Configuring Multicast Overlay Routing

For any vEdge routers to be able to participate in the multicast overlay network, you configure PIM on those routers. You can optionally configure IGMP to allow individual hosts on the service side to join multicast groups within a particular VPN.

Enable PIM at a Site with Multicast Sources

For a vEdge router located at a site that contains one or more multicast sources, you enable PIM on the service-side interface or interfaces. These are the interfaces that face the local-site network. You enable PIM per VPN, so you must configure PIM and PIM interfaces for all VPNs support multicast services. You cannot configure PIM in VPN 0 (the transport VPN facing the overlay network) or in VPN 512 (the management VPN).

For each VPN, you must configure the name of the service-side interface. You can optionally configure auto-RP to receive group-to-RP mapping updates.

To configure PIM at a site with multicast sources:

1. Configure a VPN for the PIM network:
   ```
   vEdge(config)# vpn vpn-id
   ```
   `vpn-id` can be any VPN number except VPN 0 (the transport VPN facing the overlay network) or VPN 512 (the management VPN).

2. Configure the interfaces in the VPN:
   ```
   vEdge(config-vpn)# interface interface-name
   vEdge(config-interface)# ip address prefix/length
   vEdge(config-interface)# no shutdown
   ```
   The interface names in the two `interface` names must be the same.

3. Configure PIM and the interfaces that participate in the PIM network:
   ```
   vEdge(config-vpn)# router pim
   vEdge(config-pim)# interface interface-name
   vEdge(config-interface)# no shutdown
   ```
   The interface name in the two `interface` commands must be the same.

4. Optionally, modify PIM timers on the interface. The default PIM hello interval is 30 seconds, and the default join/prune interval is 60 seconds.
   ```
   vEdge(config-interface)# hello-interval seconds
   vEdge(config-interface)# join-prune-interval seconds
   ```
   The hello interval can be in the range of 1 through 3600 seconds. The join/prune interval can be in the range of 10 through 600 seconds.

5. Optionally, enable automatic discover of rendezvous points (RPs) in the PIM network:
   ```
   vEdge(config-pim)# auto-rp
   ```

Here is an example of a PIM configuration on a vEdge router:
Enable PIM at a Site with Multicast Receivers

For a vEdge router located at a site that contains one or more multicast receivers, you enable PIM on the service-side interface or interfaces (the interfaces facing the local-site network). You enable PIM per VPN, so you must configure PIM and PIM interfaces for all VPNs support multicast services.

For each VPN, you must configure the name of the service-side interface.

To configure PIM at a site with multicast receivers:

1. Configure a VPN for the PIM network:
   
   `vEdge(config)# vpn vpn-id`
   
   `vpn-id` can be any VPN number except VPN 0 (reserved for control plane traffic) or VPN 512 (the management VPN).

2. Configure PIM and the interfaces that participate in the PIM network:
   
   `vEdge(config-vpn)# router pim`
   
   `vEdge(config-pim)# interface interface-name`

3. Configure the interface used by PIM in the PIM VPN:
   
   `vEdge(config-vpn)# interface interface-name`
   
   `vEdge(config-interface)# ip address prefix/length`
   
   `vEdge(config-interface)# no shutdown`
   
   The interface names in the two `interface` names must be the same.

4. By default, a vEdge router joins the shortest-path tree (SPT) immediately after the first packet arrives from a new source. To force traffic to remain on the shared tree and travel via the RP instead of via the SPT, configure the traffic rate at which to switch from the shared tree to the SPT:
   
   `vEdge(config-vpn)# router pim spt-threshold kbps`
   
   The rate can be from 0 through 100 kbps.

5. In a topology that includes multicast replicators, the Viptela software, by default, uses the same replicator for a multicast group. You can have the software choose the replicator randomly:
   
   `vEdge(config-vpn)# router pim replicator-selection random`

Here is an example of a PIM configuration on a vEdge router:

```
vEdge(config-vpn-2)# show full-configuration
vpn 2
  router
  pim
    interface ge0/7
      exit
      exit
    !
  interface ge0/7
    ip address 10.0.100.15/24
    no shutdown
    !
```

https://sdwan-docs.cisco.com/Product_Documentation/Software_Features/Release_18.4/03Routing/05Configuring_Multicast_Ov

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Configure a Multicast Replicator

For a vEdge router that is a replicator, the configuration has two parts: you configure the router to be a replicator, and you enable PIM on each VPN that participates in a multicast domain.

To configure a replicator:

1. Configure a VPN for the PIM network:
   ```
   vEdge(config)# vpn vpn-id
   
   vpn-id can be any VPN number except VPN 0 (the transport VPN facing the overlay network) or VPN 512 (the management VPN).
   ```

2. Configure the replicator functionality on the local vEdge router:
   ```
   vEdge(config-vpn)# router multicast-replicator local
   ```

3. On the transport side, a single vEdge router acting as a replicator can accept a maximum of 1024 (*,G) and (S,G) joins. For each join, the router can accept 256 tunnel outgoing interfaces (OILs). To modify the number of joins the replicator can accept, change the value of the join threshold:
   ```
   vEdge(config-router)# multicast-replicator threshold number
   ```

4. Enable PIM on each VPN that participates in a multicast domain:
   ```
   vEdge(config)# vpn vpn-id
   vEdge(config-vpn)# router pim
   ```
   If the router is just a replicator and is not part of a local network that contains either multicast sources or receivers, you do not need to configure any interfaces in the PIM portion of the configuration. The replicator learns the locations of multicast sources and receivers from the OMP messages it exchanges with the vSmart controller. These control plane messages are exchanged in the transport VPN (VPN 0). Similarly, the other vEdge routers discover replicators dynamically, through OMP messages from the vSmart controller.

PIM Scalability Information

When configuring PIM, the following scalability limits apply:

- Any single vEdge router supports a maximum of 1024 multicast state entries. Note that a (*,G) and an (S,G) for the same group count as two entries.

- The 1024 multicast state entries are shared across all configured VPNs on a single vEdge router.

- Each state entry can contain a maximum of 64 service-side entries and a maximum of 256 transport-side entries in its outgoing interface list (OIL).

Enable IGMP at a Site with Multicast Hosts

For VPNs in which you want to individual hosts to join multicast groups, you can enable IGMP on vEdge routers:

```
vEdge(config)#vpn vpn-id router igmp
vEdge(config-igmp)# interface interface-name
```

Ensure that the interface being used for IGMP is configured in the VPN:
If desired, specify the multicast groups to initiate join requests with:
```
vEdge(config-igmp)# interface interface-name join-group group-ip-address
```

**Configure the Interface Bandwidth Allowed for Multicast Traffic**

By default, multicast traffic can use up to 20 percent of the interface bandwidth. You can change this allocation to a value from 5 to 100 percent:
```
vEdge(config)# system multicast-buffer-percent percentage
```

This systemwide configuration applies to all multicast-enabled interfaces on the vEdge router.

**Multicast Configuration Limitations**

You cannot configure the following for overlay multicast routing:

- Data policy
- Access lists
- Mirroring

**Additional Information**

[Multicast Overlay Routing Overview](https://sdwan-docs.cisco.com/Product_Documentation/Software_Features/Release_18.4/03Routing/05Configuring_Multicast_Ov)