

# Configuring MPLS Layer 2 VPN over GRE

- Information About MPLS Layer 2 VPN over GRE, on page 1
- How to Configure MPLS Layer 3 VPN over GRE, on page 3
- Configuration Examples for MPLS Layer 2 VPN over GRE, on page 4
- Additional References for Configuring MPLS Layer 2 VPN over GRE, on page 5
- Feature History for Configuring MPLS Layer 2 VPN over GRE, on page 5

# Information About MPLS Layer 2 VPN over GRE

The MPLS Layer 2 VPN over GRE feature provides a mechanism for tunneling Multiprotocol Label Switching (MPLS) packets over non-MPLS networks. This feature allows you to create a generic routing encapsulation (GRE) tunnel across a non-MPLS network. The MPLS packets are encapsulated within the GRE tunnel packets, and the encapsulated packets traverse the non-MPLS network through the GRE tunnel. When GRE tunnel packets are received at the other side of the non-MPLS network, the GRE tunnel packet header is removed and the inner MPLS packet is forwarded to its final destination.

To configure MPLS Layer 2 VPN over GRE, you must have configured either Virtual Private LAN Service (VPLS) or EoMPLS (Ethernet over MPLS).

## **Types of Tunneling Configurations**

The following sections provide information about the different types of tunneling configurations that are supported.

## **PE-to-PE Tunneling**

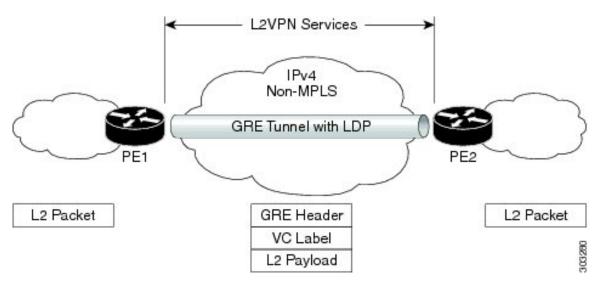
The provider edge-to-provider edge (PE-to-PE) tunneling configuration provides a scalable way to connect multiple customer networks across a non-MPLS network. With this configuration, traffic that is destined to multiple customer networks is multiplexed through a single GRE tunnel.

The PE device on one side of the non-MPLS network uses the routing protocols (that operate within the non-MPLS network) to learn about the PE device on the other side of the non-MPLS network. The learned routes that are established between the PE devices are then stored in the main or default routing table.

The opposing PE device uses Border Gateway Protocol (BGP) to learn about the routes that are associated with the customer networks that are behind the PE devices. These learned routes are not known to the non-MPLS network.

Figure 1: PE-to-PE Tunneling, on page 2 shows an end-to-end IP core from one PE device to another through the GRE tunnel that spans the non-MPLS network.

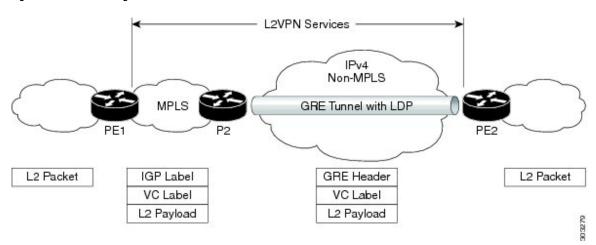
Figure 1: PE-to-PE Tunneling



## **P-to-PE Tunneling**

Figure 2: P-to-PE Tunneling, on page 2 shows a method of connecting two MPLS segments (P2 to PE2) across a non-MPLS network. In this configuration, MPLS traffic that is destined to the other side of the non-MPLS network is sent through a single GRE tunnel.

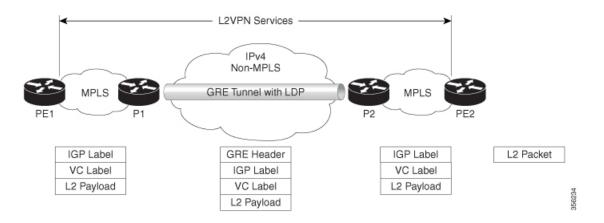
Figure 2: P-to-PE Tunneling



## **P-to-P Tunneling**

Figure 3: P-to-P Tunneling, on page 3 shows a method of connecting two MPLS segments (P1 to P2) across a non-MPLS network. In this configuration, MPLS traffic that is destined to the other side of the non-MPLS network is sent through a single GRE tunnel.

