Provisioning Unmanaged Multi-VRF CE

This chapter describes how to implement a new, Unmanaged Multi-VPN routing and forwarding tables (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:

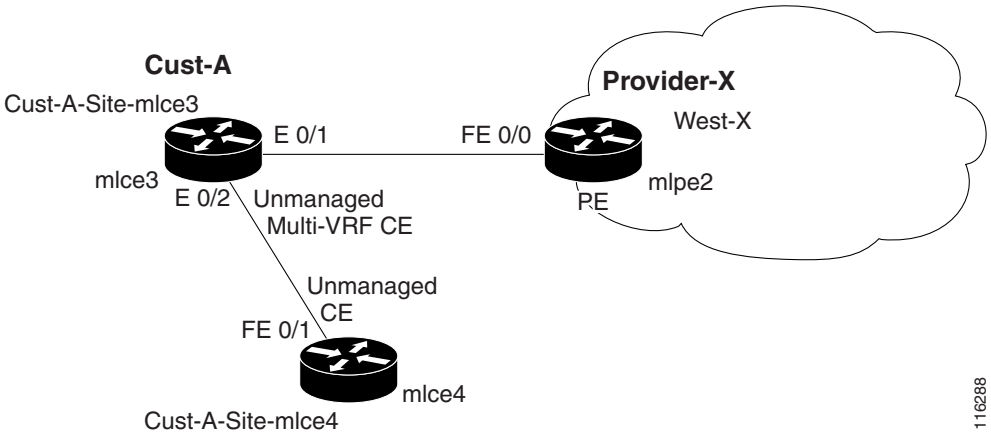
Unmanaged MVRFCE Overview

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 (see Chapter 5, "MPLS VPN Service Policies"), 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 (see Chapter 6, "MPLS VPN Service Requests"), 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

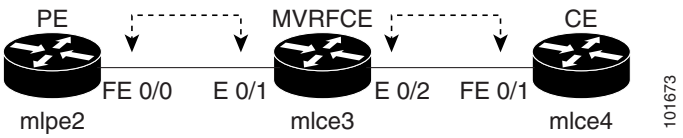
MVRFCE PE-CE Policy Type

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.

Adding 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 ISC Customers

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

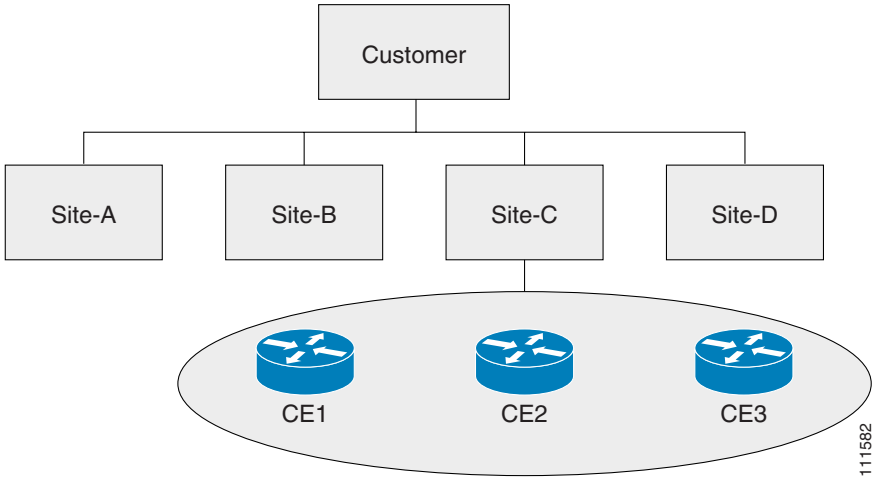
- Customer Name
- Customer Site
- Customer Device (CPE)

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 Devices

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:

Creating Logical Devices

Step 1 Log into ISC.

