MPLS Multi-VRF (VRF-Lite)

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The MPLS Multi-VRF feature allows you to configure and maintain more than one instance of a routing and forwarding table within the same customer edge (CE) router.

Finding Feature Information

Your software release may not support all the features documented in this module. For the latest feature information and caveats, see 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 for MPLS Multi-VRF" section on page 17.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to http://www.cisco.com/go/cfn. An account on Cisco.com is not required.

Contents

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Prerequisites for MPLS Multi-VRF

The network's core and provider edge (PE) routers must be configured for the MPLS-VPN operation.

Restrictions for MPLS Multi-VRF

- You can configure the MPLS Multi-VRF feature only on Layer 3 interfaces.
- The MPLS Multi-VRF feature is not supported by Interior Gateway Routing Protocol (IGRP) or by Intermediate System-to-Intermediate System (IS-IS).
- Label distribution for a given VPN routing and forwarding (VRF) instance on a given router can be handled by either the Border Gateway Protocol (BGP) or the Label Distribution Protocol (LDP), but not by both the protocols at the same time.
- Multicast cannot operate on a Layer 3 interface that is configured with the MPLS Multi-VRF feature.
- Multicast cannot be configured at the same time on the same Layer 3 interface as the MPLS Multi-VRF feature.

Information About MPLS Multi-VRF

How the MPLS Multi-VRF Feature Works

The MPLS Multi-VRF feature enables a service provider to support two or more VPNs, where the IP addresses can overlap several VPNs. The MPLS Multi-VRF feature uses input interfaces to distinguish routes for different VPNs and forms virtual packet-forwarding tables by associating one or more Layer 3 interfaces with each VRF. Interfaces in a VRF can be either physical, such as Ethernet ports, or logical, such as VLAN switched virtual interfaces (SVIs), but a Layer 3 interface cannot belong to more than one VRF at any one time. The Multi-VRF feature allows an operator to support two or more routing domains on a CE router, with each routing domain having its own set of interfaces and its own set of routing and forwarding tables. The MPLS Multi-VRF feature allows the label switched paths (LSPs) to be extended to the CE and into each routing domain that the CE supports.

The MPLS Multi-VRF feature works as follows:

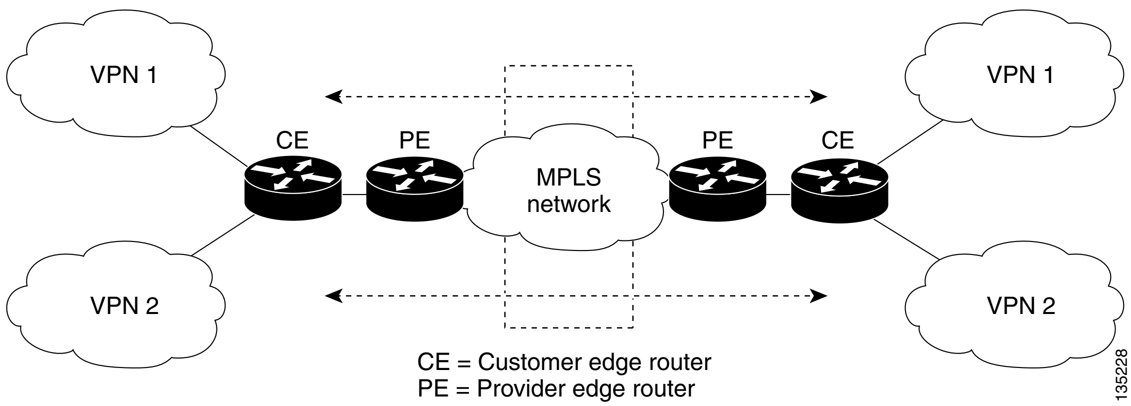
- Each CE router advertises its site's local routes to a PE router and learns the remote VPN routes from that PE router.
- PE routers exchange routing information with CE routers by using static routing or a routing protocol such as BGP, Routing Information Protocol (RIP)v1, or RIPv2.
- PE routers exchange MPLS label information with CE routers through LDP or BGP.
- The PE router needs to maintain VPN routes only for those VPNs to which it is directly attached, eliminating the requirement that the PE maintain all of the service provider's VPN routes. Each PE router maintains a VRF for each of its directly connected sites. Two or more interfaces on a PE router

can be associated with a single VRF if all sites participate in the same VPN. Each VPN is mapped to a specified VRF. After learning local VPN routes from CE routers, the PE router exchanges VPN routing information with other PE routers through internal BGP (iBGP).

