Provisioning an Unmanaged Multi-VRF CE

This chapter describes how to implement a new, Unmanaged Multi-VRF (MVRF) CE with all the required infrastructure data, define an MVRFCE PE-CE Service Policy, and create an MVRFCE PE-CE Service Request, using the Cisco IP Solution Center (ISC).

This chapter contains the following major sections:

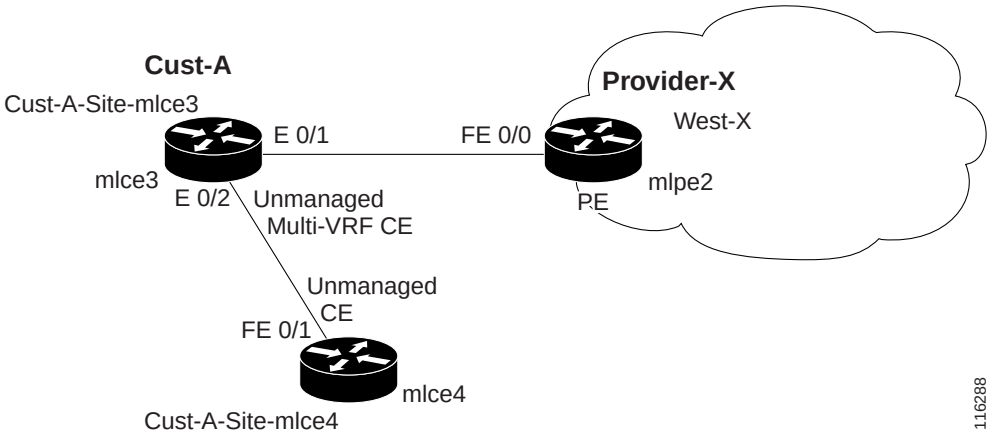
Unmanaged MVRFCE Overview

The unmanaged MVRFCE feature is similar to the unmanaged CE feature in so far as the service provider does not use ISC to upload or download configurations to the CPE. This feature is similar to the managed MVRFCE feature in so far as ISC creates a link with three devices: a PE, an MVRFCE, and a CE.

In the unmanaged scenarios, the customer configures the CPE manually. To automate the process of configuring the unmanaged MVRFCE, the service provider can use ISC to generate the configuration and then send it to the customer for manual implementation.

Figure 2-1 shows an overview of a network topology with MPLS VPN MVRFCE PE-CE links.

Figure 2-1 Unmanaged MVRFCE PE-CE Network Topology



The network topology in Figure 2-1 shows a service provider (**Provider-X**) and a customer (**Cust-A**). The Provider contains one Region (**West-X**) and one PE (**mlpe2**). The Customer contains an MVRFCE (**mlce3**) and a CE (**mlce4**). Both of these CPEs are unmanaged.

This section contains the following sections:

Process Overview

To configure MPLS VPN services with ISC, you must understand three key concepts:

Network Inventory

The purpose of preparing network inventory in ISC is to populate the Repository with infrastructure data. If multiple devices are involved, you can use Inventory Manager for importing devices and creating PE or CPE. Otherwise, you can use Inventory and Connection Manager to create the devices and infrastructure data.

To create an MPLS VPN Service Request, you must create the following infrastructure data:

- Devices

  A Device in ISC is a logical representation of a physical device in the network. You can import devices (configurations) into ISC by using Inventory Manager or the ISC GUI. You can also use the Auto Discovery feature of Inventory Manager to import devices into the Repository.

- Customers

  A customer is typically an enterprise or large corporation that receives network services from a service provider. A Customer is also a key logical component of ISC.

  - Sites

    A Site is a logical component of ISC that connects a Customer with a CE. It can also represent a physical customer site.

  - CPE/CE Devices

    A CPE is “customer premises equipment,” typically a customer edge router (CE). It is also a logical component of ISC. You can create CPE in ISC by associating a device with a Customer Site.

- Providers

  A provider is typically a “service provider” or large corporation that provides network services to a customer. A Provider is also a key logical component of ISC.

  - Regions

    A Region is a logical component of ISC that connects a Provider with a PE. It can also represent a physical provider region.

  - PE Devices

    A PE is a provider edge router or switch. It is also a logical component of ISC. You can create PE in ISC by associating a Device with a Provider Region. In ISC, a PE can be a “point of presence” router (POP) or a Layer 2 switch (CLE).

- Access Domains (for Layer 2 Access)

  The Layer 2 Ethernet switching domain that connects a PE to a CE is called an Access Domain. All the switches attached to the PE-POP belong to this Access Domain. These switches belong to the Provider and are defined in ISC as PE-CLE.

- Resource Pools
  - IP Addresses
  - Multicast
  - Route Distinguisher
  - Route Target
  - VLANs (for Layer 2 Access)
- CE Routing Communities (CERC is optional)
- VPN

  Before creating a Service Policy, a VPN name must be defined within ISC.

Service Policy

To create an MVRFCE PE-CE Service Policy, you must set up the following items:

1. Policy Type
2. PE-MVRFCE Interface
3. MVRFCE-CE Interface
4. PE-MVRFCE IP Address Scheme
5. MVRFCE-CE IP Address Scheme
6. PE-MVRFCE Routing Information
7. MVRFCE-CE Routing Information

8. VRF and VPN Membership

Service Request

To create an MVRFCE PE-CE Service Request, you must complete the following items:

1. PE-MVRFCE Interface
2. MVRFCE-CE Interface
3. PE-MVRFCE IP Address Scheme
4. MVRFCE-CE IP Address Scheme
5. PE-MVRFCE Routing Information
6. MVRFCE-CE Routing Information
7. VRF and VPN Membership

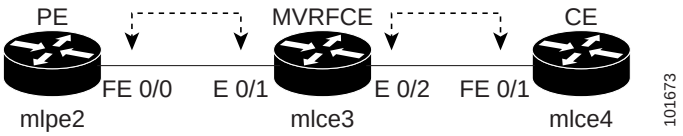
MVRFCE PE-CE Policy Type

An MVRFCE PE-CE Policy Type is a PE to CE link with three devices:

- PE
- MVRF CE
- CE

Figure 2-2 shows an example of an MVRFCE PE-CE link with three devices.

Figure 2-2 MVRFCE PE-CE Link



In an MVRFCE PE-CE Service Policy with CE Present enabled, interfaces FE 0/0, E 0/1, E 0/2 and FE 0/1 are configured as an MPLS VPN link in the Service Request process.

Infrastructure Data

In this MVRFCE PE-CE scenario, the following infrastructure data is used:

- Provider: **Provider-X**
- Region: **West-X**
- AS#: **99**
- PE: **mlpe2**
- Device Role: **PE POP**
- Customer: **Cust-A**
- Site: **Cust-A-Site- mlce3**
- CE: **mlce3**

- Site: **Cust-A-Site- mlce4**
- CE: **mlce4**
- Device Role: **CPE**
- IP Address Pool:
  - Name: **Provider-X-West-X**
  - Type: **Region**
  - Start: **25.7.0.0**
  - Mask: **30**
  - Size: **16384**
- Route Distinguisher Pool:
  - Name: **99:PROVIDER-X**
  - Start: **50000**
  - Size: **10000**
- Route Target Pool:
  - Name: **99:PROVIDER-X**
  - Start: **50000**
  - Size: **10000**
- VPN
  - Definition: **west-xVPN**

Adding a New Customer CPE

This section describes how to create a new CPE with an Unmanaged Multi-VRF management Type using the Cisco IP Solution Center (ISC) GUI. It contains the following sections:

- Overview of an ISC Customer, page 2-5
- Creating a Device, page 2-6
- Creating a Customer, Site, and CPE, page 2-11

Overview of an ISC Customer

In ISC, a Customer is defined by the following three logical components:

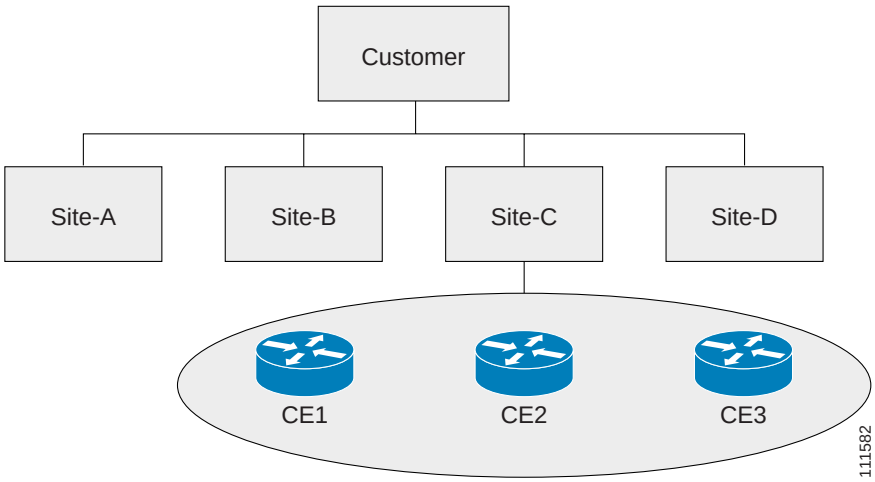
- Customer Name
- Customer Site
- Customer Device (CPE)

In ISC, a Customer is a logical container for Sites and CEs.

Within a Customer, there can be one or more Sites. Sites are logical entities that can be defined in any way that makes sense to a service provider.

Figure 2-3 shows an overview of an ISC Customer.

Figure 2-3 Overview of an ISC Customer



Creating a Device

This section describes how to create a Device with the ISC GUI, connect to a Cisco IOS router in the network, collect the live configuration, and populate the Repository. This section contains the following sections:

- Create a Device, page 2-6
- Collect the Configuration, page 2-8
- Monitor Task Logs, page 2-10

Create a Device

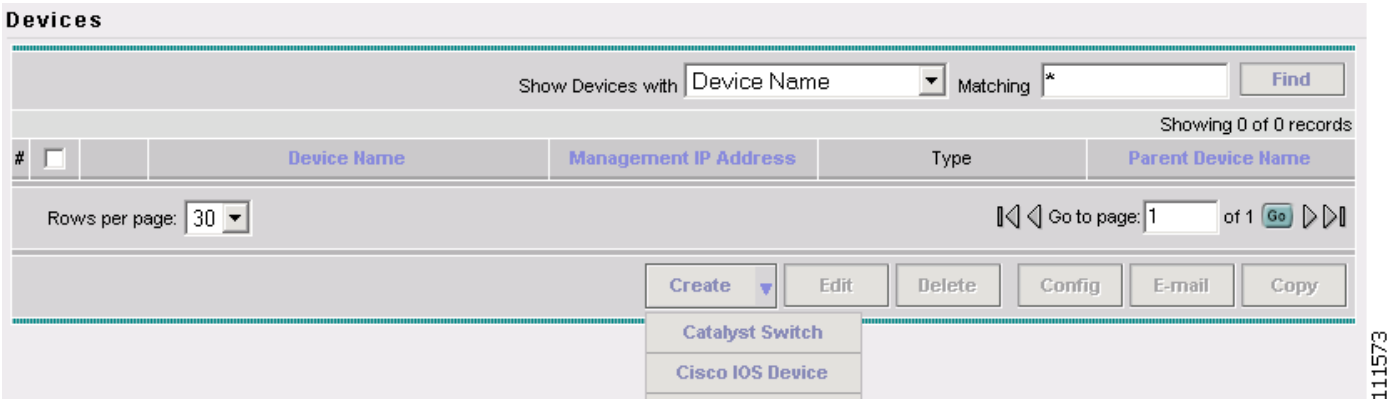
This section describes how to create a logical Device with the ISC GUI. To create a Device with the ISC GUI, follow these steps:

Step 1 Log into ISC.

Step 2 Select **Service Inventory > Inventory and Connection Manager > Devices.**

The **Devices** window appears, as shown in Figure 2-4.

Figure 2-4 Devices



Step 3 Click **Create**.

Step 4 Select **Cisco IOS Device**.

The **Create Cisco IOS Device** window appears (not shown).

Step 5 Enter the following information:

- General
  - *Device Host Name* (**mlce3**)
  - *Management IP Address* (**172.29.146.26**)
- Login and Password Information
  - *Login Password* (*******)
  - *Verify Login Password* (*******)
  - *Enable Password* (*******)
  - *Verify Enable Password* (*******)
- Device and Configuration Access Information
  - Terminal Session Protocol: **Default (Telnet)**
  - Config Access Protocol: **Default (Terminal)**
  - SNMP Version: **Default (SNMP v1/v2c)**
- SNMP v1/v2c
  - *Community String RO* (**Public**)
  - *Community String RW* (**Private**)

Step 6 Click **Save**.

Note You have saved a Device in the Repository.

Collect the Configuration

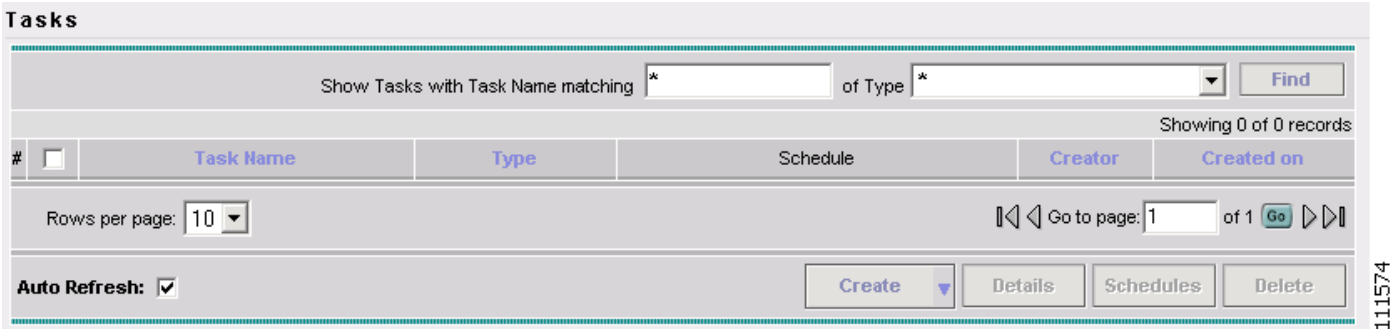
This section describes how to connect to the physical device in the network, collect the device information from the router, and populate the Repository.

To collect the configuration, follow these steps:

Step 1 Select **Monitoring > Task Manager**.

The **Tasks** window appears, as shown in Figure 2-5.

Figure 2-5 Tasks



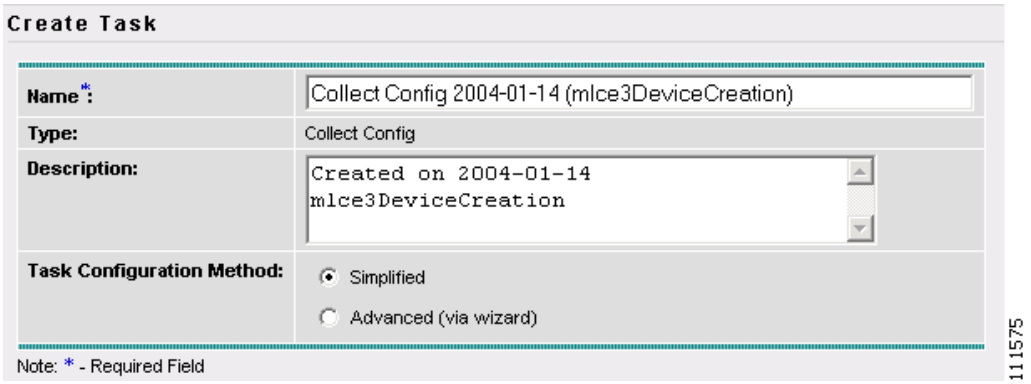
Step 2 Click **Create**.

Step 3 Select **Collect Config** (not shown).

The **Create Task** window appears, as shown in Figure 2-6.

Note You might want to change the default **Name** and **Description** for this task, so you can more easily identify it in the task log. For example, by adding: **mlce3DeviceCreation**.

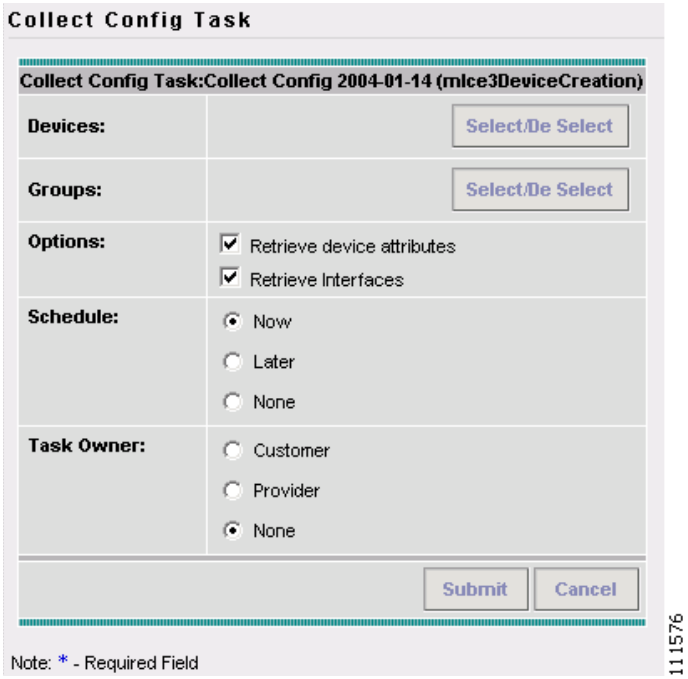
Figure 2-6 Create Task



Step 4 Click **Next** (not shown).

The **Collect Config Task** window appears, as shown in Figure 2-7.

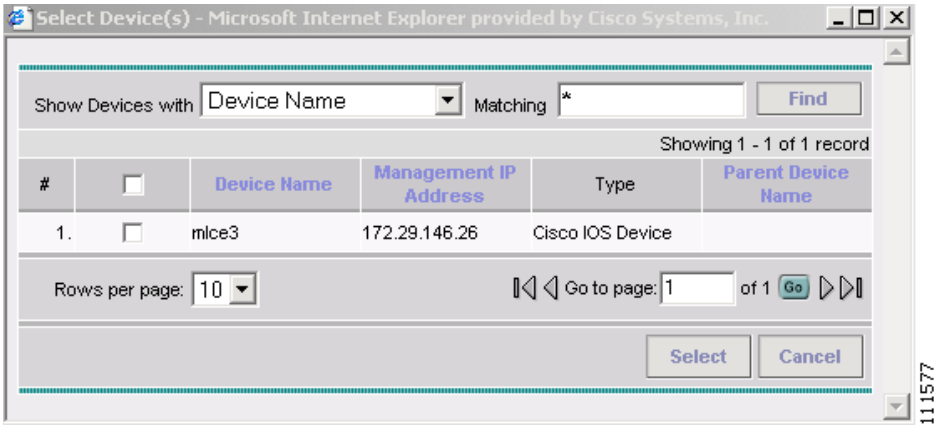
Figure 2-7 Collect Config Task



Step 5 Click **Select/De Select** at **Devices**.

The **Select Device** window appears, as shown in Figure 2-8.

Figure 2-8 Select Device



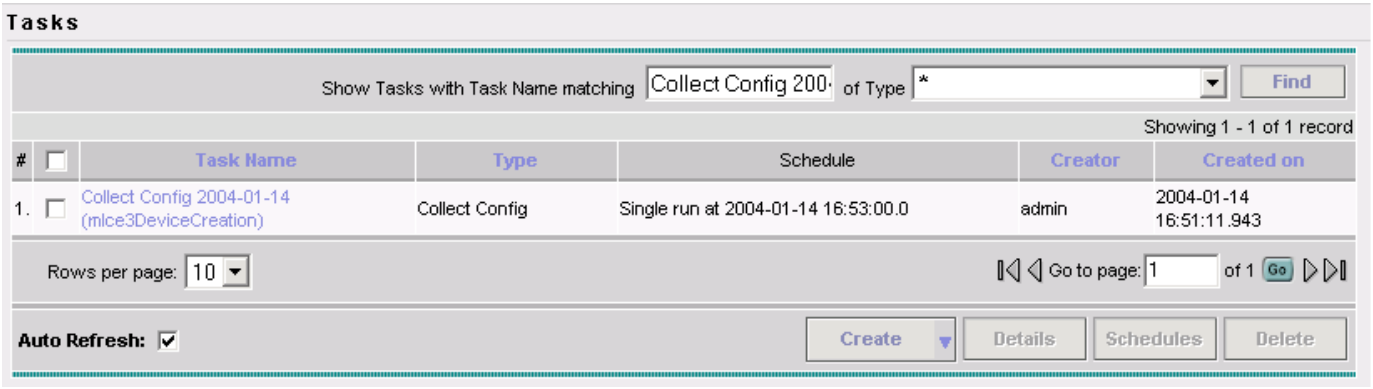
Step 6 Select the device, which you created in the previous section, Creating a Device, page 2-6, and then click **Select**. (**mlce3**)

The **Collect Config Task** window appears (not shown).

Step 7 Click **Submit**.

The **Task** window appears, as shown in Figure 2-9.

Figure 2-9 Tasks



Step 8 Select your task in the **Task Name column** and then click **Details** to view more information.

Note You have created a **Task** in the Repository.

