



CHAPTER 27

Provisioning Regular PE-CE Links

This chapter describes how to configure MPLS VPN PE-CE links in the Prime Fulfillment provisioning process.

MPLS VPN PE-CE Link Overview

To provision an MPLS VPN service in Prime Fulfillment, you must first create an MPLS VPN Service Policy. In Prime Fulfillment, a Service Policy is a set of default configurations for creating and deploying a service request.

Prime Fulfillment supports two MPLS VPN Service Policy Types: Regular PE-CE and MVRFCE PE-CE. The following scenarios focus on the Regular PE-CE Policy Type.

The Regular PE-CE Policy Type is a normal PE to CE link between two devices. This Policy Type has two options:

- CE Present *enabled* (One PE with one CE; two devices)
- CE Present *disabled* (PE Only with no CE; one device)

Figure 27-1 shows an example of a normal PE to CE link between two devices.

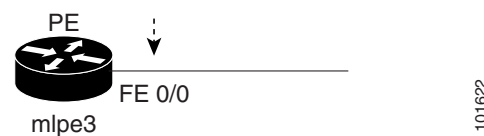
Figure 27-1 PE to CE link with CE Present



In a PE to CE link with CE Present enabled, interfaces S3/1 and S1/0 are configured as an MPLS VPN link in the service request process.

Figure 27-2 shows an example of a PE Only link with no CE.

Figure 27-2 PE to CE link with No CE

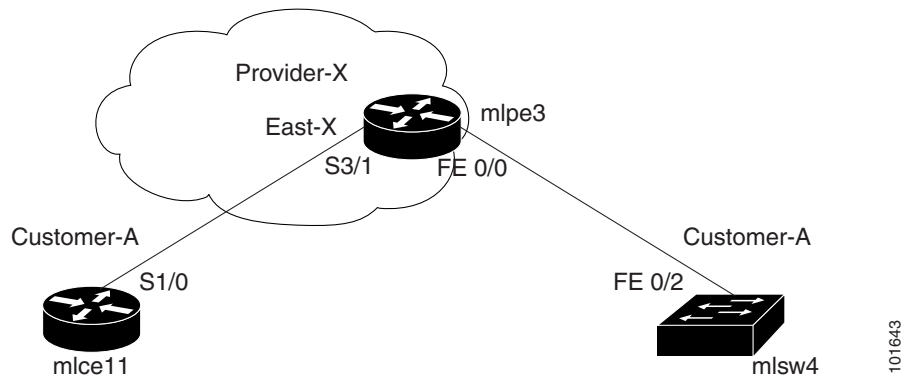


In a PE to CE link with CE Present disabled, interface FE0/0 is configured as an MPLS VPN link in the service request process.

Network Topology

Figure 27-3 shows an overview of the network topology in which the MPLS VPN PE-CE links are created.

Figure 27-3 Network Topology for MPLS VPN PE-CE Scenarios.



The network topology in Figure 27-3 illustrates the lab environment of a service provider (Provider-X) and one customer (Cust-A). There is one Region (East-X) and one PE (mlpe3.cisco.com). Each customer device (one CE and one CLE) represents a Site (mlce11-Site and mlsw4-Site).

Prerequisite Tasks

Before you can create a Service Policy in Prime Fulfillment, you must complete the following Service Inventory tasks:

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- Step 1** Set up a Customer with a Site (see [Chapter 21, “Creating Customers, Sites, and CPEs”](#)).
 - Step 2** Set up a Provider with a Region (see [Chapter 21, “Creating Providers, Regions, and PEs”](#)).
 - Step 3** Import, create, or discover Devices (see [Chapter 21, “Creating Devices”](#)).
 - Step 4** Create CPE and PE (see [Chapter 21, “Creating CPEs”](#)).
 - Step 5** Collect Configurations (see [Chapter 21, “Collecting Configurations”](#)).
 - Step 6** Create Resource Pools (see [Chapter 21, “Creating Resource Pools”](#)).
 - Step 7** Create Route Target(s) (see [Chapter 21, “Creating Route Target\(s\)”](#)).
 - Step 8** Define a MPLS VPN (see [Chapter 21, “Creating an MPLS VPN”](#)).
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Defining a VPN for the PE-CE Link

During service deployment, Prime Fulfillment generates the Cisco IOS commands to configure the logical VPN relationships. At the beginning of the provisioning process, before creating a Service Policy, a VPN must be defined within Prime Fulfillment.

To define a VPN, perform the following steps.