Step 2 Go to **Service Inventory > Inventory and Connection Manager > Devices.**

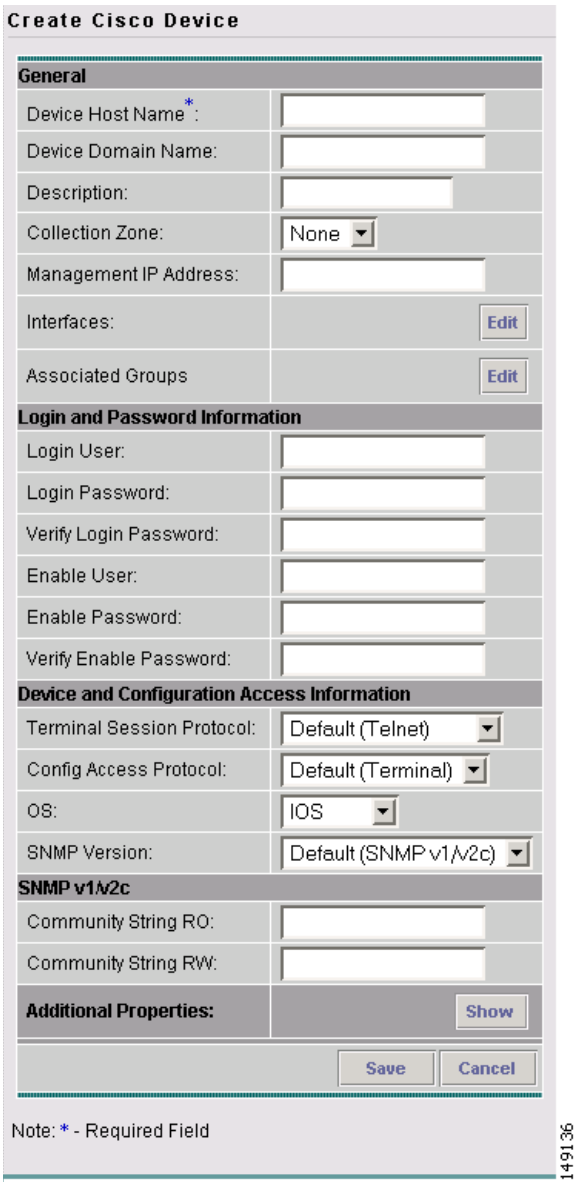
The Devices window appears.

Step 3 Click **Create**.

Step 4 From the drop-down list, choose **Cisco Device**.

The Create Cisco Device window appears (see Figure 2-4).

Figure 2-4 New Device Information



Step 5 Enter all required information for this new device.

Step 6 For Additional Properties, click **Show**.

Step 7 To save this new device, click **Save**.

You have saved a Device in the Repository.

Collecting Configurations

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

Step 1 Go to **Monitoring > Task Manager**.

The Tasks window appears.

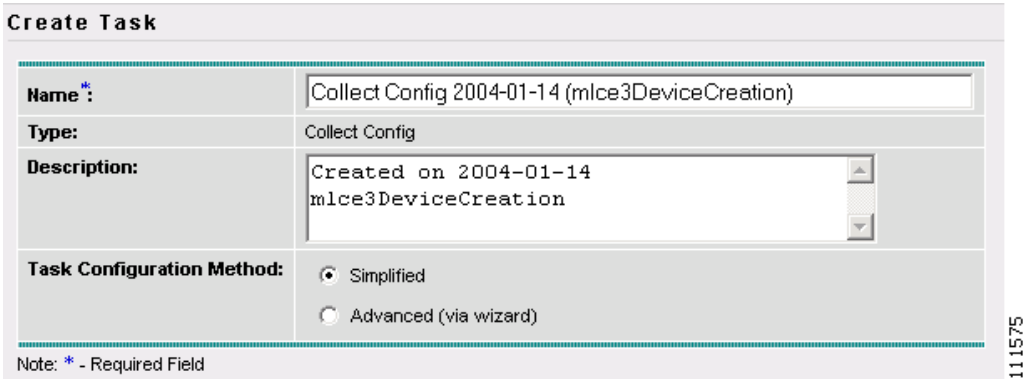
Step 2 Click **Create**.