Monitor Task Logs

To monitor the logs for your task, follow these steps:

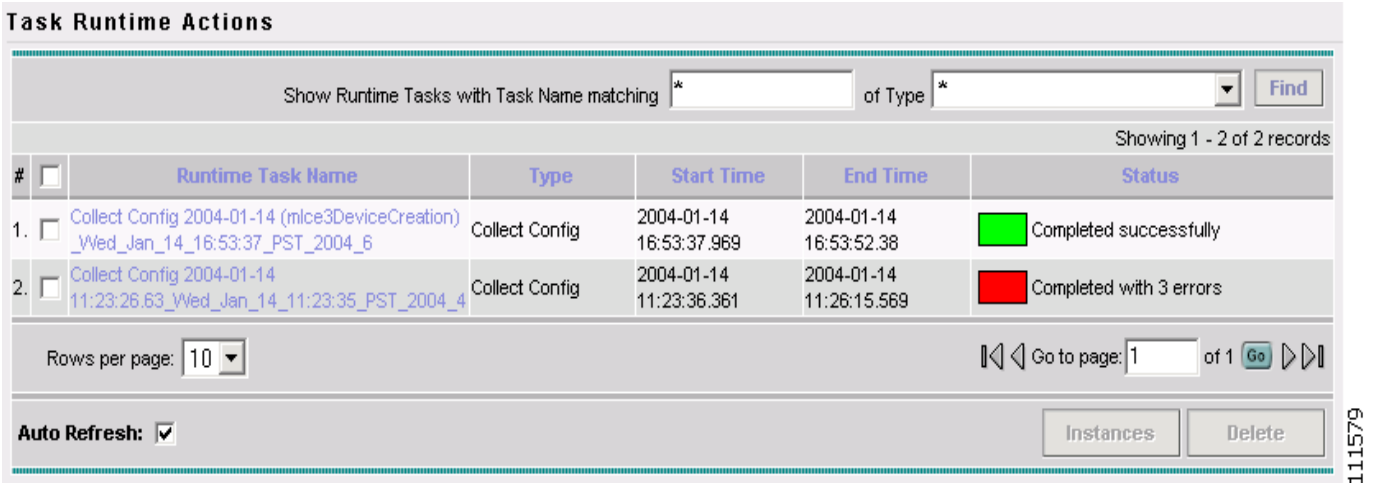
Step 1 Select **Monitoring > Task Manager**.

The **Tasks** window appears (not shown).

Step 2 Click **Logs** in the **Selection** window (not shown).

The **Task Runtime Actions** window appears, as shown in Figure 2-10.

Figure 2-10 Task Runtime Actions



Note The **Status** field shows the task has completed successfully. You have collected the configuration for a device and saved it in the Repository.

Step 3 Select your task and then click **Instances** to view more information.

Creating a Customer, Site, and CPE

This section describes how to create a Customer with the ISC GUI, create a Site for the Customer, and associate a Device with the Site. This section contains the following sections:

Create a Customer

To create a Customer with the ISC GUI, follow these steps:

Step 1 Select **Service Inventory** > **Inventory and Connection Manager** > **Customers**.

The **Customers** window appears (not shown).

Step 2 Click **Create**.

The **Create Customer** window appears (not shown).

Step 3 Enter a *Customer Name* and then click **Save.** (**Cust-A**)

Note You have saved a Customer in the Repository.

The **Customers** window appears (not shown).

Create a Site

To create a Site, follow these steps:

Step 1 Select **Service Inventory** > **Inventory and Connection Manager**.

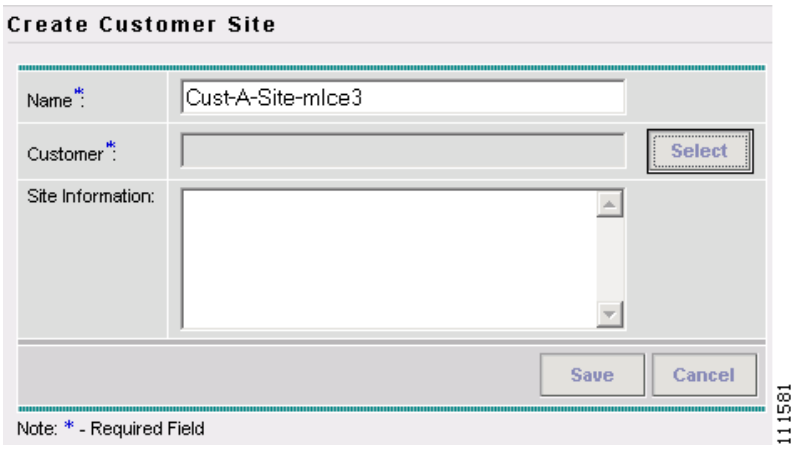
Step 2 Click **Customer Sites** in the **Selection** window.

The **Customer Site** window appears (not shown).

Step 3 Click **Create**.

The **Create Customer Site** window appears, as shown in Figure 2-11.

Figure 2-11 Create Customer Site

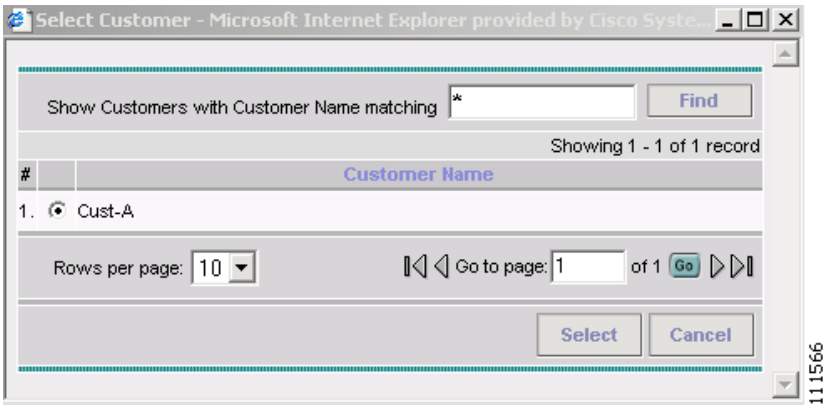


Step 4 Enter a *Site Name*. (**Cust-A-Site-mlce3**)

Step 5 Click **Select**.

The **Select Customer** window appears, as shown in Figure 2-12.

Figure 2-12 Select Customer



Step 6 Select a Customer. (**Cust-A**)

Step 7 Click **Select**.

The **Create Customer Site** window appears.

Click **Save**.

Note You have saved a Customer Site in the Repository.

Create a CPE

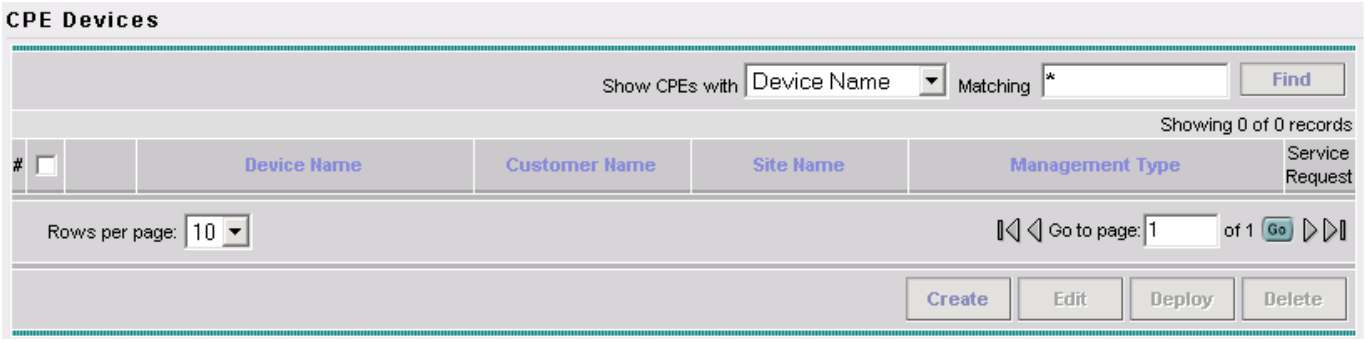
To create a CPE, follow these steps:

Step 1 Select **Service Inventory > Inventory and Connection Manager**.

Step 2 Click **CPE Devices** in the **Selection** window.

The **CPE Devices** window appears, as shown in Figure 2-13.

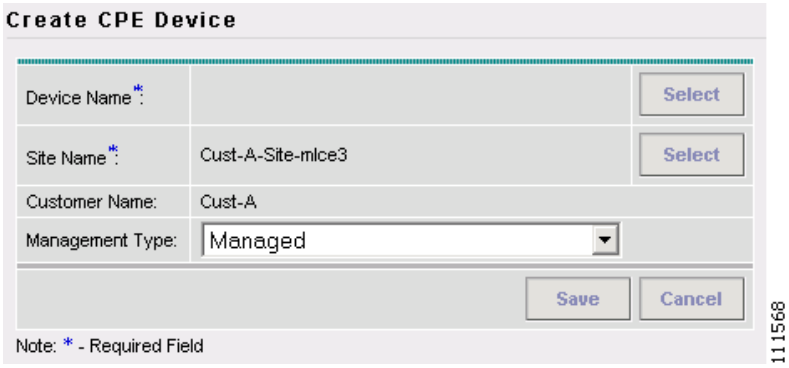
Figure 2-13 CPE Devices



Step 3 Click **Create**.

The **Create CPE Device** window appears, as shown in Figure 2-14.

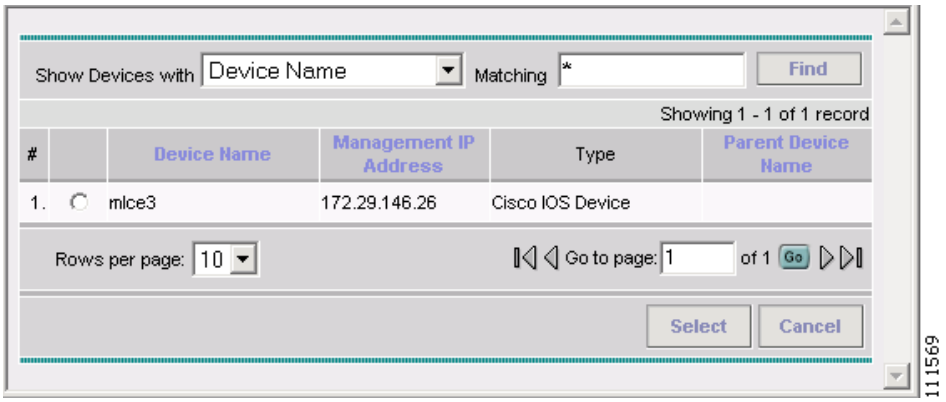
Figure 2-14 Create CPE Device



Step 4 Click **Select** to Select a Device.

The **Select Device** window appears, as shown in Figure 2-15.

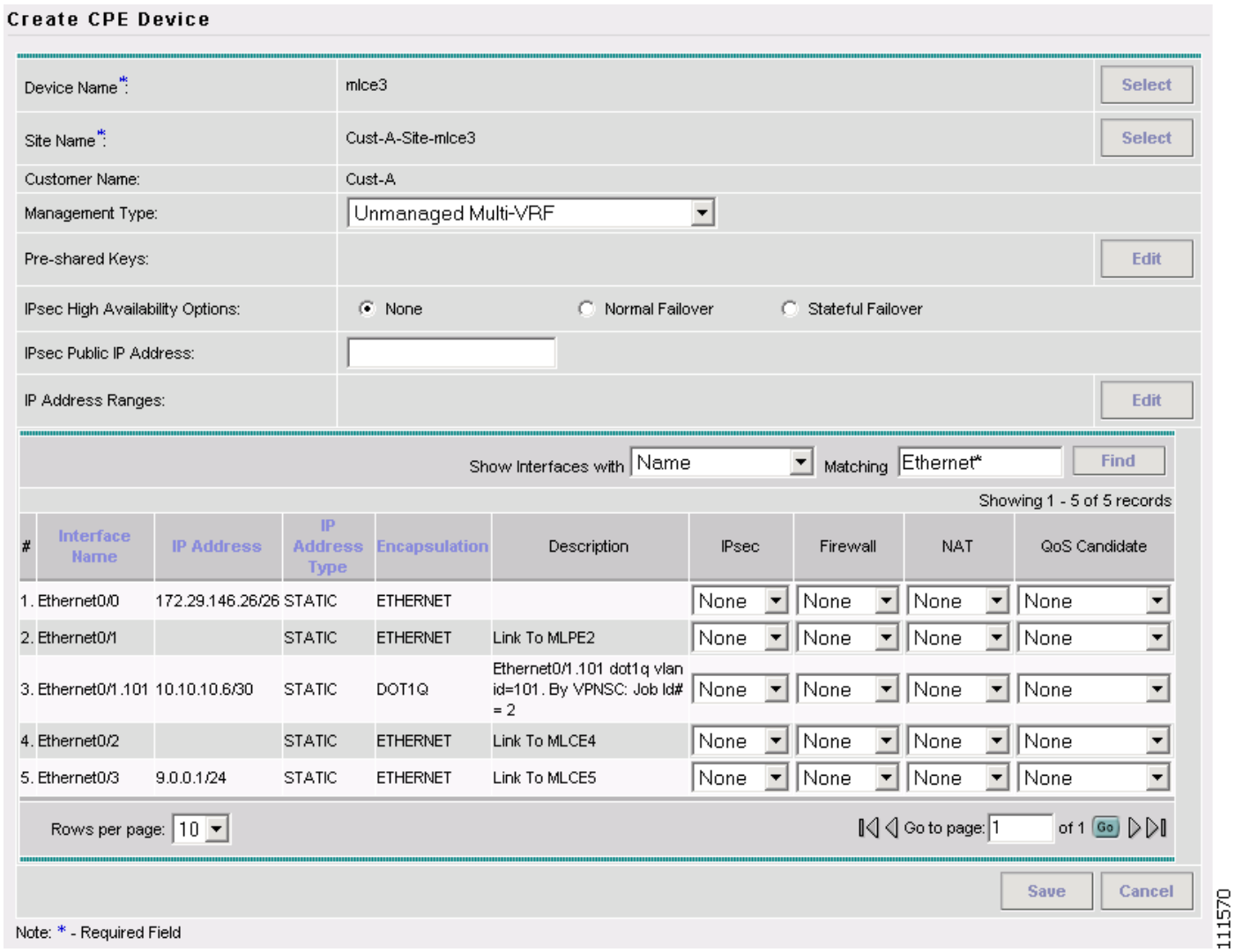
Figure 2-15 Select Device



Step 5 Select a Device and then click **Select**. (**mlce3**)

The **Create CPE Device** window appears, as shown in Figure 2-16.

Figure 2-16 Create CPE Device

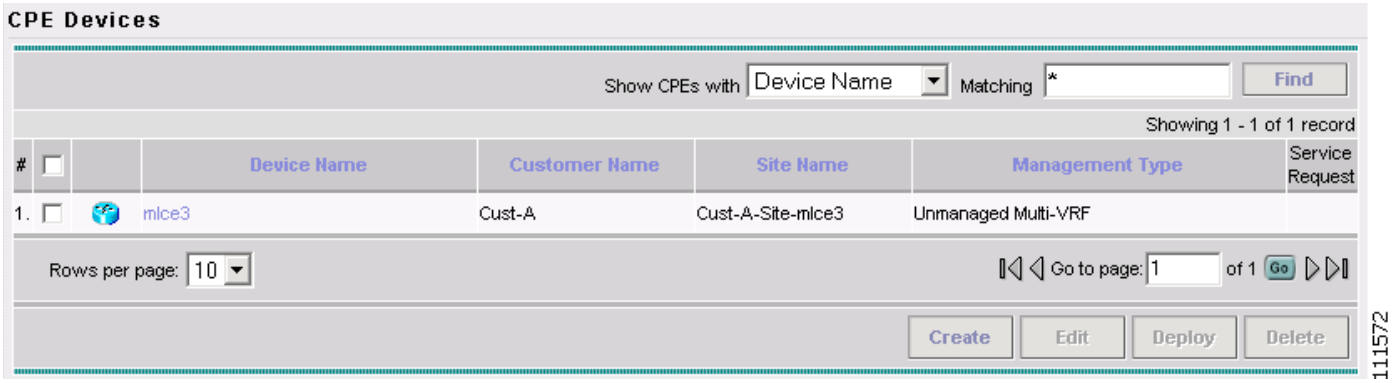


Step 6 Select **Management Type**. (**Unmanaged Multi-VRF**)

Step 7 Click **Save**.

The **Create CPE Device** window appears, as shown in Figure 2-17.

Figure 2-17 CPE Devices



Note You have saved a CPE in the Repository.

Adding a New Provider PE

This section describes how to use Cisco IP Solution Center (ISC) Inventory Manager to create a PE from a Device and configure a Provider in the process.

This section contains the following sections:

Overview of an ISC Provider

In ISC, a Provider is defined by the following three logical components:

- Provider Name and BGP Autonomous System (AS) number
- Provider Region
- Provider Device (PE)

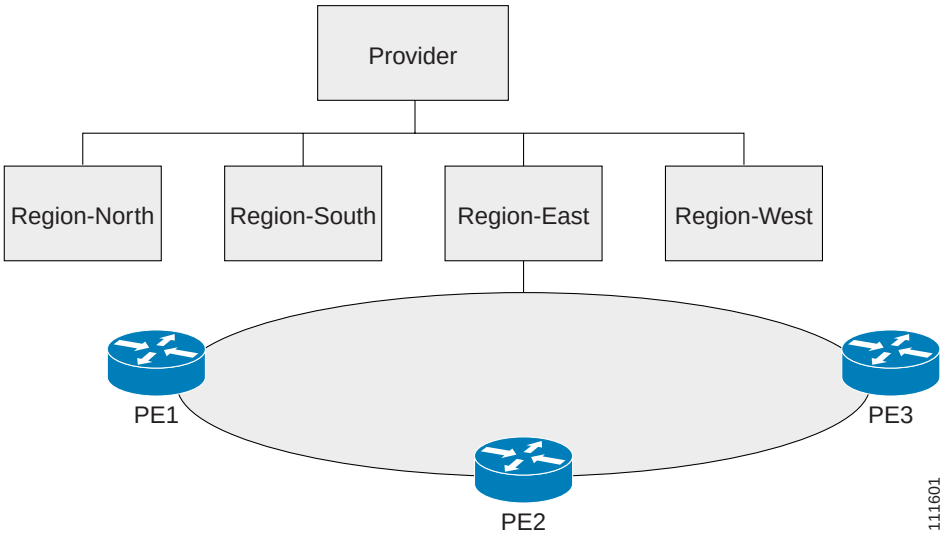
In ISC, a provider administrative domain (PAD) is a single AS. It is not a specific service provider, rather it is a logical container for Regions and PEs.

Within a single PAD, there must be one or more Regions. Regions are logical entities that can be defined in any way that makes sense to a service provider.

Within a Region, a Provider can contain one or more PEs. The PEs can be a PE-POP (“router”) or a PE-CLE (“switch”).

Figure 2-3 shows an overview of an ISC Provider.

Figure 2-18 Overview of an ISC Provider



Create a Device Group

This section describes how to create a Device Group with Inventory Manager. To create a Device Group, follow these steps:

Step 1 Log into ISC.

Step 2 Select **Service Inventory > Inventory and Connection Manager > Inventory Manager.**

The **Inventory Manager** Java Web Start window appears (not shown).

Step 3 Click **Inventory Manager**.

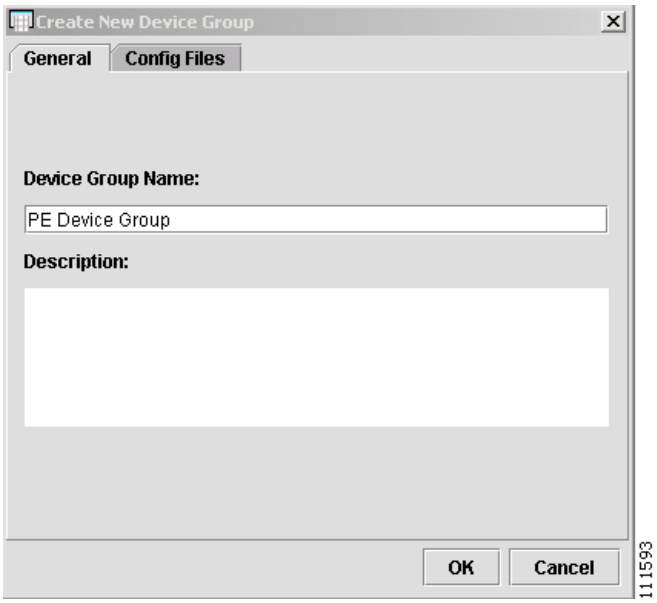
The **Inventory Manager** task bar appears, as shown in Figure 2-19.

Figure 2-19 Inventory Manager Task Bar

Step 4 Select **File > New > New Device Group**.

The **Create New Device Group** window appears, as shown in Figure 2-20.

Figure 2-20 Create New Device Group



Step 5 Enter the *Device Group Name* (**PE Device Group**) and a *Description* (optional).

Step 6 Click **OK**.

The **No Config Files Specified for Import** window appears (not shown).

Step 7 Click **Yes**.

The **Choose Config Files for Device Group** window appears (not shown).

Note This process is continued in Import Configuration Files, page 2-18.

Import Configuration Files

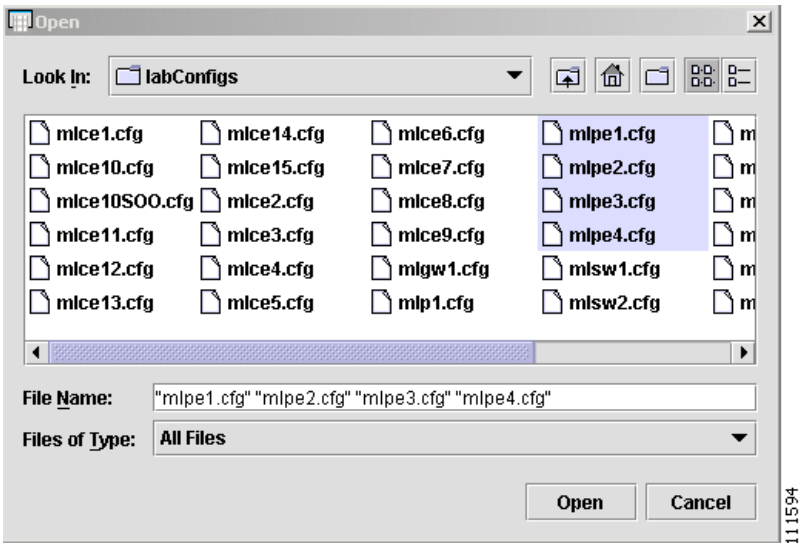
This section describes how to import configuration files with Inventory Manager.

To import configuration files, follow these steps:

Step 1 From the **Choose Config Files for Device Group** window in the previous section (Step 7), click **Add**.

The **Open** window appears, as shown in Figure 2-21.

Figure 2-21 Open Config Files



Step 2 Browse to the directory where your configuration files are located and select the appropriate configuration file. Use Ctrl+Click to select multiple devices.