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- Step 1** Choose **Inventory > Logical Inventory > VPNs**.
The VPNs window appears.
- Step 2** Click **Create** to create a VPN.
The Create New VPN window appears.
- Step 3** In the Name field, enter the VPN name.
It is recommended not to use special characters (' ` " < > () [] { } / \ & ^ ! ? ~ * % = , . + |) in the VPN name, as this may cause misconfiguration of the VRF name for certain devices, if the VPN name is used to autogenerate a VRF name.
- Step 4** In the Customer field, click **Select**.
The Select Customer window appears.
- Step 5** Check to choose a Customer and click **Select**.
The VPNs window reappears where the new VPN Name is associated with a Customer in this new VPN definition.
- Step 6** Click **Save**.
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Note You can also set VRF and VPN attributes via a previously defined independent VRF object. For more information on this feature, see [Chapter 22, “Independent VRF Management.”](#)



Note For more information on setting the VRF and VPN attributes in MPLS VPN service requests, see [Chapter 25, “Defining VRF and VPN Attributes in an MPLS Service Request”](#).

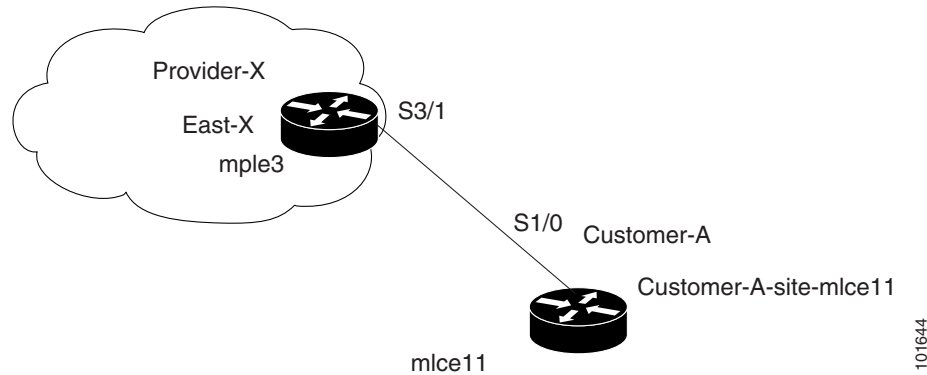
Creating MPLS VPN PE-CE Service Policies

This section contains the following sections:

- [PE-CE Service Policy Overview, page 27-3](#)
- [Creating a PE-CE Service Policy, page 27-4](#)
- [Creating a PE-NoCE Service Policy, page 27-6](#)

PE-CE Service Policy Overview

[Figure 27-4](#) shows an example of the PE-CE link that is defined in the PE-CE Service Policy scenario.

Figure 27-4 PE-CE Topology

Creating a PE-CE Service Policy

To create a PE-CE service policy, perform the following steps.

- Step 1** Choose **Service Design > Policies > MPLS**.
The MPLS window appears as shown in [Figure 27-5](#).

Figure 27-5 MPLS Policy Editor - Policy Type

- Step 2** Edit the following attributes:
- **Policy Name:** Enter the policy name.
 - **Policy Owner:** Choose the Policy Owner.
 - **Customer:**
 - Click **Select** to specify a Customer.
The Customer for MPLS Policy window appears.
 - Check to choose a Customer and click **Select**.
 - **Policy Type:** Choose the Policy Type. (**Regular PE-CE**)
- Step 3** **CE Present:** Check to set CE as present.

Step 4 Click **Next**.

The MPLS Policy Editor - Interface window appears, as shown in [Figure 27-6](#).

Figure 27-6 *The MPLS Policy Editor - Interface*

**Step 5** Click **Next** to accept the defaults.

The MPLS Policy Editor - IP Address Scheme window appears.



Note Make sure the Editable check boxes are checked, so you can edit these attributes in the service request process.

Step 6 Edit all applicable attributes.

Note If you check **Automatically Assign IP Address**, the screen refreshes and adds a forth attribute: **IP Address Pool**.

Step 7 Click **Next**.

The MPLS Policy Editor - Routing Information window appears.

Step 8 Click **Next** to accept the defaults.

The MPLS Policy Editor - VRF and VPN Membership window appears.



Note For information about protocol types, see [Chapter 24, “Specifying the Routing Protocol for a Service”](#).



Note If you want to set the VRF and VPN attributes via a previously defined VRF object, check the **Use VRF Object** check box. For more information on this feature, see [Chapter 22, “Independent VRF Management.”](#) That chapter describes how to use independent VRF objects in MPLS VPN service policies and service requests.

Step 9 To enable template association for the policy, click the **Next** button in MPLS Policy Editor - VRF and VPN Membership window.

