-------------------

Command History	Release	Modification
	Release 5.0.0	This command was introduced.

Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

The **maximum route-interfaces** command is used to set an upper limit for route interface states. When the limit is reached, PIM discontinues route interface creation for its topology table.

Task ID	Task ID	Operations
	multicast	read, write

Examples

The following example shows how to set the upper limit for PIM route interface states to 200000:

```
RP/0/RP0/CPU0:router# router pim
RP/0/RP0/CPU0:router (config-pim-default-ipv4) # maximum route-interfaces 200000
```

maximum routes

To configure the maximum number of routes that is allowed by Protocol Independent Multicast (PIM), use the **maximum routes** command in PIM configuration mode. To return to the default behavior, use the **no** form of this command.

maximum routes *number*
no maximum routes

Syntax Description	<i>number</i> Maximum number of PIM routes. Range is 1 to 200000.
---------------------------	---

Command Default	<i>number</i> : 100000
------------------------	------------------------

Command Modes	PIM configuration
----------------------	-------------------

Command History	Release	Modification
	Release 5.0.0	This command was introduced.

Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

The **maximum routes** command is used to set an upper limit for PIM routes. When the limit is reached, PIM discontinues route creation for its topology table.

Task ID	Task ID	Operations
	multicast	read, write

Examples	The following example shows how to set the upper limit for PIM routes to 200000:
-----------------	--

```
RP/0/RP0/CPU0:router# router pim
RP/0/RP0/CPU0:router(config-pim-default-ipv4)# maximum routes 200000
```

neighbor-check-on-recv enable

To block the receipt of join and prune messages from non-Protocol Independent Multicast (PIM) neighbors, use the **neighbor-check-on-recv enable** command in PIM configuration mode. To return to the default behavior, use the **no** form of this command.

neighbor-check-on-recv enable
no neighbor-check-on-recv enable

Syntax Description	This command has no keywords or arguments.	
Command Default	Join and prune messages that are sent from non-PIM neighbors are received and not rejected.	
Command Modes	PIM configuration	
Command History	Release	Modification
	Release 5.0.0	This command was introduced.
Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.	
Task ID	Task ID	Operations
	multicast	read, write
Examples	The following example shows how to enable PIM neighbor checking on received join and prune messages:	
	<pre>RP/0/RP0/CPU0:router# router pim RP/0/RP0/CPU0:router(config-pim-default-ipv4)# neighbor-check-on-recv enable</pre>	
Related Commands	Command	Description
	neighbor-check-on-send enable , on page 30	Enables Protocol Independent Multicast (PIM) neighbor checking when sending join and prune messages.

neighbor-check-on-send enable

To enable Protocol Independent Multicast (PIM) neighbor checking when sending join and prune messages, use the **neighbor-check-on-send enable** command in PIM configuration mode. To return to the default behavior, use the **no** form of this command.

neighbor-check-on-send enable
no neighbor-check-on-send enable

Syntax Description	This command has no keywords or arguments.
---------------------------	--

Command Default	Join and prune messages are sent to non-PIM neighbors.
------------------------	--

Command Modes	PIM configuration
----------------------	-------------------

Command History	Release	Modification
	Release 5.0.0	This command was introduced.

Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

Task ID	Task ID	Operations
	multicast	read, write

Examples	The following example shows how to enable PIM neighbor checking when sending join and prune messages:
-----------------	---

```
RP/0/RP0/CPU0:router# router pim
RP/0/RP0/CPU0:router(config-pim-default-ipv4)# neighbor-check-on-send enable
```

Related Commands	Command	Description
	neighbor-check-on-recv enable, on page 29	Blocks the receipt of join and prune messages from non-Protocol Independent Multicast (PIM) neighbors.

neighbor-filter

To filter Protocol Independent Multicast (PIM) neighbor messages from specific IP addresses, use the **neighbor-filter** command in PIM configuration mode. To return to the default behavior, use the **no** form of this command.

neighbor-filter *access-list*
no neighbor-filter

Syntax Description	<i>access-list</i> Number or name of a standard IP access list that denies PIM packets from a source.
---------------------------	---

Command Default	PIM neighbor messages are not filtered.
------------------------	---

Command Modes	PIM configuration
----------------------	-------------------

Command History	Release	Modification
	Release 5.0.0	This command was introduced.

Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

The **neighbor-filter** command is used to prevent unauthorized routers on the LAN from becoming PIM neighbors. Hello messages from addresses specified in the command are ignored.

Task ID	Task ID	Operations
	multicast	read, write

Examples	The following example shows how to configure PIM to ignore all hello messages from IP address 10.0.0.1:
-----------------	---

```
RP/0/RP0/CPU0:router(config-pim-default-ipv4)# neighbor-filter 1
RP/0/RP0/CPU0:router(config-pim-default-ipv4)# exit
RP/0/RP0/CPU0:router(config)# ipv4 access-list 1
RP/0/RP0/CPU0:router(config-ipv4-acl)# deny ipv4 any 10.0.0.1/24
```

nsf lifetime (PIM)

To configure the nonstop forwarding (NSF) timeout value for the Protocol Independent Multicast (PIM) process, use the **nsf lifetime** command in PIM configuration mode. To return to the default behavior, use the **no nsf lifetime** form of this command.

nsf lifetime *seconds*
no nsf lifetime

Syntax Description	<i>seconds</i> Maximum time for NSF mode in seconds. Range is 10 to 600.
---------------------------	--

Command Default	<i>seconds</i> : 120
------------------------	----------------------

Command Modes	PIM configuration
----------------------	-------------------

Command History	Release	Modification
	Release 5.0.0	This command was introduced.

Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

While in PIM NSF mode, PIM is recovering multicast routing topology from the network and updating the Multicast Routing Information Base (MRIB). After the PIM NSF timeout value is reached, PIM signals the MRIB and resumes normal operation.

Task ID	Task ID	Operations
	multicast	read, write

Examples	The following command shows how to set the PIM NSF timeout value to 30 seconds:
-----------------	---

```
RP/0/RP0/CPU0:router(config)# router pim
RP/0/RP0/CPU0:router(config-pim-default-ipv4)# nsf lifetime 30
```

Related Commands	Command	Description
	nsf (multicast)	Turns on NSF capability for the multicast routing system.
	show igmp nsf	Displays the state of NSF operation in IGMP.
	show mfib nsf	Displays the state of NSF operation for the MFIB line cards.
	show mrrib nsf	Displays the state of NSF operation in the MRIB.