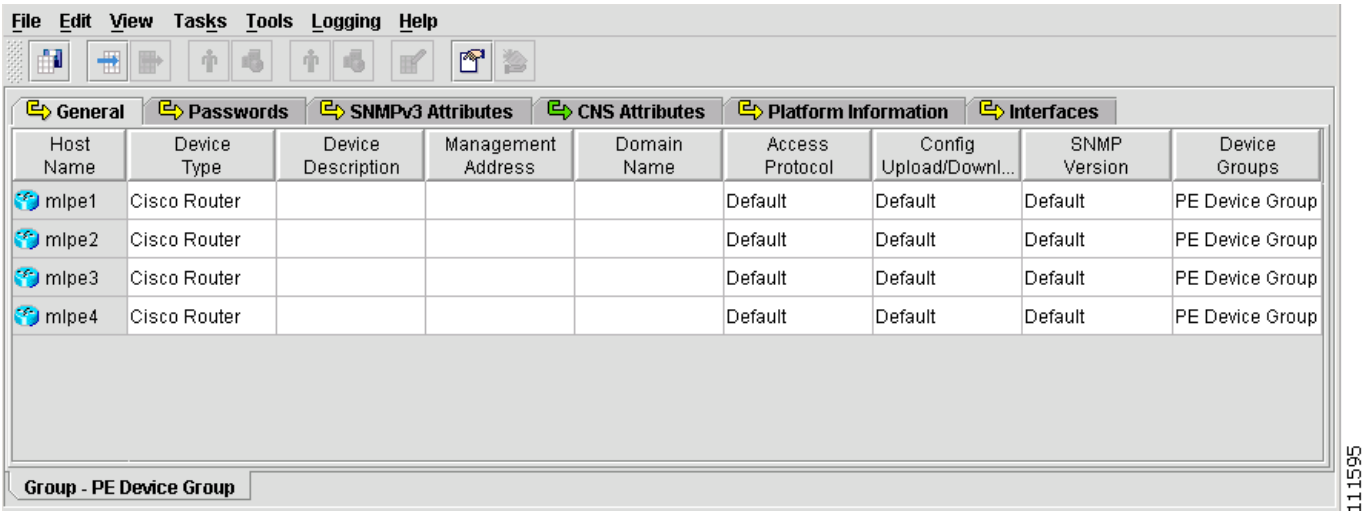
Step 3 Click **Open**.

The **Choose Config Files for Device Group** window appears (not shown).

Step 4 Click **OK**.

The **Group** spreadsheet appears, as shown in Figure 2-22.

Figure 2-22 Group Spreadsheet



Step 5 Select **File** > **Save**.

Note You have now saved this Device Group, with the logical Devices and configuration data, in the Repository.

Open a Device

Note Inventory Manager is designed to configure multiple Devices in a single operation. To facilitate understanding of this process, this scenario focuses on only one Device.

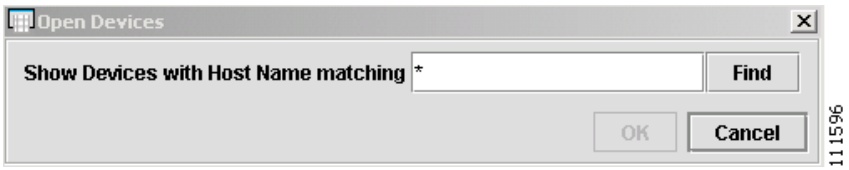
This section describes how to open a Device with Inventory Manager.

To open a Device, follow these steps:

Step 1 From the **Inventory Manager** task bar (not shown), select **File > Open > Open Devices.**

The **Open Devices** window appears, as shown in Figure 2-23.

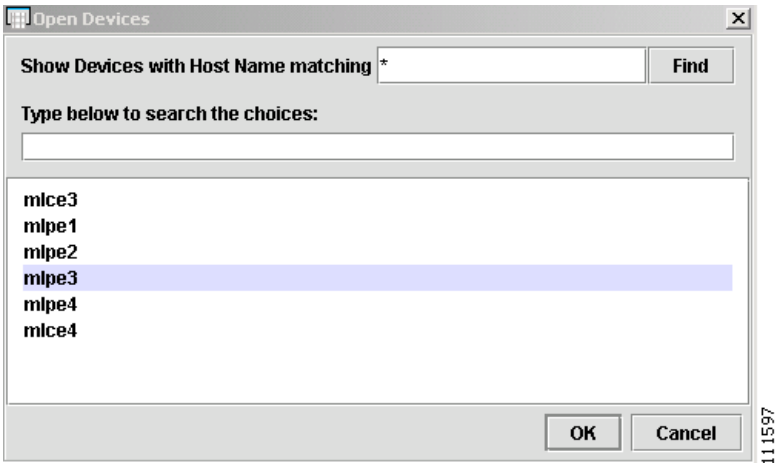
Figure 2-23 Open Devices



Step 2 Click **Find**.

The **Open Devices** window appears, as shown in Figure 2-24.

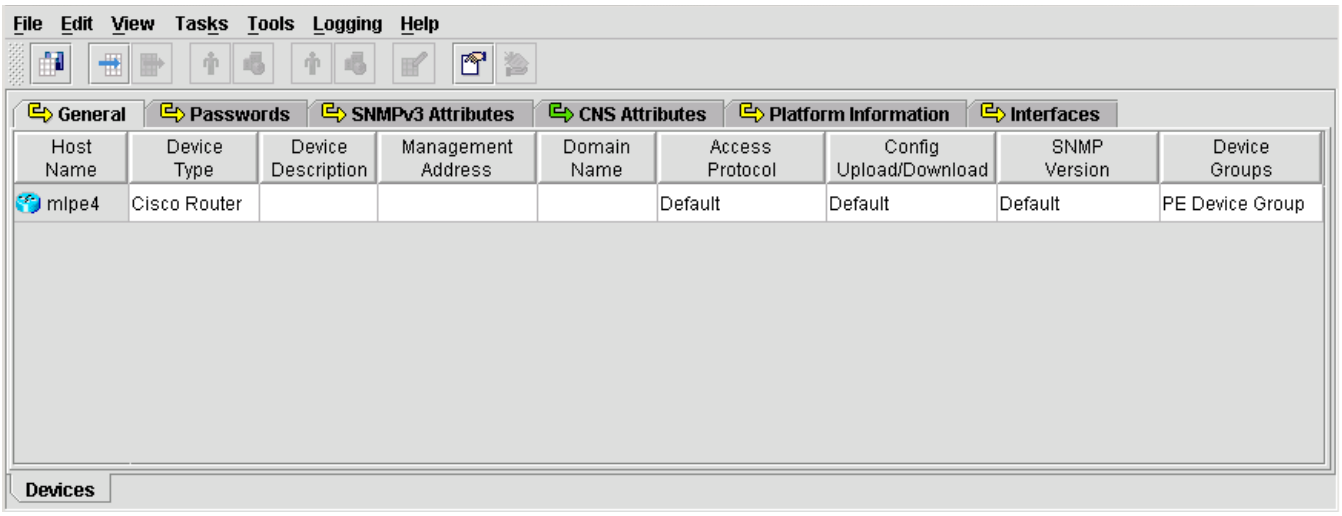
Figure 2-24 Open Devices



Step 3 Select a Device and then click **OK**. (**mlpe3**)

The **Devices** spreadsheet appears, as shown in Figure 2-25.

Figure 2-25 Devices Spreadsheet



Note This process is continued in Collect the Latest Configuration, page 2-21.

Collect the Latest Configuration

This section describes how to connect to a physical device in the network, and collect the latest configuration, with Inventory Manager.

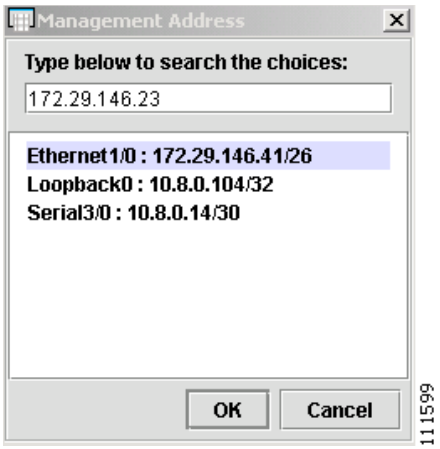
To collect a configuration, follow these steps:

Step 1 Click the cell in the **Management Address** column of the **Device** spreadsheet shown above in Figure 2-25.

The **Management Address** window appears, as shown in Figure 2-26.

Note The three IP addresses in the lower window were imported previously in the section, Import Configuration Files, page 2-18. These interface addresses could also be used as the Management Address.

Figure 2-26 Management Address



Step 2 Enter the *Management Address* and then click **OK**. (**172.29.146.23**)

The **Devices** spreadsheet appears (not shown).

Step 3 Click the **Passwords** tab.

The **Passwords** spreadsheet appears (not shown).

Step 4 Click the **Login Password** cell.

The **Login Password** window appears (not shown).

Step 5 Enter the *Password* (*******).

Step 6 Enter the *Verify Password* (*******).

Step 7 Click **OK**.

Step 8 Click the **Enable Password** cell.

The **Enable Password** window appears (not shown).

Step 9 Enter the *Password* (*******).

Step 10 Enter the *Verify Password* (*******).

Step 11 Click **OK**.

Step 12 Select **File** > **Save**.

Step 13 Select **Task** > **Collect Latest Config Files**.

Step 14 Accept the prompt to proceed.

You are notified if the task completes successfully.

Step 15 Click the **Platform Information** tab to view the newly collected configuration information.

The **Platform Information** spreadsheet appears, as shown in Figure 2-27 below.

Step 16 Select **File** > **Save**.

Note You have now saved this Device information in the Repository. This process is continued in Create a Provider and a PE, page 2-23.

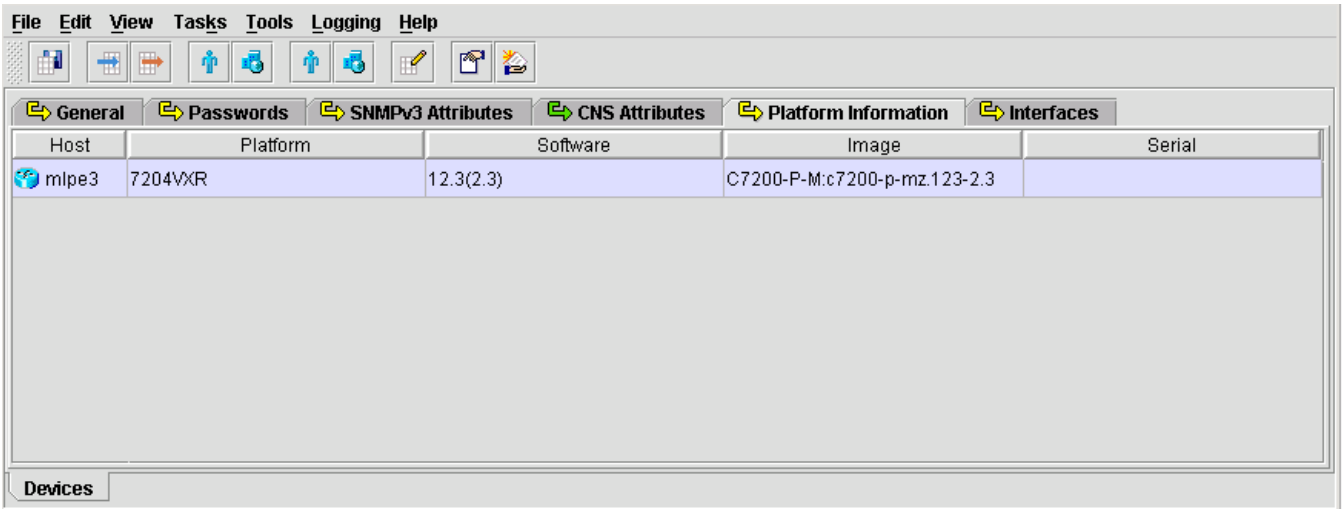
Create a Provider and a PE

This section describes how to create a Provider and a PE from a Device, using Inventory Manager.

To create a Provider and a PE, follow these steps:

Step 1 From the **Devices** spreadsheet shown in Figure 2-27, click the cell in the **Host** column to select the Device.

Figure 2-27 Platform Information

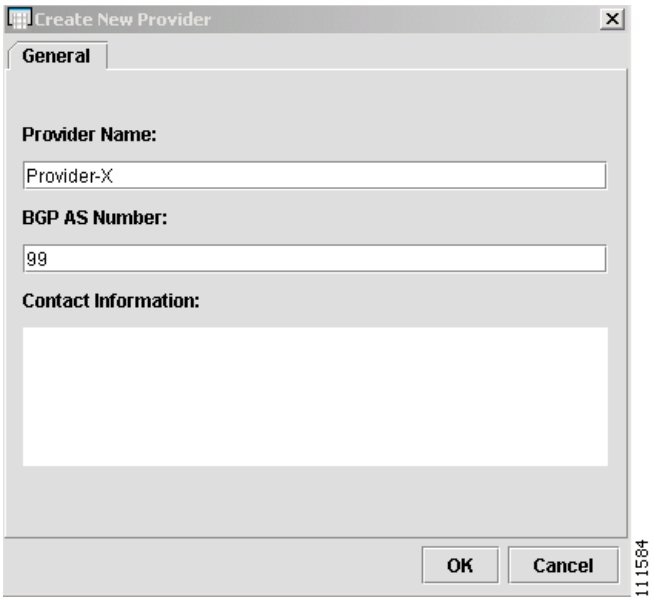


Step 2 From the Inventory Manager task bar, select **Edit > Move to New Provider**, as shown in Figure 2-28.

Figure 2-28 Move to New Customer

The **Create New Provider** window appears, as shown in Figure 2-29.

Figure 2-29 Create New Provider

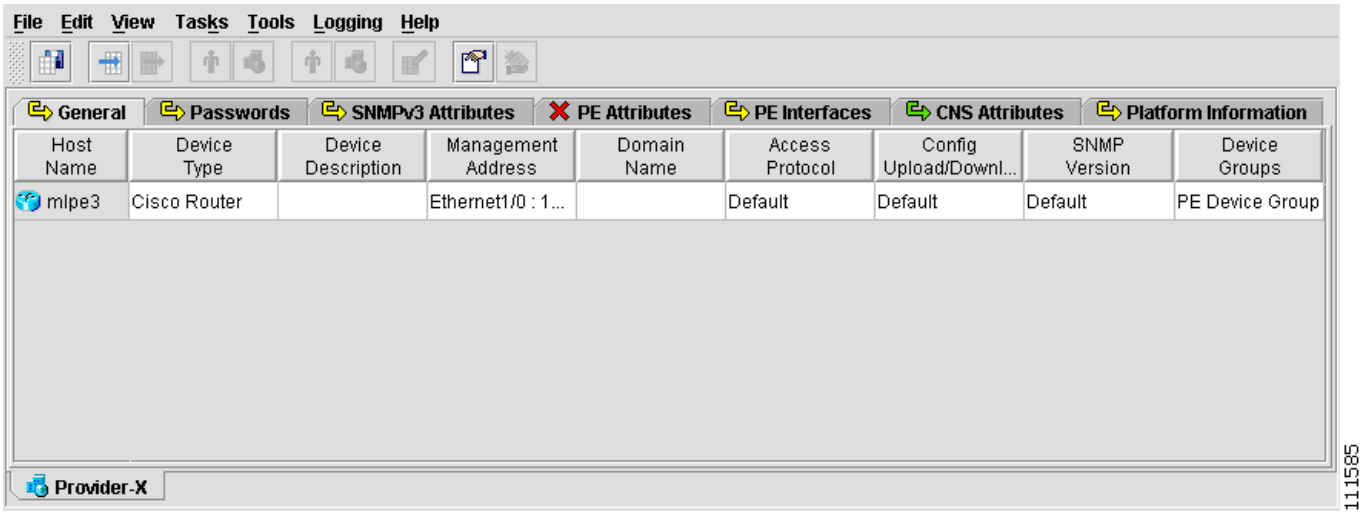


Enter the *Provider Name* and *BGP AS Number*. (**Provider-X**, **99**)

Step 3 Click **OK**.

The **Provider** spreadsheet appears with a PE, as shown in Figure 2-30.

Figure 2-30 Provider Spreadsheet



Step 4 Select **File > Save**.

Note The Provider spreadsheet contains two new tabs, **PE Attributes** and **PE Interfaces**. This process is continued in Create a Region for the PE, page 2-25.

Create a Region for the PE

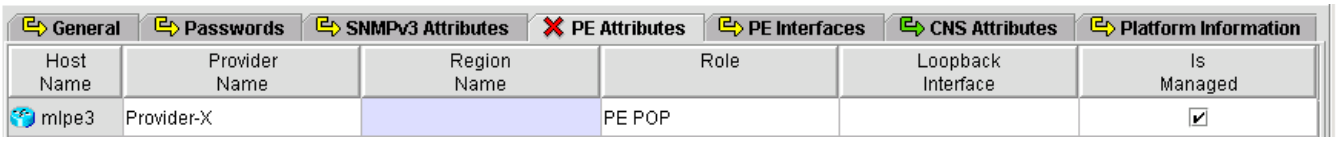
This section describes how to create a Region for the PE with Inventory Manager.

To create a Region, follow these steps:

Step 1 From the Provider spreadsheet, shown in Figure 2-30, click the **PE Attributes** tab.

The **PE Attributes** spreadsheet appears, as shown in Figure 2-31.

Figure 2-31 PE Attributes



Step 2 Click the cell in the **Region Name** column.

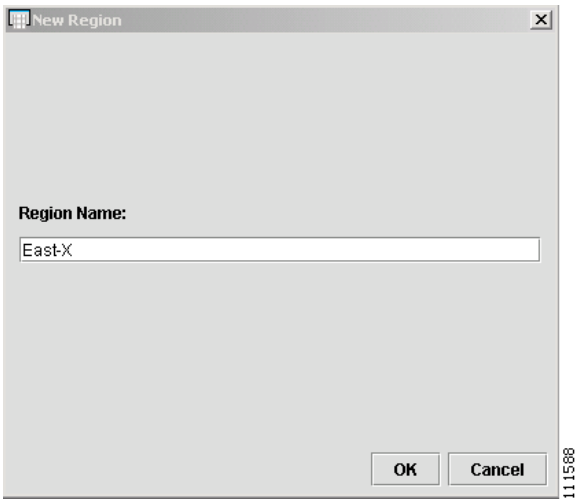
The **Region Name** window appears, as shown in Figure 2-32.

Figure 2-32 Region Name

Step 3 Click **Create Region**.

The **New Region** window appears, as shown in Figure 2-33.

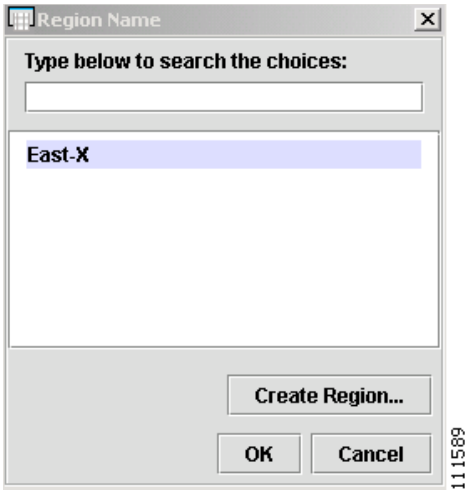
Figure 2-33 New Region



Step 4 Enter the *Region Name* and then click **OK**. (**East-X**)

The **Region Name** window appears, as shown in Figure 2-34.

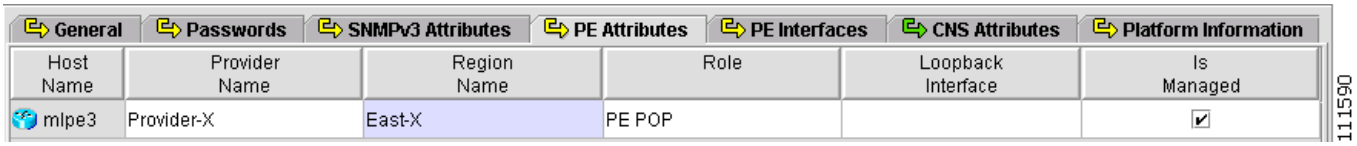
Figure 2-34 Region Name



Step 5 Click **OK**.

The **PE Attributes** spreadsheet appears, as shown in Figure 2-35.

Figure 2-35 PE Attributes



Step 6 Click **File > Save**.

Note The process of adding a PE to a Provider Region is complete. To view or edit the PE in the ISC GUI, continue to Edit a PE with the ISC GUI, page 2-27.

Edit a PE with the ISC GUI

This section describes how to view or edit a PE with the ISC GUI.

To view a PE with the ISC GUI, follow these steps:

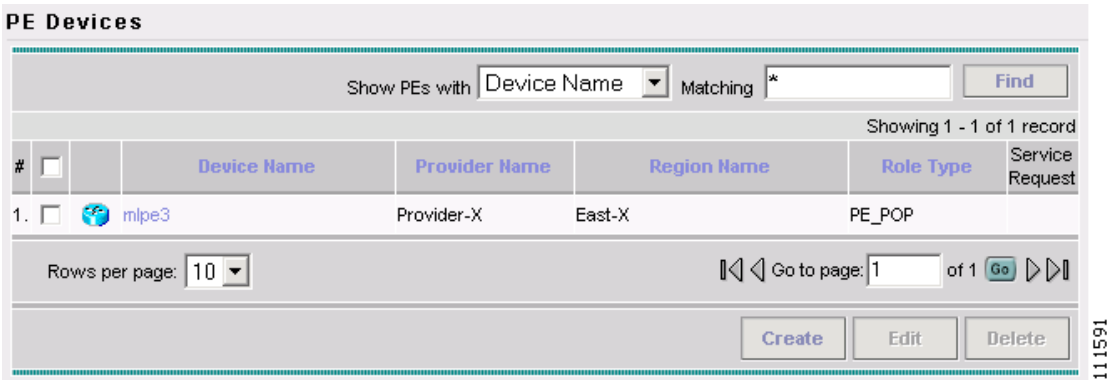
Step 1 Open a new browser and log into ISC.

Step 2 Select **Service Inventory > Inventory and Connection Manager.**

Step 3 Click **PE Devices** in the **Selection** window.

The **PE Devices** window appears, as shown in Figure 2-36.

Figure 2-36 PE Devices



Step 4 Select the PE Device.

