



## MVPNv6

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This module describes how to configure IPv6 Multicast Virtual Private Network (MVPNv6) to enable service providers to use their existing IPv4 backbone to provide multicast-enabled private IPv6 networks to their customers.

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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.

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.

## Prerequisites for MVPNv6

- BGP must be configured and operational on all devices sending or receiving multicast traffic.
- BGP extended communities must be enabled to support the use of Multicast Distribution Trees (MDTs) in the network. Use the **neighbor send-community both** or **neighbor send-community extended** command to enable BGP extended communities.

- VPN routing and forwarding (MVRF) instances to be used for MVPNv6 must be configured on the PE devices.

## Restrictions for MVPNv6

Point-to-point GRE tunnel as an output interface in a VRF for MVPNv6 is not supported.

## Information About MVPNv6

### MVPNv6

To provide Layer 3 multicast services to customers with multiple distributed sites, service providers need a secure and scalable mechanism to transmit multicast traffic across the service-provider network. IPv4 Multicast VPN (MVPN) provides such services for IPv4 multicast traffic over a shared service provider backbone.

IPv6 Multicast Virtual Private Network (MVPNv6) provides the same services for IPv6 traffic, enabling service providers to provide multicast-enabled private IPv6 networks to their customers using their existing IPv4 back bone. The IPv4 and IPv6 VPN traffic is carried over the same tunnels simultaneously.

## How to Configure MVPNv6

### Configuring Multicast Routing

Perform this task to enable IPv4 and IPv6 multicast routing for the multicast VPN routing and forwarding (MVRF) instance to be used for MVPNv6.

#### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ip routing**
4. **ip routing vrf *vrf-name***
5. **ipv6 routing**
6. **ipv6 routing vrf *vrf-name***
7. **exit**

## DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b>  <b>Example:</b> Device> enable	Enables privileged EXEC mode.  <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
<b>Step 2</b>	<b>configure terminal</b>  <b>Example:</b> Device# configure terminal	Enters global configuration mode.
<b>Step 3</b>	<b>ip routing</b>  <b>Example:</b> Device(config)# ip routing	Enables IPv4 multicast routing.
<b>Step 4</b>	<b>ip routing vrf <i>vrf-name</i></b>  <b>Example:</b> Device(config)# ip routing vrf blue	Enables IPv4 multicast routing for the specified MVRF instance.
<b>Step 5</b>	<b>ipv6 routing</b>  <b>Example:</b> Device(config)# ipv6 routing	Enables IPv6 multicast routing.
<b>Step 6</b>	<b>ipv6 routing vrf <i>vrf-name</i></b>  <b>Example:</b> Device(config)# ipv6 routing vrf blue	Enables IPv6 multicast routing for the specified MVRF instance.
<b>Step 7</b>	<b>exit</b>  <b>Example:</b> Device(config)# exit	Exits global configuration mode.

# Configuring MVRP on PE Devices

## SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface** *type number*
4. **vrf forwarding** *vrf-name*
5. **ip address** *ip-address mask*
6. **ip pim sparse-mode**
7. **delay** *tens-of-seconds*
8. **ipv6 address** *ipv6-address link-local*
9. **ipv6 address** *ipv6-address-prefix*
10. **ipv6 pim**
11. **exit**
12. **ip pim rp-address** *ip-address*
13. **ip pim vrf** *vrf-name rp-address address*
14. **ipv6 pim vrf** *vrf-name rp-address ipv6-address*
15. **exit**

## DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b>  <b>Example:</b> Device> enable	Enables privileged EXEC mode.  • Enter your password if prompted.
<b>Step 2</b>	<b>configure terminal</b>  <b>Example:</b> Device# configure terminal	Enters global configuration mode.
<b>Step 3</b>	<b>interface</b> <i>type number</i>  <b>Example:</b> Device(config)# interface GigabitEthernet 3/0/3	Enters interface configuration mode.
<b>Step 4</b>	<b>vrf forwarding</b> <i>vrf-name</i>  <b>Example:</b> Device(config-if)# vrf forwarding blue	Associates a VRF with the interface.