With the MPLS Multi-VRF feature, two or more customers can share one CE router, and only one physical link is used between the CE and the PE routers. The shared CE router maintains separate VRF tables for each customer and routes packets for each customer based on that customer's own routing table. The MPLS Multi-VRF feature extends limited PE router functionality to a CE router, giving it the ability, through the maintenance of separate VRF tables, to extend the privacy and security of a VPN to the branch office.

Figure 1 shows a configuration where each CE router acts as if it were two CE routers. Because the MPLS Multi-VRF feature is a Layer 3 feature, each interface associated with a VRF must be a Layer 3 interface.

Figure 1 Each CE Router Acting as Several Virtual CE Routers



How Packets Are Forwarded in a Network Using the MPLS Multi-VRF Feature

Following is the packet-forwarding process in an MPLS Multi-VRF CE-enabled network, as illustrated in Figure 1:

- When the CE receives a packet from a VPN, it looks up the routing table based on the input interface. When a route is found, the CE imposes the MPLS label it received from the PE for that route and forwards the packet to the PE.
- When the ingress PE receives a packet from the CE, it swaps the incoming label with the corresponding label stack and sends it to the MPLS network.
- When an egress PE receives a packet from the network, it swaps the VPN label with the label it earlier had received for the route from the CE, and forwards it to the CE.
- When a CE receives a packet from an egress PE, it uses the incoming label on the packet to forward the packet to the correct VPN.

To configure Multi-VRF, create a VRF table and then specify the Layer 3 interface associated with that VRF. Next, configure the routing protocols within the VPN, and between the CE and the PE. BGP is the preferred routing protocol for distributing VPN routing information across the provider's backbone. See the "How to Configure MPLS Multi-VRF" section on page 4.

The Multi-VRF network has three major components:

- VPN route target communities: These are lists of all other members of a VPN community. You need to configure VPN route targets for each VPN community member.
- Multiprotocol BGP peering of VPN community PE routers: This propagates VRF reachability information to all members of a VPN community. You need to configure BGP peering in all PE routers within a VPN community.
- VPN forwarding: This transports all traffic between VPN community members across a VPN service-provider network.

Considerations for Configuring MPLS Multi-VRF

When BGP is used as the routing protocol, it can also be used for MPLS label exchange between the PE and CE routers. By contrast, if Open Shortest Path First (OSPF), Enhanced Interior Gateway Routing Protocol (EIGRP), RIP, or static routing is used, LDP must be used to signal labels.

To configure the MPLS Multi-VRF feature, create a VRF table, specify the Layer 3 interface associated with that VRF, and then configure the routing protocols within the VPN and between the CE and the PE routers.

Consider these points when configuring the MPLS Multi-VRF feature in your network:

- A router with the MPLS Multi-VRF feature is shared by several customers, and each customer has its own routing table.
- Because each customer uses a different VRF table, the same IP addresses can be reused. Overlapping IP addresses are allowed in different VPNs.
- The MPLS Multi-VRF feature lets several customers share the same physical link between the PE and CE routers. Trunk ports with several VLANs separate packets among the customers. Each customer has its own VLAN.
- For the PE router, there is no difference between using the MPLS Multi-VRF feature or using several CE routers. In Figure 2, for example, four virtual Layer 3 interfaces are connected to the MPLS Multi-VRF CE router.
- The MPLS Multi-VRF feature does not affect the packet switching rate.