Step 5 Click **Edit**.

Creating an Access Domain

Note This section is only required for Layer 2 access to MPLS VPN.

This section describes how to create an Access Domain using the Cisco IP Solution Center (ISC) GUI. This section contains the following sections:

- Overview of an Access Domain, page 2-28
- Create an Access Domain, page 2-28

Overview of an Access Domain

Any Transport over MPLS (AToM) is the Cisco solution for transporting Layer 2 traffic over an IP/MPLS backbone. AToM is required for supporting legacy services over MPLS infrastructures and for supporting new connectivity options, including Layer 2 VPNs and Layer 2 virtual leased lines.

AToM supports three types of Ethernet-based L2VPNs (EoMPLS):

- Point-to-Point Ethernet Wire Service (EWS)
- Point-to-Point Ethernet Relay Service (ERS)
- Multipoint TLS Service

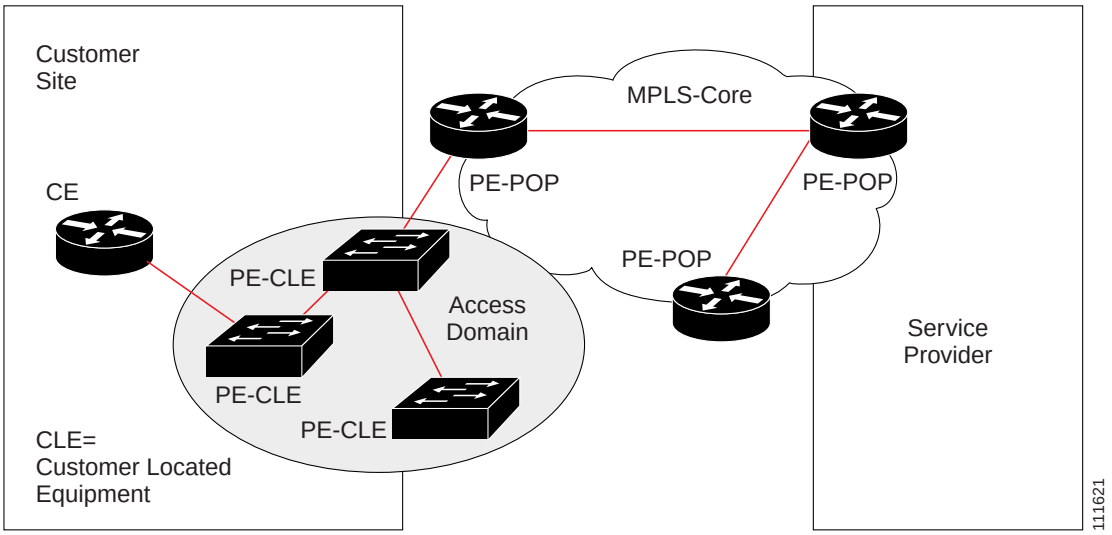
The Layer 2 Ethernet switching domain that connects a PE to a CE is called an Access Domain. All the switches attached to the PE-POP belong to this Access Domain. These switches belong to the Provider and are defined in ISC as PE-CLE.

Note To have ISC automatically assign VLAN links from a VLAN pool, you must create an Access Domain.

ISC supports multiple PE-POPs per Access Domain and multiple PE-CLE devices can be included.

Figure 2-37 shows an overview of an ISC Access Domain.

Figure 2-37 Overview of an Access Domain



Create an Access Domain

This section describes how to create a Device with the ISC GUI.

To create a Device with the ISC GUI, follow these steps:

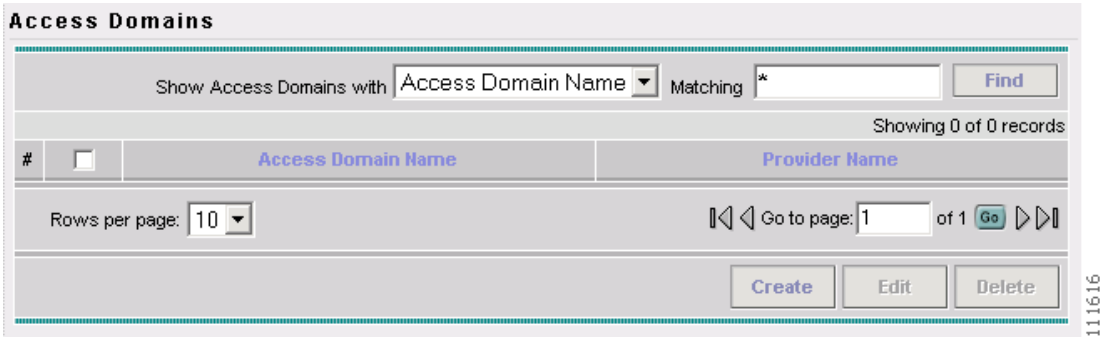
Step 1 Log into ISC.

Step 2 Select **Service Inventory > Inventory and Connection Manager.**

Step 3 Click **Access Domains** in the **Selection** window.

The **Access Domains** window appears, as shown in Figure 2-38.

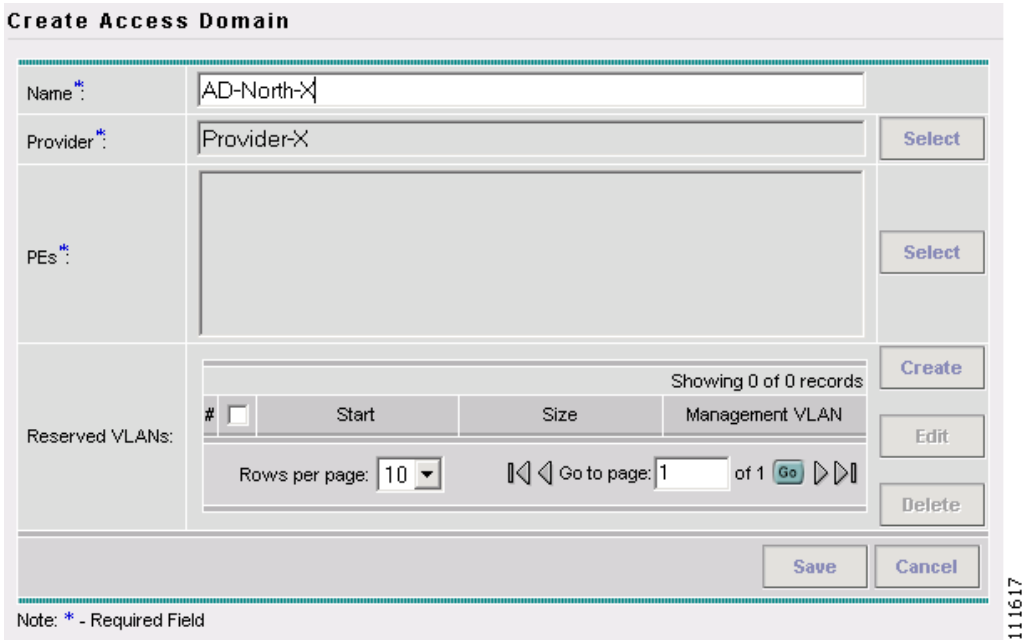
Figure 2-38 Access Domains



Step 4 Click **Create**.

The **Create Access Domain** window appears, as shown in Figure 2-39.

Figure 2-39 Create Access Domain



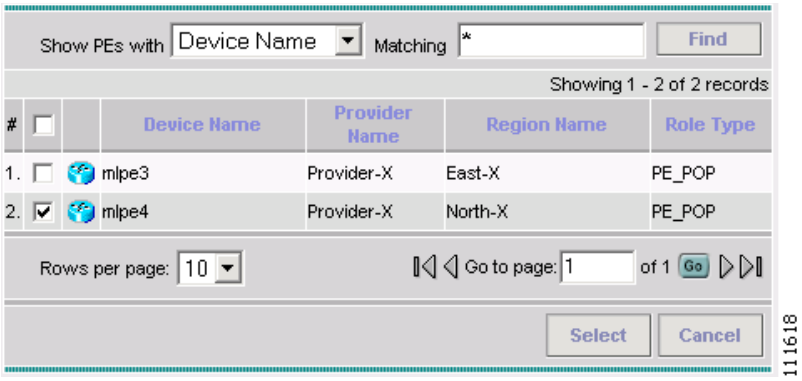
Step 5 Enter an Access Domain *Name*.

Step 6 Select a Provider (not shown).

Step 7 Click **Select** to show PEs.

The **Show PEs** window appears, as shown in Figure 2-40.

Figure 2-40 Show PEs

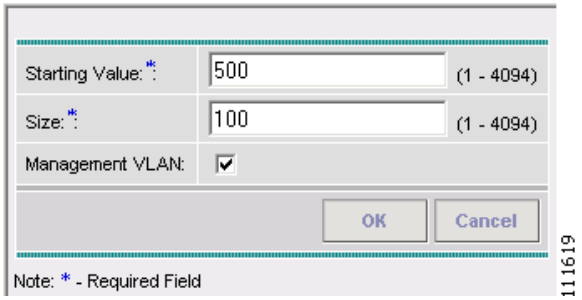


Step 8 Select a PE.

Step 9 Click **Select**.

The **Create Reserved VLAN** window appears, as shown in Figure 2-41.

Figure 2-41 Create Reserved VLAN



Step 10 Enter a *Starting Value.*

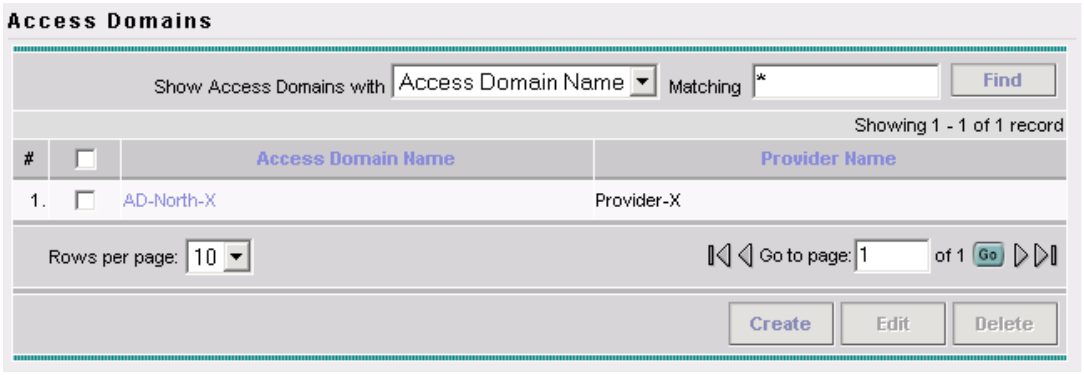
Step 11 Enter a *Size.*

Step 12 Select **Management VLAN**.

Step 13 Click **OK**.

The **Access Domains** window appears, as shown in Figure 2-8.

Figure 2-42 Access Domains



The Access Domain has been saved in the Repository.

Creating Resource Pools

This section describes how to create Resource Pools using the Cisco IP Solution Center (ISC) GUI.

This section contains the following sections:

Overview of Resource Pools

Before creating a service in ISC, you must define your Resource Pools. From these Resource Pools, ISC can automatically assign some values during the provisioning process. You can also manually assign these values during the provisioning process, but it is not recommended.

ISC allocates numbers from the following pools during the provisioning process:

- **IP Address**—Connects PE and CE interfaces, when you define addresses in a Service Request.
- **Multicast**—Class D addresses used with multicast, when building PE to multiple CE links.
- **Route Distinguisher** (**RD**)—A 64-bit number composed of the Provider AS number and an index number that is prepended to a VPN route. The RD allows the route subnet to be unique across the entire provider MPLS VPN network. It is carried by MP-BGPv4 as a 96-bit VPNv4 address as part of the extended community string.

- **Route Target (RT)**—An import and export feature of a VRF, the RT allows VPN routes to be forwarded between VRFs. It is a 64-bit number, also carried as part of the MP-BGPv4 extended community string, and directly related to each VPNv4 route and its VPN-related IPv4 route.
- **Site of Origin**—Indicates the origin of a BGP update. Depending on the use of two Cisco IOS BGP commands, the Site of Origin will be used by BGP to preclude routing loops.
- **VC ID (Virtual Circuit)**—Used as a Layer 2 circuit identifier across a provider network.
- **VLAN**—Used in a Layer 2 VPN as a circuit identifier within the provider Access Domain.

Create an IP Address Pool

This section describes how to create an IP Address Pool with the ISC GUI.

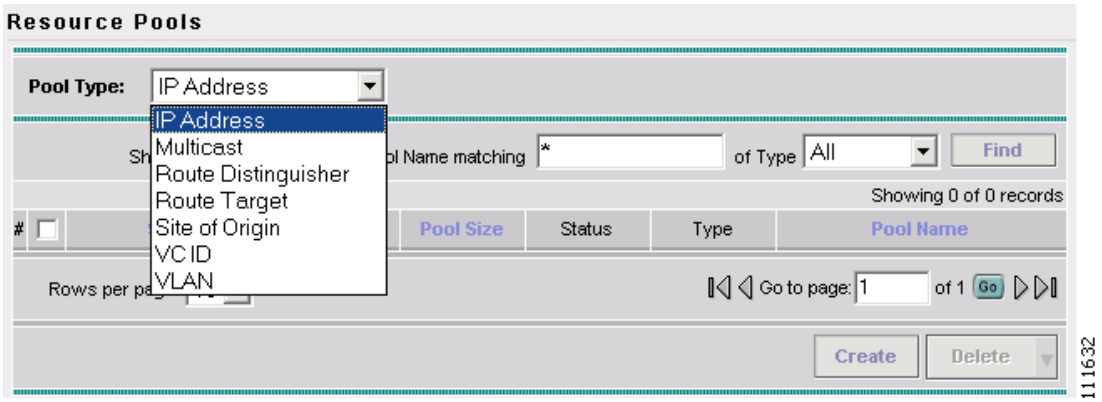
To create an IP Address Pool with the ISC GUI, follow these steps:

Step 1 Log into ISC.

Step 2 Select **Service Inventory > Inventory and Connection Manager > Resource Pools.**

The **Resource Pools** window appears, as shown in Figure 2-43.

Figure 2-43 Resource Pools

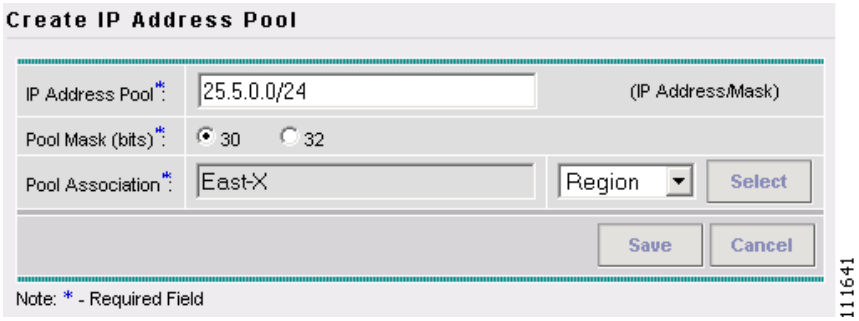


Step 3 Select **IP Address** from the **Pool Type** window.

Step 4 Click **Create**.

The **Create IP Address Pool** window appears, as shown in Figure 2-44.

Figure 2-44 Create IP Address Pool



Step 5 Enter an *IP Address* and *Mask*. (**25.5.0.0/24**)

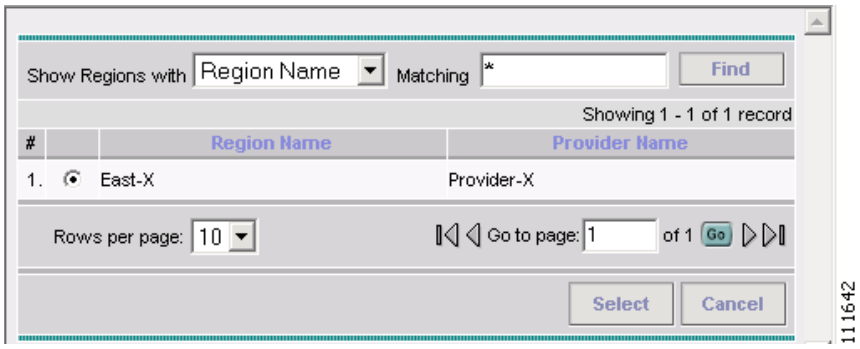
Step 6 Select the **Pool Mask (bits)** value. (**30**)

Note Use **32** for loopback addresses.

Step 7 Click **Select** to associate the pool with a Region.

The **Select Region** window appears, as shown in Figure 2-45.

Figure 2-45 Select Region

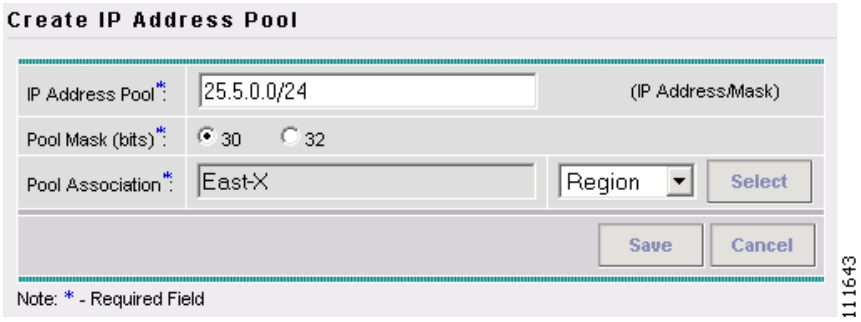


Step 8 Select a **Region**.

Step 9 Click **Select**.

The **Create IP Address Pool** window appears, as shown in Figure 2-6.

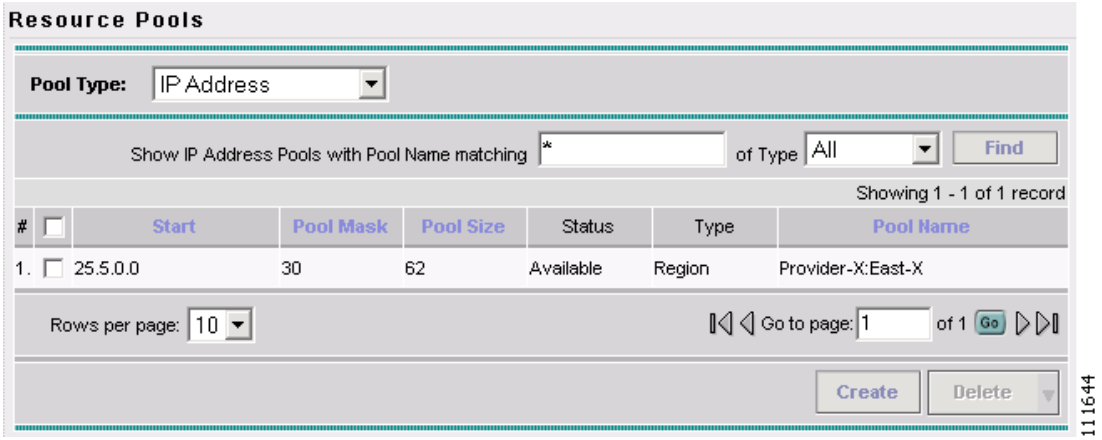
Figure 2-46 Create IP Address Pool



Step 10 Click **Save**.

The **Resource Pools - IP Address** window appears, as shown in Figure 2-47.

Figure 2-47 Resource Pools - IP Address



You have saved an IP Address Pool in the Repository.

Create a Multicast Pool

This section describes how to create a Multicast Address Pool with the ISC GUI.

To create a Multicast Pool with the ISC GUI, follow these steps:

Step 1 Log into ISC.

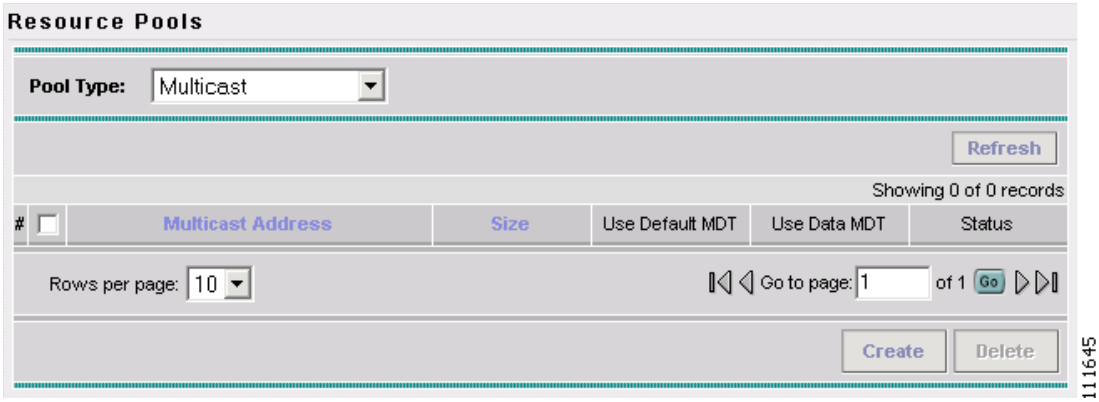
Step 2 Select **Service Inventory > Inventory and Connection Manager > Resource Pools.**

The **Resource Pools** window appears (not shown).

Step 3 Select **Multicast** from the **Pool Type** window.

The **Resource Pools - Multicast** window appears, as shown in Figure 2-8.

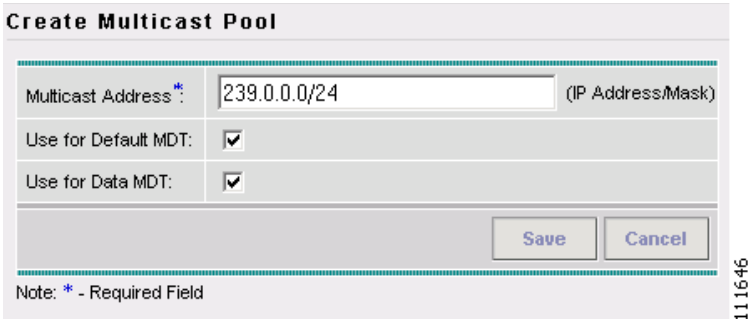
Figure 2-48 Resource Pools - Multicast



Step 4 Click **Create**.

The **Create Multicast Pool** window appears, as shown in Figure 2-49.

