

BIG-IP[®] Advanced Routing[™]

Protocol Independent Multicasting Command Line Interface Reference Guide

Version 7.10.6



Publication Date

This document was published on September 21, 2016.

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CHAPTER 1 ZebOS Command Line Interface Environment

This chapter provides basic information about the ZebOS® Command Line Interface, including in how to access and how to use the CLI features. The ZebOS CLI is a text-based command interface. Each command is usually associated with a specific task. In addition, users can use commands in scripts to automate configuration tasks.

You can give the commands described in this manual locally from the console of a device running ZebOS or remotely from a terminal emulator such as `putty` or `xterm`.

Command Line Interface Overview

The ZebOS® Command Line Interface (CLI) is a text-based command interface. Each command is usually associated with a specific task. The commands can be used in scripts to automate configuration tasks.

Starting the Command Line Interface

You must start daemons as described in this section before you can use the CLI. The general steps are listed below. For details about the ZebOS daemons, see the *ZebOS Network Platform Installation Guide*.

1. Start your terminal emulator and connect to the device or go to the console of the device running ZebOS.
2. Connect to the directory where you installed the ZebOS executables.
3. Start the Network Services Manager (NSM).

```
# ./nsm -d
```

4. Start the protocol module daemons that your organization uses, such as `mstpd`, `ospf6d`, or `ripd`.

```
# ./mstpd -d
```

5. Start the Integrated Management Interface (IMI) daemon.

```
# ./imi -d
```

6. Start the IMI shell.

```
# ./imish
```

Note: Your organization may use a ZebOS build that does not include `imish`. If that is the case, you must connect to a port on which a protocol daemon is listening. For details, see the *ZebOS Network Platform Installation Guide*.

You can now begin using the CLI.

Command Line Interface Help

You access the CLI help by entering a full or partial command string and a question mark “?”. The CLI displays the command keywords or parameters along with a short description. For example, at the CLI command prompt, type:

```
ZebOS> show ?
```

The CLI displays this keyword list with short descriptions for each keyword:

```
ZebOS>show ?
access-list          List IP access lists
```

bfd	Bidirectional Forwarding Detection (BFD)
bgp	Border Gateway Protocol (BGP)
cli	Show CLI tree of current mode
clns	Connectionless-Mode Network Service (CLNS)
debugging	Debugging functions (see also 'undebug')
faults	Show recorded faults
history	Display the session command history
interface	Interface status and configuration
ip	Internet Protocol (IP)
ipv6	Internet Protocol version 6 (IPv6)
isis	Intermediate System-Intermediate System
list	Show command lists
mrib	MRIB
nsm	NSM
privilege	Show current privilege level
proc-names	Show process names
process	Process
route-map	route-map information
router-id	Router ID
running-config	Current Operating configuration

...

If you type the ? in the middle of a keyword, the CLI displays help for that keyword only.

```
ZebOS> show de?
  debugging  Debugging functions (see also 'undebug')
```

If the ? is typed in the middle of a keyword, but the incomplete keyword matches several other keywords, ZebOS displays help for all matching keywords.

```
ZebOS> show i? (CLI does not display the question mark).
  interface  Interface status and configuration
  ip         IP information
  isis      ISIS information
```

Command Completion

The CLI can complete the spelling of a command or a parameter. Begin typing the command or parameter and then press the tab key. For example, at the CLI command prompt type sh:

```
ZebOS> sh
```

Press the tab key. The CLI displays:

```
ZebOS> show
```

If the command or parameter spelling is ambiguous, the ZebOS CLI displays the choices that match the abbreviation. Type show i and press the tab key. The CLI displays:

```
ZebOS> show i
interface ip          ipv6          isis
ZebOS> show i
```

The CLI displays the interface and ip keywords. Type n to select interface and press the tab key. The CLI displays:

```
ZebOS> show in
ZebOS> show interface
```

Type ? and the CLI displays the list of parameters for the show interface command.

```
ZebOS> show interface
```

```
IFNAME  Interface name
|       Output modifiers
>       Output redirection
<cr>
```

The CLI displays the only parameter associated with this command, the `IFNAME` parameter.

Command Abbreviations

The CLI accepts abbreviations that uniquely identify a keyword in commands. For example

```
sh in eth0
```

is an abbreviation for the `show interface` command.

Command Line Errors

Any unknown spelling variation causes the CLI to display the error `Unrecognized command` in response to the `?`. The CLI displays the command again as last entered.

```
ZebOS>show dd?
% Unrecognized command
ZebOS>show dd
```

When you press the Enter key after typing an invalid command, the CLI displays:

```
ZebOS(config)#router ospf here
                        ^
% Invalid input detected at '^' marker.
```

where the `^` points to the first character in error in the command.

If a command is incomplete, the CLI displays the following message:

```
ZebOS> show
% Incomplete command.
```

Some commands are too long for the display line and can wrap in mid-parameter or mid-keyword, as shown below:

```
area 10.10.0.18 virtual-link 10.10.0.19 authent
ication-key 57393
```

Command Negation

Many commands can be negated using the `no` keyword. Depending on the command or the parameters, some command negation can disable one feature or a feature for a specific ID, interface, address or other identifier. However, some negation is for the base command only and the negated form does not take a parameter.

Typographic Conventions

The following table describes the typographic conventions used in this reference.

Convention	Description	Example
Monospaced font	Command strings entered on a command line	<code>show ip ospf</code>
lowercase	Keywords that you enter exactly as shown in the command syntax.	<code>show ip ospf</code>
UPPERCASE	See Variable Placeholders	IFNAME
()	Optional parameters, from which you must select one. Vertical bars delimit the selections. Do not enter the parentheses or vertical bars as part of the command.	<code>(A . B . C . D <0-4294967295>)</code>
()	Optional parameters, from which you select one or none. Vertical bars delimit the selections. Do not enter the parentheses or vertical bars as part of the command.	<code>(A . B . C . D <0-4294967295>)</code>
()	Optional parameter which you can specify or omit. Do not enter the parentheses or vertical bar as part of the command.	<code>(IFNAME)</code>
{ }	Optional parameters, from which you must select one or more. Vertical bars delimit the selections. Do not enter the braces or vertical bars as part of the command.	<code>{intra-area <1-255> inter-area <1-255> external <1-255> }</code>
[]	Optional parameters, from which you select zero or more. Vertical bars delimit the selections. Do not enter the brackets or vertical bars as part of the command. A '?' before a parameter in square brackets limits that parameter to one occurrence in a command string.	<code>[<1-65535> AA:NN internet local-AS no-advertise no-export]</code>
.	Repeatable parameter. The parameter that follows a period can be repeated more than once. Do not enter the period as part of the command.	<code>set as-path prepend . <1-65535></code>

Variable Placeholders

The command syntax use the following tokens to represent command line variables for which you supply a value:

Token	Description
WORD	A contiguous text string (excluding spaces), such as IFNAME for the name of an interface
LINE	A text string, including spaces; no other parameters can follow this parameter
A . B . C . D	IPv4 address
A . B . C . D / M	IPv4 address and mask/prefix
X : X : : X : X	IPv6 address
X : X : : X : X / M	IPv6 address and mask/prefix
HH : MM : SS	Time format
AA : NN	BGP community value
XX : XX : XX : XX : XX : XX	MAC address
<1-5> <1-65535> <0-2147483647> <0-4294967295>	Numeric range

Command Description Format

The following table explains the sections used to describe each command in this reference.

Section	Description
Command Name	The command, what the command does, and when should it be used
Command Syntax	The syntax of the command
Parameters	Parameters and options for the command
Default	The status before the command is executed
Command Mode	The name of the mode in which this command is used. Examples include Exec or Configure modes.
Example	An example of the command being executed

Keyboard Operations

You can perform these operations from the keyboard:

Key combination	Operation
Left arrow or Ctrl+b	Moves one character to the left. When a command extends beyond a single line, you can press left arrow or Ctrl+b repeatedly to scroll toward the beginning of the line, or you can press Ctrl+a to go directly to the beginning of the line.
Right arrow or Ctrl-f	Moves one character to the right. When a command extends beyond a single line, you can press right arrow or Ctrl+f repeatedly to scroll toward the end of the line, or you can press Ctrl+e to go directly to the end of the line.
Esc, b	Moves back one word
Esc, f	Moves forward one word
Ctrl+e	Moves to end of the line
Ctrl+a	Moves to the beginning of the line
Ctrl+u	Deletes the line
Ctrl+w	Deletes from the cursor to the previous whitespace
Alt+d	Deletes the current word
Ctrl+k	Deletes from the cursor to the end of line
Ctrl+y	Pastes text previously deleted with Ctrl+k, Alt+d, Ctrl+w, or Ctrl+u at the cursor
Ctrl+t	Transposes the current character with the previous character
Ctrl+c	Ignores the current line and redisplay the command prompt
Ctrl+z	Ends configuration mode and returns to exec mode
Ctrl+l	Clears the screen
Up Arrow or Ctrl+p	Scroll backward through command history
Down Arrow or Ctrl+n	Scroll forward through command history

Show Command Tokens

You can use two tokens to modify the output of a `show` command. Enter a question mark to display these tokens:

```
ZebOS# show users ?
  | Output modifiers
  > Output redirection
```

Output Modifiers

You can type the | (vertical bar character) to use output modifiers. For example:

```
ZebOS>show rsvp | ?
  begin      Begin with the line that matches
  exclude    Exclude lines that match
  include    Include lines that match
  redirect   Redirect output
```

Begin Modifier

The `begin` modifier displays the output beginning with the first line that contains the input string (everything typed after the `begin` keyword). For example:

```
ZebOS# show run | begin eth1
...skipping
interface eth1
  ipv6 address fe80::204:75ff:fee6:5393/64
!
interface eth2
  ipv6 address fe80::20d:56ff:fe96:725a/64
!
line con 0
  login
!
end
```

You can specify a regular expression after the `begin` keyword, This example begins the output at a line with either “eth3” or “eth4”:

```
ZebOS#show run | begin eth[3-4]

...skipping
interface eth3
  shutdown
!
interface eth4
  shutdown
!
interface svlan0.1
  no shutdown
!
route-map myroute permit 3
!
route-map mymap1 permit 10
!
route-map rmap1 permit 3
!
line con 0
  login
line vty 0 4
  login
!
```

end

Include Modifier

The `include` modifier includes only those lines of output that contain the input string. In the output below, all lines containing the word “input” are included:

```
ZebOS# show interface eth1 | include input
input packets 80434552, bytes 2147483647, dropped 0, multicast packets 0
input errors 0, length 0, overrun 0, CRC 0, frame 0, fifo 1, missed 0
```

You can specify a regular expression after the `include` keyword. This examples includes all lines with “input” or “output”:

```
ZebOS#show int eth0 | include (in|out)put
input packets 597058, bytes 338081476, dropped 0, multicast packets 0
input errors 0, length 0, overrun 0, CRC 0, frame 0, fifo 0, missed 0
output packets 613147, bytes 126055987, dropped 0
output errors 0, aborted 0, carrier 0, fifo 0, heartbeat 0, window 0
```

