



Configuring Multicast Routing over GRE Tunnel

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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. An account on Cisco.com is not required.

Prerequisites for Configuring Multicast Routing over GRE Tunnel

Before configuring multicast routing over GRE, you should be familiar with the concepts of IP Multicast Routing Technology and GRE Tunneling.

Restrictions for Configuring Multicast Routing over GRE Tunnel

The following are the restrictions for configuring multicast routing over GRE tunnel:

- IPv6 multicast over GRE tunnel is not supported.
- The total number of supported multicast routes (mroutes) is 2000, across all tunnels.
- Bidirectional PIM is not supported.

- Multicast routing should be configured on the first hop router (FHR), the rendezvous point (RP) and the last hop router (LHR) to support multicast over the GRE tunnel.
- On Catalyst 3850 and Catalyst 3650 series switches, the tunnel source can be a loopback, physical, or L3 EtherChannel interface.
- No feature interactions such as IPSec, ACL, Tunnel counters, Crypto support, Fragmentation, Cisco Discovery Protocol (CDP), QoS, GRE keepalive, Multipoint GRE, etc. are supported on the GRE Tunnel.

Information About Multicast Routing over GRE Tunnel

This chapter describes how to configure a Generic Route Encapsulation (GRE) tunnel to tunnel IP multicast packets between non-IP multicast areas. The benefit is that IP multicast traffic can be sent from a source to a multicast group, over an area where IP multicast is not supported. Multicast Routing over GRE Tunnel supports ip pim dense-mode, sparse-dense mode, sparse mode and pim-ssm mode; and supports static RP and auto-RP. See Rendezvous Point and Auto-RP for information on configuring static RP and auto-RP.

**Note**

Beginning in Cisco IOS XE Denali 16.3.1, multicast routing and NHRP are supported with GRE Tunneling. NHRP can optionally be configured along with the multicast configuration on the tunnel interface to facilitate dynamic discovery of tunnel end points. Please see NHRP for configuring NHRP on a tunnel interface.

Benefits of Tunneling to Connect Non-IP Multicast Areas

- If the path between a source and a group member (destination) does not support IP multicast, a tunnel between them can transport IP multicast packets.

How to Configure Multicast Routing over GRE Tunnel

Configuring a GRE Tunnel to Connect Non-IP Multicast Areas

You can configure a GRE tunnel to transport IP multicast packets between a source and destination that are connected by a medium that does not support multicast routing.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ip multicast-routing**
4. **interface tunnel** *number*
5. **ip address** *ip_address subnet_mask*
6. **ip pim** { *sparse-dense-mode* | *sparse-mode* | *dense-mode* }
7. **tunnel source** { *ip-address* | *interface-name* }
8. **tunnel destination** { *hostname* | *ip-address* }
9. **end**
10. **show interface** *type number*

DETAILED STEPS

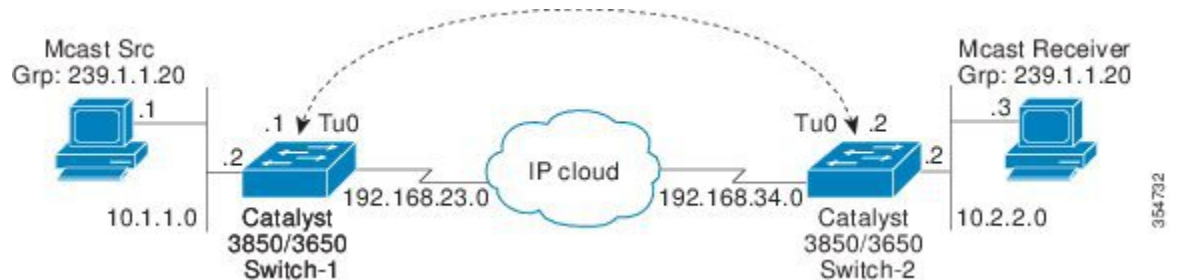
	Command or Action	Purpose
Step 1	enable Example: Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	configure terminal Example: Device# configure terminal	Enters global configuration mode.
Step 3	ip multicast-routing Example: Device(config)# ip multicast-routing	Enables IP multicast routing.
Step 4	interface tunnel <i>number</i> Example: Device(config)# interface tunnel 0	Enters tunnel interface configuration mode.
Step 5	ip address <i>ip_address subnet_mask</i> Example: Device(config-if)# ip address 192.168.24.1 255.255.255.252	Configures IP address and IP subnet.