Command	Description
show pim nsf, on page 60	Displays the state of NSF operation for PIM.

old-register-checksum

To configure a Cisco IOS XR designated router (DRs) in a network where the rendezvous point is running an older version of Cisco IOS software, use the **old-register-checksum** command in PIM configuration mode. To return to the default behavior, use the **no** form of this command.

old-register-checksum
no old-register-checksum

Syntax Description This command has no keywords or arguments.

Command Default No default behavior or values

Command Modes PIM configuration

Command History	Release	Modification
	Release 5.0.0	This command was introduced.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Cisco IOS XR software accepts register messages with checksum on the Protocol Independent Multicast (PIM) header and the next 4 bytes only. This differs from the Cisco IOS method that accepts register messages with the entire PIM message for all PIM message types. The **old-register-checksum** command generates and accepts registers compatible with Cisco IOS software. This command is provided entirely for backward compatibility with Cisco IOS implementations.



Note To allow interoperability with Cisco IOS rendezvous points running older software, run this command on all DRs in your network running Cisco IOS XR software. Cisco IOS XR register messages are incompatible with Cisco IOS software.

Task ID	Task ID	Operations
	multicast	read, write

Examples The following example shows how to set a source designated router (DR) to generate a register compatible with an earlier version of Cisco IOS XR PIM rendezvous point:

```
RP/0/RP0/CPU0:router (config) # router pim
RP/0/RP0/CPU0:router (config-pim-default-ipv4) # old-register-checksum
```

router pim

To enter Protocol Independent Multicast (PIM) configuration mode, use the **router pim** command in XR Config

configuration mode. To return to the default behavior, use the **no** form of this command.

```
router pim [address family {ipv4|ipv6}]
no router pim [address family {ipv4|ipv6}]
```

Syntax Description	
address-family	(Optional) Specifies which address prefixes to use.
ipv4	(Optional) Specifies IPv4 address prefixes.
ipv6	(Optional) Specifies IPv6 address prefixes.

Command Default The default is IPv4 address prefixes.

Command Modes XR Config

Command History	Release	Modification
	Release 5.0.0	This command was introduced.
	Release 5.2.1	IPv6 support was added on this command.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

From PIM configuration mode, you can configure the address of a rendezvous point (RP) for a particular group, configure the nonstop forwarding (NSF) timeout value for the PIM process, and so on.

Task ID	Task ID	Operations
	multicast	read, write

Examples

This example shows how to enter PIM configuration mode for IPv4 address prefixes:

```
RP/0/RP0/CPU0:router(config)# router pim
RP/0/RP0/CPU0:router(config-pim-default-ipv4)#
```

This example shows how to enter PIM configuration mode for IPv4 address prefixes and specify the **address-family ipv6** keywords:

```
RP/0/RP0/CPU0:router(config)# router pim address-family ipv4  
RP/0/RP0/CPU0:router(config-pim-default-ipv4)#  
  
RP/0/RP0/CPU0:router(config)# router pim address-family ipv6  
RP/0/RP0/CPU0:router(config-pim-default-ipv6)#
```

rp-address

To statically configure the address of a Protocol Independent Multicast (PIM) rendezvous point (RP) for a particular group, use the **rp-address** command in PIM configuration mode. To return to the default behavior, use the **no** form of this command.

```
rp-address ip-address [group-access-list] [override] [bidir]
no rp-address ip-address [group-access-list] [override] [bidir]
```

Syntax Description		
<i>ip-address</i>		IP address of a router to be a PIM rendezvous point. This address is a unicast IP address in four-part dotted-decimal notation.
<i>group-access-list</i>		(Optional) Name of an access list that defines for which multicast groups the rendezvous point should be used. This list is a standard IP access list.
override		(Optional) Indicates that if there is a conflict, the rendezvous point configured with this command prevails over the rendezvous point learned through the auto rendezvous point (Auto-RP) or BSR mechanism.
bidir		(Optional) Configures a bidirectional (bidir) rendezvous point.

Command Default No PIM rendezvous points are preconfigured.

Command Modes PIM configuration

Command History	Release	Modification
	Release 5.0.0	This command was introduced.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

All routers within a common PIM sparse mode (PIM-SM) require the knowledge of the well-known PIM rendezvous point address. The address is learned through Auto-RP, BSR, or is statically configured using this command.

If the optional *group-access-list-number* argument is not specified, the rendezvous point for the group is applied to the entire IP multicast group range (224.0.0.0/4).

You can configure a single rendezvous point to serve more than one group. The group range specified in the access list determines the PIM rendezvous point group mapping. If no access list is specified, the rendezvous point default maps to 224/4.

If the rendezvous point for a group is learned through a dynamic mechanism, such as Auto-RP, this command might not be required. If there is a conflict between the rendezvous point configured with this command and one learned by Auto-RP, the Auto-RP information is used unless the **override** keyword is specified.

Task ID	Task ID	Operations
	multicast	read, write

Examples

The following example shows how to set the PIM rendezvous point address to 10.0.0.1 for all multicast groups:

```
RP/0/RP0/CPU0:router(config)# router pim
RP/0/RP0/CPU0:router(config-pim-default-ipv4)# rp-address 10.0.0.1
```

The following example shows how to set the PIM rendezvous point address to 172.16.6.21 for groups 225.2.2.0 - 225.2.2.255:

```
RP/0/RP0/CPU0:router(config)# ipv4 access-list 1
RP/0/RP0/CPU0:router(config-ipv4-acl)# permit ipv4 any 225.2.2.0 0.0.0.255
RP/0/RP0/CPU0:router(config-ipv4-acl)# exit
RP/0/RP0/CPU0:router(config)# router pim
RP/0/RP0/CPU0:router(config-pim-ipv4)# rp-address 172.16.6.21
RP/0/RP0/CPU0:router(config-pim-ipv4)#
RP/0/RP0/CPU0:router(config)# router pim
RP/0/RP0/CPU0:router(config-pim-default-ipv4)# rp-address 172.16.6.21
```