Exclude Modifier

The `exclude` modifier excludes all lines of output that contain the input string. In the following output example, all lines containing the word “input” are excluded:

```
ZebOS# show interface eth1 | exclude input
Interface eth1
Scope: both
Hardware is Ethernet, address is 0004.75e6.5393
index 3 metric 1 mtu 1500 <UP,BROADCAST,RUNNING,MULTICAST>
VRF Binding: Not bound
Administrative Group(s): None
DSTE Bandwidth Constraint Mode is MAM
inet6 fe80::204:75ff:fee6:5393/64
output packets 4438, bytes 394940, dropped 0
output errors 0, aborted 0, carrier 0, fifo 0, heartbeat 0, window 0
collisions 0
```

You can specify a regular expression after the `exclude` keyword. This example excludes lines with “output” or “input”:

```
ZebOS#show interface eth0 | exclude (in|out)put
Interface eth0
Scope: both
Hardware is Ethernet Current HW addr: 001b.2139.6c4a
Physical:001b.2139.6c4a Logical:(not set)
index 2 metric 1 mtu 1500 duplex-full arp ageing timeout 3000
<UP,BROADCAST,RUNNING,MULTICAST>
VRF Binding: Not bound
Bandwidth 100m
DHCP client is disabled.
inet 10.1.2.173/24 broadcast 10.1.2.255
VRRP Master of : VRRP is not configured on this interface.
inet6 fe80::21b:21ff:fe39:6c4a/64
collisions 0
```


Redirect Modifier

The `redirect` modifier writes the output into a file. The output is not displayed.

```
ZebOS# show history | redirect /var/frame.txt
```

The output redirection token (`>`) does the same thing:

```
ZebOS# show history >/var/frame.txt
```

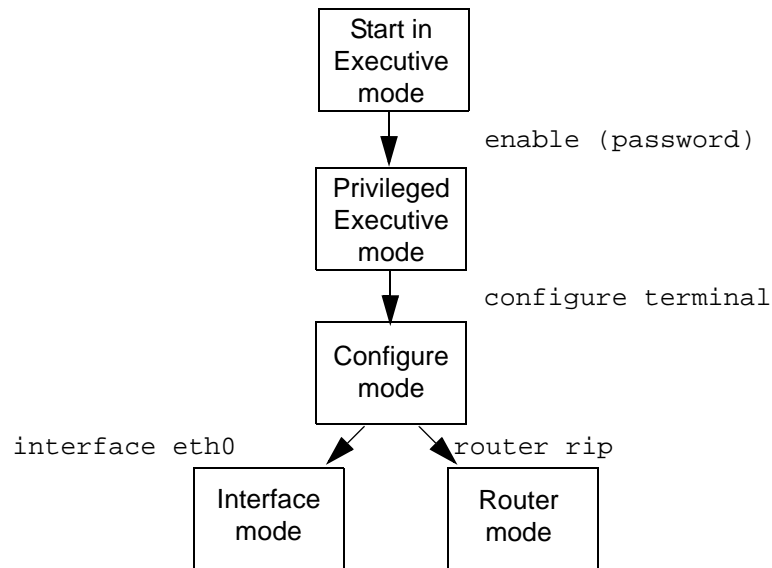
Common Command Modes

Commands are grouped into modes arranged in a hierarchy. Each mode has its own set of commands. The command modes common to all protocols are listed below.

Name	Description
Executive Mode	Also called the <i>view</i> mode, this the first mode to appear after you start the CLI. It is a base mode from where you can perform basic commands such as <code>show</code> , <code>exit</code> , <code>quit</code> , <code>help</code> , <code>list</code> , and <code>enable</code> .
Privileged Executive Mode	Also called the <i>enable</i> mode, in this mode you can run additional basic commands such as <code>debug</code> , <code>write</code> , and <code>show</code> .
Configure Mode	Also called Configure Terminal mode, in this mode you can run configuration commands and go into other modes such as Interface, Router, Route Map, Key Chain, and Address Family.
Interface Mode	In this mode you can configure protocol-specific settings for a particular interface. Any setting you configure in this mode overrides a setting configured in Router mode.
Router Mode	This mode is used to configure router-specific settings for a protocol such as RIP or OSPF.

Common Command Mode Tree

The diagram below shows the common command mode hierarchy.



To change modes:

1. Enter Privileged Executive mode by entering `enable` in Executive mode.
2. Enter Configure mode by entering `configure terminal` in Privileged Executive mode.

The example below shows starting `imish` and then moving from Executive mode to Privileged Executive mode to Configure mode and finally to Router mode:

```
# ./imish
ZebOS>enable mypassword
ZebOS#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
ZebOS(config)#router rip
ZebOS(config-router)#
```

See the *ZebOS Network Platform NSM Command Line Interface Reference Guide* for information about other command modes.

Note: Each protocol can have modes in addition to the common command modes. See the command reference for the respective protocol for details.

CHAPTER 2 PIMv4 Commands

The chapter includes the commands that support the Protocol-Independent Multicast (PIM) implementation in ZebOS. It includes the following commands:

- [clear ip mroute on page 19](#)
- [clear ip pim sparse-mode on page 20](#)
- [debug ip pim on page 21](#)
- [debug ip pim packet on page 22](#)
- [debug pim all on page 23](#)
- [debug ip pim timer assert on page 24](#)
- [debug ip pim timer bsr on page 25](#)
- [debug ip pim timer hello on page 26](#)
- [debug ip pim timer joinprune on page 27](#)
- [debug ip pim timer joinprune on page 28](#)
- [debug ip pim timer register on page 29](#)
- [ip pim accept-register on page 30](#)
- [ip pim anycast-rp on page 31](#)
- [ip pim bsr-border on page 32](#)
- [ip pim bsr-candidate on page 33](#)
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- [show ip pim bsr-router on page 62](#)
- [show ip pim local-members on page 63](#)
- [show ip pim rp-hash on page 64](#)
- [show ip pim rp mapping on page 65](#)
- [undebug all ip pim on page 66](#)

clear ip mroute

Use this command to delete all multicast route table entries and all multicast routes at the PIM protocol level.

Command Syntax

```
clear ip mroute *
clear ip mroute * pim (dense-mode|sparse-mode)
clear ip mroute A.B.C.D
clear ip mroute A.B.C.D A.B.C.D
clear ip mroute A.B.C.D A.B.C.D pim (dense-mode|sparse-mode)
clear ip mroute A.B.C.D pim sparse-mode
clear ip mroute statistics *
clear ip mroute statistics A.B.C.D
clear ip mroute statistics A.B.C.D A.B.C.D
```

Parameters

*	Delete all multicast routes
pim	Group IP address
A.B.C.D	Clears group IP address
A.B.C.D	Clears source IP address
dense-mode	Clears multicast rout table for PIM dense-mode
sparse-mode	Clears multicast route table for PIM sparse mode
statistics	Clears multicast route statistics

Command Mode

Exec mode and Privileged Exec mode

Example

```
ZebOS#clear ip mroute * pim sparse-mode
ZebOS#clear ip mroute 224.2.2.2 4.4.4.4 pim sparse-mode
```

clear ip pim sparse-mode

Use this command to clear all rendezvous point (RP) sets learned through the PIMv2 Bootstrap Router (BSR).

Command Syntax

```
clear ip pim sparse-mode bsr rp-set *
```

Parameters

rp-set	PIMv2 bootstrap router RP set
*	Clear all RP sets

Command Mode

Exec mode and Privileged Exec mode

Example

```
ZebOS#clear ip pim sparse-mode bsr rp-set *
```

debug ip pim

Use this command to enable debugging for PIM.

Use the `no` option with this command to deactivate debugging for PIM.

Command Syntax

```
debug ip pim (all|events|mfc|mib|mtrace|nexthop|nsm|packet|state|timer)
no debug ip pim (all|events|mfc|mib|mtrace|nexthop|nsm|packet|state|timer)
```

Parameters

<code>all</code>	Enable debugging for all PIM events
<code>events</code>	Enable debugging for general configuration
<code>mfc</code>	Enable debugging for MFC updates
<code>mib</code>	Enable debugging for MIB entries
<code>mtrace</code>	Enable debugging for MTRACE messages
<code>nexthop</code>	Enable debugging for Reverse Path Forwarding (RPF) neighbor nexthop cache handling
<code>nsm</code>	Enable debugging for NSM
<code>packet</code>	Enable debugging for PIM packets
<code>state</code>	Enable debugging for PIM states
<code>timer</code>	Enable debugging for PIM timers

Command Mode

Exec mode, Privilege Exec mode, and Configure mode

Examples

```
ZebOS#configure terminal
ZebOS(config)#debug ip pim all
```

debug ip pim packet

Use this command to activate debugging of incoming or outgoing PIM packets.

Use the `no` option with this command to deactivate debugging of incoming or outgoing PIM packets.

Command Syntax

```
debug ip pim packet
debug ip pim packet in
debug ip pim packet out
no debug ip pim packet
no debug ip pim packet in
no debug ip pim packet out
```

Parameters

<code>in</code>	Debug incoming packets
<code>out</code>	Debug outgoing packets

Command Mode

Configure and Privileged Exec modes

Example

```
ZebOS#configure terminal
ZebOS(config)#debug ip pim packet in
```

debug pim all

Use this command to enable debugging of all PIM events.

Use the `no` option with this command to disable debugging for PIM.

Command Syntax

```
debug pim all
no debug pim all
```

Command Mode

Exec mode, Privilege Exec mode, and Configure mode

Example

```
ZebOS#debug pim all
```

debug ip pim timer assert

Use this command to enable debugging of the PIM assert timers.

Use the `no` option with this command to disable debugging for PIM assert timers.

Command Syntax

```
debug ip pim timer assert
debug ip pim timer assert at
no debug ip pim timer assert
no debug ip pim timer assert at
```

Parameters

`at` Use this option to turn on or off debugging of the PIM Assert Timer

Command Mode

Exec mode, Privilege Exec mode, and Configure mode

Example

```
ZebOS#debug ip pim timer assert at
```

debug ip pim timer bsr

Use this command to enable debugging of PIM BSR time.

Use the `no` option with this command to disable debugging of the PIM BSR timer.

Command Syntax

```
debug ip pim timer bsr
debug ip pim timer bsr bst
debug ip pim timer bsr crp
no debug ip pim timer bsr
no debug ip pim timer bsr bst
no debug ip pim timer bsr crp
```

Parameters

<code>bst</code>	Turn on or turn off the bootstrap debugging timer
<code>crp</code>	Turn on or turn off the Candidate-RP debugging timer

Command Mode

Exec mode, Privilege Exec mode, and Configure mode

Example

```
ZebOS#configure terminal
ZebOS(config)#debug ip pim timer bsr bst
```

debug ip pim timer hello

Use this command to enable debugging of various PIM Hello timers.

Use the `no` option with this command to disable debugging of the PIM Hello timers.