How to Configure MPLS Multi-VRF

- Configuring VRFs, page 4 (required)
- Configuring BGP as the Routing Protocol, page 6 (required)
- Configuring PE-to-CE MPLS Forwarding and Signaling with BGP, page 8 (required)
- Configuring a Routing Protocol Other Than BGP, page 10 (required)
- Configuring PE-to-CE MPLS Forwarding and Signaling with LDP, page 11 (required)

Configuring VRFs

Perform the following task to configure VRFs on both the PE and CE routers:

If a VRF has not been configured, the router has the following default configuration:

- No VRFs have been defined.

- No import maps, export maps, or route maps have been defined.
- No VRF maximum routes exist.
- Only the global routing table exists on the interface.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ip routing**
4. **ip vrf** *vrf-name*
5. **rd** *route-distinguisher*
6. **route-target** {**export** | **import** | **both**} *route-target-ext-community*
7. **import map** *route-map*
8. **exit**
9. **interface** *type number*
10. **ip vrf forwarding** *vrf-name*
11. **end**
12. **show ip vrf**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**ip routing** **Example:** `Router(config)# ip routing`	Enables IP routing.
Step 4	**ip vrf** *vrf-name* **Example:** `Router(config)# ip vrf v1`	Names the VRF and enters VRF configuration mode.
Step 5	**rd** *route-distinguisher* **Example:** `Router(config-vrf)# rd 100:1`	Creates a VRF table by specifying a route distinguisher. • Enter either an autonomous system number and an arbitrary number (xxx:y), or an IP address and an arbitrary number (A.B.C.D:y).

	Command or Action	Purpose
Step 6	**route-target** {**export** | **import** | **both**} *route-target-ext-community* **Example:** `Router(config-vrf)# route-target export 100:1`	Creates a list of import, export, or import and export route target communities for the specified VRF. • Enter either an autonomous system number and an arbitrary number (xxx:y), or an IP address and an arbitrary number (A.B.C.D:y). **Note** This command works only if BGP is running.
Step 7	**import map** *route-map* **Example:** `Router(config-vrf)# import map importmap1`	(Optional) Associates a route map with the VRF.
Step 8	**exit** **Example:** `Router(config-vrf)# exit`	Returns to global configuration mode.
Step 9	**interface** *type-number* **Example:** `Router(config)# interface fastethernet3/0.10`	Specifies the Layer 3 interface to be associated with the VRF and enters interface configuration mode. • The interface can be a routed port or an SVI.
Step 10	**ip vrf forwarding** *vrf-name* **Example:** `Router(config-if)# ip vrf forwarding v1`	Associates the VRF with the Layer 3 interface.
Step 11	**end** **Example:** `Router(config-if)# end`	Exits interface configuration mode and returns to privileged EXEC mode.
Step 12	**show ip vrf** **Example:** `Router# show ip vrf`	Displays the settings of the VRFs.

Configuring BGP as the Routing Protocol

Most routing protocols can be used between the CE and the PE routers. However, external BGP (eBGP) is recommended, because:

- BGP does not require more than one algorithm to communicate with many CE routers.
- BGP is designed to pass routing information between systems run by different administrations.
- BGP facilitates passing attributes of the routes to the CE router.

When BGP is used as the routing protocol, it can also be used to handle the MPLS label exchange between the PE and CE routers. By contrast, if OSPF, EIGRP, RIP, or static routing is used, LDP must be used to signal labels.