	Command or Action	Purpose
<b>Step 5</b>	<b>ip address</b> <i>ip-address mask</i>  <b>Example:</b> Device(config-if)# ip address 10.1.0.1 255.255.0.0	Configures an IPv4 address on the interface.
<b>Step 6</b>	<b>ip pim sparse-mode</b>  <b>Example:</b> Device(config-if)# ip pim sparse-mode	Enables Protocol Independent Multicast (PIM) on the interface.
<b>Step 7</b>	<b>delay</b> <i>tens-of-seconds</i>  <b>Example:</b> Device(config-if)# delay 1000	Configures delay value on the interface.
<b>Step 8</b>	<b>ipv6 address</b> <i>ipv6-address link-local</i>  <b>Example:</b> Device(config-if)# ipv6 address FE80::20:1:1 link-local	Specifies a link-local IPv6 address. <ul style="list-style-type: none"> <li>• This address is used instead of the link-local address that was automatically configured when IPv6 was enabled on the interface.</li> </ul>
<b>Step 9</b>	<b>ipv6 address</b> <i>ipv6-address-prefix</i>  <b>Example:</b> Device(config-if)# ipv6 address FC00::/7	Configures an IPv6 address on the interface.
<b>Step 10</b>	<b>ipv6 pim</b>  <b>Example:</b> Device(config-if)# ipv6 pim	Enables Protocol Independent Multicast (PIM) for IPv6.
<b>Step 11</b>	<b>exit</b>  <b>Example:</b> Device(config-if)# exit	Exits interface configuration mode.
<b>Step 12</b>	<b>ip pim rp-address</b> <i>ip-address</i>  <b>Example:</b> Device(config)# ip pim rp-address 10.10.10.10	Configure the address of a PIM rendezvous point (RP) for multicast groups.
<b>Step 13</b>	<b>ip pim vrf</b> <i>vrf-name rp-address address</i>  <b>Example:</b> Device(config)# ip pim vrf blue rp-address 10.10.0.10	Configures the IPv4 address of a PIM RP and associates the RP with the specified MVRP instance.

	Command or Action	Purpose
<b>Step 14</b>	<b>ipv6 pim vrf <i>vrf-name</i> rp-address <i>ipv6-address</i></b>  <b>Example:</b> Device(config)# ipv6 pim vrf blue rp-address FC00::1:1:1	Configures the IPv6 address of a PIM RP and associates the RP with the specified MVRF instance.
<b>Step 15</b>	<b>exit</b>  <b>Example:</b> Device(config)# exit	Exits global configuration mode.

## Configuring Routing Protocols Between the PE and CE Devices

### Before You Begin

The PE and CE devices must be configured with the same routing protocol.

### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **router bgp *as-number***
4. **address-family ipv6 vrf *vrf-name***
5. **redistribute connected**
6. **redistribute eigrp *as-number***
7. **redistribute static**
8. **end**

### DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b>  <b>Example:</b> Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
<b>Step 2</b>	<b>configure terminal</b>  <b>Example:</b> Device# configure terminal	Enters global configuration mode.

	Command or Action	Purpose
<b>Step 3</b>	<b>router bgp <i>as-number</i></b>  <b>Example:</b> Device(config)# router bgp 55	Specifies the number of an autonomous system that identifies the device to other BGP devices.
<b>Step 4</b>	<b>address-family ipv6 vrf <i>vrf-name</i></b>  <b>Example:</b> Device(config-router)# address-family ipv6 vrf blue	Specifies the name of the VRF to associate with subsequent address family configuration mode commands.
<b>Step 5</b>	<b>redistribute connected</b>  <b>Example:</b> Device(config-router-af)# redistribute connected	Redistributes the directly connected networks to BGP.
<b>Step 6</b>	<b>redistribute eigrp <i>as-number</i></b>  <b>Example:</b> Device(config-router-af)# redistribute eigrp 11	Redistributes the EIGRP routes into BGP.
<b>Step 7</b>	<b>redistribute static</b>  <b>Example:</b> Device(config-router-af)# redistribute static	Redistribute the static routes into BGP.
<b>Step 8</b>	<b>end</b>  <b>Example:</b> Device(config-router-af)# end	Returns to privileged EXEC mode.

## Configuration Examples for MVPNv6

### Example: MVPNv6

```

mls ipv6 vrf
!
vrf definition blue
 rd 55:1111
 route-target export 55:1111
 route-target import 55:1111
!
 address-family ipv4
  mdt default 232.1.1.1
 exit-address-family
!
 address-family ipv6
  mdt default 232.1.1.1
 exit-address-family

```

```

!
ip multicast-routing
ip multicast-routing vrf blue
!
!
ipv6 unicast-routing
ipv6 multicast-routing
ipv6 multicast-routing vrf blue
!

interface GigabitEthernet3/0/3
 vrf forwarding blue
 ip address 10.1.0.1 255.255.255.0
 no ip redirects
 no ip proxy-arp
 ip pim sparse-dense-mode
 delay 100
 ipv6 address FE80::20:1:1 link-local
 ipv6 address FC00::/7
 no mls qos trust
!
router bgp 55
 address-family ipv6 vrf blue
  redistribute connected
  redistribute eigrp 11
  redistribute static
 exit-address-family
!

ip pim vrf blue rp-address 10.10.0.10
!
ipv6 pim vrf blue rp-address FC00::1:1:1
!
!
!

```

## Additional References for Nextgen MVPN BGP C-Route Signaling

### Related Documents

Related Topic	Document Title
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>



**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 MVPNv6

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 MVPNv6**

Feature Name	Releases	Feature Information
MVPNv6	15.2(4)S 15.3(1)T Cisco IOS XE Release 3.8S	This feature enables service providers to use their existing IPv4 back bone to provide multicast-enabled private IPv6 networks to their customers.  No commands were introduced or modified.