Figure 3: P-to-P Tunneling



# **How to Configure MPLS Layer 3 VPN over GRE**

To configure the MPLS over GRE feature, you must create a GRE tunnel to span the non-MPLS networks. Perform the following procedure on the devices that are located at both ends of the GRE tunnel.

#### **Procedure**

Command or Action	Purpose	
enable	Enables privileged EXEC mode.	
Example:	Enter your password, if prompted.	
Device> enable		
configure terminal	Enters global configuration mode.	
Example:		
Device# configure terminal		
interface tunnel tunnel-number	Creates a tunnel interface and enters interface configuration mode.	
Example:		
Device(config)# interface tunnel 1		
ip address ip-address mask	Assigns an IP address to the tunnel interface.	
Example:		
Device(config-if)# ip address 10.0.0.1 255.255.255.0		
tunnel source source-address	Configures the tunnel's source IP address.	
Example:		
Device(config-if)# tunnel source 10.1.1.1		
	enable  Example:  Device> enable  configure terminal  Example:  Device# configure terminal  interface tunnel tunnel-number  Example:  Device(config)# interface tunnel 1  ip address ip-address mask  Example:  Device(config-if)# ip address 10.0.0.1  255.255.255.0  tunnel source source-address  Example:	

	Command or Action	Purpose
Step 6	tunnel destination destination-address	Configures the tunnel's destination IP address.
	Example:	
	Device(config-if)# tunnel destination 10.1.1.2	
Step 7	mpls ip	Enables MPLS on the tunnel's physical interface.
	Example:	
	Device(config-if)# mpls ip	
Step 8	end	Returns to privileged EXEC mode.
	Example:	
	Device(config-if)# end	

# Configuration Examples for MPLS Layer 2 VPN over GRE

The following section provides an example for configuring MPLS Layer 2 VPN over GRE.

## **Example: Configuring a GRE Tunnel That Spans a non-MPLS Network**

The following examples show how to configure a generic GRE tunnel configuration that spans a non-MPLS network.

The following example shows the tunnel configuration on the PE1 device:

```
Device> enable
Device# configure terminal
Device(config)# interface Tunnel 1
Device(config-if)# ip address 10.1.1.1 255.255.255.0
Device(config-if)# tunnel source 10.0.0.1
Device(config-if)# tunnel destination 10.0.0.2
Device(config-if)# ip ospf 1 area 0
Device(config-if)# mpls ip
```

The following example shows the tunnel configuration on the PE2 device:

```
Device> enable
Device# configure terminal
Device(config)# interface Tunnel 1
Device(config-if)# ip address 10.1.1.2 255.255.255.0
Device(config-if)# tunnel source 10.0.0.2
Device(config-if)# tunnel destination 10.0.0.1
Device(config-if)# ip ospf 1 area 0
Device(config-if)# mpls ip
```

# Additional References for Configuring MPLS Layer 2 VPN over GRE

#### **Related Documents**

Related Topic	Document Title
Configuring VPLS	For more information, see Information About VPLS.
Configuring Ethernet-over-MPLS (EoMPLS) and Pseudowire Redundancy (PWR)	For more information, see How to Configure Ethernet-over-MPLS

# **Feature History for Configuring MPLS Layer 2 VPN over GRE**

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 Gibraltar 16.12.1	MPLS Layer 2 VPN over GRE	The MPLS Layer 2 VPN over GRE feature provides a mechanism for tunneling MPLS packets over non-MPLS networks.

Use the Cisco Feature Navigator to find information about platform and software image support. To access Cisco Feature Navigator, go to https://cfnng.cisco.com/

http://www.cisco.com/go/cfn.

Feature History for Configuring MPLS Layer 2 VPN over GRE