Command Syntax

```
debug ip pim timer hello
debug ip pim timer hello ht
debug ip pim timer hello nlt
debug ip pim timer hello tht
no debug ip pim timer hello
no debug ip pim timer hello ht
no debug ip pim timer hello nlt
no debug ip pim timer hello tht
```

Parameters

<code>ht</code>	Turn on or turn off the PIM Hello debugging timer (ht)
<code>nlt</code>	Turn on or turn off the PIM Neighbor Liveliness debugging timer (nlt)
<code>tht</code>	Turn on or turn off the Triggered Hello Timer (tht)

Command Mode

Exec mode, Privilege Exec mode, and Configure mode

Example

```
ZebOS#configure terminal
ZebOS(config)#debug ip pim timer hello ht
```

debug ip pim timer joinprune

Use this command to enable debugging of various PIM JoinPrune timers.

Use the no option with this command to disable the debugging of the PIM JoinPrune timers.

Command Syntax

```
debug ip pim timer joinprune
debug ip pim timer joinprune et
debug ip pim timer joinprune kat
debug ip pim timer joinprune jt
debug ip pim timer joinprune ot
debug ip pim timer joinprune ppt
no debug ip pim timer joinprune
no debug ip pim timer joinprune et
no debug ip pim timer joinprune kat
no debug ip pim timer joinprune jt
no debug ip pim timer joinprune ot
no debug ip pim timer joinprune ppt
```

Parameters

et	Turn on or turn off the PIM JoinPrune expiry timer (et)
jt	Turn on or turn off the PIM JoinPrune upstream Join Timer (jt)
kat	Turn on or turn off the PIM JoinPrune Keep Alive timer (kat)
ot	Turn on or turn off the PIM JoinPrune Upstream Override Timer (ot)
ppt	Turn on or turn off the PIM JoinPrune PrunePending Timer ((ppt)

Command Mode

Exec mode, Privilege Exec mode, and Configure mode

Example

```
ZebOS#debug ip pim timer joinprune et
```

debug ip pim timer joinprune

Use this command to enable debugging of various PIM JoinPrune timers.

Use the no option with this command to disable the debugging of the PIM JoinPrune timers.

Command Syntax

```
debug ip pim timer joinprune
debug ip pim timer joinprune et
debug ip pim timer joinprune kat
debug ip pim timer joinprune jt
debug ip pim timer joinprune ot
debug ip pim timer joinprune ppt
no debug ip pim timer joinprune
no debug ip pim timer joinprune et
no debug ip pim timer joinprune kat
no debug ip pim timer joinprune jt
no debug ip pim timer joinprune ot
no debug ip pim timer joinprune ppt
```

Parameters

et	Turn on or turn off the PIM JoinPrune expiry timer (et)
jt	Turn on or turn off the PIM JoinPrune upstream Join Timer (jt)
kat	Turn on or turn off the PIM JoinPrune Keep Alive timer (kat)
ot	Turn on or turn off the PIM JoinPrune Upstream Override Timer (ot)
ppt	Turn on or turn off the PIM JoinPrune PrunePending Timer ((ppt)

Command Mode

Exec mode, Privilege Exec mode, and Configure mode

Example

```
ZebOS#debug ip pim timer joinprune et
```

debug ip pim timer register

Use this command to enable the PIM register timer's debugging.

Use the no option with this command to disable the PIM register timer's debugging.

Command Syntax

```
debug ip pim timer register
```

```
debug ip pim timer register rst
```

```
no debug ip pim timer register
```

```
no debug ip pim timer register rst
```

Parameters

<code>rst</code>	Turn on or turn off the PIM Register Stop Timer (rst)
------------------	---

Command Mode

Exec mode, Privilege Exec mode, and Configure mode

Example

```
ZebOS#debug ip pim timer register
```

ip pim accept-register

Use this command to configure the ability to filter out multicast sources specified by the given access-list at the RP, so that the RP will accept/refuse to perform the Register mechanism for the packets sent by the specified sources. By default, the RP accepts Register packets from all multicast sources.

Use the no option with this command to revert to default.

Command Syntax

```
ip pim accept-register list (<100-199>|<2000-2699>|WORD)
no ip pim accept-register
```

Parameters

<100-199>	An IP extended access-list value
<2000-2699>	An IP extended access-list value in the expanded range
WORD	Name of a standard access list

Command Mode

Configure mode

Example

```
ZebOS#configure terminal
ZebOS(config)#ip pim accept-register list 121

ZebOS(config)#no ip pim accept-register
```

ip pim anycast-rp

Use this command to configure the Anycast RP in the RP set.

Use the no option with this command to remove the configuration.

Command Syntax

```
ip pim anycast-rp A.B.C.D A.B.C.D
no ip pim anycast-rp A.B.C.D
no ip pim anycast-rp A.B.C.D A.B.C.D
```

Parameters

A.B.C.D	Unicast IP address of the Anycast RP set. An Anycast RP set is a collection of RPs in the same domain.
A.B.C.D	Destination IP address where Register messages are copied and sent. A Member RP is an individual RP member in the Anycast RP set.

Command Mode

Configure mode

Examples

The following example shows how to configure the Anycast RP in the RP set.

```
ZebOS#configure terminal
ZebOS (config)#ip pim anycast-rp 1.1.1.1 10.10.10.10
```

The following example shows how to remove the configuration.

```
ZebOS#configure terminal
ZebOS (config)#no ip pim anycast-rp 1.1.1.1 10.10.10.10
```

ip pim bsr-border

Use this command to prevent bootstrap router (BSR) messages from being sent or received through an interface.

When this command is configured on an interface, no PIM Version 2 BSR messages are sent or received through the interface. Use this command to configure an interface bordering another PIM domain to avoid the exchange of BSR messages between the two domains. BSR messages should not be exchanged between different domains, because routers in one domain may elect rendezvous points (RPs) in the other domain, resulting in a protocol malfunction or loss of isolation between the domains.

Note: This command does not set up multicast boundaries. It only sets up a PIM domain BSR message border.

Use the `no` option with this command to remove the BSR border configuration.

Command Syntax

```
ip pim bsr-border
no ip pim bsr-border
```

Parameters

None

Default

Bootstrap router border configuration is disabled by default.

Command Mode

Interface mode

Examples

The following example configures the interface to be the PIM domain border:

```
ZebOS#configure terminal
ZebOS(config)#interface eth0
ZebOS(config-if)#ip pim bsr-border

ZebOS(config)#interface eth0
ZebOS(config-if)#no ip pim bsr-border
```

ip pim bsr-candidate

Use this command to give the router the candidate BSR status using the specified IP address of the interface.

Use the `no` option with this command to disable this function.

Command Syntax

```
ip pim bsr-candidate IFNAME
ip pim bsr-candidate IFNAME <0-32>
ip pim bsr-candidate IFNAME <0-32> <0-255>
no ip pim bsr-candidate (IFNAME|)
```

Parameters

IFNAME	Specify the name of the interface
<0-32>	Specify a hash mask length for RP selection
<0-255>	Specify a priority for a BSR candidate

Command Mode

Configure mode

Example

```
ZebOS#configure terminal
ZebOS(config)#ip pim bsr-candidate eth0 20 30
```

ip pim cisco-register-checksum

Use this command to configure the option to calculate the register checksum over the whole packet. This command is used to inter-operate with older Cisco IOS versions.

Use the no option with this command to revert to the default settings.

Command Syntax

```
ip pim cisco-register-checksum
ip pim cisco-register-checksum group-list (<1-99>|<1300-1999>|WORD)
no ip pim cisco-register-checksum
no ip pim cisco-register-checksum group-list (<1-99>|<1300-1999>|WORD)
```

Parameters

group-list	Use this parameter to configure the option to calculate the register checksum over the whole packet on multicast groups specified by the access-list.
<1-99>	Specify an IP standard access-list.
<1300-1999>	Specify an IP access-list (expanded range).
WORD	IP named standard access list.

Default

This command is disabled by default. By default, Register Checksum is calculated only over the header.

Command Mode

Configure mode

Example

```
ZebOS#configure terminal
ZebOS(config)#ip pim cisco-register-checksum

ZebOS#configure terminal
ZebOS(config)#ip pim cisco-register-checksum group-list 34
ZebOS(config)#ip access-list 34 permit 224.0.1.3
```

ip pim

Use this command to enable PIM dense-mode or sparse-mode on the current interface.

Use the `no` option with this command to disable PIM dense-mode or sparse-mode on the interface.

Command Syntax

Command Syntax

```
ip pim (dense-mode|sparse-mode |sparse-dense-mode)
no ip pim (dense-mode|sparse-mode |sparse-dense-mode)
```

Parameters

<code>dense-mode</code>	Enable PIM dense-mode operation
<code>sparse-mode</code>	Enable PIM sparse-mode
<code>sparse-dense-mode</code>	Enable PIM sparse-dense-mode

Command Mode

Interface mode

Examples

```
ZebOS#configure terminal
ZebOS(config)#interface eth0
ZebOS(config-if)#ip pim dense-mode
```

```
ZebOS(config)#interface eth0
ZebOS(config-if)#no ip pim dense-mode
```

```
ZebOS-XP(config)#interface eth0
ZebOS-XP(config-if)#ip pim sparse-dense-mode
```

```
ZebOS-XP(config-if)#no ip pim sparse-dense-mode
```

ip pim passive

Use this command to enable or disable passive mode operation for local members on the interface. Passive mode essentially stops PIM transactions on the interface, allowing only the Internet Group Management Protocol (IGMP) mechanism to be active.

Use the `no` option with this command to disable the passive mode.

Command Syntax

```
ip pim (dense-mode|sparse-mode) passive
no ip pim (dense-mode|sparse-mode) passive
```

Parameters

<code>dense-mode</code>	Enable passive operation for PIM dense-mode
<code>sparse-mode</code>	Enable passive operation for PIM sparse-mode

Command Mode

Interface mode

Examples

```
ZebOS#configure terminal
ZebOS(config)#interface eth0
ZebOS(config-if)#ip pim dense-mode passive

ZebOS(config)#interface eth0
ZebOS(config-if)#no ip pim dense-mode passive

ZebOS#configure terminal
ZebOS(config)#interface eth0
ZebOS(config-if)#ip pim sparse-mode passive

ZebOS(config)#interface eth0
ZebOS(config-if)#no ip pim sparse-mode passive
```

ip pim dense-group

Use this command to force a particular group to always follow dense mode irrespective of whether RP mapping is available or not in SM-DM mode.

Use the `no` option with this command to delete the group-address and follow SM-DM rules.

Command Syntax

```
ip pim dense-group A.B.C.D
ip pim (vrf NAME|) dense-group A.B.C.D
no ip pim (vrf NAME|) dense-group A.B.C.D
no ip pim dense-group A.B.C.D
```

Parameter

A.B.C.D	Specify IP address
vrf	virtual-router forwarding
NAME	Specify the name of the VRF

Command Mode

Interface mode

Examples

```
ZebOS-XP#configure terminal
ZebOS-XP(config)#interface eth1
ZebOS-XP(config-if)#ip pim dense-group 1.1.1.1

ZebOS-XP(config-if)# no ip pim dense-group 1.1.1.1
```

ip pim dr-priority

Use this command to set the designated router's priority value.

Use the `no` option with this command to remove the priority from the DR.