To configure a BGP PE-to-CE routing session, perform the following task on the CE and PE routers.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **router bgp** *autonomous-system-number*
4. **network** *ip-address* **mask** *network-mask*
5. **redistribute ospf** *process-id* **match internal**
6. **network** *ip-address* **area** *area-id*
7. **address-family ipv4 vrf** *vrf-name*
8. **neighbor** {*ip-address* | *peer-group-name*} **remote-as** *as-number*
9. **neighbor** *address* **activate**

DETAILED STEPS

	Command	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**router bgp** *autonomous-system-number* **Example:** `Router(config)# router bgp 100`	Configures the BGP routing process with the autonomous system number passed to other BGP routers, and enters router configuration mode.
Step 4	**network** *ip-address* **mask** *network-mask* **Example:** `Router(config-router)# network 10.0.0.0 mask 255.255.255.0`	Specifies a network and mask to be announced using BGP.
Step 5	**redistribute ospf** *process-id* **match internal** **Example:** `Router(config-router)# redistribute ospf 2 match internal`	Sets the router to redistribute OSPF internal routes.
Step 6	**network** *ip-address* **area** *area-id* **Example:** `Router(config-router)# network 10.0.0.0 255.255.255.0 area 0`	Identifies the network address and mask on which OSPF is running, and the area ID of that network address.

	Command	Purpose
Step 7	**address-family ipv4 vrf** *vrf-name* **Example:** `Router(config-router)# address-family ipv4 vrf v12`	Identifies the name of the VRF instance that will be associated with the commands shown in Step 8 and Step 9, and enters VRF address family configuration mode.
Step 8	**neighbor** {*ip-address* | *peer-group-name*} **remote-as** *as-number* **Example:** `Router(config-router-af)# neighbor 10.0.0.3 remote-as 100`	Informs this router's BGP neighbor table of the neighbor's address (or peer group name) and the neighbor's autonomous system number.
Step 9	**neighbor** *address* **activate** **Example:** `Router(config-router-af)# neighbor 10.0.0.3 activate`	Activates the advertisement of the IPv4 address-family neighbors.

Configuring PE-to-CE MPLS Forwarding and Signaling with BGP

If BGP is used for routing between the PE and CE routers, configure BGP to signal the labels on the VRF interfaces of both the CE and PE routers. You must globally enable signaling at the router-configuration level and for each interface:

- To enable MPLS label signaling via BGP at the router-configuration level, use the **neighbor send-label** command.
- To enable MPLS forwarding on the interface used for the PE-to-CE eBGP session at the interface level, use the **mpls bgp forwarding** command.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **router bgp** *autonomous-system-number*
4. **address-family ipv4 vrf** *vrf-name*
5. **neighbor** {*ip-address* | *peer-group-name*} **remote-as** *as-number*
6. **neighbor** *address* **send-label** [**explicit-null**]
7. **neighbor** *address* **activate**
8. **end**
9. **configure terminal**
10. **interface** *type number*
11. **mpls bgp forwarding**

DETAILED STEPS

	Command	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**router bgp** *autonomous-system-number* **Example:** `Router(config)# router bgp 100`	Configures the BGP routing process with the autonomous system number passed to other BGP routers and enters router configuration mode.
Step 4	**address-family ipv4 vrf** *vrf-name* **Example:** `Router(config-router)# address-family ipv4 vrf v12`	Identifies the name of the VRF instance that will be associated with the next two commands and enters address family configuration mode.
Step 5	**neighbor** {*ip-address* | *peer-group-name*} **remote-as** *as-number* **Example:** `Router(config-router-af)# neighbor 10.0.0.3 remote-as 100`	Informs this router's BGP neighbor table of the neighbor's address (or peer group name) and the neighbor's autonomous system number.
Step 6	**neighbor** *address* **send-label** [**explicit-null**] **Example:** `Router(config-router-af)# neighbor 10.0.0.3 send-label`	Enables the router to use BGP to distribute MPLS labels along with the IPv4 routes to the peer routers. • If a BGP session is running when you issue this command, the BGP session flaps immediately after the command is issued.
Step 7	**neighbor** *address* **activate** **Example:** `Router(config-router-af)# neighbor 10.0.0.3 activate`	Activates the advertisement of the IPv4 address-family neighbors.
Step 8	**end** **Example:** `Router(config-router-af)# end`	Exits address family configuration mode and returns to privileged EXEC mode.
Step 9	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.