Related Commands

Command	Description
ipv4 access-list	Defines a standard IP access list. For more information, see <i>IP Addresses and Services Command Reference for Cisco NCS 6000 Series Routers</i>

rpf topology route-policy

To assign a route policy in PIM to select a reverse-path forwarding (RPF) topology, use the **rpf topology route-policy** command in PIM command mode. To disable this configuration, use the **no** form of this command.

```
rpf topology route-policy policy-name
no rpf topology route-policy policy-name
```

Syntax Description	<i>policy-name</i> (Required) Name of the specific route policy that you want PIM to associate with a reverse-path forwarding topology.				
Command Default	No default behavior or values				
Command Modes	PIM configuration PIM address-family configuration				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 5.0.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 5.0.0	This command was introduced.
Release	Modification				
Release 5.0.0	This command was introduced.				
Usage Guidelines	<p>To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.</p> <p>For information about routing policy commands and how to create a routing policy, see <i>Routing Command Reference for Cisco NCS 6000 Series Routers</i> and <i>Routing Configuration Guide for Cisco NCS 6000 Series Routers</i>.</p>				
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>multicast</td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operations	multicast	read, write
Task ID	Operations				
multicast	read, write				
Examples	<p>The following examples show how to associate a specific routing policy in PIM with a RPF topology table for IPv4 address family prefixes:</p> <pre>RP/0/RP0/CPU0:router(config)# router pim RP/0/RP0/CPU0:router(config-pim-default-ipv4)# rpf topology route-policy mypolicy</pre>				

rpf-redirect

To assign a rpf-redirect route policy in PIM, use the **rpf-redirect route-policy** command in PIM command mode. To disable this configuration, use the **no** form of this command.

rpf-redirect route-policy *policy-name*
no rpf-redirect route-policy *policy-name*

Syntax Description	<i>policy-name</i> (Required) Name of the specific route policy that you want PIM to associate with a reverse-path forwarding topology.				
Command Default	No default behavior or values				
Command Modes	PIM configuration PIM address-family configuration				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 5.2.1</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 5.2.1	This command was introduced.
Release	Modification				
Release 5.2.1	This command was introduced.				
Usage Guidelines	For information about routing policy commands and how to create a routing policy, see <i>Routing Command Reference for Cisco NCS 6000 Series Routers</i> and <i>Routing Configuration Guide for Cisco NCS 6000 Series Routers</i> .				
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operation</th> </tr> </thead> <tbody> <tr> <td>Multicast</td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operation	Multicast	read, write
Task ID	Operation				
Multicast	read, write				

Example

The following example shows how to associate a specific rpf-redirect routing policy to an rpf-redirect bundle for IPv4 address family prefixes:

```
RP/0/RP0/CPU0:router(config)# router pim
RP/0/RP0/CPU0:router(config-pim)#address-family ipv4
RP/0/RP0/CPU0:router(config-pim-default-ipv4)# rpf-redirect route-policy <route-policy>
```

rpf-redirect bundle

To assign a rpf-redirect bundle in PIM, use the **rpf-redirect bundle** command in PIM command mode. To disable this configuration, use the **no** form of this command.

rpf-redirect bundle <bundle name>**bandwidth** <number in kbps>**threshold** <number in kbps>
no rpf-redirect bundle <bundle name>**bandwidth** <number in kbps>**threshold** <number in kbps>

Syntax Description	<i>bundle name</i>	(Required) Name of the specific bundle route policy that you want PIM to associate with a reverse-path forwarding topology.
	<i>number in kbps (bandwidth)</i>	(Required) The value of the bandwidth in kbps.
	<i>number in kbps (threshold)</i>	(Required) The threshold value of the bandwidth set in kbps.
Command Default	No default behavior or values	
Command Modes	PIM configuration	
	PIM address-family configuration	
	Interface mode	
Command History	Release	Modification
	Release 5.2.1	This command was introduced.
Usage Guidelines	For information about routing policy commands and how to create a routing policy, see <i>Routing Command Reference for Cisco NCS 6000 Series Routers</i> and <i>Routing Configuration Guide for Cisco NCS 6000 Series Routers</i> .	
Task ID	Task ID	Operation
		Multicast read, write

Example

The following examples show how to associate a specific routing policy bundle in PIM with a RPF redirect for IPv4 address family prefixes:

The following command adds the **GigBitEthernet0/0/4/7** interface to the PIM bundle **WEST** and allows maximum of **6000 kbps** to be used by multicast, and initiates a syslog, an alarm message when the usage reaches the threshold **5000 kbps**.

```
RP/0/RP0/CPU0:router(config)# router pim
RP/0/RP0/CPU0:router(config-pim)#address-family ipv4
RP/0/RP0/CPU0:router(config-pim-default-ipv4)# hello-interval 1
```

```
RP/0/RP0/CPU0:router(config-pim-default-ipv4)# join-prune-interval 15
RP/0/RP0/CPU0:router(config-pim-default-ipv4)# rpf-redirect route-policy directv
RP/0/RP0/CPU0:router(config-pim-default-ipv4)# nsf lifetime 60
RP/0/RP0/CPU0:router(config-pim-default-ipv4)# interface GigabitEthernet0/0/4/7
RP/0/RP0/CPU0:router(config-pim-ipv4-if)# enable
RP/0/RP0/CPU0:router(config-pim-ipv4-if)# rpf-redirect bundle WEST bandwidth 6000 threshold
5000
```

rpf-vector

To enable Reverse Path Forwarding (RPF) vector signaling for Protocol Independent Multicast (PIM), use the **rpf-vector** command in PIM configuration mode. To return to the default behavior, use the **no** form of this command.

rpf-vector
no rpf-vector

Syntax Description This command has no keywords or arguments.

Command Default By default, RPF vector signaling is disabled.

Command Modes PIM configuration

Command History	Release	Modification
	Release 5.0.0	This command was introduced.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

RPF vector is a PIM proxy that lets core routers without RPF information forward join and prune messages for external sources (for example, a Multiprotocol Label Switching [MPLS]-based BGP-free core, where the MPLS core router is without external routes learned from Border Gateway Protocol [BGP]).