Command Syntax

```
ip pim dr-priority <0-4294967294>
no ip pim dr-priority (<0-4294967294>|)
```

Parameter

<0-4294967294> Valid range of values for DR priority, with a higher value resulting in a higher preference

Default

The default DR priority value is 1.

Command Mode

Interface mode

Examples

```
ZebOS#configure terminal
ZebOS(config)#interface eth0
ZebOS(config-if)#ip pim dr-priority 11234

ZebOS(config)#interface eth0
ZebOS(config-if)#no ip pim dr-priority 11234
```

ip pim exclude-genid

Use this command to exclude the GenID (generated ID) option from Hello packets sent by the ZebOS PIM module on an interface. This command is used to inter-operate with older Cisco IOS versions.

Use the `no` option with this command to restore PIM to its default setting.

Command Syntax

```
ip pim exclude-genid
no ip pim exclude-genid
```

Parameters

None

Command Mode

Interface mode

Default

By default, this command is disabled; that is, the GenID option is included.

Examples

```
ZebOS#configure terminal
ZebOS(config)#interface eth0
ZebOS(config-if)#ip pim exclude-genid

ZebOS(config)#interface eth0
ZebOS(config-if)#no ip pim exclude-genid
```

ip pim hello-holdtime

Use this command to configure a hello holdtime other than the default ($3.5 * \text{hello_interval}$ seconds).

When configuring `hello-holdtime`, if the configured value is less than the current `hello_interval`, it is refused.

When removing a configured `hello_holdtime`, the value is reset to ($3.5 * \text{current hello_interval}$) value.

Every time the `hello_interval` is updated, the `hello-holdtime` is also updated according to rules below:

If the `hello_holdtime` is not configured, or if the `hello_holdtime` is configured, but is less than the current `hello_interval` value, it is modified to ($3.5 * \text{hello_interval}$). Otherwise, the configured value is maintained.

Use the `no` option with this command to remove the configured `hello-holdtime`.

Command Syntax

```
ip pim hello-holdtime <1-65535>
no ip pim hello-holdtime
```

Parameter

<1-65535> Range of values for hello-holdtime, in seconds

Command Mode

Interface mode

Examples

```
ZebOS#configure terminal
ZebOS(config)#interface eth0
ZebOS(config-if)#ip pim hello-holdtime 123

ZebOS(config)#interface eth0
ZebOS(config-if)#no ip pim hello-holdtime
```

ip pim hello-interval

Use this command to configure a hello interval value other than the default. When a hello-interval is configured and hello-holdtime is not configured, or when the hello-holdtime value configured is less than the new hello-interval value, the holdtime value is modified to (3.5 * hello_interval). Otherwise, the hello-holdtime value is the configured value.

Use the `no` option with this command to reset the hello-interval to its default value.

Command Syntax

```
ip pim hello-interval <1-65535>
no ip pim hello-interval
```

Parameter

<1-65535> Range of values for the hello-interval. No fractional values are allowed.

Default

The default value for hello-interval is 30 seconds.

Command Mode

Interface mode

Example

```
ZebOS#configure terminal
ZebOS(config)#interface eth0
ZebOS(config-if)#ip pim hello-interval 123

ZebOS(config)#interface eth0
ZebOS(config-if)#no ip pim hello-interval
```

ip pim ignore-rp-set-priority

Use this command to ignore the RP-SET priority value, and use only the hashing mechanism for RP selection. This command is used to inter-operate with older Cisco IOS versions.

Use the `no` option with this command to remove this setting.

Command Syntax

```
ip pim ignore-rp-set-priority
no ip pim ignore-rp-set-priority
```

Command Mode

Configure mode

Examples

```
ZebOS#configure terminal
ZebOS(config)#ip pim ignore-rp-set-priority

ZebOS#configure terminal
ZebOS(config)#no ip pim ignore-rp-set-priority
```

ip pim jp-timer

Use this command to set a PIM join/prune timer.

Use the `no` option with this command to remove the join/prune timer.

Command Syntax

```
ip pim jp-timer <1-65535>
no ip pim jp-timer
no ip pim jp-timer <1-65535>
```

Parameters

`<1-65535>` Range of values for the Join/Prune timer, in seconds

Command Mode

Configure mode

Examples

```
ZebOS#configure terminal
ZebOS(config)#ip pim jp-timer 234

ZebOS#configure terminal
ZebOS(config)#no ip pim jp-timer 234
```

ip pim neighbor-filter

Use this command to enable filtering of neighbors on the interface. When configuring a neighbor filter, PIM either not establish adjacency with neighbor or terminates adjacency with existing neighbors, when denied by filtering access list.

Use the `no` option with this command to disable filtering of neighbors on the interface.

Command Syntax

```
ip pim neighbor-filter (<1-99>|WORD)
no ip pim neighbor-filter (<1-99>|WORD)
```

Parameters

<1-99>	An IP standard access-list number
WORD	Name of an IP standard access list

Command Mode

Interface mode

Default

This command is disabled; by default, there is no filtering.

Example

```
ZebOS#configure terminal
ZebOS(config)#interface eth0
ZebOS(config-if)#ip pim neighbor-filter 14
ZebOS(config-if)#exit
ZebOS(config)#ip access-list deny 192.168.1.53
ZebOS(config)#ip access-list permit any
```

ip pim propagation-delay

Use this command to configure a propagation delay value for PIM.

Use the no option with this command to return the propagation delay to its default value.

Command Syntax

```
ip pim propagation-delay <1000-5000>
no ip pim propagation-delay
```

Parameter

<1000-5000> Range of values for propagation delay, in milliseconds

Default

The default propagation delay is 500 milliseconds.

Command Mode

Interface mode

Examples

```
ZebOS#configure terminal
ZebOS(config)#interface eth0
ZebOS(config-if)#ip pim propagation-delay 1000

ZebOS(config)#interface eth0
ZebOS(config-if)#ip pim propagation-delay
```

ip pim register-rate-limit

Use this command to configure the rate of Register packets sent by this designated router (DR), in number of packets per second.

Use the no option to remove the register-rate-limit configuration.

Note: The configured rate is per (S,G) state, and is not a system-wide rate.

Command Syntax

```
ip pim register-rate-limit <1-65535>
no ip pim register-rate-limit
```

Parameters

<1-65535> Range of values for packets to send per second

Command mode

Configure mode

Example

```
ZebOS#configure terminal
ZebOS(config)#ip pim register-rate-limit 3444

ZebOS#configure terminal
ZebOS(config)#no ip pim register-rate-limit
```

ip pim register-rp-reachability

Use this command to enable the RP reachability check for PIM Registers at the DR.

Use the no option to reset to the default state.

Command Syntax

```
ip pim register-rp-reachability
no ip pim register-rp-reachability
```

Command Mode

Configure mode

Default

The default setting is no checking for rendezvous point reachability,

Example

```
ZebOS#configure terminal
ZebOS(config)#ip pim register-rp-reachability
```

ip pim register-source

Use this command to configure the source address of Register packets sent by this DR, overriding the default source address, which is the address of the RPF interface toward the source host.

Use the `no` option to remove the source address of register packets sent by this DR, and reset it to use the default source address, that is, the address of the RPF interface toward the source host.

The configured address must be a reachable address so the RP can send corresponding Register-Stop messages in response. This address is usually the loopback interface address, but can also be other physical addresses. The address must be advertised by unicast routing protocols on the DR.

Note: The interface configured does not require PIM to be enabled.

Command Syntax

```
ip pim register-source A.B.C.D
ip pim register-source IFNAME
no ip pim register-source
```

Parameters

A.B.C.D	The IP address to use as the source of the register packets
IFNAME	The name of the interface to use as the source of the register packets

Command mode

Configure mode

Example

```
ZebOS#configure terminal
ZebOS(config)#ip pim register-source 3.3.3.2
```

ip pim register-suppression

Use this command to configure the register-suppression time, in seconds, overriding the default value of 60 seconds. Configuring this value modifies register-suppression time at the DR; configuring this value at the RP modifies the RP-keepalive-period value if the `ip pim rp-register-kat` command is not used.

Use the `no` option to remove the register-suppression setting.

Command Syntax

```
ip pim register-suppression <1-65535>
no ip pim register-suppression
```

Parameters

<1-65535> Range of values for register suppression time in seconds

Command mode

Configure mode

Examples

```
ZebOS#configure terminal
ZebOS(config)#ip pim register-suppression 555
```

```
ZebOS#configure terminal
ZebOS(config)#no ip pim register-suppression
```

ip pim rp-address

Use this command to statically configure an RP address for multicast groups.

Use the `no` option to remove the RP address.

The ZebOS PIM implementation supports multiple static RPs. It also supports usage of static-RP and BSR mechanism, simultaneously. The following list states the correct usage of this command:

- If RP-address configured through BSR and RP-address configured statically are both available for a group range, the RP-address configured through BSR is chosen over statically configured RP-address.
- One static-RP can be configured for multiple group ranges using Access Lists. However, configuring multiple static RPs (using `ip pim rp-address` command) with the same RP address is not allowed. The static-RP can either be configured for the whole multicast group range 224/4 (without ACL) or for specific group ranges (using ACL). For example, configuring `ip pim rp-address 1.2.3.4` will configure static-RP 1.2.3.4 for the default group range 224/4. Configuring `ip pim rp-address 5.6.7.8 grp-list` will configure static-RP 5.6.7.8 for all the group ranges represented by Permit filters in `grp-list` ACL.
- If multiple static-RPs are available for a group range, then one with the highest IP address is chosen.
- Only Permit filters in ACL are considered as valid group ranges. The default Permit filter 0.0.0.0/0 is converted to default multicast filter 224/4.
- After configuration, the RP-address is inserted into static-RP group tree based on the configured group ranges. For each group range multiple static-RPs are maintained in a linked list. This list is sorted in a descending order of IP addresses. When selecting static-RPs for a group range, the first element, which is the static-RP with highest IP address, is chosen.
- Deletion of RP-address is handled by removing the static-RP from all the existing group ranges and recomputing the RPs for existing TIB states if required.
- Group mode and RP address mappings learned through BSR take precedence over mappings statistically defined by the `ip pim rp-address` command without the `override` keyword. Commands with the `override` keyword take precedence over dynamically learned mappings.

Command Syntax

```
ip pim rp-address A.B.C.D (override|)
ip pim rp-address A.B.C.D (<1-99>|<1300-1999>|WORD) (override|)
no ip pim rp-address A.B.C.D
no ip pim rp-address A.B.C.D (<1-99>|<1300-1999>|WORD)
```

Parameters

<1-99>	Ann IP Standard access-list
<1300-1999>	An IP Standard access-list (expanded range)
WORD	An IP ZebOS access-list name
override	Static RP overrides dynamically-learned RP

Command Mode

Configure mode

Example

```
ZebOS(config)#ip pim rp-address 3.3.3.3 4
```

ip pim rp-register-kat

Use this command to configure a Keepalive Timer (KAT) value for (S,G) states at RP to monitor PIM register packets, overriding the generic KAT timer value.

Use the no option to remove this configuration.

