Configuring Multicast Routing over GRE Tunnel

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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 32000, 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 9000 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 sparse mode and pim-ssm mode; and supports static RP and auto-RP. See Rendevous Point and Auto-RP for information on configuring static RP and auto-RP.

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

This section provides steps for configuring 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.

Procedure

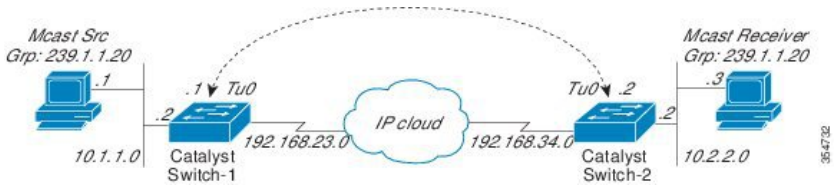
	Command or Action	Purpose
Step 1	**enable** **Example:** `Device> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 3	**ip multicast-routing** **Example:** `Device(config)# ip multicast-routing`	Enables IP multicast routing.
Step 4	**interface tunnel** *number* **Example:** `Device(config)# interface tunnel 0`	Enters tunnel interface configuration mode.
Step 5	**ip address ip_address** *subnet_mask* **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	**ip pim sparse-mode** **Example:** `Device(config-if)# ip pim sparse-mode`	Enables sparse mode of operation of Protocol Independent Multicast (PIM) on the tunnel interface with one of the following mode of operation:
Step 7	**tunnel source** { *ip-address* | *interface-name* } **Example:** `Device(config-if)# tunnel source 100.1.1.1`	Configures the tunnel source.
Step 8	**tunnel destination** { *hostname* | *ip-address* } **Example:** `Device(config-if)# tunnel destination 100.1.5.3`	Configures the tunnel destination.
Step 9	**end** **Example:** `Device(config-if)# end`	Ends the current configuration session and returns to privileged EXEC mode.
Step 10	**show interface** *type number* **Example:** `Device# show interface tunnel 0`	Displays tunnel interface information.

Tunneling to Connect Non-IP Multicast Areas Example

The following example shows multicast-routing between a Catalyst 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 Switch-1 and is configured for multicast group 239.1.1.20. The multicast receiver (10.2.2.3) is connected to Catalyst 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-mode** command is configured on

tunnel interfaces to support PIM in the sparse mode. Sparse mode configuration on the tunnel interfaces allows sparse-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-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-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-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-mode
```

Additional References for Multicast Routing over GRE Tunnel

Related Documents

Related Topic	Document Title
For complete syntax and usage information for the commands used in this chapter.	See the IP Multicast Routing Commands section of the *Command Reference (Catalyst 9300 Series Switches)* .

Feature History for Multicast Routing over GRE Tunnel

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

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

Release	Feature	Feature Information
Cisco IOS XE Everest 16.5.1a	Multicast Routing over GRE Tunnel	Multicast routing over GRE tunnel allows IP multicast traffic to be sent from a source to a multicast group, over an area where IP multicast is not supported

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