Task ID	Task ID	Operations
	multicast	read, write

Examples

The following example shows how to enable RPF vector:

```
RP/0/RP0/CPU0:router(config)# router pim
RP/0/RP0/CPU0:router(config-pim-default-ipv4)# rpf-vector
```

rp-static-deny

To configure the deny range of the static Protocol Independent Multicast (PIM) rendezvous point (RP), use the **rp-static-deny** command in PIM configuration mode. To return to the default behavior, use the **no** form of this command.

rp-static-deny *access-list*
no rp-static-deny

Syntax Description	<i>access-list</i> Name of an access list. This list is a standard IP access list.
---------------------------	--

Command Default	No default behavior or values
------------------------	-------------------------------

Command Modes	PIM configuration
----------------------	-------------------

Command History	Release	Modification
	Release 5.0.0	This command was introduced.

Usage Guidelines	To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.
-------------------------	---

Task ID	Task ID	Operations
	multicast	read, write

Examples	The following example shows how to configure the PIM RP deny range:
-----------------	---

```
RP/0/RP0/CPU0:router (config) # router pim
RP/0/RP0/CPU0:router (config-pim-default-ipv4) # rp-static-deny listA
```

Related Commands	Command	Description
	ipv4 access-list	Defines a standard IP access list.

show auto-rp candidate-rp

To display the group ranges that this router represents (advertises) as a candidate rendezvous point (RP), use the **show auto-rp candidate-rp** command in

XR EXEC

show auto-rp [ipv4] candidate-rp

Syntax Description	ipv4 (Optional) Specifies IPv4 address prefixes.
---------------------------	---

Command Default	IPv4 addressing is the default.
------------------------	---------------------------------

Command Modes	EXEC XR EXEC
----------------------	-----------------

Command History	Release	Modification
	Release 5.0.0	This command was introduced.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The **show auto-rp candidate-rp** command displays all the candidate rendezvous points configured on this router.

Information that is displayed is the time-to-live (TTL) value; the interval from which the rendezvous point announcements were sent; and the mode, such as Protocol Independent Multicast (PIM) sparse mode (SM), to which the rendezvous point belongs.

Task ID	Task ID	Operations
	multicast	read

Examples

The following is sample output from the **show auto-rp candidate-rp** command:

```
RP/0/RP0/CPU0:router# show auto-rp candidate-rp
Group Range      Mode  Candidate RP  ttl  interval
224.0.0.0/4     SM    10.0.0.6     30   30
```

This table describes the significant fields shown in the display.

Table 2: show auto-rp candidate-rp Field Descriptions

Field	Description
Group Range	Multicast group address and prefix for which this router is advertised as a rendezvous point.
Mode	PIM protocol mode for which this router is advertised as a rendezvous point , either PIM-SM or bidirectional PIM (bidir).
Candidate RP	Address of the interface serving as a rendezvous point for the range.
ttl	TTL scope value (in router hops) for Auto-RP candidate announcement messages sent out from this candidate rendezvous point interface.
interval	Time between candidate rendezvous point announcement messages for this candidate rendezvous point interface.

show pim global summary

To display configured Protocol Independent Multicast (PIM) out-of-resource (OOR) limits and current counts for all VRFs, use the **show pim global summary** command in XR EXEC mode.

show pim global summary

Syntax Description This command has no keywords or arguments.

Command Default None

Command Modes XR EXEC mode

Command History

Release	Modification
Release 3.7.2	This command was introduced.

Usage Guidelines Use the **show pim global summary** command to display global limits that are shared by all VRFs.

Task ID

Task ID	Operation
multicast	read

Examples

The following is sample output from the **show pim global summary** command that shows PIM routes, with the maximum number of routes allowed being 100000:

```
RP/0/RP0/CPU0:router# show pim global summary

PIM Global Summary

PIM State Counters
```

	Current	Maximum	Warning-threshold
Routes	8	100000	100000
Topology Interface States	8	300000	300000
SM Registers	0	20000	20000
AutoRP Group Ranges	0	500	450
BSR Group Ranges	0	500	450
BSR C-RP caches	0	100	0

This table describes the significant fields shown in the display.

Table 3: show pim global summary Field Descriptions

Field	Description
Routes	Current number of routes (in the PIM topology table) and the maximum allowed before the creation of new routes is prohibited to avoid out-of-resource (OOR) conditions.

Field	Description
Topology Interface States	Current total number of interfaces (in the PIM topology table) present in all route entries and the maximum allowed before the creation of new routes is prohibited to avoid OOR conditions.
SM Registers	Current number of sparse mode route entries from which PIM register messages are received and the maximum allowed before the creation of new register states is prohibited to avoid OOR conditions.
AutoRP Group Ranges	Current number of sparse mode group range-to-rendezvous point mappings learned through the auto-rendezvous point (Auto-RP) mechanism and the maximum allowed before the creation of new group ranges is prohibited to avoid OOR conditions.
Warning-threshold	Maximum number of multicast routes that can be configured per router.
BSR Group Ranges	The number of BSR groups and the maximum set range.
BSR C-RP caches	The number of candidate-RP caches in BSR and the maximum set range.

show pim group-map

To display group-to-PIM mode mapping, use the **show pim group-map** command in XR EXEC mode.

```
show pim [{ipv4|ipv6}] group-map [ip-address-name] [info-source]
```

Syntax Description

ipv4	(Optional) Specifies IPv4 address prefixes.
ipv6	(Optional) Specifies IPv6 address prefixes.
info-source	(Optional) Displays the group range information source.

Command Default

IPv4 addressing is the default.

Command Modes

XR EXEC

Command History

Release	Modification
Release 5.0.0	This command was introduced.
Release 5.2.1	IPv6 support was added on this command.

Usage Guidelines

To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The **show pim group-map** command displays all group protocol address mappings for the rendezvous point. Mappings are learned from different clients or through the auto rendezvous point (Auto-RP) mechanism.