The Template Association window appears. In this window, you can enable template support and, optionally, associate templates and data files with the policy. For instructions about associating templates with policies and how to use the features in this window, see [Chapter 49, “Using Templates and Data Files with Policies and Service Requests”](#). When you have completed setting up templates and data files for the policy per the instructions in the appendix, click **Finish** in the Template Association window to close it.

The Policies window appears.

Step 10 If you did not enable templates, click **Finish** in the MPLS Policy Editor – VRF and VPN window.

The Policies window reappears.

The MPLS VPN PE-CE Service Policy is complete.

Creating a PE-NoCE Service Policy

To create a PE-NoCE service policy, perform the following steps.

Step 1 Choose **Service Design > Policies > MPLS**.

The MPLS Policy Editor - Policy Type window appears.

Step 2 Edit the following attributes:

- **Policy Name:** Enter the policy name.
- **Policy Owner:** Choose the Policy Owner.
- **Customer:**
 - Click **Select** to specify a Customer.

The Customer for MPLS Policy window appears.

 - Choose a Customer and click **Select**.
- **Policy Type:** Choose the Policy Type. (**Regular PE-CE**)
- **CE Present:** Do *not* check to set CE as **not** present (**NoCE**).

Step 3 Click **Next**.

The MPLS Policy Editor - Interface window appears.

Step 4 Click **Next** to accept the defaults.

The MPLS Policy Editor - IP Address Scheme window appears.



Note Make sure the Editable check boxes are checked, so you can edit these attributes in the service request process.

The field values displayed in this dialog box reflect the values specified in the service policy associated with this service.

For details on the IP address scheme fields, see [Chapter 24, “Specifying the IP Address Scheme”](#).

Step 5 Edit all applicable attributes.

Note If you check **Automatically Assign IP Address**, the screen refreshes and adds a forth attribute: **IP Address Pool**.

Step 6 Click **Next**.

The MPLS Policy Editor - Routing Information window appears.

Step 7 Click **Next** to accept the defaults.

The MPLS Policy Editor - VRF and VPN Membership window appears.



Note For information about protocol types, see [Chapter 24, “Specifying the Routing Protocol for a Service”](#).



Note If you want to set the VRF and VPN attributes via a previously defined VRF object, check the **Use VRF Object** check box. For more information on this feature, see [Chapter 22, “Independent VRF Management.”](#) That chapter describes how to use independent VRF objects in MPLS VPN service policies and service requests.

Step 8 To enable template association for the policy, click the **Next** button in MPLS Policy Editor - VRF and VPN Membership window.

The Template Association window appears. In this window, you can enable template support and, optionally, associate templates and data files with the policy. For instructions about associating templates with policies and how to use the features in this window, see [Chapter 49, “Using Templates and Data Files with Policies and Service Requests”](#) When you have completed setting up templates and data files for the policy per the instructions in the appendix, click **Finish** in the Template Association window to close it.

The Policies window appears.

Step 9 If you did not enable templates, click **Finish** in the MPLS Policy Editor – VRF and VPN window.

The Policies window reappears.

The MPLS VPN PE-NoCE Service Policy is complete.

Creating MPLS VPN PE-CE Service Requests

This section contains the following sections:

- [Creating PE-CE Service Requests, page 27-8](#)
- [Creating PE-NoCE Service Requests, page 27-11](#)

Creating PE-CE Service Requests

To create a PE-CE service request, perform the following steps.

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- Step 1** Choose **Operate > Service Requests > MPLS**.
The MPLS Policy Selection window appears.
- Step 2** Choose an MPLS PE-CE type policy.
- Step 3** Click **OK**.
The MPLS Service Request Editor window appears.
- Step 4** Click **Add Link**.
The MPLS Service Request Editor window appears.
- Step 5** Click **Select CE**.
The CPE for MPLS VPN Link window appears.
- Step 6** Choose a CPE device and click **Select**.
The MPLS Service Request Editor window appears.
- Step 7** Choose a CE Interface from the drop-down list.
The MPLS Service Request Editor window appears.
- Step 8** Click **Select PE**.
The PE for MPLS VPN Link window appears.
- Step 9** Choose a PE device and click **Select**.
The MPLS Service Request Editor window appears.
- Step 10** Choose a PE Interface from the drop-down list.
The MPLS Service Request Editor window appears.
- Step 11** Click **Select PE**.
The PE for MPLS VPN Link window reappears.
- Step 12** In the Link Attribute cell, click **Add**.
The MPLS Link Attribute Editor - Interface window appears, as shown in [Figure 27-7](#).