Figure 2-49 Create Multicast Pool



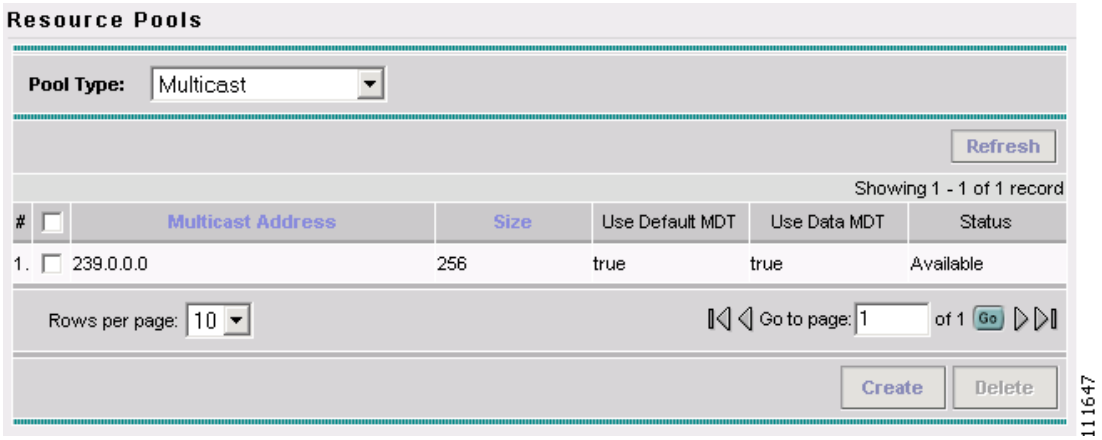
Step 5 Enter an *IP Address* and *Mask*. (**239.0.0.0/24**)

Step 6 Select the defaults**.** (**Default MDT** and **Data MDT**).

Step 7 Click **Save.**

The **Resource Pools - Multicast** window appears, as shown in Figure 2-48.

Figure 2-50 Resource Pools - Multicast



You have saved a Multicast Address Pool in the Repository.

Create a Route Distinguisher Pool

This section describes how to create a Route Distinguisher Pool with the ISC GUI.

To create a Route Distinguisher Pool with the ISC GUI, follow these steps:

Step 1 Log into ISC.

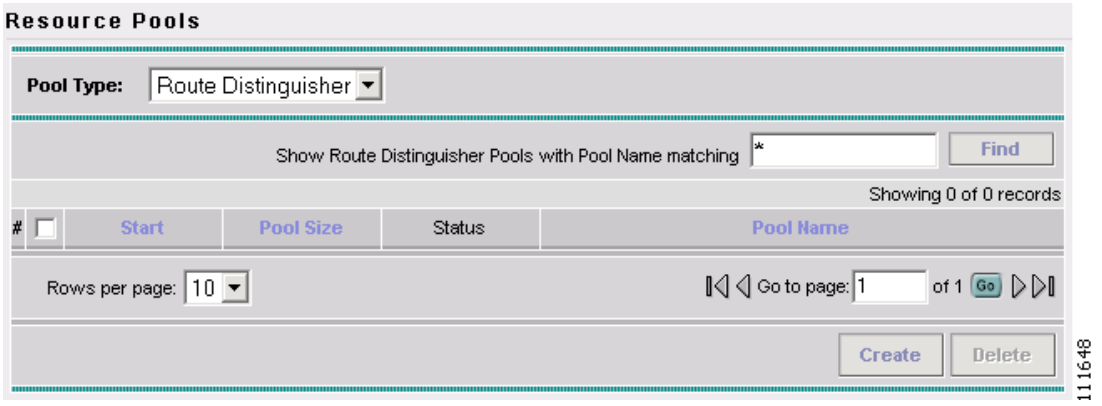
Step 2 Select **Service Inventory > Inventory and Connection Manager > Resource Pools.**

The **Resource Pools** window appears (not shown).

Step 3 Select **Route Distinguisher** from the **Pool Type** window.

The **Resource Pools - Route Distinguisher** window appears, as shown in Figure 2-11.

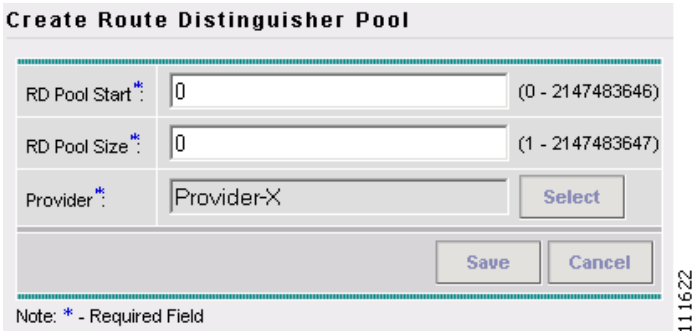
Figure 2-51 Resource Pools - Route Distinguisher



Step 4 Click **Create**.

The **Create Route Distinguisher Pool** window appears, as shown in Figure 2-52.

Figure 2-52 Create Route Distinguisher Pool



Step 5 Enter an *RD Pool Start*. (**50000**)

Step 6 Enter an *RD Pool Size*. (**1000**)

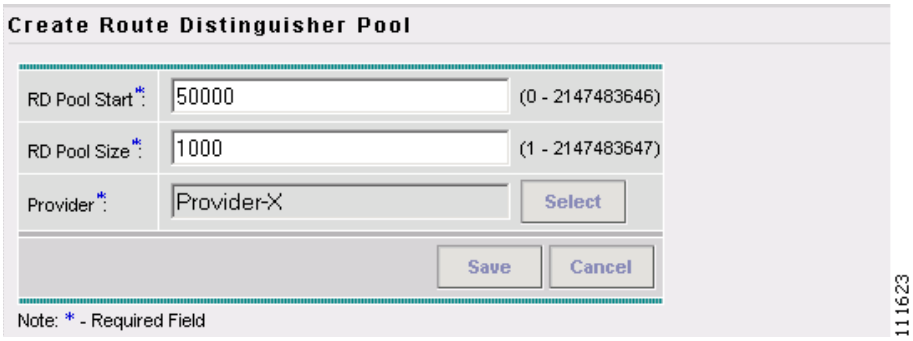
Step 7 Click **Select**.

The **Select Provider** window appears (not shown).

Step 8 Select a **Provider**.

The **Create Route Distinguisher Pool** window appears, as shown in Figure 2-53.

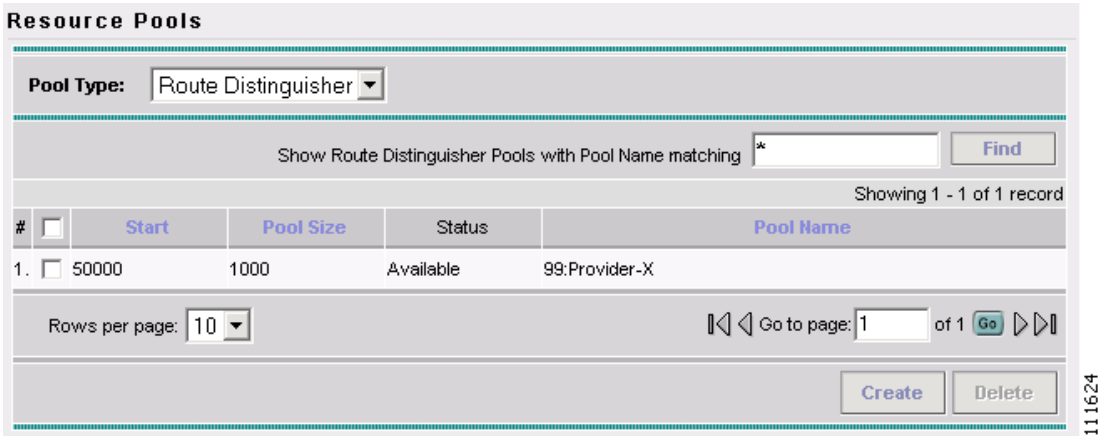
Figure 2-53 Create Route Distinguisher Pool



Step 9 Click **Save**.

The **Resource Pools - Route Distinguisher** window appears, as shown in Figure 2-15.

Figure 2-54 Create Route Distinguisher Pool



You have saved a Route Distinguisher Pool in the Repository.

Create a Route Target Pool

This section describes how to create a Route Target Pool with the ISC GUI.

To create a Route Target Pool with the ISC GUI, follow these steps:

Step 1 Log into ISC.

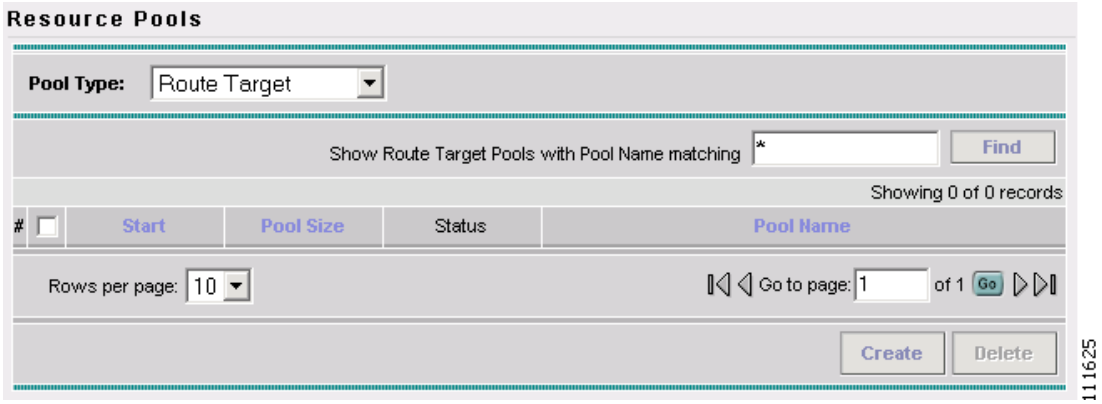
Step 2 Select **Service Inventory > Inventory and Connection Manager > Resource Pools.**

The **Resource Pools** window appears (not shown).

Step 3 Select **Route Target** from the **Pool Type** window.

The **Resource Pools - Route Target** window appears, as shown in Figure 2-55.

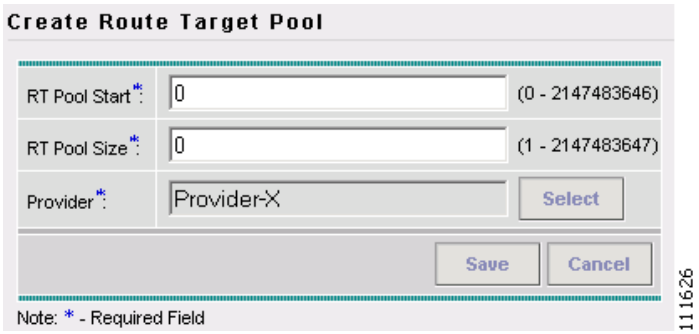
Figure 2-55 Create Route Target Pool



Step 4 Click **Create**.

The **Create Route Target Pool** window appears, as shown in Figure 2-56.

Figure 2-56 Create Route Target Pool



Step 5 Enter an *RT Pool Start*. (**50000**)

Step 6 Enter an *RT Pool Size*. (**1000**)

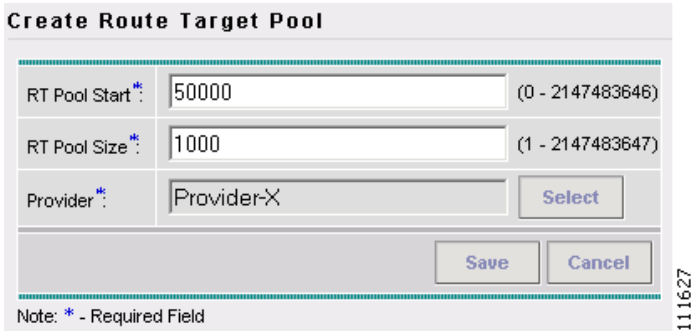
Step 7 Click **Select**.

The **Select Provider** window appears (not shown).

Step 8 Select a **Provider**.

The **Create Route Target Pool** window appears, as shown in Figure 2-57.

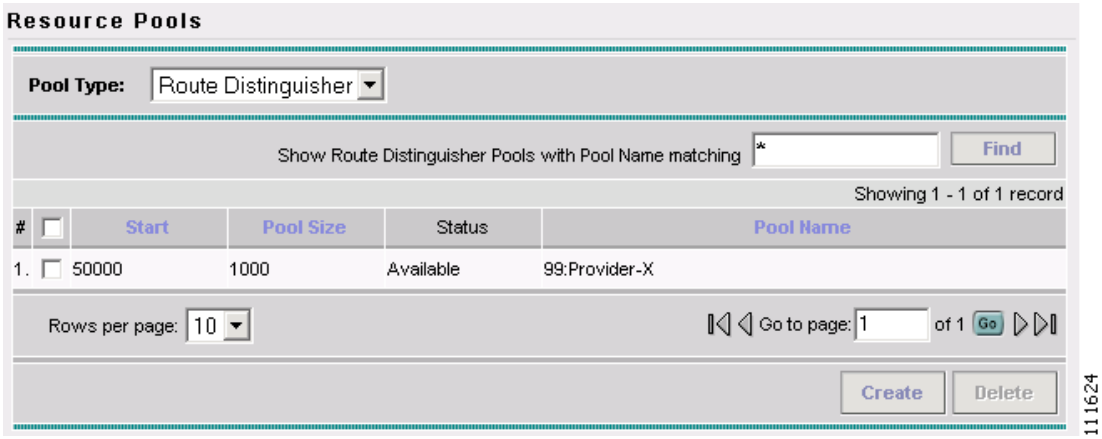
Figure 2-57 Create Route Target Pool



Step 9 Click **Save**.

The **Resource Pools - Route Target** window appears, as shown in Figure 2-58.

Figure 2-58 Resource Pools - Route Target



You have saved a Route Target Pool in the Repository.

Create a Site of Origin Pool

This section describes how to create a Site of Origin Pool with the ISC GUI.

To create a Site of Origin Pool with the ISC GUI, follow these steps:

Step 1 Log into ISC.

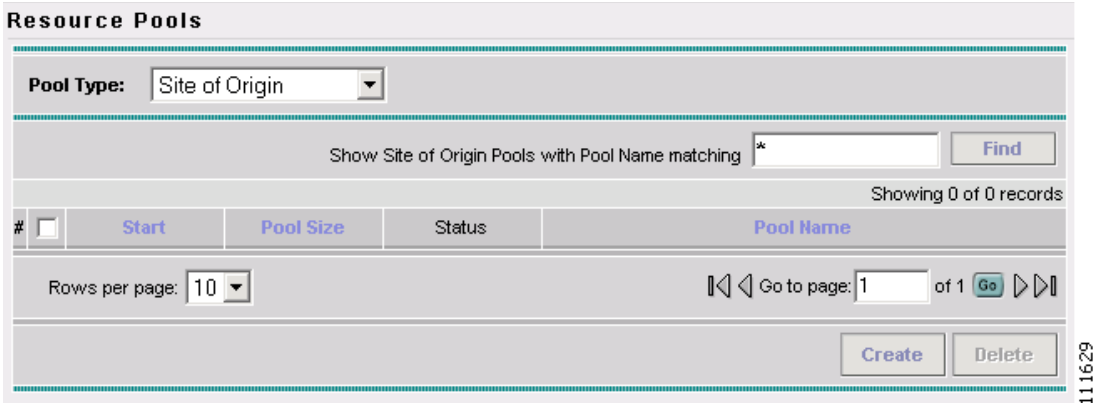
Step 2 Select **Service Inventory > Inventory and Connection Manager > Resource Pools.**

The **Resource Pools** window appears (not shown).

Step 3 Select **Site of Origin** from the **Pool Type** window.

The **Resource Pools - Site of Origin** window appears, as shown in Figure 2-59.

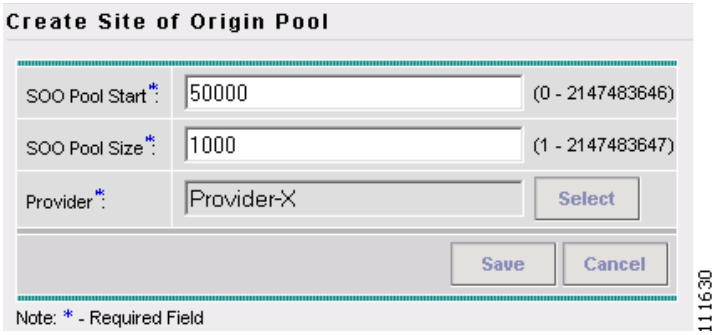
Figure 2-59 Resource Pools - Site of Origin



Step 4 Click **Create**.

The **Create Site of Origin Pool** window appears, as shown in Figure 2-60.

Figure 2-60 Create Site of Origin Pool



Step 5 Enter an *SOO Pool Start*. (**50000**)

Step 6 Enter an *SOO Pool Size*. (**1000**)

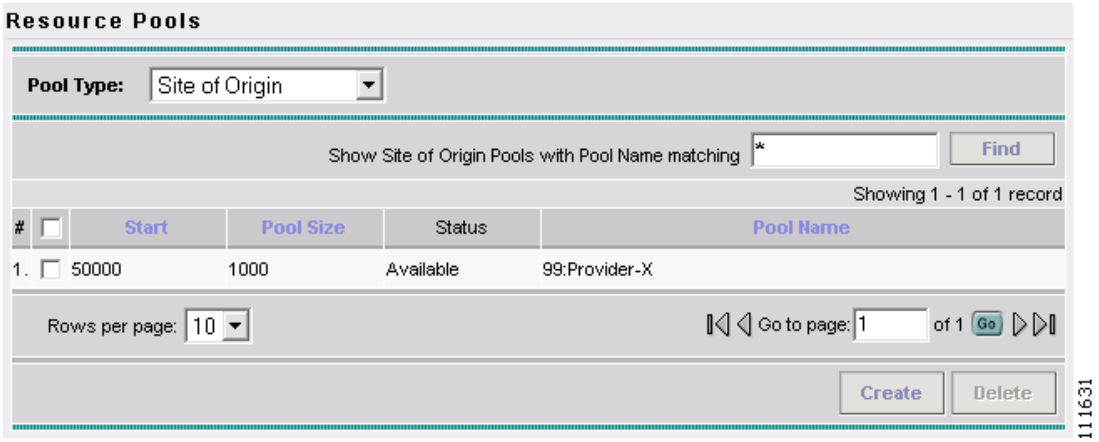
Step 7 Click **Select**.

The **Select Provider** window appears (not shown).

Step 8 Select a **Provider**.

The **Create Route Target Pool** window appears, as shown in Figure 2-61.

Figure 2-61 Resource Pools - Site of Origin



You have saved a Site of Origin Pool in the Repository.

Create a VC ID Pool

This section describes how to create a Virtual Circuit ID (VC ID) Pool with the ISC GUI.

To create a VC ID Pool with the ISC GUI, follow these steps:

Step 1 Log into ISC.

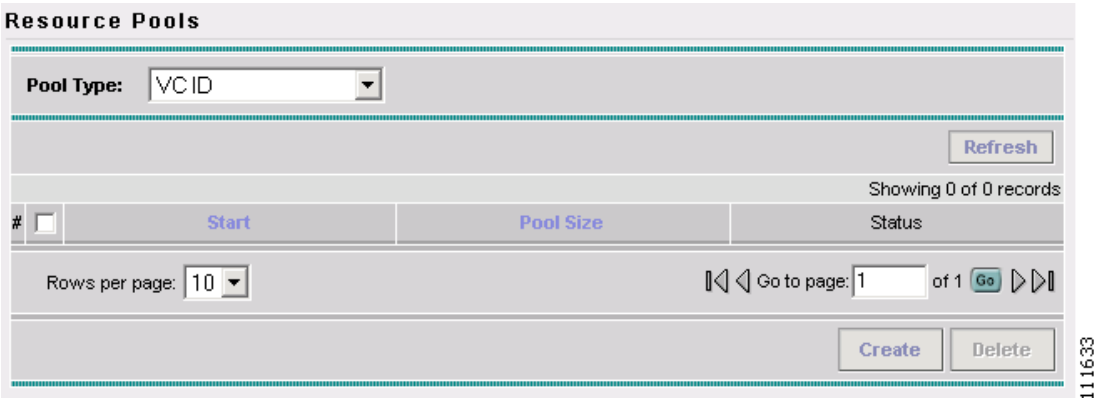
Step 2 Select **Service Inventory > Inventory and Connection Manager > Resource Pools.**

The **Resource Pools** window appears (not shown).

Step 3 Select **VC ID** from the **Pool Type** window.

The **Resource Pools - VC ID** window appears, as shown in Figure 2-62.

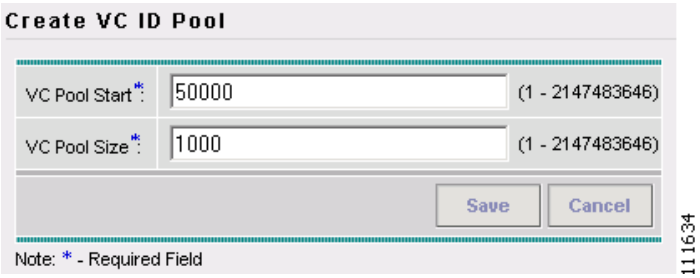
Figure 2-62 Resource Pools - VC ID



Step 4 Click **Create**.

The **Create VC ID Pool** window appears, as shown in Figure 2-63.