Task ID

Task ID	Operations
multicast	read

Examples

The following is sample output from the **show pim group-map** command:

```
RP/0/RP0/CPU0:router# show pim group-map

IP PIM Group Mapping Table
(* indicates group mappings being used)
(+ indicates BSR group mappings active in MRIB)

Group Range          Proto Client Groups RP address      Info
-----
224.0.1.39/32*      DM    perm    1      0.0.0.0
224.0.1.40/32*      DM    perm    1      0.0.0.0
```

```

224.0.0.0/24*      NO    perm    0      0.0.0.0
232.0.0.0/8*      SSM   config  0      0.0.0.0
224.0.0.0/4*      SM    autorp  1      10.10.2.2      RPF: POS01/0/3,10.10.3.2
224.0.0.0/4      SM    static  0      0 0.0.0.0      RPF: Null,0.0.0.0

```

In lines 1 and 2, Auto-RP group ranges are specifically denied from the sparse mode group range.

In line 3, link-local multicast groups (224.0.0.0 to 224.0.0.255 as defined by 224.0.0.0/24) are also denied from the sparse mode group range.

In line 4, the Protocol Independent Multicast (PIM) Source Specific Multicast (PIM-SSM) group range is mapped to 232.0.0.0/8.

Line 5 shows that all the remaining groups are in sparse mode mapped to rendezvous point 10.10.3.2.

This table describes the significant fields shown in the display.

Table 4: show pim group-map Field Descriptions

Field	Description
Group Range	Multicast group range that is mapped.
Proto	Multicast forwarding mode.
Client	States how the client was learned.
Groups	Number of groups from the PIM topology table.
RP address	Rendezvous point address.
Info	RPF interface used and the PIM-SM Reverse Path Forwarding (RPF) information toward the rendezvous point.

Related Commands

Command	Description
domain ipv4 host	Defines a static hostname-to-address mapping in the host cache using IPv4. For more information, see <i>IP Addresses and Services Command Reference for Cisco NCS 6000 Series Routers</i>
rp-address, on page 37	Configures the address of a PIM rendezvous point for a particular group.
show pim range-list, on page 62	Displays the range-list information for PIM.

show pim interface

To display information about interfaces configured for Protocol Independent Multicast (PIM), use the **show pim interface** command in

XR EXEC
mode.

show pim [**{ipv4|ipv6}**] **interface** [**{type interface-path-id|state-on|state-off}**] [**detail**]

Syntax Description	
ipv4	(Optional) Specifies IPv4 address prefixes.
ipv6	(Optional) Specifies IPv6 address prefixes.
<i>type</i>	(Optional) Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	(Optional) Physical interface or virtual interface.
Note	Use the show interfaces command in EXEC mode to see a list of all interfaces currently configured on the router.
	For more information about the syntax for the router, use the question mark (?) online help function.
state-on	(Optional) Displays only interfaces from which PIM is enabled and active.
state-off	(Optional) Displays only interfaces from which PIM is disabled or inactive.
detail	(Optional) Displays detailed address information.

Command Default IPv4 addressing is the default.

Command Modes XR EXEC

Command History	Release	Modification
	Release 5.0.0	This command was introduced.
	Release 5.2.1	IPv6 support was added on this command.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The **show pim interface** command displays neighboring information on all PIM-enabled interfaces, such as designated router (DR) priority and DR election winner.

Task ID	Task ID	Operations
	multicast	read

Examples

The following is sample output from the **show pim interface** command:

```
RP/0/RP0/CPU0:router# show pim interface
```

Address	Interface	PIM	Nbr Count	Hello Intvl	DR Prior	DR
172.29.52.127	MgmtEth0/0/CPU0/0	off	0	30	1	not elected
10.6.6.6	Loopback0	off	0	30	1	not elected
0.0.0.0	Loopback60	off	0	30	1	not elected
0.0.0.0	Loopback61	off	0	30	1	not elected
10.46.4.6	ATM0/2/0/0.1	off	0	30	1	not elected
10.46.5.6	ATM0/2/0/0.2	off	0	30	1	not elected
10.46.6.6	ATM0/2/0/0.3	off	0	30	1	not elected
10.46.7.6	ATM0/2/0/0.4	off	0	30	1	not elected
10.46.8.6	ATM0/2/0/3.1	off	0	30	1	not elected
10.46.9.6	ATM0/2/0/3.2	off	0	30	1	not elected
10.56.16.6	Serial0/3/2/1	off	0	30	1	not elected
10.56.4.2	Serial0/3/0/0/0:0	off	0	30	1	not elected
10.56.4.6	Serial0/3/0/0/1:0	off	0	30	1	not elected
10.56.4.10	Serial0/3/0/0/2:0	off	0	30	1	not elected
10.56.4.14	Serial0/3/0/0/2:1	off	0	30	1	not elected
10.56.4.18	Serial0/3/0/0/3:0	off	0	30	1	not elected
10.56.4.22	Serial0/3/0/0/3:1	off	0	30	1	not elected
10.56.4.26	Serial0/3/0/0/3:2	off	0	30	1	not elected
10.56.4.30	Serial0/3/0/0/3:3	off	0	30	1	not elected
10.56.8.2	Serial0/3/0/1/0:0	off	0	30	1	not elected
10.56.12.6	Serial0/3/2/0.1	off	0	30	1	not elected
10.56.13.6	Serial0/3/2/0.2	off	0	30	1	not elected
10.56.14.6	Serial0/3/2/0.3	off	0	30	1	not elected
10.56.15.6	Serial0/3/2/0.4	off	0	30	1	not elected
10.67.4.6	POS0/4/1/0	off	0	30	1	not elected
10.67.8.6	POS0/4/1/1	off	0	30	1	not elected

This table describes the significant fields shown in the display.

Table 5: show pim interface Field Descriptions

Field	Description
Address	IP address of the interface.
Interface	Interface type and number that is configured to run PIM.
PIM	PIM is turned off or turned on this interface.
Nbr Count	Number of PIM neighbors in the neighbor table for the interface.
Hello Intvl	Frequency, in seconds, of PIM hello messages, as set by the ip pim hello-interval command in interface configuration mode.
DR Priority	Designated router priority is advertised by the neighbor in its hello messages.