	Command	Purpose
Step 10	**interface** *type number* **Example:** `Router(config)# interface fastethernet3/0.10`	Enters interface configuration mode for the interface to be used for the BGP session. • The interface can be a routed port or an SVI.
Step 11	**mpls bgp forwarding** **Example:** `Router(config-if)# mpls bgp forwarding`	Enables MPLS forwarding on the interface.

Configuring a Routing Protocol Other Than BGP

The configuration task described below uses OSPF to configure a routing protocol, but you can use other protocols like RIP, EIGRP, or static routing.

If you use OSPF as the routing protocol between the PE and CE routers, enter the **capability vrf-lite** command in router configuration mode. See *OSPF Support for Multi-VRF in CE Routers* for more information.

Note:

- If OSPF, EIGRP, RIP, or static routing is used, LDP must be used to signal labels.
- The MPLS Multi-VRF feature is not supported by IGRP nor IS-IS.
- Multicast cannot be configured on the same Layer 3 interface as the MPLS Multi-VRF feature is configured.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **router ospf** *process-id* [**vrf** *vpn-name*]
4. **log-adjacency-changes**
5. **redistribute bgp** *autonomous-system-number* **subnets**
6. **network** *ip-address subnet-mask* **area** *area-id*
7. **end**
8. **show ip ospf**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**router ospf** *process-id* [**vrf** *vpn-name*] **Example:** `Router(config)# router ospf 100 vrf v1`	Enables OSPF routing, specifies a VRF table, and enters router configuration mode.
Step 4	**log-adjacency-changes** **Example:** `Router(config-router)# log-adjacency-changes`	(Optional) Logs changes in the adjacency state. • This is the default state.
Step 5	**redistribute bgp** *autonomous-system-number* **subnets** **Example:** `Router(config-router)# redistribute bgp 800 subnets`	Sets the router to redistribute information from the BGP network to the OSPF network.
Step 6	**network** *ip-address subnet-mask* **area** *area-id* **Example:** `Router(config-router)# network 10.0.0.0 255.255.255.0 area 0`	Indicates the network address and mask on which OSPF runs, and the area ID of that network address.

Step 7	**end**
	
	`Example:`
	`Router(config-router)# end`
		Exits router configuration mode and returns to privileged EXEC mode.

Step 8	**show ip ospf** **Example:** `Router# show ip ospf`	Displays information about the OSPF routing processes.

Configuring PE-to-CE MPLS Forwarding and Signaling with LDP

If OSPF, EIGRP, RIP, or static routing is used, LDP must be used to signal labels. Perform the following steps to configure PE-to-CE MPLS forwarding and signaling with LDP.

SUMMARY STEPS

1. **enable**

2. **configure terminal**
3. **interface** *type number*
4. **mpls ip**

DETAILED STEPS

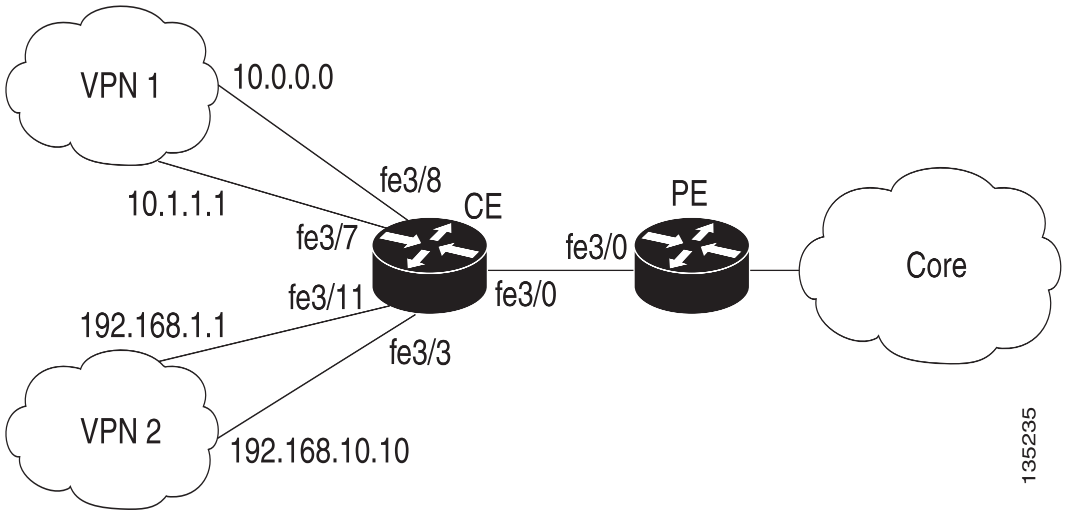
	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**interface** *type number* **Example:** `Router(config)# interface fastethernet3/0.10`	Enters subinterface configuration mode for the interface associated with the VRF. • The interface can be a routed port or an SVI.
Step 4	**mpls ip** **Example:** `Router(config-subif)# mpls ip`	Enables MPLS forwarding of IPv4 packets along normally routed paths for this interface.