Figure 2-63 Create VC ID Pool



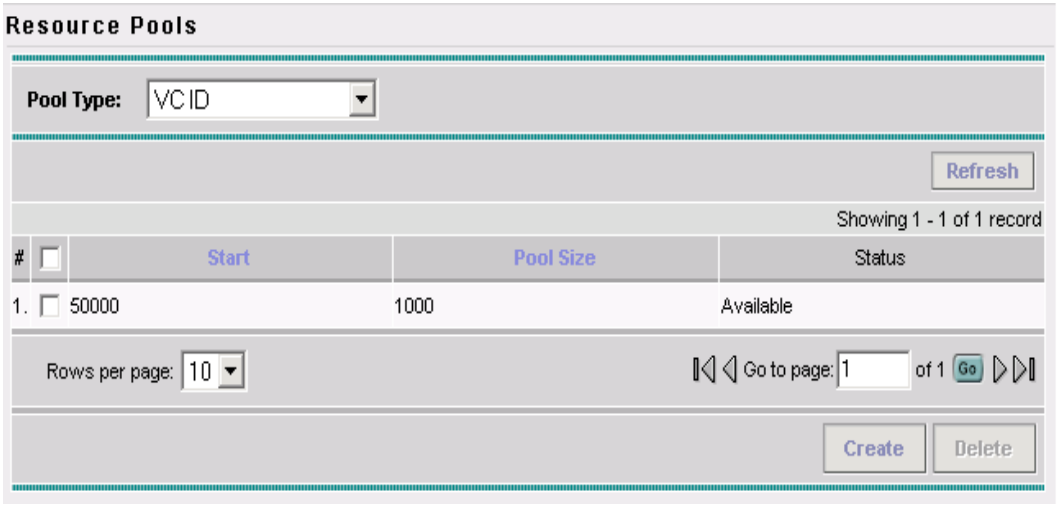
Step 5 Enter an *VC Pool Start*. (**50000**).

Step 6 Enter an *VC Pool Size*. (**1000**).

Step 7 Click **Save**.

The **Resource Pools - VC ID** window appears, as shown in Figure 2-64.

Figure 2-64 Resource Pools - VC ID



You have saved a VC ID Pool in the Repository.

Create a VLAN Pool

This section describes how to create a VLAN (VC ID) Pool with the ISC GUI.

To create a VLAN Pool with the ISC GUI, follow these steps:

Step 1 Log into ISC.

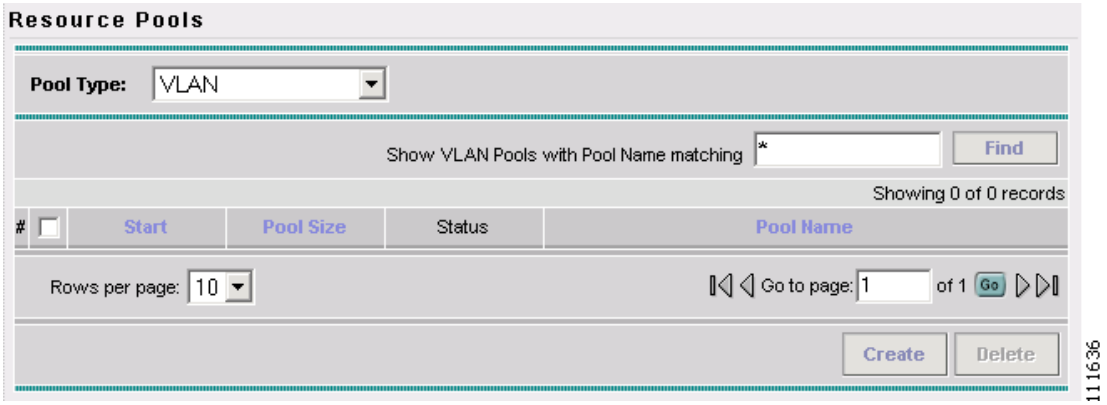
Step 2 Select **Service Inventory > Inventory and Connection Manager > Resource Pools.**

The **Resource Pools** window appears (not shown).

Step 3 Select **VLAN** from the **Pool Type** window.

The **Resource Pools - VLAN** window appears, as shown in Figure 2-65.

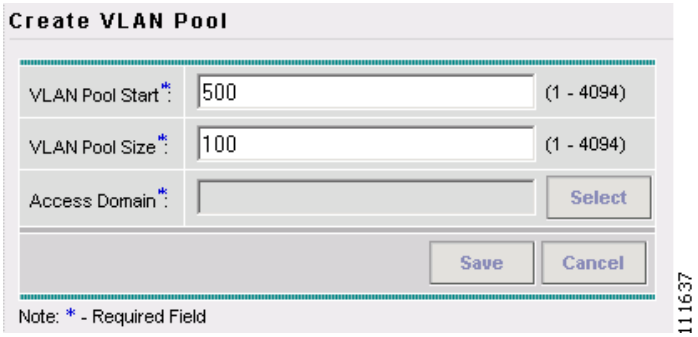
Figure 2-65 Resource Pools - VLAN



Step 4 Click **Create**.

The **Create VLAN Pool** window appears, as shown in Figure 2-66.

Figure 2-66 Select Device



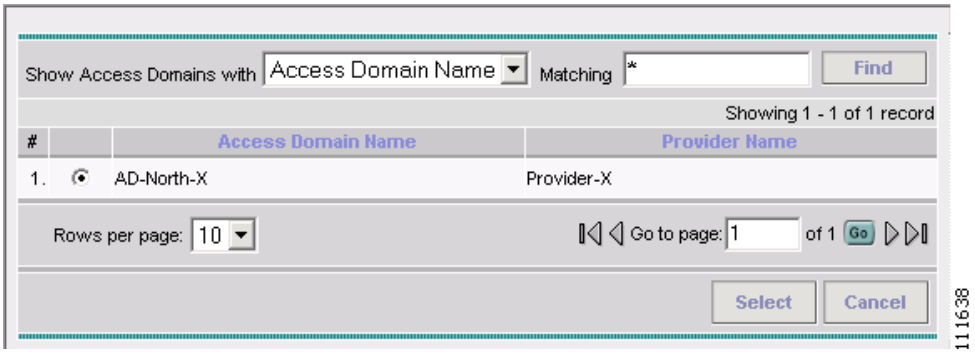
Step 5 Enter an *VLAN Pool Start*. (**500**)

Step 6 Enter an *VLAN Pool Size*. (**100**)

Step 7 Click **Select**.

The **Select Access Domain** window appears, as shown in Figure 2-67.

Figure 2-67 Select Access Domain

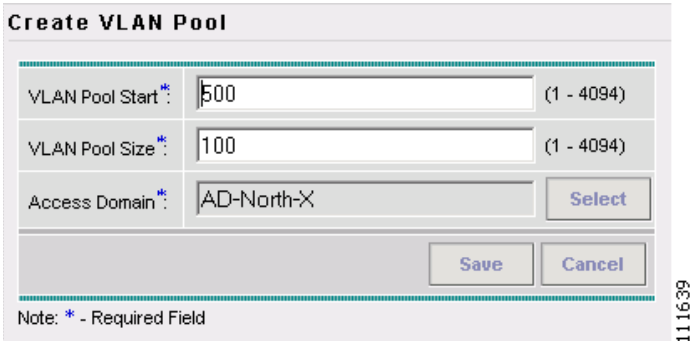


Step 8 Select an **Access Domain**.

Step 9 Click **Select.**

The **Create VLAN Pool** window appears, as shown in Figure 2-68.

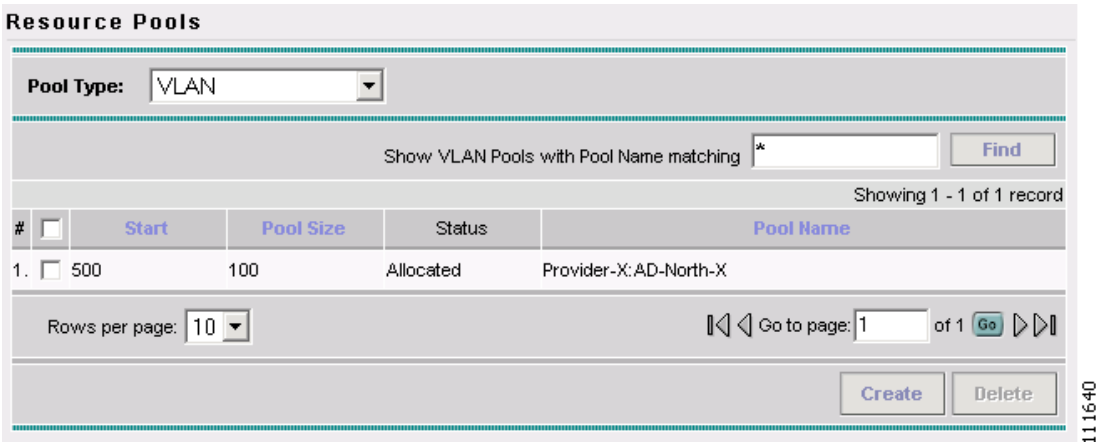
Figure 2-68 Create VLAN Pool



Step 10 Click **Save**.

The **Resource Pools - VLAN** window appears, as shown in Figure 2-69.

Figure 2-69 Resource Pools - VLAN



You have saved a VLAN Pool in the Repository.

Defining a VPN

During service deployment, ISC 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 ISC. The first element in a VPN definition is the name of the VPN.

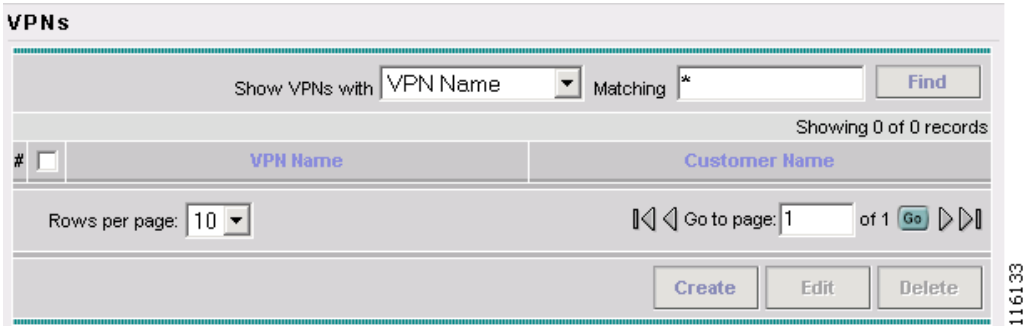
To create a VPN Name, follow these steps:

Step 1 Log into ISC.

Step 2 Select **Service Inventory > Inventory and Connection Manager > VPNs**.

The VPN window appears, as shown in Figure 2-70.

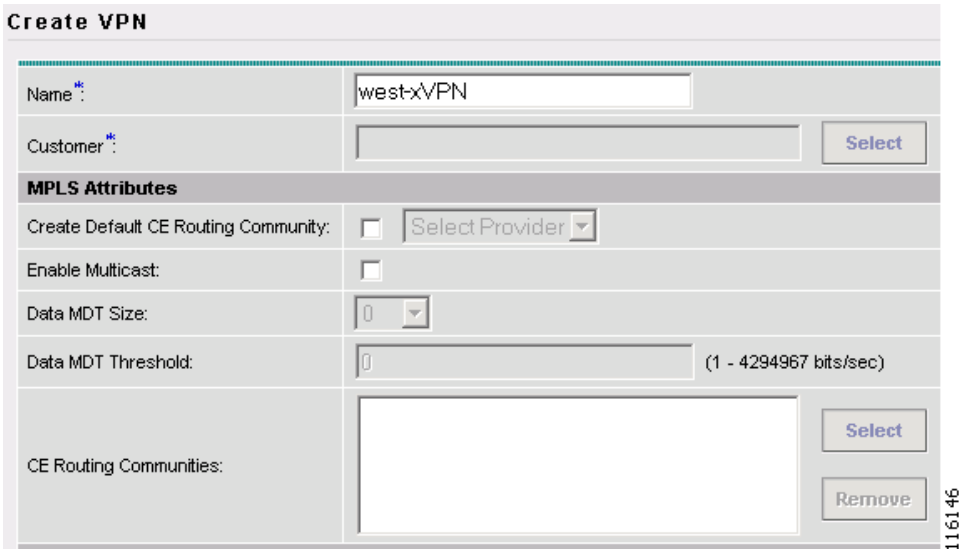
Figure 2-70 VPNs



Step 3 Click **Create** to create a VPN.

The Create VPN window appears, as shown in Figure 2-71.

Figure 2-71 Create VPN

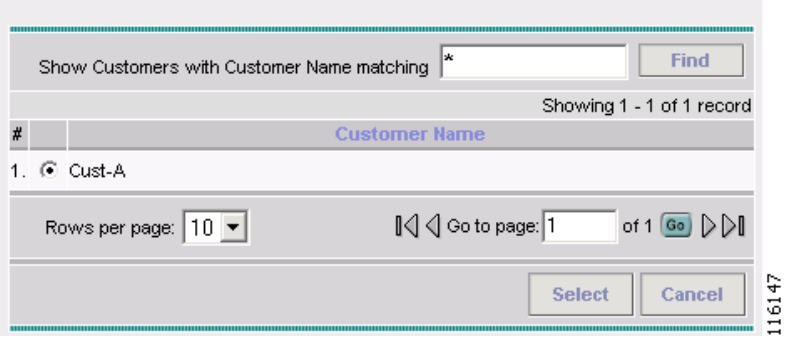


Step 4 Enter the *VPN Name*. (**west-xVPN**)

Step 5 Click **Select**.

The Select Customer window appears, as shown in Figure 2-72.

Figure 2-72 Select Customer

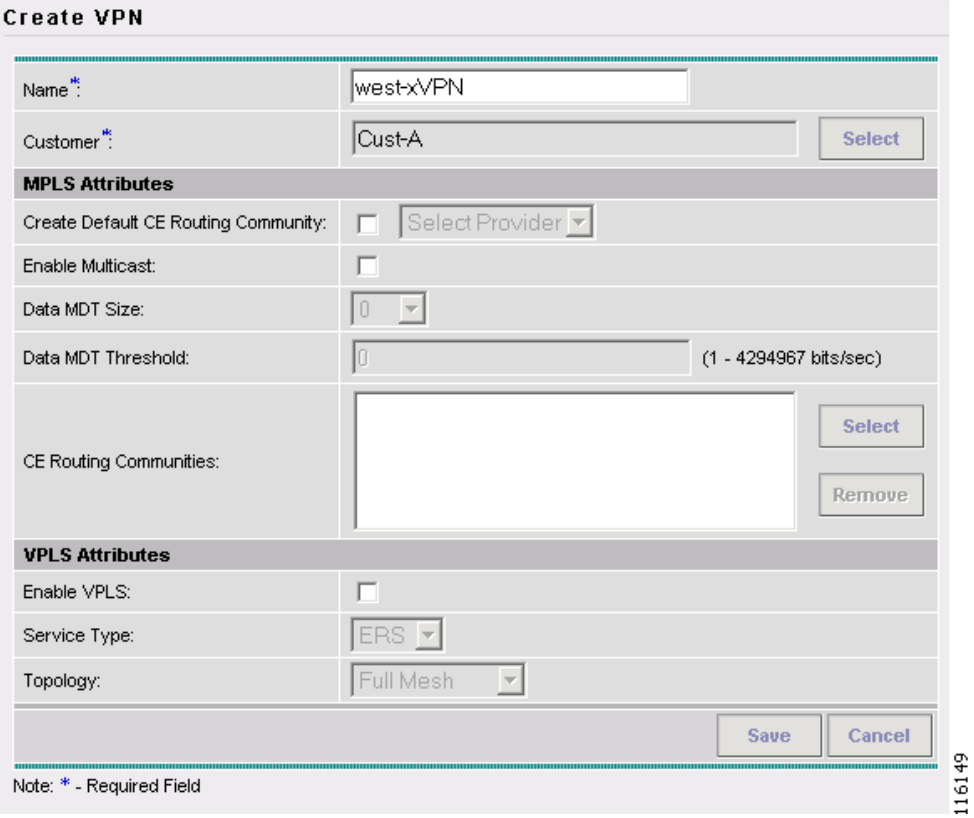


Step 6 Select a Customer and then click **Select.** (**Cust-A)**

Step 7 Click **Next**.

The VPNs window reappears, as shown in Figure 2-73.

Figure 2-73 VPNs



Step 8 To associate the VPN with a Provider, you have two options:

- Select **Create Default CE Routing Community** and then Select a **Provider**.
- Select a CE Routing Community, if one is already set up.

Step 9 Click **Save**.

The VPN Name (**west-xVPN**) is associated with the Customer (**Cust-A**) in this new VPN definition.

Defining an MVRFCE PE-CE Service Policy

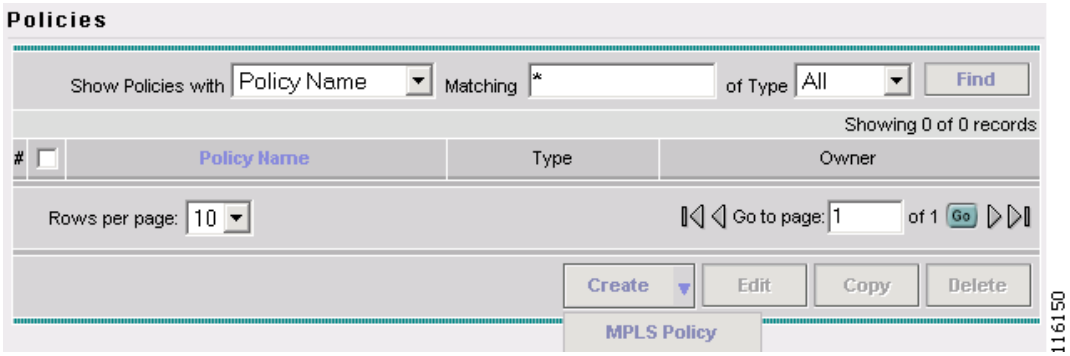
To define an MVRFCE PE-CE Service Policy, follow these steps:

Step 1 Log into ISC.

Step 2 Select **Service Design** > **Policies**.

The Policies window appears, as shown in Figure 2-74.

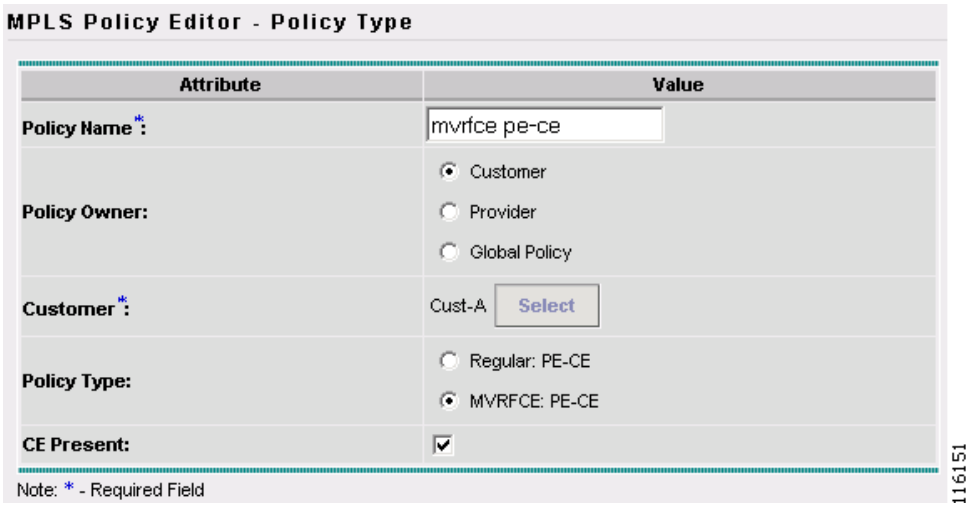
Figure 2-74 Policies



Step 3 From the **Create** drop-down list, select **MPLS Policy**.

The MPLS Policy Editor - Policy Type window appears, as shown in Figure 2-75.

Figure 2-75 MPLS Policy Editor - Policy Type



Step 4 Edit the following attributes:

Step 5 Enter the *policy name*. (**mvrfce pe-ce**)

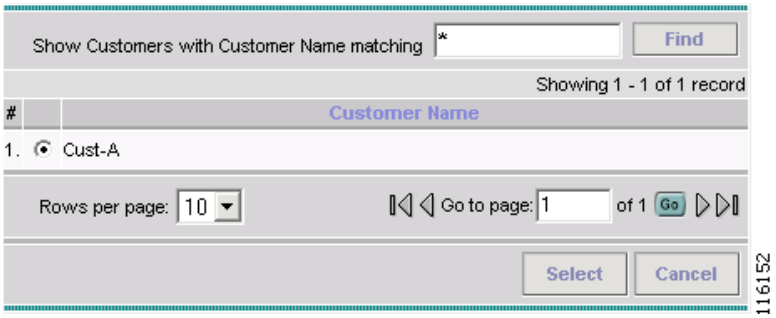
Step 6 Select the Policy Type. (**Regular MVRFCE PE-CE**)

Step 7 Select CE Present. (**CE Present**)

Step 8 Click **Select** to specify a Customer.

The Customer for MPLS Policy ownership window appears, as shown in Figure 2-76.

Figure 2-76 Customer for MPLS Policy

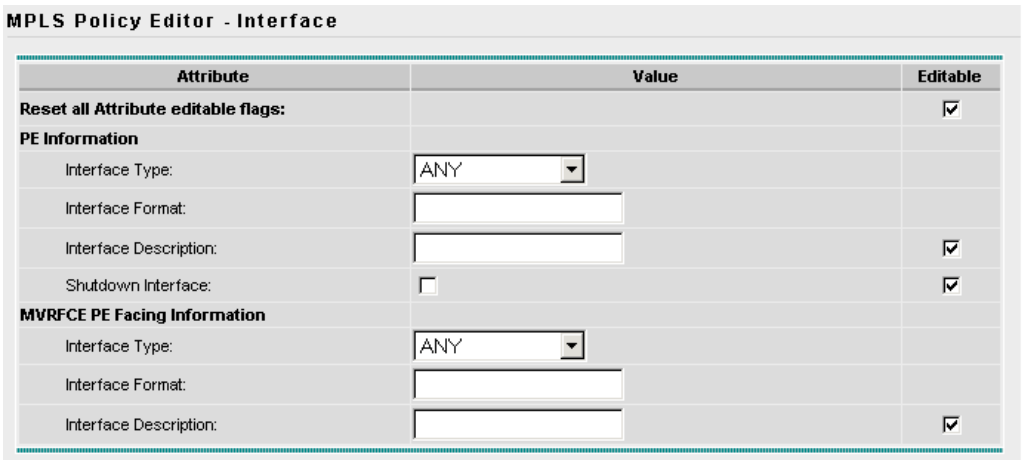


Step 9 Select a Customer and then click **Select.** (**Cust-A**)

Step 10 Click **Next**.

The MPLS Policy Editor - PE Interface window appears, as shown in Figure 2-77.