Command Syntax

```
ip pim rp-register-kat <1-65535>
no ip pim rp-register-kat
```

Parameters

<1-65535> Range of values for a KAT time in seconds

Command mode

Configure mode

Example

```
ZebOS#configure terminal
ZebOS(config)#ip pim rp-register-kat 3454

ZebOS(config)#no ip pim rp-register-kat
```

ip pim spt-threshold

Use this command to turn on the ability of the last-hop PIM router to switch to SPT.

Use the `no` option with this command to turn off the ability of the last-hop PIM router to switch to SPT.

Note: This option is binary, meaning that the switching to SPT happens either at the receiving of the first data packet or not at all. It is not rate-based.

Command Syntax

```
ip pim spt-threshold
ip pim spt-threshold group-list (<1-99>|<1300-1999>|WORD)
ip pim spt-threshold
ip pim spt-threshold group-list (<1-99>|<1300-1999>|WORD)
no ip pim spt-threshold
no ip pim spt-threshold group-list (<1-99>|<1300-1999>|WORD)
```

Parameters

<code>group-list</code>	Enable the ability for the last-hop PIM router to switch to SPT for multicast group addresses indicated by the given access-list
<code><1-99></code>	An IP Standard access-list
<code><1300-1999></code>	An IP Standard access-list (expanded range)
<code>WORD</code>	A named standard access list

Command Mode

Configure mode

Examples

```
ZebOS#configure terminal
ZebOS(config)#ip pim spt-threshold

ZebOS#configure terminal
ZebOS(config)#ip pim spt-threshold group-list LIST1
ZebOS(config)#ip access-list permit 224.0.1.3

ZebOS#configure terminal
ZebOS(config)#no ip pim spt-threshold
```

ip pim ssm

Use this command to configure Source Specific Multicast (SSM), and define the) range of IP multicast addresses. The keyword `default` defines the SSM range as 232/8. To define the SSM range to be other than the default, define and access-list.

When an SSM range of IP multicast addresses is defined with the `ip pim ssm` command, the no (*,G) or (S,G,rpt) state is initiated for groups in the SSM range.

The messages corresponding to these states are no accepted or originated in the SSM range.

Use the `no` form of this command to disable the SSM range.

Command Syntax

```
ip pim ssm default
ip pim ssm range (<1-99>|WORD)
no ip pim ssm
```

Parameters

<code>default</code>	This keyword defines the 232/8 group range for SSM
<code>range</code>	Define an access-list for group range to use for SSM
<code><1-99></code>	Range of values for a standard access-list
<code>WORD</code>	A named standard access list

Command Mode

Configure mode

Example

The following example shows how to configure SSM service for the IP address range defined by access list 10:

```
ZebOS#configure terminal
ZebOS(config)#access-list 10 permit 225.1.1.1
ZebOS(config)#ip pim ssm range 4
```

ip pim state-refresh origination-interval

Use this command to configure a PIM-DM State-Refresh origination interval other than the default value.). The origination interval is the number of seconds between PIM-DM State Refresh control messages.

Use the `no` option with this command to return the origination interval to its default value.

Command Syntax

```
ip pim state-refresh origination-interval <1-100>
no ip pim state-refresh origination-interval
```

Parameter

<1-100> Range of values for state-refresh origination interval, in seconds

Note: No fractional values are allowed for the interval time.

Default

The default state-refresh origination interval is 60 seconds.

Command Mode

Interface mode

Examples

```
ZebOS#configure terminal
ZebOS(config)#interface eth0
ZebOS(config-if)#ip pim state-refresh origination-interval 65

ZebOS(config)#interface eth0
ZebOS(config-if)#ip pim state-refresh origination-interval
```


ip pim unicast-bsm

Use this command to enable support for sending and receiving unicast Bootstrap Messages (BSM) on an interface. This command supports backward-compatibility with older versions of the Bootstrap Router specification, which specifies unicast BSM to refresh the state of new or restarting neighbors.

Use the `no` option with this command to disable unicast bootstrap messaging on an interface.

Command Syntax

```
ip pim unicast-bsm
no ip pim unicast-bsm
```

Parameters

None

Default

Unicast bootstrap messaging is disabled by default.

Command Mode

Interface mode

Examples

```
ZebOS#configure terminal
ZebOS(config)#interface eth0
ZebOS(config-if)#ip pim unicast-bsm

ZebOS(config)#interface eth0
ZebOS(config-if)#no ip pim unicast-bsm
```

show debugging ip pim

Use this command to display the debug status for the PIM process.

Command Syntax

```
show debugging ip pim
```

Command Mode

Privileged Exec mode

Examples

```
ZebOS# show debugging ip pim
```

show debugging pim

Use this command to display the status of debugging for PIM.

Command Syntax

```
show debugging pim
```

Parameters

None

Command Mode

Privileged Exec and Exec mode

Example

This command displays one of several status:

```
ZebOS#show debugging pim
```

show ip pim interface

Use this command to display PIM interface information.

Command Syntax

```
show ip pim interface
show ip pim interface detail
```

Parameters

`detail` Display detailed information about a PIM interface

Command Mode

Exec mode and Privileged Exec mode

Examples

```
ZebOS#show ip pim interface
```

show ip pim mroute

Use this command to display information in the IP PIM multicast routing table.

Command Syntax

```
show ip pim mroute (detail|)
show ip pim mroute A.B.C.D (detail|)
show ip pim mroute A.B.C.D A.B.C.D (detail|)
```

Parameter

A.B.C.D Display all entries for this group IP address

A.B.C.D Display all entries for this source IP address

Note: A group IP address and a source IP address cannot be simultaneously

detail Display detailed PIM multicast routing table information

Command Mode

Exec mode and Privileged Exec mode

Example

```
ZebOS#show ip pim mroute
```

show ip pim neighbor

Use this command to display PIM neighbor information.

Command Syntax

```
show ip pim neighbor (detail|)
show ip pim neighbor IFNAME (detail|)
show ip pim neighbor IFNAME A.B.C.D (detail|)
```

Parameters

IFNAME	Name of the interface
A.B.C.D	IPv4 address of the neighbor interface
detail	Display detailed information for a PIM neighbor

Command Mode

Exec mode and Privileged Exec mode

Examples

```
ZebOS>#show ip pim neighbor
```

show ip pim nexthop

Displays the nexthop information from NSM as used by PIM.

Command Syntax

```
show ip pim nexthop
```

Command Mode

Exec mode and Privileged Exec mode

Example

```
ZebOS#show ip pim nexthop
```

show ip pim bsr-router

Use this command to show the bootstrap router v2 address.

Command Syntax

```
show ip pim bsr-router
```

Command Mode

Privileged Exec and Exec mode

Example

```
ZebOS#show ip pim bsr-router
PIMv2 Bootstrap information
  BSR address: 10.10.11.35 (?)
  Uptime:      00:00:38, BSR Priority: 0, Hash mask length: 10
  Expires:     00:01:32
  Role: Non-candidate BSR
  State: Accept Preferred
```

show ip pim local-members

Use this command to display information about local membership for PIM interfaces.

Command Syntax

```
show ip pim local-members
show ip pim local-members IFNAME
```

Parameters

IFNAME Display neighbors for an interface name

Command Mode

Privileged Exec and Exec mode

Example

```
ZebOS#show ip pim local-members
```

show ip pim rp-hash

Use this command to display the rendezvous point (RP) to chose based on the group selected.

Command Syntax

```
show ip pim rp-hash A.B.C.D
```

Parameters

A.B.C.D Specify a group address

Command Mode

Privileged Exec mode and Exec mode

Example

A.B.C.D in command refers to the group address to be hashed.

```
ZebOS#show ip pim rp-hash 224.0.1.3
```

show ip pim rp mapping

Use this command to show group-to-RP (rendezvous point) mappings, and the RP set.

Command Syntax

```
show ip pim rp mapping
```

Command Mode

Privileged Exec mode and Exec mode

Example

```
ZebOS>show ip pim rp mapping
```

undebg all ip pim

Use this command to disable all PIM debugging from Configure mode.

Command Syntax

```
undebg all ip pim
```

Command Mode

Privileged Exec mode and Exec mode

Example

```
ZebOS#undebg all ip pim
```

CHAPTER 3 PIMv6 Commands

The chapter includes the commands that support the Protocol-Independent Multicast (PIM) implementation in ZebOS. It includes the following commands:

- [clear ipv6 mroute on page 69](#)
- [clear ipv6 pim sparse-mode bsr on page 70](#)
- [debug ipv6 pim on page 71](#)
- [debug ipv6 pim packet on page 72](#)
- [debug ipv6 pim timer assert on page 73](#)
- [debug ipv6 pim timer hello on page 75](#)
- [debug ipv6 pim timer register on page 78](#)
- [ipv6 pim accept-register on page 79](#)
- [ipv6 pim anycast-rp on page 80](#)
- [ipv6 pim bsr-border on page 81](#)
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- [ipv6 pim cisco-register-checksum on page 83](#)
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- [show ipv6 pim local-members on page 111](#)
- [show ipv6 pim rp-hash on page 112](#)
- [show ipv6 pim rp mapping on page 113](#)
- [undebug all ipv6 pim on page 114](#)

clear ipv6 mroute

Use this command to delete all multicast route table entries and all multicast routes at the PIM protocol level.

Command Syntax

```
clear ipv6 mroute *
clear ipv6 mroute * pim (dense-mode|sparse-mode)
clear ipv6 mroute X:X::X:X
clear ipv6 mroute X:X::X:X X:X::X:X
clear ipv6 mroute X:X::X:X X:X::X:X pim (dense-mode|sparse-mode)
clear ipv6 mroute X:X::X:X pim sparse-mode
clear ipv6 mroute statistics *
clear ipv6 mroute statistics X:X::X:X
clear ipv6 mroute statistics X:X::X:X X:X::X:X
clear ipv6 mroute (vrf NAME|) * pim (dense-mode|sparse-mode)
```

Parameters

*	Delete all multicast routes
dense-mode	Clear multicast rout table for PIM dense-mode
sparse-mode	Clear multicast route table for PIM sparse mode

Command Mode

Exec mode and Privileged Exec mode

Example

```
ZebOS#clear ipv6 mroute * pim sparse-mode
ZebOS#clear ipv6 mroute 3ffe::24:3 ff00::3 pim sparse-mode
```

clear ipv6 pim sparse-mode bsr

Use this command to clear all rendezvous point (RP) sets learned through the PIMv2 Bootstrap Router (BSR).

Command Syntax

```
clear ipv6 pim sparse-mode bsr rp-set *
```

Parameters

rp-set	PIMv2 bootstrap router RP set
*	Clear all RP sets

Command Mode

Exec mode and Privileged Exec mode

Example

```
ZebOS#clear ipv6 pim sparse-mode bsr rp-set *
```

debug ipv6 pim

Use this command to enable debugging for PIM.

Use the `no` option with this command to deactivate debugging for PIM.