Configuration Examples for MPLS Multi-VRF

- Example: Configuring MPLS Multi-VRF on the PE Router, page 13
- Example: Configuring MPLS Multi-VRF on the CE Router, page 14

Figure 2 shows an example MPLS Multi-VRF configuration.

Figure 2 MPLS Multi-VRF Configuration Example



Example: Configuring MPLS Multi-VRF on the PE Router

Configuring VRFs

```
configure terminal
ip vrf v1
 rd 100:1
 route-target export 100:1
 route-target import 100:1
 exit
ip vrf v2
 rd 100:2
 route-target export 100:2
 route-target import 100:2
 exit
```

Configuring PE-to-CE Connections Using BGP for Both Routing and Label Exchange

```
router bgp 100
 address-family ipv4 vrf v2
  neighbor 10.0.0.8 remote-as 800
  neighbor 10.0.0.8 send-label
  neighbor 10.0.0.8 activate
  exit
 address-family ipv4 vrf vl
  neighbor 10.0.0.8 remote-as 800
  neighbor 10.0.0.8 send-label
  neighbor 10.0.0.8 activate
      end
configure terminal
 interface fastethernet3/0.10
  ip vrf forwarding v1
  ip address 10.0.0.3 255.255.255.0
  mpls bgp forwarding
  exit
 interface fastethernet3/0.20
  ip vrf forwarding v2
  ip address 10.0.0.3 255.255.255.0
  mpls bgp forwarding
```

```
  exit
```

Configuring PE-to-CE Connections Using OSPF for Routing and LDP for Label Exchange

```
router ospf 100 vrf v1
 network 10.0.0.0 255.255.255.0 area 0
 exit
router ospf 101 vrf v2
 network 10.0.0.0 255.255.255.0 area 0
 exit
interface fastethernet3/0.10
 ip vrf forwarding v1
 ip address 10.0.0.3 255.255.255.0
 mpls ip
 exit
interface fastethernet3/0.20
 ip vrf forwarding v2
 ip address 10.0.0.3 255.255.255.0
 mpls ip
 exit
```

Example: Configuring MPLS Multi-VRF on the CE Router

Configuring VRFs

```
configure terminal
 ip routing
 ip vrf v11
  rd 800:1
  route-target export 800:1
  route-target import 800:1
  exit
 ip vrf v12
  rd 800:2
  route-target export 800:2
  route-target import 800:2
  exit
```

Configuring CE Router VPN Connections

```
interface fastethernet3/8
    ip vrf forwarding v11
    ip address 10.0.0.8 255.255.255.0
    exit
interface fastethernet3/11
    ip vrf forwarding v12
    ip address 10.0.0.8 255.255.255.0
    exit
  router ospf 1 vrf v11
     network 10.0.0.0 255.255.255.0 area 0
     network 10.0.0.0 255.255.255.0 area 0
     exit
  router ospf 2 vrf v12
     network 10.0.0.0 255.255.255.0 area 0
     network 10.0.0.0 255.255.255.0 area 0
     exit
```

