



# IPv6 Bidirectional PIM

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## Finding Feature Information

Your software release may not support all the features documented in this module. For the latest caveats and feature information, see [Bug Search Tool](#) and the release notes for your platform and software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the feature information table at the end of this module.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to [www.cisco.com/go/cfn](http://www.cisco.com/go/cfn). An account on Cisco.com is not required.

## Restrictions for IPv6 Bidirectional PIM

When the bidirectional (bidir) range is used in a network, all devices in that network must be able to understand the bidirectional range in the bootstrap message (BSM).

# Information About IPv6 Bidirectional PIM

## Bidirectional PIM

Bidirectional PIM allows multicast devices to keep reduced state information, as compared with unidirectional shared trees in PIM-SM. Bidirectional shared trees convey data from sources to the RPA and distribute them from the RPA to the receivers. Unlike PIM-SM, bidirectional PIM does not switch over to the source tree, and there is no register encapsulation of data from the source to the RP.

A single designated forwarder (DF) exists for each RPA on every link within a bidirectional PIM domain (including multiaccess and point-to-point links). The only exception is the RPL on which no DF exists. The DF is the device on the link with the best route to the RPA, which is determined by comparing MRIB-provided metrics. A DF for a given RPA forwards downstream traffic onto its link and forwards upstream traffic from its link toward the rendezvous point link (RPL). The DF performs this function for all bidirectional groups that map to the RPA. The DF on a link is also responsible for processing Join messages from downstream devices on the link as well as ensuring that packets are forwarded to local receivers discovered through a local membership mechanism such as MLD.

Bidirectional PIM offers advantages when there are many moderate or low-rate sources. However, the bidirectional shared trees may have worse delay characteristics than do the source trees built in PIM-SM (depending on the topology).

Only static configuration of bidirectional RPs is supported in IPv6.

## How to Configure IPv6 Bidirectional PIM

### Configuring Bidirectional PIM and Displaying Bidirectional PIM Information

#### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ipv6 pim [vrf *vrf-name*] rp-address *ipv6-address* [*group-access-list*] [**bidir**]**
4. **exit**
5. **show ipv6 pim [vrf *vrf-name*] df [*interface-type interface-number*] [*rp-address*]**
6. **show ipv6 pim [vrf *vrf-name*] df winner[*interface-type interface-number*] [*rp-address*]**

#### DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>enable</b>	Enables privileged EXEC mode.

	Command or Action	Purpose
	<p><b>Example:</b></p> <pre>Device&gt; enable</pre>	<ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
<b>Step 2</b>	<p><b>configure terminal</b></p> <p><b>Example:</b></p> <pre>Device# configure terminal</pre>	Enters global configuration mode.
<b>Step 3</b>	<p><b>ipv6 pim [vrf vrf-name] rp-address ipv6-address [group-access-list] [bidir]</b></p> <p><b>Example:</b></p> <pre>Device(config)# ipv6 pim rp-address 2001:DB8::01:800:200E:8C6C bidir</pre>	Configures the address of a PIM RP for a particular group range. Use of the <b>bidir</b> keyword means that the group range will be used for bidirectional shared-tree forwarding.
<b>Step 4</b>	<p><b>exit</b></p> <p><b>Example:</b></p> <pre>Device(config-if)# exit</pre>	Exits global configuration mode, and returns the device to privileged EXEC mode.
<b>Step 5</b>	<p><b>show ipv6 pim [vrf vrf-name] df [interface-type interface-number] [rp-address]</b></p> <p><b>Example:</b></p> <pre>Device# show ipv6 pim df</pre>	Displays the designated forwarder (DF)-election state of each interface for RP.
<b>Step 6</b>	<p><b>show ipv6 pim [vrf vrf-name] df winner[interface-type interface-number] [rp-address]</b></p> <p><b>Example:</b></p> <pre>Device# show ipv6 pim df winner ethernet 1/0 200::1</pre>	Displays the DF-election winner on each interface for each RP.

# Configuration Examples for IPv6 Bidirectional PIM

## Example: Configuring Bidirectional PIM and Displaying Bidirectional PIM Information

The following example displays the DF-election states:

```
Device# show ipv6 pim df

Interface          DF State      Timer          Metrics
Ethernet0/0       Winner        4s 8ms        [120/2]
  RP :200::1
Ethernet1/0       Lose         0s 0ms        [inf/inf]
  RP :200::1
```

The following example displays information on the RP:

```
Device# show ipv6 pim df

Interface          DF State      Timer          Metrics
Ethernet0/0       None:RP LAN  0s 0ms        [inf/inf]
  RP :200::1
Ethernet1/0       Winner        7s 600ms      [0/0]
  RP :200::1
Ethernet2/0       Winner        9s 8ms        [0/0]
  RP :200::1
```

## Additional References

### Related Documents

Related Topic	Document Title
IPv6 addressing and connectivity	<i>IPv6 Configuration Guide</i>
Cisco IOS commands	<a href="#">Cisco IOS Master Commands List, All Releases</a>
IP multicast commands	<a href="#">Cisco IOS IP Multicast Command Reference</a>
IPv6 commands	<a href="#">Cisco IOS IPv6 Command Reference</a>
Cisco IOS IPv6 features	<a href="#">Cisco IOS IPv6 Feature Mapping</a>

### Standards and RFCs

Standard/RFC	Title
RFCs for IPv6	<i>IPv6 RFCs</i>

**MIBs**

MIB	MIBs Link
	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: <a href="http://www.cisco.com/go/mibs">http://www.cisco.com/go/mibs</a>

**Technical Assistance**

Description	Link
The Cisco Support and Documentation website provides online resources to download documentation, software, and tools. Use these resources to install and configure the software and to troubleshoot and resolve technical issues with Cisco products and technologies. Access to most tools on the Cisco Support and Documentation website requires a Cisco.com user ID and password.	<a href="http://www.cisco.com/cisco/web/support/index.html">http://www.cisco.com/cisco/web/support/index.html</a>

## Feature Information for IPv6 Bidirectional PIM

The following table provides release information about the feature or features described in this module. This table lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

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**Table 1: Feature Information for IPv6 Bidirectional PIM**

Feature Name	Releases	Feature Information
IPv6 Bidirectional PIM	12.2(25)SG 12.2(33)SRA 12.2(25)S 12.3(7)T 12.4 12.4(2)T Cisco IOS XE release 2.3 15.0(1)S	Bidirectional PIM allows multicast routers to keep reduced state information. Bidirectional shared trees convey data from sources to the RP and distribute them from the RP to the receivers.  The following commands were introduced or modified: <b>debug ipv6 pim df-election</b> , <b>ipv6 pim rp-address</b> , <b>show ipv6 pim df</b> , <b>show ipv6 pim df winner</b> .

