Configuring MVPNv6

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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

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
Step 1	**enable** **Example:** `Device> enable`	Enables privileged EXEC mode. Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 3	**ip routing** **Example:** `Device(config)# ip routing`	Enables IPv4 multicast routing.
Step 4	**ip routing vrf** *vrf-name* **Example:** `Device(config)# ip routing vrf blue`	Enables IPv4 multicast routing for the specified MVRF instance.
Step 5	**ipv6 routing** **Example:** `Device(config)# ipv6 routing`	Enables IPv6 multicast routing.
Step 6	**ipv6 routing vrf** *vrf-name* **Example:** `Device(config)# ipv6 routing vrf blue`	Enables IPv6 multicast routing for the specified MVRF instance.

	Command or Action	Purpose
Step 7	**exit** **Example:** `Device(config)# exit`	Exits global configuration mode.

Configuring MVRF 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
Step 1	**enable** **Example:** `Device> enable`	Enables privileged EXEC mode. Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 3	**interface** *type number* **Example:** `Device(config)# interface GigabitEthernet 3/0/3`	Enters interface configuration mode.
Step 4	**vrf forwarding** *vrf-name* **Example:** `Device(config-if)# vrf forwarding blue`	Associates a VRF with the interface.

	Command or Action	Purpose
Step 5	**ip address** *ip-address mask* **Example:** `Device(config-if)# ip address 10.1.0.1 255.255.0.0`	Configures an IPv4 address on the interface.
Step 6	**ip pim sparse-mode** **Example:** `Device(config-if)# ip pim sparse-mode`	Enables Protocol Independent Multicast (PIM) on the interface.
Step 7	**delay** *tens-of-seconds* **Example:** `Device(config-if)# delay 1000`	Configures delay value on the interface.
Step 8	**ipv6 address** *ipv6-address* **link-local** **Example:** `Device(config-if)# ipv6 address FE80::20:1:1 link-local`	Specifies a link-local IPv6 address. This address is used instead of the link-local address that was automatically configured when IPv6 was enabled on the interface.
Step 9	**ipv6 address** *ipv6-address-prefix* **Example:** `Device(config-if)# ipv6 address FC00::/7`	Configures an IPv6 address on the interface.
Step 10	**ipv6 pim** **Example:** `Device(config-if)# ipv6 pim`	Enables Protocol Independent Multicast (PIM) for IPv6.
Step 11	**exit** **Example:** `Device(config-if)# exit`	Exits interface configuration mode.
Step 12	**ip pim rp-address** *ip-address* **Example:** `Device(config)# ip pim rp-address 10.10.10.10`	Configure the address of a PIM rendezvous point (RP) for multicast groups.
Step 13	**ip pim vrf** *vrf-name* **rp-address** *address* **Example:** `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 MVRF instance.
Step 14	**ipv6 pim vrf** *vrf-name* **rp-address** *ipv6-address* **Example:** `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.
Step 15	**exit** **Example:**	Exits global configuration mode.

	Command or Action	Purpose
	`Device(config)# exit`	

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
Step 1	**enable** **Example:** `Device> enable`	Enables privileged EXEC mode. Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 3	**router bgp** *as-number* **Example:** `Device(config)# router bgp 55`	Specifies the number of an autonomous system that identifies the device to other BGP devices.
Step 4	**address-family ipv6 vrf** *vrf-name* **Example:** `Device(config-router)# address-family ipv6 vrf blue`	Specifies the name of the VRF to associate with subsequent address family configuration mode commands.
Step 5	**redistribute connected** **Example:** `Device(config-router-af)# redistibute connected`	Redistributes the directly connected networks to BGP.
Step 6	**redistribute eigrp** *as-number* **Example:**	Redistributes the EIGRP routes into BGP.

	Command or Action	Purpose
	`Device(config-router-af)# redistribute eigrp 11`	
Step 7	**redistribute static** **Example:** `Device(config-router-af)# redistribute static`	Redistribute the static routes into BGP.
Step 8	**end** **Example:** `Device(config-router-af)# end`	Returns to privileged EXEC mode.

Configuration Example for MVPNv6

The following is an example for configuring 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
!
!
```

Feature History for MVPNv6

This table provides release and related information for features explained in this module.

These features are available on all releases subsequent to the one they were introduced in, unless noted otherwise.

Release	Feature	Feature Information
Cisco IOS XE Gibraltar 16.11.1	MVPNv6	This feature enables service providers to use their existing IPv4 back bone to provide multicast-enabled private IPv6 networks to their customers. This feature was introduced on the C9500-12Q, C9500-16X, C9500-24Q, and C9500-40X models of the Cisco Catalyst 9500 Series Switches.
Cisco IOS XE Amsterdam 17.3.1	MVPNv6	Support for this feature was introduced on the C9500-32C, C9500-32QC, C9500-48Y4C, and C9500-24Y4C models of the Cisco Catalyst 9500 Series Switches.

Use Cisco Feature Navigator to find information about platform and software image support. To access Cisco Feature Navigator, go to http://www.cisco.com/go/cfn.