Field	Description
DR	IP address of the DR on the LAN. Note that serial lines do not have DRs, so the IP address is shown as 0.0.0.0. If the interface on this router is the DR, “this system” is indicated; otherwise, the IP address of the external neighbor is given.

show pim join-prune statistic

To display Protocol Independent Multicast (PIM) join and prune aggregation statistics, use the **show pim join-prune statistics** command in EXEC mode.

```
show pim [{ipv4|ipv6}] join-prune statistic [type interface-path-id]
```

Syntax Description	
ipv4	(Optional) Specifies IPv4 address prefixes.
ipv6	(Optional) Specifies IPv6 address prefixes.
type	(Optional) Interface type. For more information, use the question mark (?) online help function.
interface-path-id	(Optional) Physical interface or virtual interface.
	<p>Note Use the show interfaces command in EXEC mode to see a list of all interfaces currently configured on the router.</p> <p>For more information about the syntax for the router, use the question mark (?) online help function.</p>

Command Default IP addressing is the default.

Command Modes EXEC

Command History	Release	Modification
	Release 5.0.0	This command was introduced.
	Release 5.2.1	IPv6 support was added on this command.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The **show pim join-prune statistics** command displays the average PIM join and prune groups for the most recent packets (in increments of 1000/10000/50000) that either were sent out or received from each PIM interface. If fewer than 1000/10000/50000 join and prune group messages are received since PIM was started or the statistics were cleared, the join-prune aggregation shown in the command display is zero (0).

Because each PIM join and prune packet can contain multiple groups, this command can provide a snapshot view of the average pace based on the number of join and prune packets, and on the consideration of the aggregation factor of each join and prune packet.

Task ID	Task ID	Operations
	multicast	read

Examples

The following is sample output from the **show pim join-prune statistics** command with all router interfaces specified:

```
RP/0/RP0/CPU0:router# show pim join-prune statistics

PIM Average Join/Prune Aggregation for last (100/1K/10K) packets
Interface      MTU      Transmitted   Received

Loopback0      1514     0 / 0 / 0    0 / 0 / 0
Encapstunnel0  0        0 / 0 / 0    0 / 0 / 0
Decapstunnel0  0        0 / 0 / 0    0 / 0 / 0
Loopback1      1514     0 / 0 / 0    0 / 0 / 0
POS0/3/0/0     4470     0 / 0 / 0    0 / 0 / 0
POS0/3/0/3     4470     0 / 0 / 0    0 / 0 / 0
```

This table describes the significant fields shown in the display.

Table 6: show pim join-prune statistics Field Descriptions

Field	Description
Interface	Interface from which statistics were collected.
MTU	Maximum transmission unit (MTU) in bytes for the interface.
Transmitted	Number of join and prune states aggregated into transmitted messages in the last 1000/10000/50000 transmitted join and prune messages.
Received	Number of join and prune states aggregated into received messages in the last 1000/10000/50000 received join and prune messages.

show pim rpf-redirect

To display the maximum bandwidth, the bandwidth used by traffic flowing through the local box, and the bandwidth used by other routers sharing the PIM bundle member interfaces of all members of bundles known to the system, use **show pim rpf-redirect** command in EXEC mode.

show pim *ipv4* rpf-redirect

Syntax Description	<i>ipv4</i> (Optional) Specifies IPv4 address prefixes.
---------------------------	---

Command Default	IPv4 addressing is the default.
------------------------	---------------------------------

Command Modes	EXEC
----------------------	------

Command History	Release	Modification
	Release 5.2.1	This command was introduced.

Usage Guidelines

Task ID	Task ID	Operation
	multicast	read

Example

The following sample output from the **show pim rpf-redirect** command displays statistics about the PIM bundles:

```
RP/0/RP0/CPU0:router#show pim rpf-redirect
Mon Aug 11 16:50:35.811 IST
PIM RPF-Redirect bundle database

Member      Available/Allocated Available/Allocated  Local / Network  Total
           Bandwidth          Threshold Bandwidth  Bandwidth        Bandwidth
           (Kbps)                (Kbps)                (Kbps)           (Kbps)

Bundle: east

Gi0/0/0/0   100000/100000       80000/80000        0/0              0
```

where, Available/Allocated Bandwidth (kbps) is the total multicast bandwidth (in kbps) available/allocated for multicast transmission; Available/Threshold Bandwidth (kbps) is the multicast bandwidth threshold beyond which the redirects are enabled, displays the available and the threshold bandwidth (kbps); Local/Network Bandwidth (in kbps) is the difference between the Allocated Bandwidth and Available Bandwidth; and the Total Bandwidth (kbps) is represented by the Local/Network Bandwidth.

show pim rpf-redirect route

To display the content of the snooping database, use **show pim rpf-redirect** command in EXEC mode.

show pim *ipv4* rpf-redirect route

Syntax Description	<i>ipv4</i> (Optional) Specifies IPv4 address prefixes.	
Command Default	IPv4 addressing is the default.	
Command Modes	EXEC	
Command History	Release	Modification
	Release 5.2.1	This command was introduced.
Usage Guidelines		
Task ID	Task ID	Operation
	multicast	read

show pim mstatic

To display multicast static routing information, use the **show pim mstatic** command in

XR EXEC

mode.

show pim [{ipv4|ipv6}] **mstatic** [ipv4]

Syntax Description	ipv4 (Optional) Specifies IPv4 address prefixes.
	ipv6 (Optional) Specifies IPv6 address prefixes.

Command Default IPv4 addressing is the default.

Command Modes XR EXEC

Command History	Release	Modification
	Release 5.0.0	This command was introduced.
Release 5.2.1	IPv6 support was added on this command.	

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The **show pim mstatic** command is used to view all the multicast static routes. Multicast static routes are defined by the **static-rpf** command.

Task ID	Task ID	Operations
	multicast	read

Examples

The following is sample output from the **show pim mstatic** command that shows how to reach IP address 10.0.0.1:

```
RP/0/RP0/CPU0:router# show pim mstatic

IP Multicast Static Routes Information
* 10.0.0.1/32 via pos0/1/0/1 with nexthop 172.16.0.1 and distance 0
```

This table describes the significant fields shown in the display.

Table 7: show pim mstatic Field Descriptions

Field	Description
10.0.0.1	Destination IP address.
pos0/1/0/1	Interface that is entered to reach destination IP address 10.0.0.1
172.16.0.1	Next-hop IP address to enter to reach destination address 10.0.0.1.
0	Distance of this mstatic route.