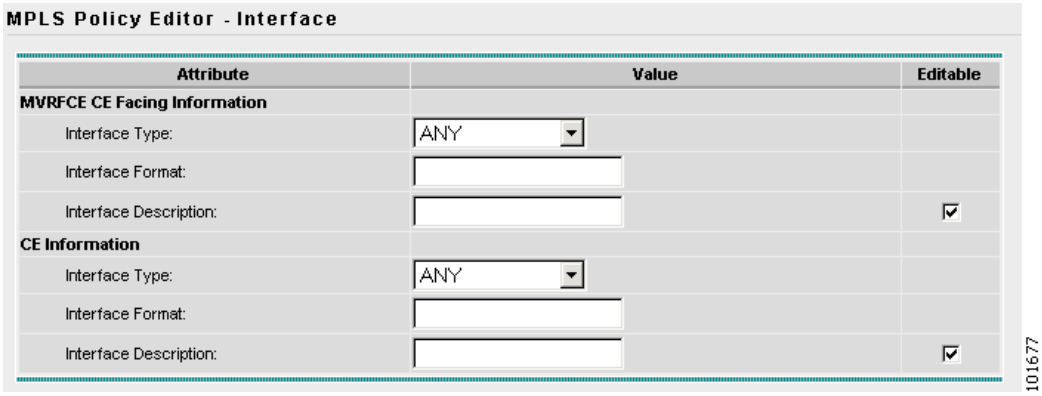
Figure 2-77 The MPLS Policy Editor - PE Interface



Step 11 Click **Next**.

The MPLS Policy Editor - CE Interface window appears, as shown in Figure 2-78.

Figure 2-78 The MPLS Policy Editor - CE Interface

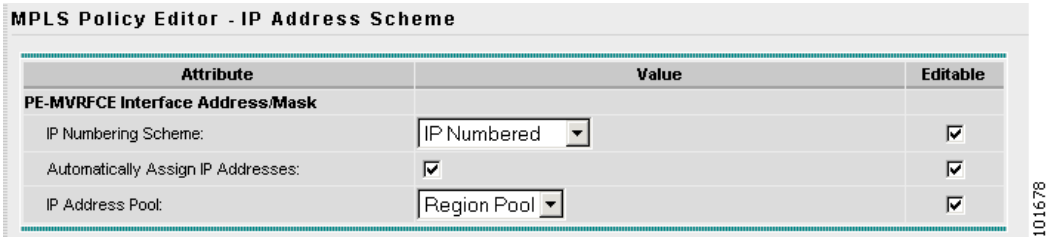


Step 12 Click **Next** to accept the defaults.

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

The MPLS Policy Editor - PE IP Address Scheme window appears, as shown in Figure 2-79.

Figure 2-79 The MPLS Policy Editor - PE IP Address Scheme



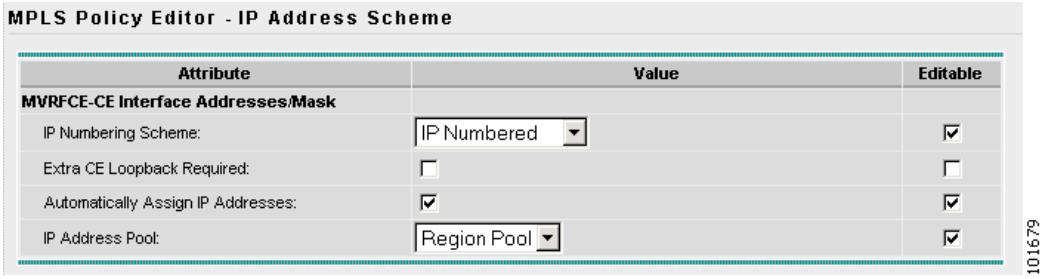
Step 13 Select **Automatically Assign IP Addresses**.

The **IP Address Pool** appears with the **Region Pool** in the window.

Step 14 Click **Next**.

The MPLS Policy Editor - CE IP Address Scheme window appears, as shown in Figure 2-79.

Figure 2-80 The MPLS Policy Editor - CE IP Address Scheme

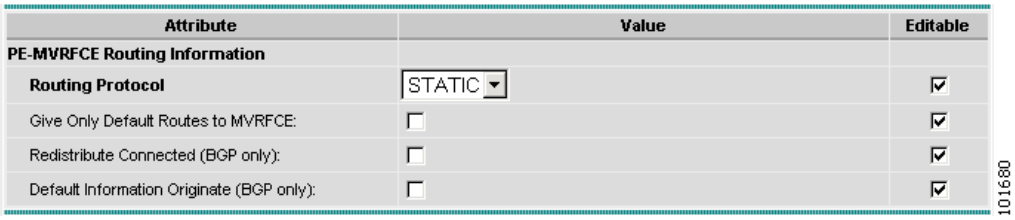


Step 15 Select **Automatically Assign IP Address**.

Step 16 Click **Next**.

The MPLS Policy Editor - PE Routing Information window appears, as shown in Figure 2-81.

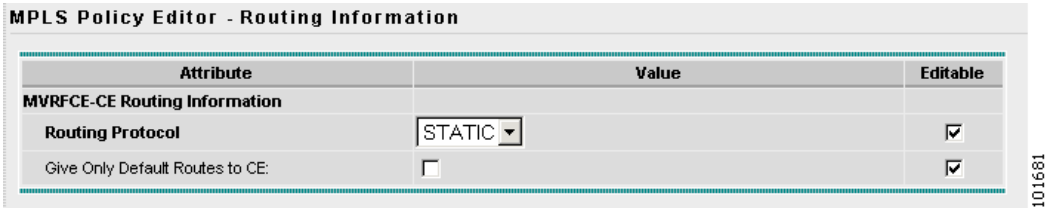
Figure 2-81 The MPLS Policy Editor - PE Routing Information



Step 17 Click **Next** to accept the defaults.

The MPLS Policy Editor - CE Routing Information window appears, as shown in Figure 2-82.

Figure 2-82 The MPLS Policy Editor - CE Routing Information

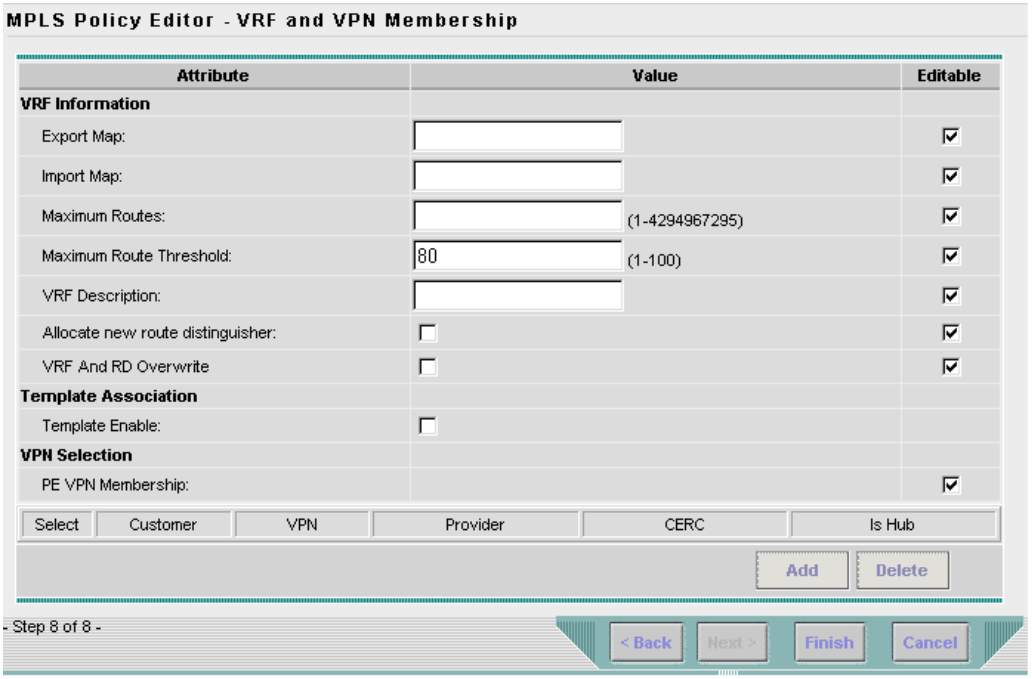


Step 18 Click **Next** to accept the defaults.

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

The MPLS Policy Editor - VRF and VPN Membership window appears, as shown in Figure 2-83.

Figure 2-83 The MPLS Policy Editor - VRF and VPN Membership



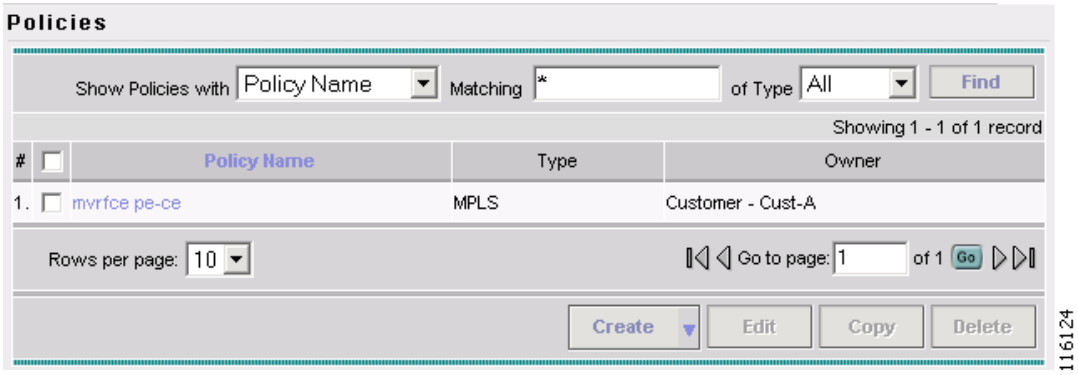
Step 19 Click **Next** to accept the defaults.

Note You could add the VPN here, but in this scenario you add the VPN in the Service Request process. Make sure the Editable check boxes are checked, so you can edit these attributes in the Service Request process.

Step 20 Click **Finish**:

The Policies window reappears, as shown in Figure 2-84.

Figure 2-84 Policies



The MVRFCE PE-CE Service Policy is complete.

Creating an MVRFCE PE-CE Service Request

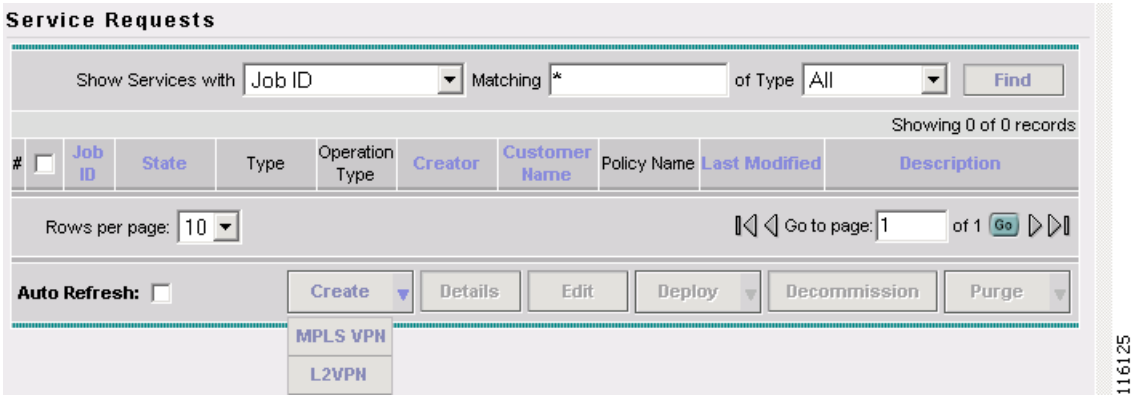
To create a MVRFCE PE-CE Service Request, follow these steps:

Step 1 Log into ISC.

Step 2 Select **Service Inventory > Inventory and Connection Manager > Service Requests**.

The Service Requests window appears, as shown in Figure 2-85.

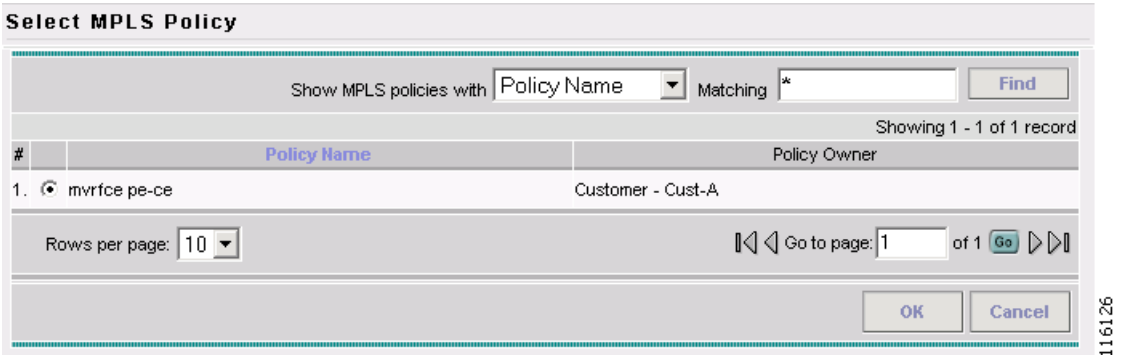
Figure 2-85 Service Requests



Step 3 From the **Create** drop-down list, select **MPLS VPN**.

The Select MPLS Policy window appears, as shown in Figure 2-86.

Figure 2-86 Select MPLS Policy

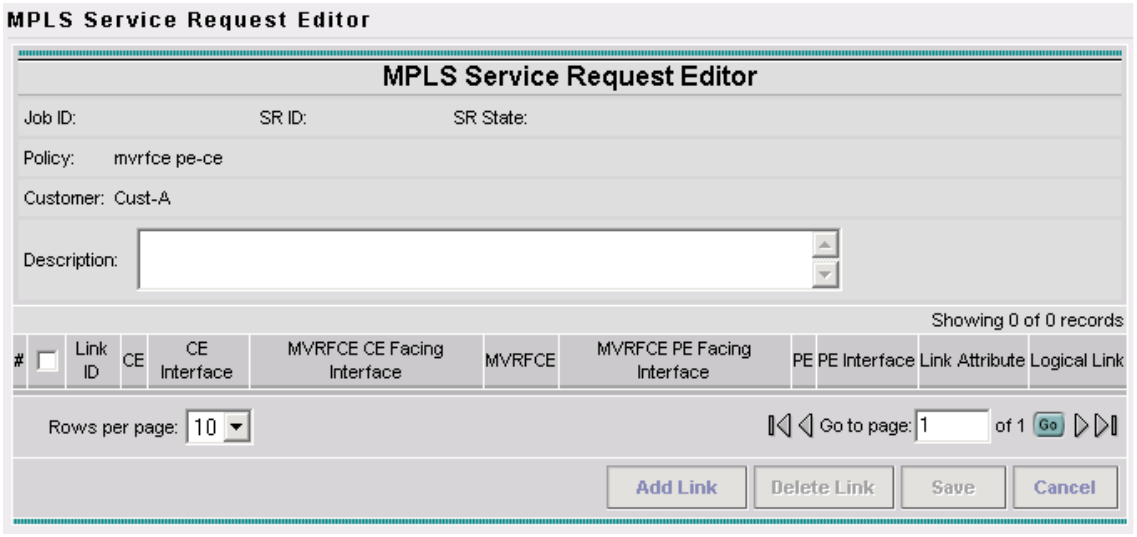


Step 4 Select the MPLS Policy. (**mvrfce pe-ce**)

Step 5 Click **OK**.

The MPLS Service Request Editor window appears, as shown in Figure 2-87.

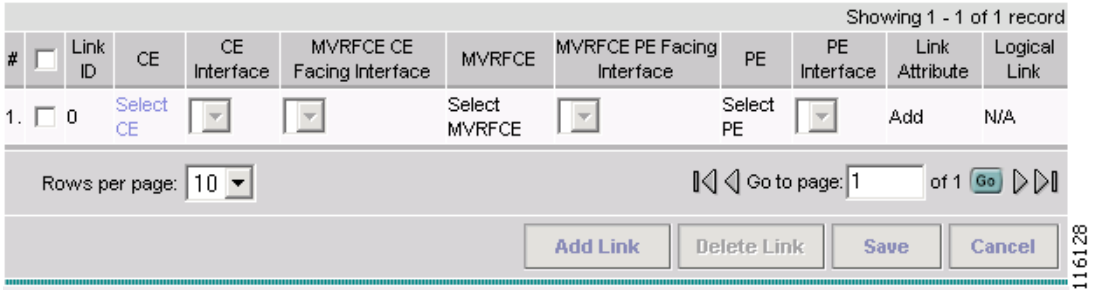
Figure 2-87 MPLS Service Request Editor



Step 6 Click **Add Link**.

The MPLS Service Request Editor window appears, as shown in Figure 2-88.

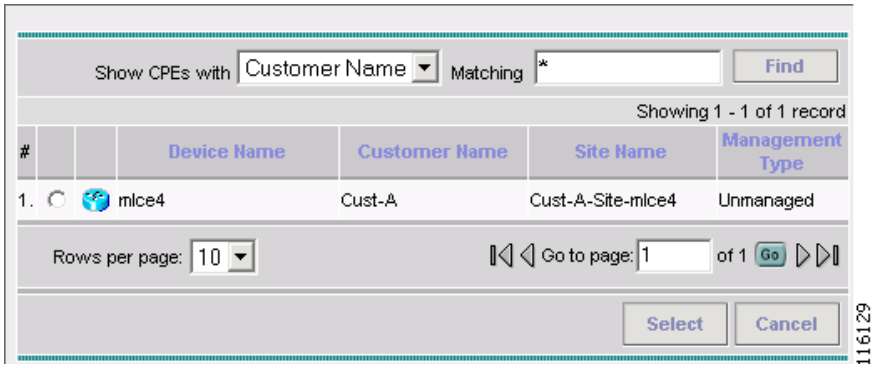
Figure 2-88 MPLS Service Request Editor - Select CE



Step 7 Click **Select CE**.

The Select CPE Device - CE window appears, as shown in Figure 2-89.

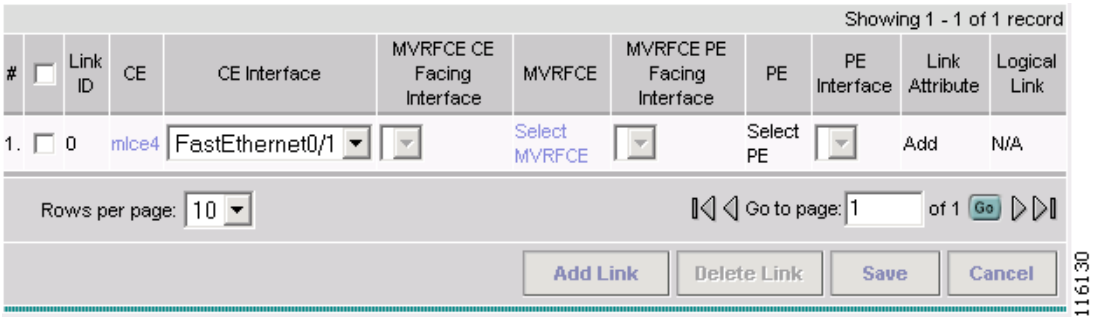
Figure 2-89 Select CPE Device - CE



Step 8 Select the **CPE** Device and then click **Select**. (**mlce4**)

The MPLS Service Request Editor window appears, as shown in Figure 2-90.

Figure 2-90 MPLS Service Request Editor - CE Interface

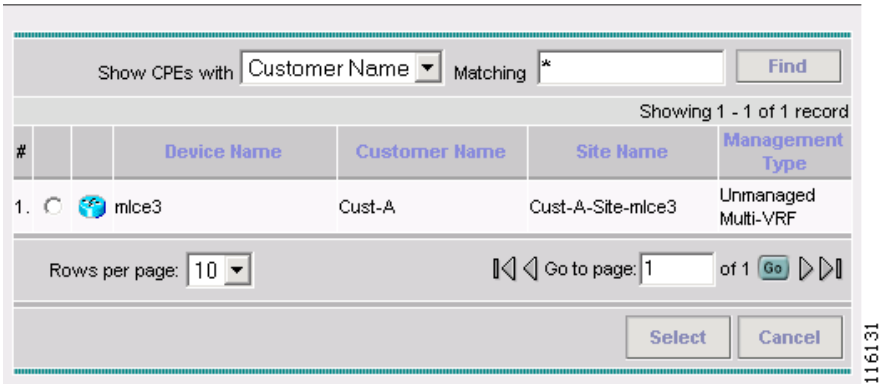


Step 9 Select the **CE Interface** from the drop-down box. (**FE0/1**)

Step 10 Click **Select MVRFCE**.

The Select CPE Device - MVRFCE window appears, as shown in Figure 2-91.

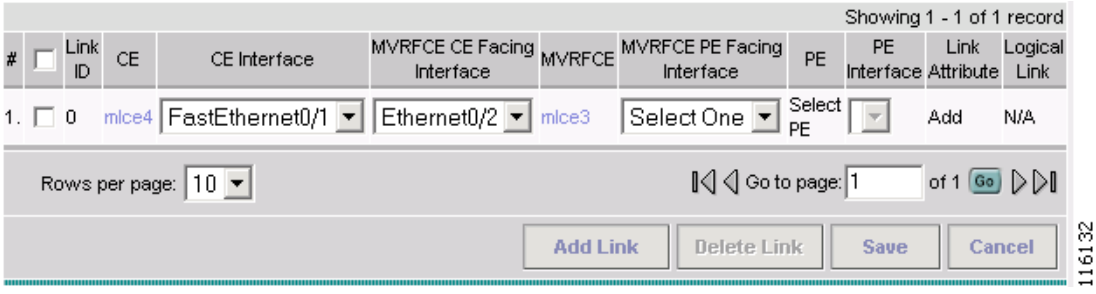
Figure 2-91 Select CPE Device - MVRFCE



Step 11 Select the **MVRFCE** and then click **Select**. (**mlce3**)

The MPLS Service Request Editor window appears, as shown in Figure 2-92.