	Command or Action	Purpose
Step 6	<p>ip pim { sparse-dense-mode sparse-mode dense-mode }</p> <p>Example:</p> <pre>Device(config-if)# ip pim sparse-dense-mode</pre>	<p>Enables Protocol Independent Multicast (PIM) on the tunnel interface with one of the following mode of operation:</p> <ul style="list-style-type: none"> • sparse-dense-mode - Treats the interface in either sparse mode or dense mode of operation, depending on which mode the multicast group operates in. • sparse-mode - Enables sparse mode of operation. • dense-mode - Enables dense mode of operation.
Step 7	<p>tunnel source { <i>ip-address</i> <i>interface-name</i> }</p> <p>Example:</p> <pre>Device(config-if)# tunnel source 100.1.1.1</pre>	Configures the tunnel source.
Step 8	<p>tunnel destination { <i>hostname</i> <i>ip-address</i> }</p> <p>Example:</p> <pre>Device(config-if)# tunnel destination 100.1.5.3</pre>	Configures the tunnel destination.
Step 9	<p>end</p> <p>Example:</p> <pre>Device(config-if)# end</pre>	Ends the current configuration session and returns to privileged EXEC mode.
Step 10	<p>show interface <i>type number</i></p> <p>Example:</p> <pre>Device# show interface tunnel 0</pre>	Displays tunnel interface information.

Tunneling to Connect Non-IP Multicast Areas Example

The following example shows multicast-routing between Catalyst 3650/3850 switch through a GRE tunnel.

Figure 1: Tunnel Connecting Non-IP Multicast Areas



In the figure above, the multicast source (10.1.1.1) is connected to Catalyst 3850/3650 Switch-1 and is configured for multicast group 239.1.1.20. The multicast receiver (10.2.2.3) is connected to Catalyst 3850/3650 Switch-2 and is configured to receive multicast packets for group 239.1.1.20. Separating Switch-1 and Switch-2 is an IP cloud, which is not configured for multicast routing.

A GRE tunnel is configured between Switch-1 to Switch-2 sourced with their loopback interfaces. Multicast-routing is enabled on Switch-1 and Switch-2. The `ip pim sparse-dense-mode` command is configured on tunnel interfaces to support PIM in either the sparse or dense modes. Sparse-dense mode configuration on the tunnel interfaces allows sparse-mode or dense-mode packets to be forwarded over the tunnel depending on rendezvous point (RP) configuration for the group.

Switch-1 Configuration:

```
Device(config)# ip multicast-routing
Device(config)# interface Loopback0 //Tunnel source interface
Device(config-if)# ip address 2.2.2.2 255.255.255.255

Device(config)# interface Tunnel 10 //Tunnel interface configured for PIM
traffic
Device(config-if)# ip address 192.168.24.1 255.255.255.252
Device(config-if)# ip pim sparse-dense-mode
Device(config-if)# ip nhrp map 192.168.24.3 4.4.4.4 //NHRP may optionally be
configured to dynamically discover tunnel end points.
Device(config-if)# ip nhrp map multicast 4.4.4.4
Device(config-if)# ip nhrp network-id 1
Device(config-if)# ip nhrp nhs 192.168.24.3
Device(config-if)# tunnel source Loopback0
Device(config-if)# tunnel destination 4.4.4.4

Device(config)# interface GigabitEthernet 0/0/0 //Source interface
Device(config-if)# ip address 10.1.1.2 255.255.255.0
Device(config-if)# ip pim sparse-dense-mode
```

Switch-2 Configuration:

```
Device(config)# ip multicast-routing
Device(config)# interface Loopback0 //Tunnel source interface
Device(config-if)# ip address 4.4.4.4 255.255.255.255
```

```
Device(config)# interface Tunnel 10      //Tunnel interface configured for PIM
traffic
Device(config-if)# ip address 192.168.24.2 255.255.255.252
Device(config-if)# ip nhrp map 192.168.24.4 2.2.2.2 //NHRP may optionally be
configured to dynamically discover tunnel end points.
Device(config-if)# ip nhrp map multicast 2.2.2.2
Device(config-if)# ip nhrp network-id 1
Device(config-if)# ip nhrp nhs 192.168.24.4
Device(config-if)# ip pim sparse-dense mode
Device(config-if)# tunnel source Loopback0
Device(config-if)# tunnel destination 2.2.2.2

Device(config)# interface GigabitEthernet 0/0/0 //Receiver interface
Device(config-if)# ip address 10.2.2.2 255.255.255.0
Device(config-if)# ip pim sparse-dense-mode
```