Related Commands

Command	Description
static-rpf	Configures a static Reverse Path Forwarding (RPF) rule for a specified prefix mask.

show pim nsf

To display the state of nonstop forwarding (NSF) operation for Protocol Independent Multicast (PIM), use the **show pim nsf** command in

EXEC

mode

XR EXEC

show pim [{ipv4|ipv6}] nsf

Syntax Description	
	ipv4 (Optional) Specifies IPv4 address prefixes.
	ipv6 (Optional) Specifies IPv6 address prefixes.

Command Default IPv4 addressing is the default.

Command Modes XR EXEC

Command History	Release	Modification
	Release 5.0.0	This command was introduced.
	Release 5.2.1	IPv6 support was added on this command.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The **show pim nsf** command displays the current multicast NSF state for PIM. For multicast NSF, the state may be normal or activated for nonstop forwarding. The latter state indicates that recovery is in progress due to a failure in the Multicast Routing Information Base (MRIB) or PIM. The total NSF timeout and time remaining are displayed until NSF expiration.

Task ID	Task ID	Operations
	multicast	read

Examples The following is sample output from the **show pim nsf** command:

```
RP/0/RP0/CPU0:router# show pim nsf
```

```
IP PIM Non-Stop Forwarding Status:
Multicast routing state: Non-Stop Forwarding Activated
```

```
NSF Lifetime: 00:02:00
NSF Time Remaining: 00:01:56
```

This table describes the significant fields shown in the display.

Table 8: show pim nsf Field Descriptions

Field	Description
Multicast routing state	PIM state is in NSF recovery mode (Normal or Non-Stop Forwarding Activated).
NSF Lifetime	Total NSF lifetime (seconds, hours, and minutes) configured for PIM.
NSF Time Remaining	Time remaining in NSF recovery for PIM if NSF recovery is activated.

show pim range-list

To display range-list information for Protocol Independent Multicast (PIM), use the **show pim range-list** command in

XR EXEC

```
show pim [{ipv4|ipv6}] range-list [{autorp|config}] [ip-address-name]
```

Syntax Description	Parameter	Description
	ipv4	(Optional) Specifies IPv4 address prefixes.
	ipv6	(Optional) Specifies IPv6 address prefixes.
	config	(Optional) Displays PIM command-line interface (CLI) range list information.
	<i>ip-address-name</i>	(Optional) IP address of the rendezvous point.

Command Default IPv4 addressing is the default.

Command Modes XR EXEC

Command History	Release	Modification
	Release 5.0.0	This command was introduced.
	Release 5.2.1	IPv6 support was added on this command.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The **show pim range-list** command is used to determine the multicast forwarding mode to group mapping. The output also indicates the rendezvous point (RP) address for the range, if applicable. The **config** keyword means that the particular range is statically configured.

Task ID	Task ID	Operations
	multicast	read

Examples

The following is sample output from the **show pim range-list** command:

```
RP/0/RP0/CPU0:router# show pim range-list
```

```
config SSM Exp: never Src: 0.0.0.0
 230.0.0.0/8 Up: 03:47:09
```

```

config BD RP: 172.16.1.3 Exp: never Src: 0.0.0.0
              239.0.0.0/8 Up: 03:47:16
config SM RP: 172.18.2.6 Exp: never Src: 0.0.0.0
              235.0.0.0/8 Up: 03:47:09

```

This table describes the significant fields shown in the display.

Table 9: show pim range-list Field Descriptions

Field	Description
config	Group range was learned by means of configuration.
SSM	PIM mode is operating in Source Specific Multicast (SSM) mode. Other modes are Sparse-Mode (SM) and bidirectional (BD) mode.
Exp: never	Expiration time for the range is “never”.
Src: 0.0.0.0	Advertising source of the range.
230.0.0.0/8	Group range: address and prefix.
Up: 03:47:09	Total time that the range has existed in the PIM group range table. In other words, the uptime in hours, minutes, and seconds.

Related Commands

Command	Description
show pim group-map, on page 49	Displays group-to-PIM mode mapping.

show pim traffic

To display Protocol Independent Multicast (PIM) traffic counter information, use the **show pim traffic** command in mode

XR EXEC

show pim [{ipv4|ipv6}] **traffic**

Syntax Description	ipv4 (Optional) Specifies IPv4 address prefixes.
	ipv6 (Optional) Specifies IPv6 address prefixes.

Command Default IPv4 addressing is the default.

Command Modes XR EXEC

Command History	Release	Modification
	Release 5.0.0	This command was introduced.
	Release 5.2.1	IPv6 support was added on this command.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

Task ID	Task ID	Operations
	multicast	read

Examples

The following is sample output from the **show pim traffic** command that displays a row for valid PIM packets, number of hello packets, and so on:

```
RP/0/RP0/CPU0:router# show pim traffic

PIM Traffic Counters
Elapsed time since counters cleared: 1d01h

Valid PIM Packets  Received                Sent
Hello              9207                    12336
Join-Prune         1076805                 531981
Data Register     14673205                 0
Null Register     73205                   0
Register Stop     0                       14673205
```

```

Assert                0                0
Batched Assert        0                0
BSR Message           0                0
Candidate-RP Adv.     0                0

Join groups sent      0
Prune groups sent     0
Output JP bytes       0
Output hello bytes    4104

Errors:
Malformed Packets     0
Bad Checksums         0
Socket Errors         0
Subnet Errors         0
Packets dropped since send queue was full 0
Packets dropped due to invalid socket      0
Packets which couldn't be accessed        0
Packets sent on Loopback Errors          6
Packets received on PIM-disabled Interface 0
Packets received with Unknown PIM Version 0

```

This table describes the significant fields shown in the display.

Table 10: show pim traffic Field Descriptions

Field	Description
Elapsed time since counters cleared	Time (in days and hours) that had elapsed since the counters were cleared with the clear pim counters command.
Valid PIM Packets	Total PIM packets that were received and sent.
HelloJoin-PruneRegisterRegister StopAssert Bidir DF Election	Specific type of PIM packets that were received and sent.
Malformed Packets	Invalid packets due to format errors that were received and sent.
Bad Checksums	Packets received or sent due to invalid checksums.
Socket Errors	Packets received or sent due to errors from the router's IP host stack sockets.
Packets dropped due to invalid socket	Packets received or sent due to invalid sockets in the router's IP host stack.
Packets which couldn't be accessed	Packets received or sent due to errors when accessing packet memory.
Packets sent on Loopback Errors	Packets received or sent due to use of loopback interfaces.
Packets received on PIM-disabled Interface	Packets received or sent due to use of interfaces not enabled for PIM.