Command Syntax

```
debug ipv6 pim (all|events|mfc|mib|mtrace|nexthop|nsm|packet|state|timer)
no debug ipv6 pim (all|events|mfc|mib|mtracenexthop|nsm|packet|state|timer)
```

Parameters

<code>all</code>	Enable debugging for all PIM events
<code>events</code>	Enable debugging for general configurationmfc
	Enable debugging for MFC updates
<code>mib</code>	Enable debugging for MIB entries
<code>mtrace</code>	Enable debugging for MTRACE messages
<code>nexthop</code>	Enable debugging for Reverse Path Forwarding (RPF) neighbor nexthop cache handling
<code>nsm</code>	Enable debugging for NSM
<code>packet</code>	Enable debugging for PIM packets
<code>state</code>	Enable debugging for PIM states
<code>timer</code>	Enable debugging for PIM timers

Command Mode

Exec mode, Privilege Exec mode, and Configure mode

Examples

```
ZebOS#configure terminal
ZebOS(config)#debug ipv6 pim state
```

debug ipv6 pim packet

Use this command to activate debugging of incoming or outgoing PIM packets.

Use the `no` option with this command to deactivate debugging of incoming or outgoing PIM packets.

Command Syntax

```
debug ipv6 pim packet
debug ipv6 pim packet in
debug ipv6 pim packet out
no debug ipv6 pim packet
no debug ipv6 pim packet in
no debug ipv6 pim packet out
```

Parameters

<code>in</code>	Debug incoming packets
<code>out</code>	Debug outgoing packets

Command Mode

Configure and Privileged Exec modes

Example

```
ZebOS#configure terminal
ZebOS(config)#debug ipv6 pim packet in
```

debug ipv6 pim timer assert

Use this command to enable debugging of the PIM assert timers.

Use the `no` option with this command to disable debugging for PIM assert timers.

Command Syntax

```
debug ipv6 pim timer assert
debug ipv6 pim timer assert at
no debug ipv6 pim timer assert
no debug ipv6 pim timer assert at
```

Parameters

`at` Use this option to turn on or turn off debugging of the PIM Assert Timer

Command Mode

Exec mode, Privilege Exec mode, and Configure mode

Example

```
ZebOS#debug ipv6 pim timer assert at
```

debug ipv6 pim timer bsr

Use this command to enable debugging of the PIM BSR time.

Use the `no` option with this command to disable debugging of the PIM BSR timer.

Command Syntax

```
debug ipv6 pim timer bsr
debug ipv6 pim timer bsr bst
debug ipv6 pim timer bsr crp
no debug ipv6 pim timer bsr
no debug ipv6 pim timer bsr bst
no debug ipv6 pim timer bsr crp
```

Parameters

<code>bst</code>	Turn on or turn off the bootstrap debugging timer
<code>crp</code>	Turn on or turn off the Candidate-RP debugging timer

Command Mode

Exec mode, Privilege Exec mode, and Configure mode

Example

```
ZebOS#configure terminal
ZebOS(config)#debug ipv6 pim timer bsr bst
```

debug ipv6 pim timer hello

Use this command to enable debugging of various PIM Hello timers.

Use the `no` option with this command to disable debugging of the PIM Hello timers.

Command Syntax

```
debug ipv6 pim timer hello
debug ipv6 pim timer hello ht
debug ipv6 pim timer hello nlt
debug ipv6 pim timer hello tht
no debug ipv6 pim timer hello
no debug ipv6 pim timer hello ht
no debug ipv6 pim timer hello nlt
no debug ipv6 pim timer hello tht
```

Parameters

<code>ht</code>	Turn on or turn off the PIM Hello debugging timer (ht)
<code>nlt</code>	Turn on or turn off the PIM Neighbor Liveliness debugging timer (nlt)
<code>tht</code>	Turn on or turn off the Triggered Hello Timer (tht)

Command Mode

Exec mode, Privilege Exec mode, and Configure mode

Example

```
ZebOS#configure terminal
ZebOS(config)#debug ipv6 pim timer hello ht
```

debug ipv6 pim timer joinprune

Use this command to enable debugging of various PIM JoinPrune timers.

Use the no option with this command to disable the debugging of the PIM JoinPrune timers.

Command Syntax

```
debug ipv6 pim timer joinprune
debug ipv6 pim timer joinprune et
debug ipv6 pim timer joinprune kat
debug ipv6 pim timer joinprune jt
debug ipv6 pim timer joinprune ot
debug ipv6 pim timer joinprune ppt
no debug ipv6 pim timer joinprune
no debug ipv6 pim timer joinprune et
no debug ipv6 pim timer joinprune kat
no debug ipv6 pim timer joinprune jt
no debug ipv6 pim timer joinprune ot
no debug ipv6 pim timer joinprune ppt
```

Parameters

et	Turn on or turn off the PIM JoinPrune expiry timer (et)
jt	Turn on or turn off the PIM JoinPrune upstream Join Timer (jt)
kat	Turn on or turn off the PIM JoinPrune Keep Alive timer (kat)

ot	Turn on or turn off the PIM JoinPrune Upstream Override Timer (ot)
ppt	Turn on or turn off the f PIM JoinPrune PrunePending Timer ((ppt)

Command Mode

Exec mode, Privilege Exec mode, and Configure mode

Example

```
ZebOS#debug ipv6 pim timer joinprune et
```

debug ipv6 pim timer register

Use this command to enable debugging of the PIM register timer.

Use the `no` option with this command to disable debugging of the PIM register timer.

Command Syntax

```
debug ipv6 pim timer register
debug ipv6 pim timer register rst
no debug ipv6 pim timer register
no debug ipv6 pim timer register rst
```

Parameters

`rst` Turn on or turn off the PIM Register Stop Timer (rst)

Command Mode

Exec mode, Privilege Exec mode, and Configure mode

Example

```
ZebOS#debug ipv6 pim timer register
```


ipv6 pim accept-register

Use this command to configure the ability to filter out multicast sources specified by the given access-list at the RP, so that the RP will accept/refuse to perform the Register mechanism for the packets sent by the specified sources. By default, the RP accepts Register packets from all multicast sources.

Use the no option with this command to revert to default.

Command Syntax

```
ipv6 pim accept-register list (<100-199>|<2000-2699>|WORD)
no ipv6 pim accept-register
```

Parameters

<100-199>	An IP extended access-list value
<2000-2699>	An IP extended access-list value in the expanded range
WORD	Name of a standard access list

Command Mode

Configure mode

Example

```
ZebOS#configure terminal
ZebOS(config)#ipv6 pim accept-register list 121

ZebOS(config)#no ipv6 pim accept-register
```

ipv6 pim anycast-rp

Use this command to configure an Anycast-RP in the RP set.

Use the no option with this command to remove the Anycast-RP configuration.

Command Syntax

```
ipv6 pim anycast-rp X:X::X:X X:X::X:X
no ipv6 pim anycast-rp X:X::X:X
no ipv6 pim anycast-rp X:X::X:X X:X::X:X
```

Parameters

X:X::X:X	Unicast IPv6 address of the Anycast RP set. An Anycast RP set is a collection of RPs in the same domain.
X:X::X:X	Destination IPv6 address where Register messages are copied and sent. A Member RP is an individual RP member in the Anycast RP set.

Command Mode

Configure mode

Examples

The following example shows how to configure the Anycast RP in the RP set.

```
ZebOS#configure terminal
ZebOS (config)#ipv6 pim anycast-rp 2:2::2:2 20:20::20:20
```

The following example shows how to remove the configuration.

```
ZebOS#configure terminal
ZebOS (config)#no ipv6 pim anycast-rp 2:2::2:2 20:20::20:20
```

ipv6 pim bsr-border

Use this command to prevent bootstrap router (BSR) messages from being sent or received through an interface.

When this command is configured on an interface, no PIM Version 2 BSR messages are sent or received through the interface. Use this command to configure an interface bordering another PIM domain to avoid the exchange of BSR messages between the two domains. BSR messages should not be exchanged between different domains, because routers in one domain may elect rendezvous points (RPs) in the other domain, resulting in a protocol malfunction or loss of isolation between the domains.

Use the `no` option with this command to remove the BSR border configuration.

Note: This command does not set up multicast boundaries. It only sets up a PIM domain BSR message border.

Command Syntax

```
ipv6 pim bsr-border
no ipv6 pim bsr-border
```

Parameters

None

Default

Bootstrap router border configuration is disabled by default.

Command Mode

Interface mode

Examples

The following example configures the interface to be the PIM domain border:

```
ZebOS#configure terminal
ZebOS(config)#interface eth0
ZebOS(config-if)#ipv6 pim bsr-border

ZebOS(config)#interface eth0
ZebOS(config-if)#no ipv6 pim bsr-border
```

ipv6 pim bsr-candidate

Use this command to give the router the candidate BSR status using the name the interface.

Use the `no` option with this command to disable this function.

Command Syntax

```
ipv6 pim bsr-candidate IFNAME
ipv6 pim bsr-candidate IFNAME <0-32>
ipv6 pim bsr-candidate IFNAME <0-32> <0-255>
no ipv6 pim bsr-candidate (IFNAME|)
```

Parameters

IFNAME	Specify the name of the interface
<0-32>	Specify a hash mask length for RP selection
<0-255>	Specify a priority for a BSR candidate

Command Mode

Configure mode

Example

```
ZebOS#configure terminal
ZebOS(config)#ipv6 pim bsr-candidate eth0 20 30
```

ipv6 pim cisco-register-checksum

Use this command to configure the option to calculate the register checksum over the whole packet. This command is used to inter-operate with older Cisco IOS versions.

Use the `no` option with this command to revert to the default settings.

Command Syntax

```
ipv6 pim cisco-register-checksum
ipv6 pim cisco-register-checksum group-list (<1-99>|<1300-1999>|WORD)
no ipv6 pim cisco-register-checksum
no ipv6 pim cisco-register-checksum group-list (<1-99>|<1300-1999>|WORD)
```

Parameters

<code>group-list</code>	Use this parameter to configure the option to calculate the register checksum over the whole packet on multicast groups specified by the access-list.
<code><1-99></code>	Specify an IP standard access-list.
<code><1300-1999></code>	Specify an IP access-list (expanded range).
<code>WORD</code>	IP named standard access list.

Default

This command is disabled by default. By default, Register Checksum is calculated only over the header.

Command Mode

Configure mode

Example

```
ZebOS#configure terminal
ZebOS(config)#ipv6 pim cisco-register-checksum

ZebOS(config)#ipv6 pim cisco-register-checksum group-list G1
ZebOS(config)#ipv6 access-list filter permit ffl:10/128
```

ipv6 pim

Use this command to enable IPv6 PIM dense-mode or sparse-mode on the current interface.

Use the `no` option with this command to disable IPv6 PIM dense-mode or sparse-mode on the interface.