Figure 27-7 *MPLS Link Attribute Editor - Interface*



PE Information

- Step 13** **Interface Name:** Enter a value to identify the interface.
- Step 14** **Interface Description:** Optionally, you can enter a description of the PE interface.
- Step 15** **Shutdown Interface:** When you check this check box, the PE interface is configured in a shutdown state.
- Step 16** **Encapsulation:** Choose the PE Encapsulation from the drop-down list.
The selections available in the drop-down list are determined by the interface type.
- Step 17** **VLAN ID:** Enter the VLAN ID. The VLAN ID is shared between the PE and CE, so there is one VLAN ID for both.
- Step 18** **Auto-Pick VLAN ID:** Check this check box if you would like Prime Fulfillment to autopick a VLAN ID from the VLAN pool.
If this box is checked, the VLAN ID field is not visible in the GUI.
- Step 19** **Second VLAN ID:** The Second VLAN ID is an optional attribute that provides a method to match the Q-in-Q second VLAN tag of incoming frames on the PE interface.
For usage details about this attribute, see [Chapter 25, “Notes on the VLAN ID and Second VLAN ID Attributes”](#).
- Step 20** **Use SVI:** Check this box to have Prime Fulfillment terminate VRF on SVI.

CE Information

- Step 21** **Interface Name:** Enter a value from to identify the interface.
- Step 22** **Interface Description:** Optionally, you can enter a description of the PE interface.
- Step 23** **Encapsulation:** Choose the CE Encapsulation from the drop-down list.

The selections available in the drop-down list are determined by the interface type.

Step 24 Click **Next**.

The MPLS Link Attribute Editor - IP Address Scheme window appears.

Step 25 Accept the defaults and click **Next**.

The MPLS Link Attribute Editor - Routing Information window appears, as shown in [Figure 27-8](#).

Figure 27-8 *MPLS Link Attribute Editor - Routing Information*



Note For information about protocol types, see [Chapter 24, “Specifying the Routing Protocol for a Service”](#).

Step 26 Choose a Next Hop Option:

- USE_OUT_GOING_INTF_NAME
- USE_NEXT_HOP_IPADDR
- OUTGOING_INTF_NAME+NEXT_HOP_IPADDR



Note If this interface is dual stacked (IPv4 and IPv6), you will be prompted to enter the routing information for both IPv4 and IPv6 independently. The fields in the IPv6 Routing Information window are slightly different from the IPv4 version. For information on setting up the routing information for IPv6, see [Chapter 25, “Setting Static Routing Protocol Attributes \(for IPv4 and IPv6\)”](#).

Step 27 To continue, click **Next**.

The MPLS Link Attribute Editor - VRF and VPN window appears.



Note If you want to set the VRF and VPN attributes via a previously defined VRF object, check the **Use VRF Object** check box. For more information on this feature, see [Chapter 22, “Independent VRF Management.”](#) That chapter describes how to use independent VRF objects in MPLS VPN service policies and service requests.

**Note**

For more information on setting the VRF and VPN attributes in MPLS VPN service requests, see [Chapter 25, “Defining VRF and VPN Attributes in an MPLS Service Request”](#).

Step 28 Click **Add** to join a VPN.

The Select CERCs window appears.

Step 29 Choose a Customer from the drop-down list.

Step 30 Choose a VPN from the drop-down list.

Step 31 Check to choose a VPN from the list.

Step 32 Click **Join As Hub** or **Join As Spoke**.

Step 33 Click **Done**.

The MPLS Link Attribute Editor - VRF and VPN window reappears.

Step 34 Click the **Next** button to associate templates or data files to the service request.

**Note**

This step assumes the policy on which the service request is based has template association enabled. If not, there will be no **Next** button visible in the GUI. In that case, click **Finish** and return to the MPLS Service Request Editor window and proceed with Step 37, below.

The MPLS Link Attribute Editor - Template Association window appears. In this window, you can associate templates and data files with a device by clicking the **Add** button in Template/Data File column for the device. When you click the **Add** button, the Add/Remove Templates window appears. For instructions about associating templates with service requests and how to use the features in this window, see [Chapter 49, “Using Templates and Data Files with Policies and Service Requests”](#)

Step 35 When you have completed setting up templates and data files for any device(s), click **Finish** in the Template Association window to close it and return to the MPLS Service Request Editor window.

You can define multiple links in this service request, following the instructions outlined in previous steps.

Step 36 To save your work, click **Save**.

The MPLS Service Requests window reappears showing that the MPLS VPN PE-CE service request is in the Requested state and ready to deploy.