Note If BGP is used for routing between the PE and CE routers, the BGP-learned routes from the PE router can be redistributed into OSPF using the commands in the following example.

```
  router ospf 1 vrf v11
```

```
   redistribute bgp 800 subnets
   exit
router ospf 2 vrf v12
   redistribute bgp 800 subnets
   exit
```

Configuring PE-to-CE Connections Using BGP for Both Routing and Label Exchange

```
router bgp 800
   address-family ipv4 vrf v12
      neighbor 10.0.0.3 remote-as 100
      neighbor 10.0.0.3 send-label
      neighbor 10.0.0.3 activate
       exit
   address-family ipv4 vrf v11
      neighbor 10.0.0.3 remote-as 100
      neighbor 10.0.0.3 send-label
      neighbor 10.0.0.3 activate
       end

    interface fastethernet3/0.10
        ip vrf forwarding v11
        ip address 10.0.0.8 255.255.255.0
        mpls bgp forwarding
        exit
    interface fastethernet3/0.20
        ip vrf forwarding v12
        ip address 10.0.0.8 255.255.255.0
        mpls bgp forwarding
    exit
```

Configuring PE-to-CE Connections Using OSPF for Routing and LDP for Label Exchange

```
 router ospf 1 vrf v11
    network 10.0.0.0 255.255.255.0 area 0
    exit
 router ospf 2 vrf v12
network 10.0.0.0 255.255.255.0 area 0
exit

 interface fastethernet3/0.10
     ip vrf forwarding v11
     ip address 10.0.0.3 255.255.255.0
     mpls ip
     exit
 interface fastethernet3/0.20
     ip vrf forwarding v12
     ip address 10.0.0.3 255.255.255.0
     mpls ip
     exit
```

Additional References

Related Documents

Related Topic	Document Title
Cisco IOS commands	*Cisco IOS Master Commands List, All Releases*
Cisco IOS MPLS commands	*Cisco IOS Multiprotocol Label Switching Command Reference*
OSPF with Multi-VRF	*OSPF Support for Multi-VRF in CE Routers*

Standards

Standard	Title
No new or modified standards are supported, and support for existing standards has not been modified.	—

MIBs

MIB	MIBs Link
None	To locate and download MIBs for selected platforms, Cisco software releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

RFCs

RFC	Title
None	—

Technical Assistance

Description	Link
The Cisco Support and Documentation website provides online resources to download documentation, software, and tools. Use these resources to install and configure the software and to troubleshoot and resolve technical issues with Cisco products and technologies. Access to most tools on the Cisco Support and Documentation website requires a Cisco.com user ID and password.	http://www.cisco.com/cisco/web/support/index.html

Feature Information for MPLS Multi-VRF

Table 1 lists the release history for this feature.

Use Cisco Feature Navigator to find information about platform support and software image support. Cisco Feature Navigator enables you to determine which software images support a specific software release, feature set, or platform. To access Cisco Feature Navigator, go to http://www.cisco.com/go/cfn.

Note Table 1 lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

Table 1 Feature Information for MPLS Multi-VRF

Feature Name	Releases	Feature Information
MPLS Multi-VRF	12.1(11)EA1 12.1(20)EW 12.2(4)T 12.2(8)YN 12.2(18)SXD 12.2(25)EWA 12.2(28)SB	The MPLS Multi-VRF feature allows you to configure and maintain more than one instance of a routing and forwarding table within the same CE router. In Cisco IOS Release 12.1(11)EA1, the Multi-VRF feature was introduced. The feature was integrated into Cisco IOS Release 12.1(20)EW. The feature was integrated into Cisco IOS Release 12.2(4)T. The feature was integrated into Cisco IOS Release 12.2(8)YN. The feature was integrated into Cisco IOS Release 12.2(18)SXD. The feature was integrated into Cisco IOS Release 12.2(25)EWA. Multiprotocol Label Switching support was added in Cisco IOS Release 12.2(28)SB.