Command Syntax

```
ipv6 pim (dense-mode|sparse-mode|sparse-dense-mode)
no ipv6 pim (dense-mode|sparse-mode|sparse-dense-mode)
```

Parameters

<code>dense-mode</code>	Enable IPv6 PIM dense-mode operation
<code>sparse-mode</code>	Enable IPv6 PIM sparse-mode operation
<code>sparse-dense-mode</code>	Enable IPv6 PIM sparse-dense-mode operation

Command Mode

Interface mode

Examples

```
ZebOS#configure terminal
ZebOS(config)#interface eth0
ZebOS(config-if)#ipv6 pim dense-mode
```

```
ZebOS(config)#interface eth0
ZebOS(config-if)#no ipv6 pim dense-mode
```

```
ZebOS-XP(config)#interface eth0
ZebOS-XP(config-if)#ipv6 pim sparse-dense-mode
```

```
ZebOS-XP(config-if)#no ipv6 pim sparse-dense-mode
```

ipv6 pim passive

Use this command to enable or disable passive mode operation for local members on the interface. Passive mode essentially stops PIM transactions on the interface, allowing only the Internet Group Management Protocol (IGMP) mechanism to be active.

Use the `no` option with this command to disable the passive mode.

Command Syntax

```
ipv6 pim (dense-mode|sparse-mode) passive
no ipv6 pim (dense-mode|sparse-mode) passive
```

Parameters

<code>dense-mode</code>	Enable passive operation for PIM dense-mode
<code>sparse-mode</code>	Enable passive operation for PIM sparse-mode

Command Mode

Interface mode

Examples

```
ZebOS#configure terminal
ZebOS(config)#interface eth0
ZebOS(config-if)#ipv6 pim dense-mode passive

ZebOS(config)#interface eth0
ZebOS(config-if)#no ipv6 pim dense-mode passive

ZebOS#configure terminal
ZebOS(config)#interface eth0
ZebOS(config-if)#ipv6 pim sparse-mode passive

ZebOS(config)#interface eth0
ZebOS(config-if)#no ipv6 pim sparse-mode passive
```

ipv6 pim dr-priority

Use this command to set the designated router's priority value.

Use the `no` option with this command to remove the priority from the DR.

Command Syntax

```
ipv6 pim dr-priority <0-4294967294>  
no ipv6 pim dr-priority (<0-4294967294>|)
```

Parameter

<0-4294967294> Valid range of values for DR priority, with a higher value resulting in a higher preference

Default

The default DR priority value is 1.

Command Mode

Interface mode

Examples

```
ZebOS#configure terminal  
ZebOS(config)#interface eth0  
ZebOS(config-if)#ipv6 pim dr-priority 11234  
  
ZebOS(config)#interface eth0  
ZebOS(config-if)#no ipv6 pim dr-priority 11234
```

ipv6 pim exclude-genid

Use this command to exclude the GenID (generated ID) option from Hello packets sent by the ZebOS PIM module on an interface. This command is used to inter-operate with older Cisco IOS versions.

Use the `no` option with this command to restore PIM its default setting.

Command Syntax

```
ipv6 pim exclude-genid
no ipv6 pim exclude-genid
```

Parameters

None

Default

By default, this command is disabled; that is, the GenID option is included.

Command Mode

Interface mode

Examples

```
ZebOS#configure terminal
ZebOS(config)#interface eth0
ZebOS(config-if)#ipv6 pim exclude-genid

ZebOS(config)#interface eth0
ZebOS(config-if)#no ipv6 pim exclude-genid
```

ipv6 pim hello-holdtime

Use this command to configure a hello holdtime other than the default ($3.5 * \text{hello_interval}$ seconds).

When configuring `hello-holdtime`, if the configured value is less than the current `hello_interval`, it is refused.

When removing a configured `hello_holdtime`, the value is reset to ($3.5 * \text{current hello_interval}$) value.

Every time the `hello_interval` is updated, the `hello-holdtime` is also updated according to rules below:

If the `hello_holdtime` is not configured, or if the `hello_holdtime` is configured, but is less than the current `hello_interval` value, it is modified to ($3.5 * \text{hello_interval}$). Otherwise, the configured value is maintained.

Use the `no` option with this command to remove the configured `hello-holdtime`.

Command Syntax

```
ipv6 pim hello-holdtime <1-65535>
no ipv6 pim hello-holdtime
```

Parameter

<1-65535> Range of values for hello-holdtime, in seconds

Command Mode

Interface mode

Examples

```
ZebOS#configure terminal
ZebOS(config)#interface fxp0
ZebOS(config-if)#ipv6 pim hello-holdtime 123

ZebOS(config)#interface fxp0
ZebOS(config-if)#no ipv6 pim hello-holdtime
```

ipv6 pim hello-interval

Use this command to configure a hello interval value other than the default. When a hello-interval is configured and hello-holdtime is not configured, or when the hello-holdtime value configured is less than the new hello-interval value, the holdtime value is modified to (3.5 * hello_interval). Otherwise, the hello-holdtime value is the configured value.

Use the `no` option with this command to reset the hello-interval to its default value.

Command Syntax

```
ipv6 pim hello-interval <1-65535>
no ipv6 pim hello-interval
```

Parameter

<1-65535> Range of values for the hello-interval

Note: No fractional values are allowed.

Default

The default value for hello-interval is 30 seconds.

Command Mode

Interface mode

Example

```
ZebOS#configure terminal
ZebOS(config)#interface eth0
ZebOS(config-if)#ipv6 pim hello-interval 123

ZebOS(config)#interface eth0
ZebOS(config-if)#no ipv6 pim hello-interval
```

ipv6 pim ignore-rp-set-priority

Use this command to ignore the RP-SET priority value, and use only the hashing mechanism for RP selection. This command is used to inter-operate with older Cisco IOS versions.

Use the `no` option with this command to remove this setting.

Command Syntax

```
ipv6 pim ignore-rp-set-priority
no ipv6 pim ignore-rp-set-priority
```

Command Mode

Configure mode

Examples

```
ZebOS#configure terminal
ZebOS(config)#ipv6 pim ignore-rp-set-priority

ZebOS#configure terminal
ZebOS(config)#no ipv6 pim ignore-rp-set-priority
```

ipv6 pim jp-timer

Use this command to set a PIM join/prune timer.

Use the `no` option with this command to remove the join/prune timer.

Command Syntax

```
ipv6 pim jp-timer <1-65535>
no ipv6 pim jp-timer
no ipv6 pim jp-timer <1-65535>
```

Parameters

`<1-65535>` Range of values for the Join/Prune timer, in seconds

Command Mode

Configure mode

Examples

```
ZebOS#configure terminal
ZebOS(config)#ipv6 pim jp-timer 234

ZebOS#configure terminal
ZebOS(config)#no ipv6 pim jp-timer 234
```

ipv6 pim neighbor-filter

Use this command to enable filtering of neighbors on the interface.

When configuring a neighbor filter and when denied by filtering access list, PIM either does not establish adjacency with a neighbor or terminates adjacency with existing neighbors.

Use the `no` option with this command to disable filtering of neighbors on the interface.

Command Syntax

```
ipv6 pim neighbor-filter (<1-99>|WORD)
no ipv6 pim neighbor-filter (<1-99>|WORD)
```

Parameters

<1-99>	An IP standard access-list number
WORD	Name of an IP standard access list

Command Mode

Interface mode

Default

This command is disabled; by default, there is no filtering.

Example

```
ZebOS(config)#interface fxp0
ZebOS(config-if)#ipv6 pim neighbor-filter F1
ZebOS(config-if)#exit
ZebOS(config)#ipv6 access-list filter deny fe80:20e:cff:fe01:face
ZebOS(config)#ipv6 access-list filter permit any
```

ipv6 pim propagation-delay

Use this command to configure the propagation delay value.

Use the no option with this command to return the propagation delay to its default value.

Command Syntax

```
ipv6 pim propagation-delay <1000-5000>
no ipv6 pim propagation-delay
```

Parameter

<1000-5000> Range of values for propagation delay, in milliseconds

Default

The default propagation delay is 500 milliseconds.

Command Mode

Interface mode

Examples

```
ZebOS#configure terminal
ZebOS(config)#interface eth0
ZebOS(config-if)#ipv6 pim propagation-delay 1000

ZebOS(config)#interface eth0
ZebOS(config-if)#no ipv6 pim propagation-delay
```

ipv6 pim register-rate-limit

Use this command to configure the rate of Register packets sent by this designated router (DR), in number of packets per second.

Use the no option to remove the register-rate-limit configuration.

Note: The configured rate is per (S,G) state, and is not a system-wide rate.

Command Syntax

```
ipv6 pim register-rate-limit <1-65535>
no ipv6 pim register-rate-limit
```

Parameters

<1-65535> Range of values for packets to send per second

Command mode

Configure mode

Example

```
ZebOS#configure terminal
ZebOS(config)#ipv6 pim register-rate-limit 3444

ZebOS#configure terminal
ZebOS(config)#no ipv6 pim register-rate-limit
```

ipv6 pim register-rp-reachability

Use this command to enable the RP reachability check for PIM Registers at the DR.

Use the no option to reset to the default state.

Command Syntax

```
ipv6 pim register-rp-reachability
no ipv6 pim register-rp-reachability
```

Command Mode

Configure mode

Default

The default setting is no checking for rendezvous point reachability,

Example

```
ZebOS#configure terminal
ZebOS(config)#ipv6 pim register-rp-reachability
```

ipv6 pim register-source

Use this command to configure the source address of Register packets sent by this DR, overriding the default source address, which is the address of the RPF interface toward the source host.

Use the `no` option to remove the source address of register packets sent by this DR, and reset it to use the default source address, that is, the address of the RPF interface toward the source host.

The configured address must be a reachable address so the RP can send corresponding Register-Stop messages in response. This address is usually the loopback interface address, but can also be other physical addresses. The address must be advertised by unicast routing protocols on the DR.

Note: The interface configured does not require PIM to be enabled.

Command Syntax

```
ipv6 pim register-source IFNAME
ipv6 pim register-source X:X::X:X
no ipv6 pim register-source
```

Parameters

X:X::X:X	The IP address to be used as the source of the register packets
IFNAME	The name of the interface to be used as the source of the register packets

Command mode

Configure mode

Examples

```
ZebOS#configure terminal
ZebOS(config)#ipv6 pim register-source 3ffe:406::1

ZebOS#configure terminal
ZebOS(config)#no ipv6 pim register-source
```

ipv6 pim register-suppression

Use this command to configure the register-suppression time, in seconds, overriding the default value of 60 seconds. Configuring this value modifies register-suppression time at the DR; configuring this value at the RP modifies the RP-keepalive-period value if the `ipv6 pim rp-register-kat` command is not used.

Use the `no` option to remove the register-suppression setting.

Command Syntax

```
ipv6 pim register-suppression <1-65535>
no ipv6 pim register-suppression
```

Parameters

<1-65535> Range of values for register suppression time, in seconds

Command mode

Configure mode

Examples

```
ZebOS#configure terminal
ZebOS(config)#ipv6 pim register-suppression 555
```

```
ZebOS#configure terminal
ZebOS(config)#no ipv6 pim register-suppression
```

ipv6 pim rp-address

Use this command to statically configure an RP address for multicast groups.

Use the `no` option to remove the RP address.