Field	Description
Packets received with Unknown PIM Version	Packets received or sent due to invalid PIM version numbers in the packet header.

Related Commands

Command	Description
clear pim counters, on page 10	Clears Protocol Independent Multicast (PIM) counters and statistics.

show pim tunnel info

To display information for the Protocol Independent Multicast (PIM) tunnel interface, use the **show pim tunnel info** command in

XR EXEC
mode.

show pim [{ipv4|ipv6}] **tunnel info** {*interface-unit*|all} [netio]

Syntax Description		
ipv4	(Optional)	Specifies IPv4 address prefixes.
ipv6	(Optional)	Specifies IPv6 address prefixes.
<i>interface-unit</i>	Name of virtual tunnel interface that represents the encapsulation tunnel or the decapsulation tunnel.	
all	Specifies both encapsulation and decapsulation tunnel interfaces.	
netio	(Optional)	Displays information obtained from the Netio DLL.

Command Default IPv4 addressing is the default.

Command Modes XR EXEC

Command History	Release	Modification
	Release 5.0.0	This command was introduced.
	Release 5.2.1	IPv6 support was added on this command.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

PIM register packets are sent through the virtual encapsulation tunnel interface from the source's first-hop designated router (DR) router to the rendezvous point (RP). On the RP, a virtual decapsulation tunnel is used to represent the receiving interface of the PIM register packets. This command displays tunnel information for both types of interfaces.

Register tunnels are the encapsulated (in PIM register messages) multicast packets from a source that is sent to the RP for distribution through the shared tree. Registering applies only to sparse mode (SM), not to Source Specific Multicast (SSM)

Task ID	Task ID	Operations
	multicast	read

Examples

The following is sample output from the **show pim tunnel info** command:

```
RP/0/RP0/CPU0:router# show pim tunnel info all

Interface      RP Address      Source Address
Encapstunnel0  10.1.1.1        10.1.1.1
Decapstunnel0  10.1.1.1
```

This table describes the significant fields shown in the display.

Table 11: show pim tunnel info Field Descriptions

Field	Description
Interface	Name of the tunnel interface.
RP Address	IP address of the RP tunnel endpoint.
Source Address	IP address of the first-hop DR tunnel endpoint, applicable only to encapsulation interfaces.

spt-threshold infinity

To change the behavior of the last-hop router to always use the shared tree and never perform a shortest-path tree (SPT) switchover, use the **spt-threshold infinity** command in PIM configuration mode. To return to the default behavior, use the **no** form of this command.

```
spt-threshold infinity [group-list access-list]  
no spt-threshold infinity
```

Syntax Description	group-list <i>access-list</i> (Optional) Indicates the groups restricted by the access list.				
Command Default	The last-hop Protocol Independent Multicast (PIM) router switches to the shortest-path source tree by default.				
Command Modes	PIM configuration				
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 5.0.0</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	Release 5.0.0	This command was introduced.
Release	Modification				
Release 5.0.0	This command was introduced.				
Usage Guidelines	<p>To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.</p> <p>The spt-threshold infinity command causes the last-hop PIM router to always use the shared tree instead of switching to the shortest-path source tree.</p> <p>If the group-list keyword is not used, this command applies to all multicast groups.</p>				
Task ID	<table border="1"> <thead> <tr> <th>Task ID</th> <th>Operations</th> </tr> </thead> <tbody> <tr> <td>multicast</td> <td>read, write</td> </tr> </tbody> </table>	Task ID	Operations	multicast	read, write
Task ID	Operations				
multicast	read, write				
Examples	<p>The following example shows how to configure the PIM source group grp1 to always use the shared tree:</p> <pre>RP/0/RP0/CPU0:router(config)# router pim RP/0/RP0/CPU0:router(config-pim-default-ipv4)# spt-threshold infinity group-list grp1</pre>				

ssm

To define the Protocol Independent Multicast (PIM)-Source Specific Multicast (SSM) range of IP multicast addresses, use the **ssm** command in the appropriate configuration mode. To return to the default behavior, use the **no** form of this command.

```
ssm [{allow-override|disable|range access-list}]
no ssm [{allow-override|disable|range}]
```

Syntax Description	
allow-override	(Optional) Allows SSM ranges to be overridden by more specific ranges.
disable	(Optional) Disables SSM group ranges.
range access-list	(Optional) Specifies an access list describing group ranges for this router when operating in PIM SSM mode.

Command Default Interface operates in PIM sparse mode (PIM-SM). IPv4 addressing is the default.

Command Modes Multicast routing address-family configuration
Multicast VPN configuration

Command History	Release	Modification
	Release 5.0.0	This command was introduced.

Usage Guidelines To use this command, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using a command, contact your AAA administrator for assistance.

The **ssm** command performs source filtering, which is the ability of a router to report interest in receiving packets from specific source addresses (or from all but the specific source addresses) to an IP multicast address. Unlike PIM-sparse mode (SM) that uses a rendezvous point (RP) and shared trees, PIM-SSM uses information on source addresses for a multicast group provided by receivers through the local membership protocol Internet Group Management Protocol (IGMP) and is used to directly build source-specific trees.

IGMP Version 3 must be enabled on routers that want to control the sources they receive through the network.

When multicast routing is enabled, the default is PIM-SSM enabled on the default SSM range, 232/8. SSM may be disabled with the **disable** form of the command, or any ranges may be specified in an access list with the **range** form. All forms of this command are mutually exclusive. If an access list is specified, the default SSM range is not used unless specified in the access list.

Task ID	Task ID	Operations
	multicast	read, write

Examples

The following example shows how to configure SSM service for the IP address range defined by access list 4, using the **ssm** command:

```
RP/0/RP0/CPU0:router(config)# ipv4 access-list 4  
RP/0/RP0/CPU0:router(config-ipv4-acl)# permit ipv4 any 224.2.151.141  
RP/0/RP0/CPU0:router(config)# mcast-routing  
RP/0/RP0/CPU0:router(config-mcast)# ssm range 4
```