Creating PE-NoCE Service Requests

To create a PE-NoCE service request, perform the following steps.

Step 1 Choose **Operate > Service Requests > MPLS**.

Step 2 Choose an MPLS PE-NoCE type policy.

Step 3 Click **OK**.

The MPLS Service Request Editor window appears.

Step 4 Click **Add Link**.

- The MPLS Service Request Editor window appears.
- Step 5** Click **Select PE**.
The PE for MPLS VPN Link window appears.
- Step 6** Choose a PE device and click **Select**.
The MPLS Service Request Editor window appears.
- Step 7** Choose the PE Interface from the drop-down list.
The MPLS Service Request Editor window appears.
- Step 8** In the Link Attribute cell, Click **Add**.
The MPLS Link Attribute Editor - Interface window appears, as shown in [Figure 27-9](#).

Figure 27-9 *MPLS Link Attribute Editor - Interface*



- Step 9** **Interface Name:** Enter a value to identify the interface.
- Step 10** **Interface Description:** Optionally, you can enter a description of the PE interface.
- Step 11** **Shutdown Interface:** When you check this check box, the PE interface is configured in a shutdown state.
- Step 12** **PE Encapsulation:** Choose the PE Encapsulation from the drop-down list.
The selections available in the drop-down list are determined by the interface type. This field is needed for deciding PE/UNI encapsulation.
- Step 13** **VLAN ID:** Enter the VLAN ID. The VLAN ID is shared between the PE and CE, so there is one VLAN ID for both.
- Step 14** **Auto-Pick VLAN ID:** Check this check box if you would like Prime Fulfillment to autopick a VLAN ID from the VLAN pool.
If this box is checked, the VLAN ID field is not visible in the GUI.
- Step 15** **Second VLAN ID:** The Second VLAN ID is an optional attribute that provides a method to match the Q-in-Q second VLAN tag of incoming frames on the PE interface.

For usage details about this attribute, see [Chapter 25, “Notes on the VLAN ID and Second VLAN ID Attributes”](#).

Step 16 Use SVI: Check this box to have Prime Fulfillment terminate VRF on SVI.

Step 17 Standard UNI Port: Check this box to access additional UNI security parameters.

Step 18 Click **Next**.

The MPLS Link Attribute Editor - IP Address Scheme window appears.

Step 19 Accept the defaults and click **Next**.



Note If this interface is dual stacked (IPv4 and IPv6), you will be prompted to enter the routing information for both IPv4 and IPv6 independently.

The MPLS Link Attribute Editor - Routing Information window appears.

Step 20 Set attributes for the routing information as needed for your configuration.



Note For information about protocol types, see [Chapter 24, “Specifying the Routing Protocol for a Service”](#).

Step 21 Click **Next**.

The MPLS Link Attribute Editor - VRF and VPN window appears.



Note If you want to set the VRF and VPN attributes via a previously defined VRF object, check the **Use VRF Object** check box. For more information on this feature, see [Chapter 22, “Independent VRF Management.”](#) That chapter describes how to use independent VRF objects in MPLS VPN service policies and service requests.



Note For more information on setting the VRF and VPN attributes in MPLS VPN service requests, see [Chapter 25, “Defining VRF and VPN Attributes in an MPLS Service Request”](#).

Step 22 Click **Add** to join the VPN.

The Join VPN dialog box appears.

Step 23 Check to choose the VPN.

Step 24 Click Join as Hub or Join as Spoke.

Step 25 Click **Done**.

The MPLS Service Request Editor window reappears.

Step 26 Click the **Next** button to associate templates or data files to the service request.



Note This step assumes the policy on which the service request is based has template association enabled. If not, there will be no **Next** button visible in the GUI. In that case, click **Finish** and return to the MPLS Service Request Editor window and proceed with Step 30, below.

The MPLS Link Attribute Editor - Template Association window appears. In this window, you can associate templates and data files with a device by clicking the **Add** button in Template/Data File column for the device. When you click the **Add** button, the Add/Remove Templates window appears. For instructions about associating templates with service requests and how to use the features in this window, see [Chapter 49, “Using Templates and Data Files with Policies and Service Requests”](#)

Step 27 When you have completed setting up templates and data files for any device(s), click **Finish** in the Template Association window to close it and return to the MPLS Service Request Editor window.

You can define multiple links in this service request, following the instructions outlined in previous steps.

Step 28 To save your work, click **Save**.

The MPLS Service Requests window reappears showing that the MPLS VPN PE-NoCE Service Request is in the Requested state and ready to deploy.