Figure 2-92 MPLS Service Request Editor - MVRFCE CE Facing Interface

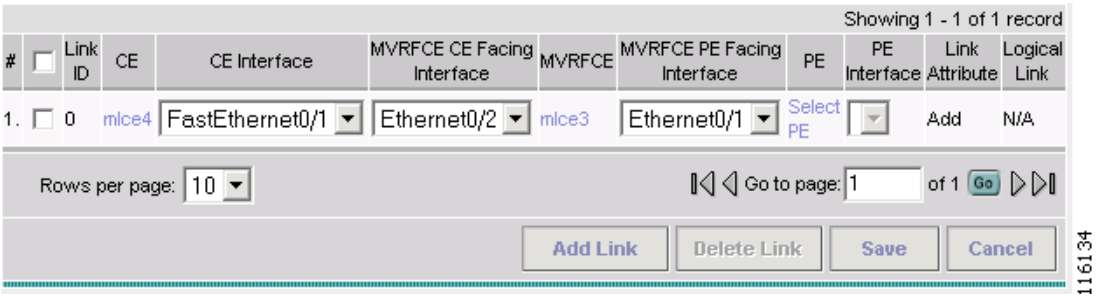


Step 12 Select the **MVRFCE CE Facing Interface** from the drop-down box. (**E0/2**)

Step 13 Select the **MVRFCE PE Facing Interface** from the drop-down box. (**E0/1**)

The MPLS Service Request Editor window appears, as shown in Figure 2-93.

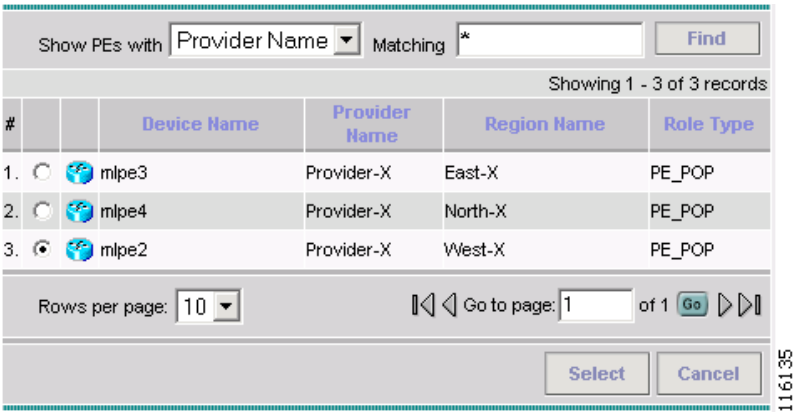
Figure 2-93 MPLS Service Request Editor - Select MVRFCE PE Facing Interface



Step 14 Select **PE**.

The Select PE Device window appears, as shown in Figure 2-94.

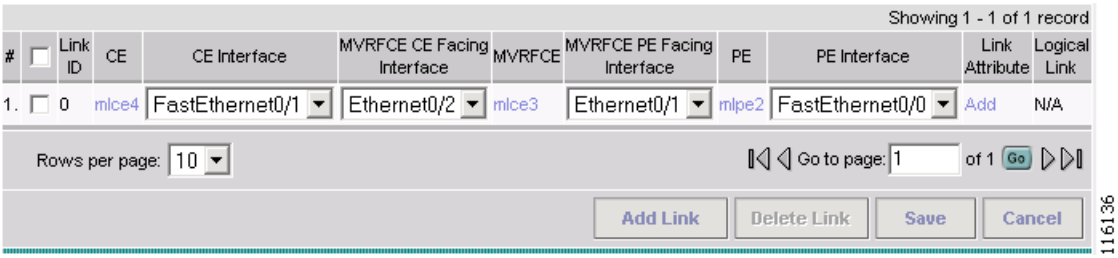
Figure 2-94 Select PE Device



Step 15 Select the **PE** and then click **Select**.

The MPLS Link Attribute Editor window appears, as shown in Figure 2-95.

Figure 2-95 MPLS Link Attribute Editor - Interface

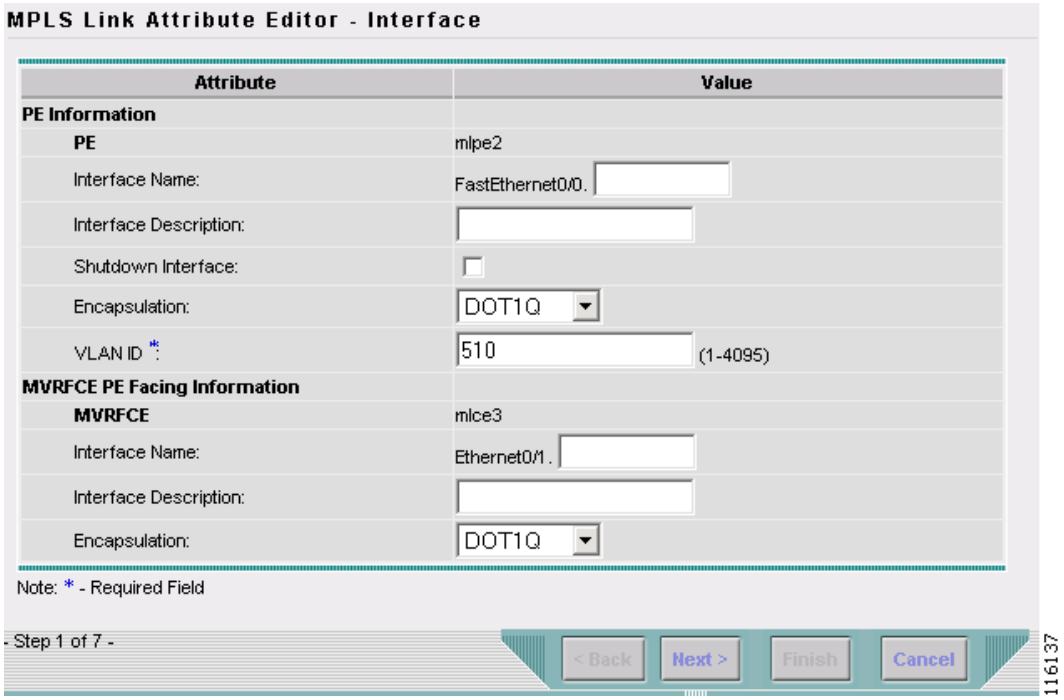


Step 16 Select the **PE Interface** from the drop-down box. (**FE0/0**)

Step 17 Click **Add** in the **Link Attribute** cell.

The MPLS Link Attribute Editor - Interface window appears, as shown in Figure 2-95.

Figure 2-96 MPLS Link Attribute Editor - Interface

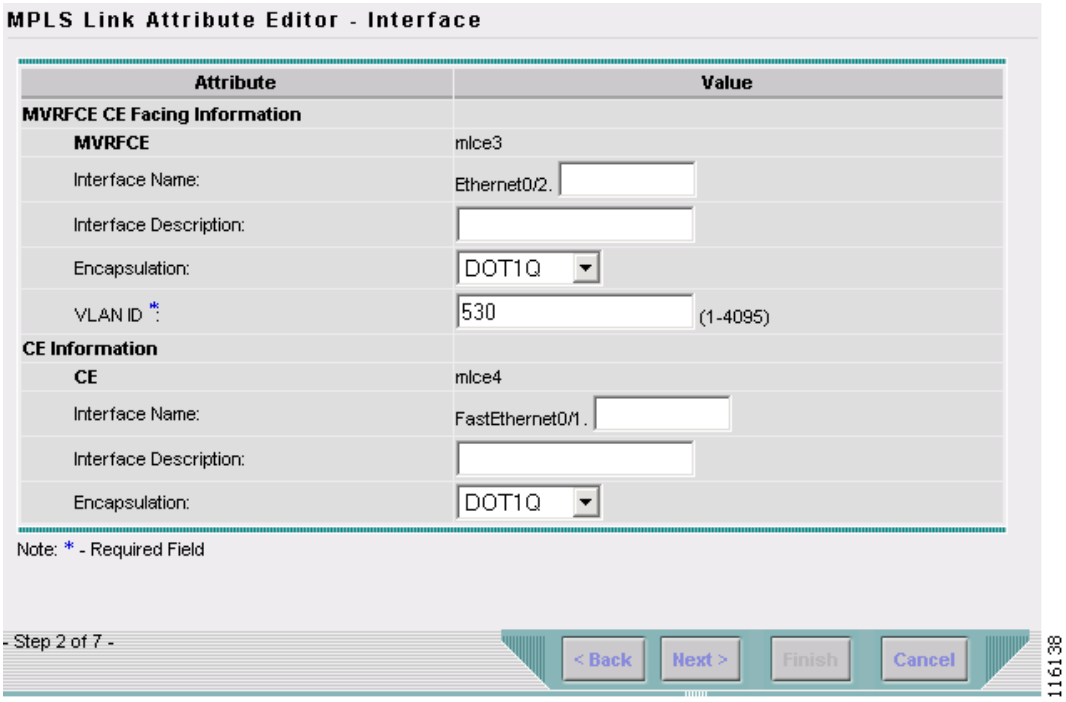


Step 18 Enter the *VLAN ID* for the PE. (**510**)

Step 19 Click **Next**.

The MPLS Link Attribute Editor - Interface window appears, as shown in Figure 2-97.

Figure 2-97 MPLS Link Attribute Editor - Interface

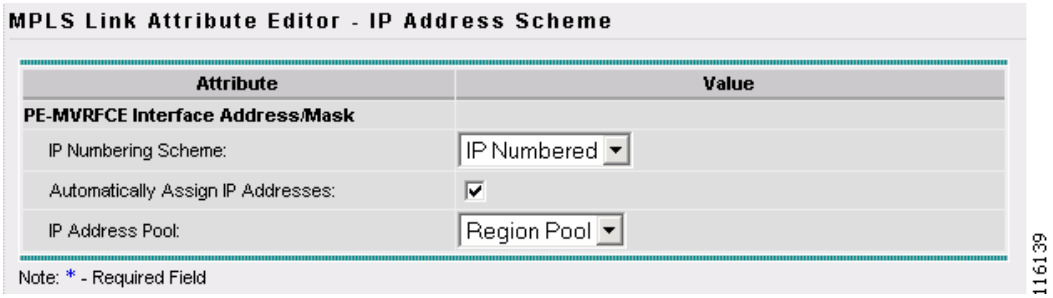


Step 20 Enter the *VLAN ID* for the MVRFCE. (**530**)

Click **Next**.

The MPLS Link Attribute Editor - IP Address Scheme window appears, as shown in Figure 2-98.

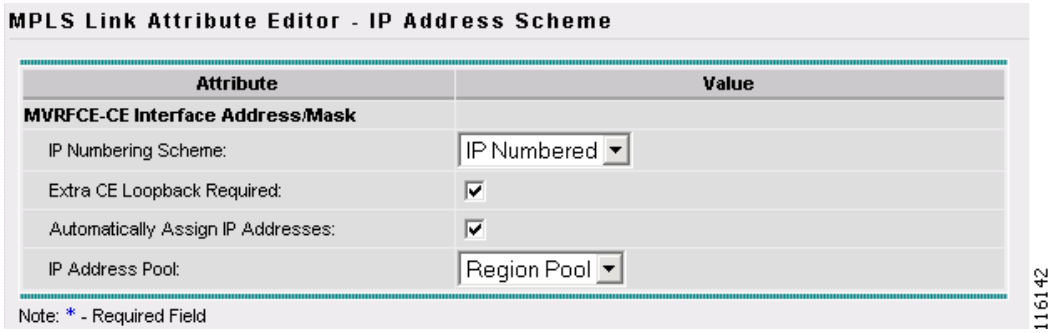
Figure 2-98 MPLS Link Attribute Editor - IP Address Scheme



Step 21 Keep the defaults and click **Next**.

The MPLS Link Attribute Editor - IP Address Scheme window appears, as shown in Figure 2-99.

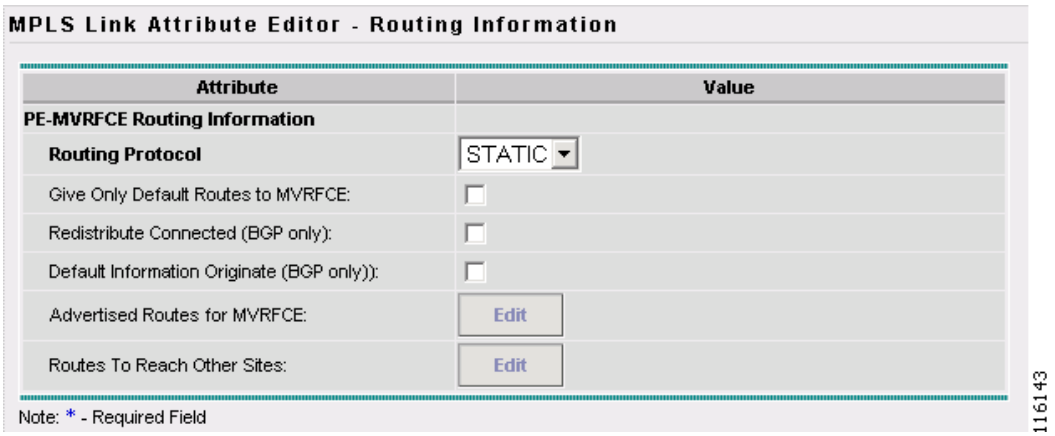
Figure 2-99 MPLS Link Attribute Editor - IP Address Scheme



Step 22 Keep the defaults and click **Next**.

The MPLS Link Attribute Editor - Routing Information window reappears, as shown in Figure 2-100.

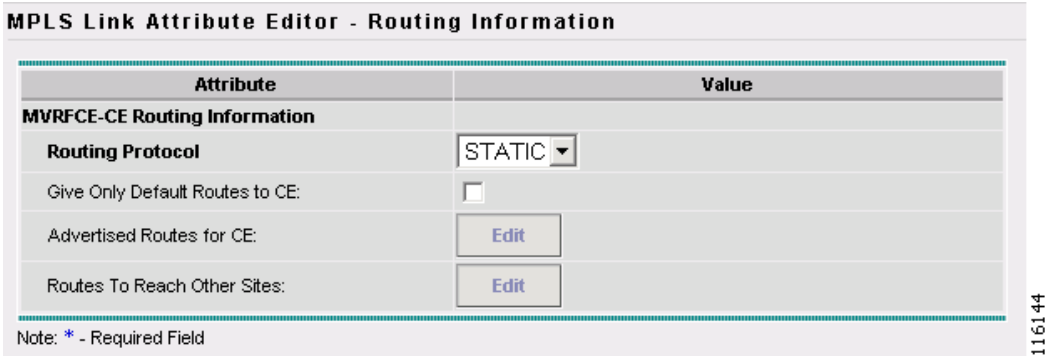
Figure 2-100 MPLS Link Attribute Editor - PE Routing Information



Step 23 Keep the defaults and click **Next**.

The MPLS Link Attribute Editor - Routing Information window reappears, as shown in Figure 2-101.

Figure 2-101 MPLS Link Attribute Editor - MVRFCE Routing Information



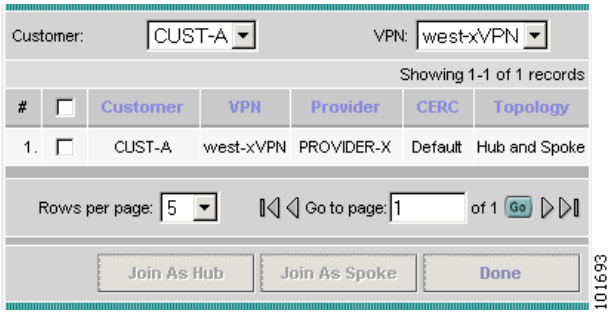
Step 24 Keep the defaults and click **Next**.

The MPLS Link Attribute Editor - VRF and VPN window appears (not shown).

Step 25 Click **Add** to select a VPN.

The Select VPN window appears, as shown in Figure 2-102.

Figure 2-102 Select VPN



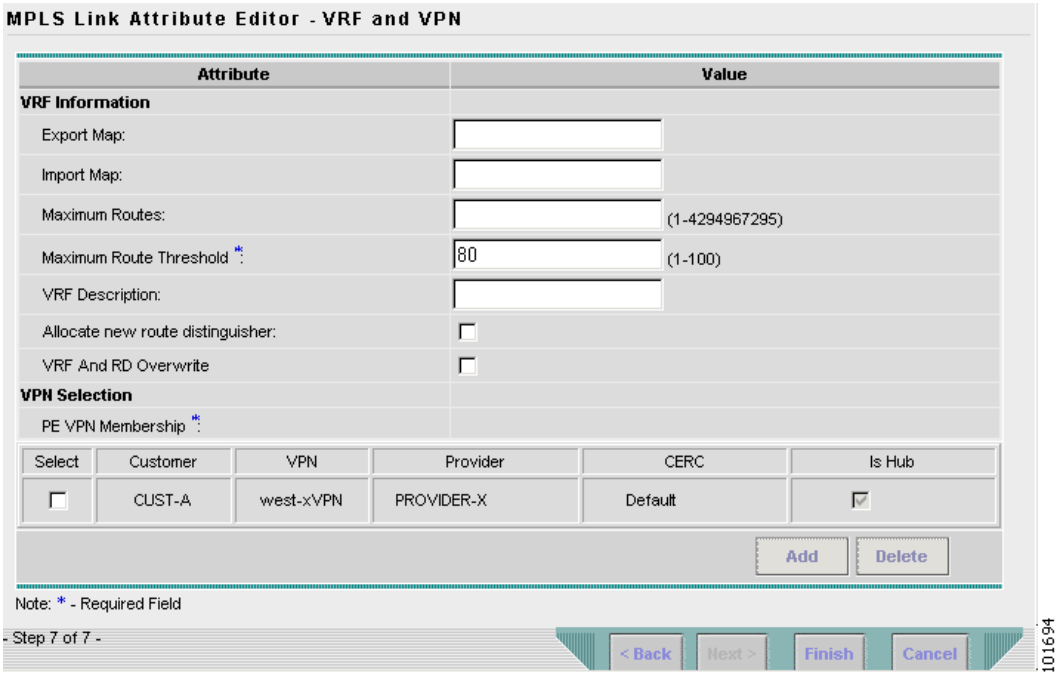
Step 26 Select a **VPN**.

Step 27 Click **Join as Hub** or **Join as Spoke** to join the CERC.

Step 28 Click **Done**.

The MPLS Link Attribute Editor - VRF and VPN window reappears, as shown in Figure 2-103.

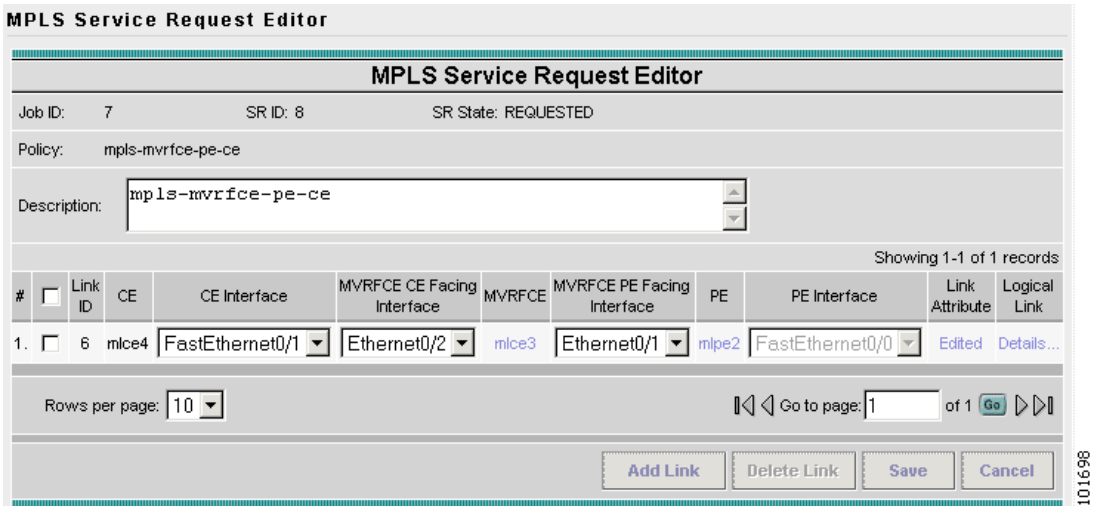
Figure 2-103 MPLS Service Request Editor



Step 29 Click **Finish**.

The MPLS Service Request Editor window appears, as shown in Figure 2-104.

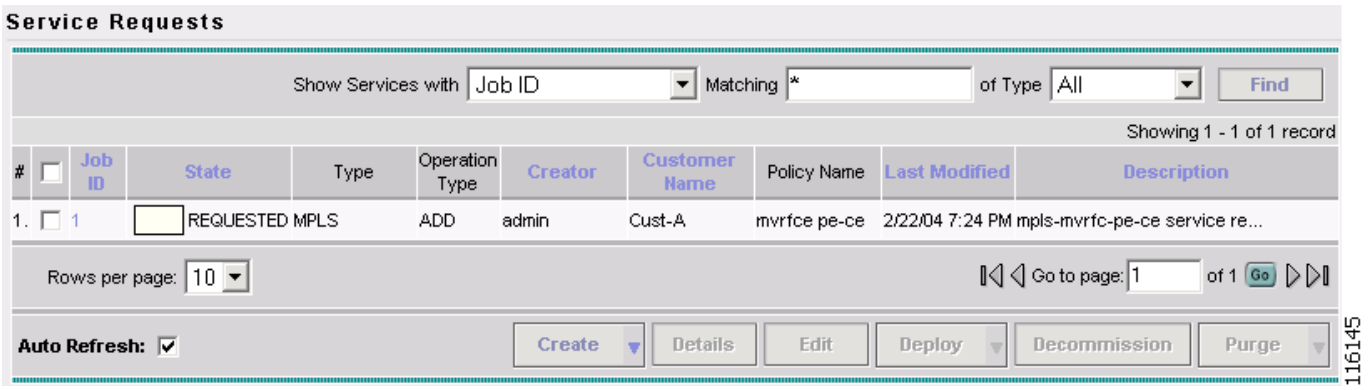
Figure 2-104 MPLS Service Request Editor



Step 30 Enter the Service Request *description* and then click **Save**. (**mpls-mvrfce-pe-ce**)

The MPLS Service Requests window appears, as shown in Figure 2-105.

Figure 2-105 Service Request



The MPLS VPN MVRFCE PE-CE Service Request is in the Requested state and ready to deploy.