The ZebOS PIM implementation supports multiple static RPs. It also supports usage of static-RP and BSR mechanism, simultaneously. The following list states the correct usage of this command:

The ZebOS PIMv6 implementation supports multiple static RPs. It also supports usage of static-RP and BSR mechanism simultaneously. The following list states the correct usage of this command:

- To support embedded RP, the router configured as the RP must use a configured access-list that permits the embedded RP group ranges derived from the embedded RP address. If embedded RP support is available, only the RP must be statically configured as the RP for the embedded RP ranges: No additional configuration is required on other PIMv6 routers. The other routers will discover the RP address from the IPv6 group address. For these routers to select a static RP instead of the embedded RP, the specific embedded RP group range must be configured in the access list of the static RP, and embedded RP support must be disabled.
- If RP-address configured through BSR and RP-address configured statically are both available for a group range, the RP-address configured through BSR is chosen over statically configured RP-address.
- A single static-RP can be configured for multiple group ranges using Access Lists. However, configuring multiple static RPs (using `ipv6 pim rp-address` command) with the same RP address is not allowed. The static-RP can either be configured for the whole multicast group range `ff00::/8` (without ACL) or for specific group ranges (using ACL).

For example, configuring `ipv6 pim rp-address 3ffe:10:10:5::153` will configure static-RP `3ffe:10:10:5::153` for the default group range `ff00::/8`. Configuring `ipv6 pim rp-address 3ffe:20:20:5::153 grp-list` will configure static-RP `3ffe:20:20:5::153` for all the group ranges represented by `Permit` filters in `grp-list` ACL.

- If multiple static-RPs are available for a group range, then one with the highest IP address is chosen.
- Only `Permit` filters in ACL are considered as valid group ranges. The default `Permit` filter `::/0` is converted to default multicast filter `ff00::/8`.
- After configuration, the RP-address is inserted into static-RP group tree based on the configured group ranges. For each group range multiple static-RPs are maintained in a linked list. This list is sorted in a descending order of IP addresses. When selecting static-RPs for a group range, the first element, which is the static-RP with highest IP address, is chosen.
- Deletion of RP-address is handled by removing the static-RP from all the existing group ranges and recomputing the RPs for existing TIB states if required.
- Group mode and RP address mappings learned through BSR take precedence over mappings statistically defined by the `ipv6 pim rp-address` command without the `override` keyword. Commands with the `override` keyword take precedence over dynamically learned mappings.

Command Syntax

```
ipv6 pim rp-address X:X::X:X (override|)
ipv6 pim rp-address X:X::X:X (<1-99>|<1300-1999>|WORD) (override|)
no ipv6 pim rp-address X:X::X:X
no ipv6 pim rp-address X:X::X:X (<1-99>|<1300-1999>|WORD)
```

Parameters

X:X::X:X IPv6 address for the RP

<1-99>	An IP Standard access-list
<1300-1999>	An IP Standard access-list (expanded range)
WORD	An IP ZebOS access-list name
override	Static RP overrides dynamically-learned RP

Command Mode

Configure mode

Example

```
ZebOS#configure terminal
ZebOS(config)#ipv6 pim rp-address 3ffe:30:30:5::153 4
```

```
ZebOS#configure terminal
ZebOS(config)#no ipv6 pim rp-address 3ffe:30:30:5::153 4
```

ipv6 pim rp-register-kat

Use this command to configure a Keepalive Timer (KAT) value for (S,G) states at RP to monitor PIM register packets, overriding the generic KAT timer value.

Use the no option to remove this configuration.

Command Syntax

```
ipv6 pim rp-register-kat <1-65535>  
no ipv6 pim rp-register-kat
```

Parameters

<1-65535> Range of values for a KAT time in seconds

Command mode

Configure mode

Example

```
ZebOS#configure terminal  
ZebOS(config)#ipv6 pim rp-register-kat 3454  
  
ZebOS(config)#no ipv6 pim rp-register-kat
```

ipv6 pim spt-threshold

Use this command to configure an SPT (System Posture Token) threshold.

Use the `no` option with this command to remove a configured SPT threshold.

Note: This option is binary, meaning that switching to SPT happens either the first data packet is received, or not at all. It is not rate-based.

Command Syntax

```
ipv6 pim spt-threshold
ipv6 pim spt-threshold group-list (<1-99>|<1300-1999>|WORD)
no ipv6 pim spt-threshold
no ipv6 pim spt-threshold group-list (<1-99>|<1300-1999>|WORD)
```

Parameters

<code>group-list</code>	Enable the ability for the last-hop PIM router to switch to SPT for multicast group addresses indicated by the given access-list
<code><1-99></code>	An IP Standard access-list
<code><1300-1999></code>	An IP Standard access-list (expanded range)
<code>WORD</code>	A named standard access list

Command Mode

Configure mode

Examples

```
ZebOS#configure terminal
ZebOS(config)#ipv6 pim spt-threshold group-list LIST1

ZebOS#configure terminal
ZebOS(config)#no ipv6 pim spt-threshold
```

ipv6 pim ssm

Use this command to configure Source Specific Multicast (SSM), and define a range of IP multicast addresses. The default keyword defines the SSM range as ff3x::/32. To define the SSM range to be other than the default, use the access-list.

When an SSM range of IP multicast addresses is defined with the `ipv6 pim ssm` command, the no (*,G) or (S,G,rpt) state is initiated for groups in the SSM range.

The messages corresponding to these states are no accepted or originated in the SSM range.

Use the `no` form of this command to disable the SSM range.

Command Syntax

```
ipv6 pim ssm default
ipv6 pim ssm range (<1-99>|WORD)
no ipv6 pim ssm
```

Parameters

<code>default</code>	Defines the FF3x::/32 group range for SSM
<code>range</code>	Define an access-list for group range to use for SSM
<code><1-99></code>	Range of values for a standard access-list
<code>WORD</code>	A named standard access list

Command Mode

Configure mode

Example

The following example shows how to configure SSM service for the IP address range defined by access list 10:

```
ZebOS#configure terminal
ZebOS(config)#access-list 10 permit 225.1.1.1
ZebOS(config)#ipv6 pim ssm range 4
```

ipv6 pim state-refresh origination-interval

Use this command to configure a PIM State-Refresh origination interval other than the default value. The origination interval is the number of seconds between PIM State Refresh control messages.

Use the `no` option with this command to return the origination interval to its default value.

Command Syntax

```
ipv6 pim state-refresh origination-interval <1-100>
no ipv6 pim state-refresh origination-interval
```

Parameter

<1-100> Range of values for state-refresh origination interval, in seconds

Note: No fractional values are allowed for the interval time.

Default

The default state-refresh origination interval is 60 seconds.

Command Mode

Interface mode

Examples

```
ZebOS#configure terminal
ZebOS(config)#interface eth0
ZebOS(config-if)#ipv6 pim state-refresh origination-interval 65

ZebOS(config)#interface eth0
ZebOS(config-if)#ipv6 pim state-refresh origination-interval
```

ipv6 pim unicast-bsm

Use this command to enable support for sending and receiving unicast Bootstrap Messages (BSM) on an interface. This command supports backward-compatibility with older versions of the Bootstrap Router specification, which specifies unicast BSM to refresh the state of new or restarting neighbors.

Use the `no` option with this command to disable unicast bootstrap messaging on an interface.

Command Syntax

```
ipv6 pim unicast-bsm
no ipv6 pim unicast-bsm
```

Parameters

None

Default

Unicast bootstrap messaging is disabled by default.

Command Mode

Interface mode

Examples

```
ZebOS#configure terminal
ZebOS(config)#interface eth0
ZebOS(config-if)#ipv6 pim unicast-bsm

ZebOS(config)#interface eth0
ZebOS(config-if)#no ipv6 pim unicast-bsm
```

show debugging ipv6 pim

Use this command to display the debug status for the IPv6 PIM process.

Command Syntax

```
show debugging ipv6 pim
```

Command Mode

Privileged Exec mode

Examples

```
ZebOS# show debugging ipv6 pim
```

show ipv6 pim interface

Use this command to display information about interfaces configured for PIM.

Command Syntax

```
show ipv6 pim interface
show ipv6 pim interface detail
```

Parameters

`detail` Display detailed information about a PIM interface

Command Mode

Exec mode and Privileged Exec mode

Examples

```
ZebOS#show ipv6 pim interface
```

show ipv6 pim mroute

Use this command to display information the IPv6 multicast routing table, or the IPv6 multicast routing table based on the specified address or addresses.

Command Syntax

```
show ipv6 pim mroute (detail|)
show ipv6 pim mroute X:X::X:X (detail|)
show ipv6 pim mroute X:X::X:X X:X::X:X (detail|)
```

Parameter

X:X::X:X	Display all entries for this group IPv6 address
X:X::X:X	Display all entries for this source IPv6 address

Note: A group IP address and a source IP address cannot be used simultaneously.

detail	Display detailed PIM multicast routing table information
--------	--

Command Mode

Exec mode and Privileged Exec mode

Example

```
ZebOS#show ipv6 pim mroute
```

show ipv6 pim neighbor

Use this command to display IPv6 PIM neighbor information.

Command Syntax

```
show ipv6 pim neighbor (detail|)
show ipv6 pim neighbor IFNAME (detail|)
show ipv6 pim neighbor IFNAME X:X::X:X (detail|)
```

Parameters

IFNAME	Name of the interface
X:X::X:X	IPv6 address of the neighbor interface
detail	Display detailed information for a PIM neighbor

Command Mode

Exec mode and Privileged Exec mode

Examples

```
ZebOS>#show ipv6 pim neighbor
```

```
ZebOS#show ipv6 pim neighbor detail
```

show ipv6 pim nexthop

Use this command to display the nexthop information from NSM as used by IPv6 PIM.

Command Syntax

```
show ipv6 pim nexthop
```

Command Mode

Exec mode and Privileged Exec mode

Example

```
ZebOS#show ipv6 pim nexthop
```

show ipv6 pim bsr-router

Use this command to show the bootstrap router v2 address.

Command Syntax

```
show ipv6 pim bsr-router
```

Command Mode

Privileged Exec and Exec mode

Example

```
ZebOS#show ipv6 pim bsr-router
```

show ipv6 pim local-members

Use this command to display information about local membership for PIM interfaces.

Command Syntax

```
show ipv6 pim local-members
show ipv6 pim local-members IFNAME
```

Parameters

IFNAME Display neighbors for an interface name

Command Mode

Privileged Exec and Exec mode

Example

```
ZebOS#show ipv6 pim local-members
```

show ipv6 pim rp-hash

Use this command to display the rendezvous point (RP) based on the group selected.

Command Syntax

```
show ipv6 pim rp-hash X:X::X:X
```

Parameters

X:X::X:X Specify a group address

Command Mode

Privileged Exec mode and Exec mode

Example

```
ZebOS#show ipv6 pim rp-hash ff02::d
```

show ipv6 pim rp mapping

Use this command to display the mappings for the PIM group to the active rendezvous points.

Command Syntax

```
show ipv6 pim rp mapping
```

Command Mode

Privileged Exec mode and Exec mode

Example

```
ZebOS#show ipv6 pim rp mapping
```

undebg all ipv6 pim

Use this command to disable all PIM debugging.

Command Syntax

```
undebg all ipv6 pim
```

Command Mode

Privileged Exec mode and Exec mode

Example

```
ZebOS#undebg all ipv6 pim
```

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