Step 3 Choose **Collect Config**.

The Create Task window appears, as shown in Figure 2-5.

Tip You might want to change the default **Name** and **Description** for this task, so you can more easily identify it in the task log.

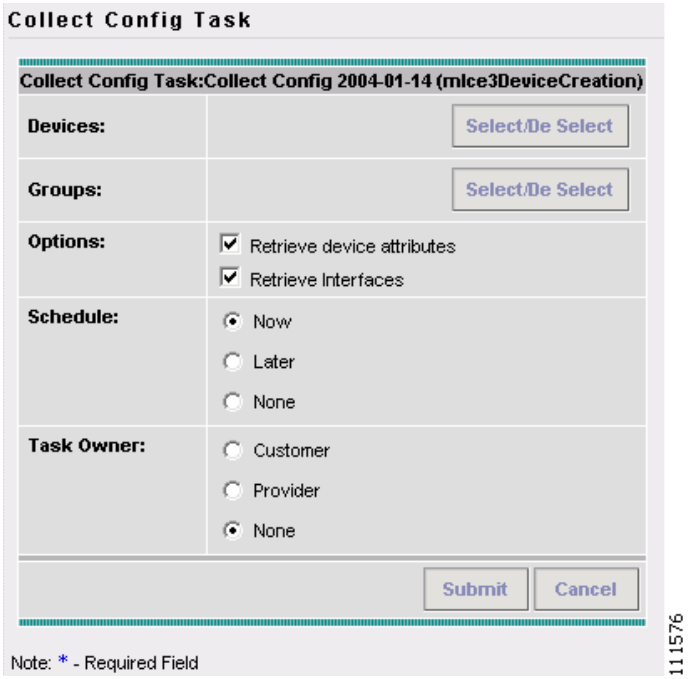
Figure 2-5 Create Task



Step 4 Click **Next**.

The Collect Config Task window appears, as shown in Figure 2-6.

Figure 2-6 Collect Config Task



Step 5 To choose devices associated to the task, in the Devices panel, click **Select/De Select**.

The Choose Device window appears.

Step 6 Check to choose the desired device(s), then click **Select**.

The Collect Config Task window reappears.

To Choose device groups associated to the task, in the Groups panel, click **Select/De Select**.

A list of available device groups appears.

Step 7 Check to choose the desired device group(s), then click **Select**.

The Collect Config Task window reappears.

Step 8 Set schedule and task owner, if applicable.

Step 9 Click **Submit**.

The Tasks window appears.

Step 10 Choose your task in the Task Name column, then click **Details** to view more information.

Monitoring Task Logs

Step 1 Go to **Monitoring > Task Manager**.

The Tasks window appears.

Step 2 In the Selection pane, click **Logs**.

The Task Runtime Actions window appears.

Note The **Status** field shows the task has completed successfully.

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

Creating Customers, Sites, and CPEs

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:

Creating Customers

Step 1 Go to **Service Inventory > Inventory and Connection Manager > Customers**.

The Customers window appears.

Step 2 Click **Create**.

The Create Customer window appears.

Step 3 Enter a Customer Name and then click **Save**.

The Customers window appears.

Creating Sites

Step 1 Go to **Service Inventory > Inventory and Connection Manager**.

Step 2 In the Selection pane, click **Customer Sites**.

The Customer Site window appears.

Step 3 Click **Create**.

The Create Customer Site window appears.

Step 4 Enter a site name in the Name field.

Step 5 To associate a customer to this site, in the Customer field, click **Select**.

A list of available customer names appears.

Step 6 Check to choose the desired customer, then click **Select**.

The Create Customer Site window reappears.

Step 7 Click **Save**.

Creating CPEs

Step 1 Go to **Service Inventory > Inventory and Connection Manager**.

Step 2 In the Selection pane, click **CPE Devices**.

The CPE Devices window appears.

Step 3 Click **Create**.

The Create CPE Device window appears.

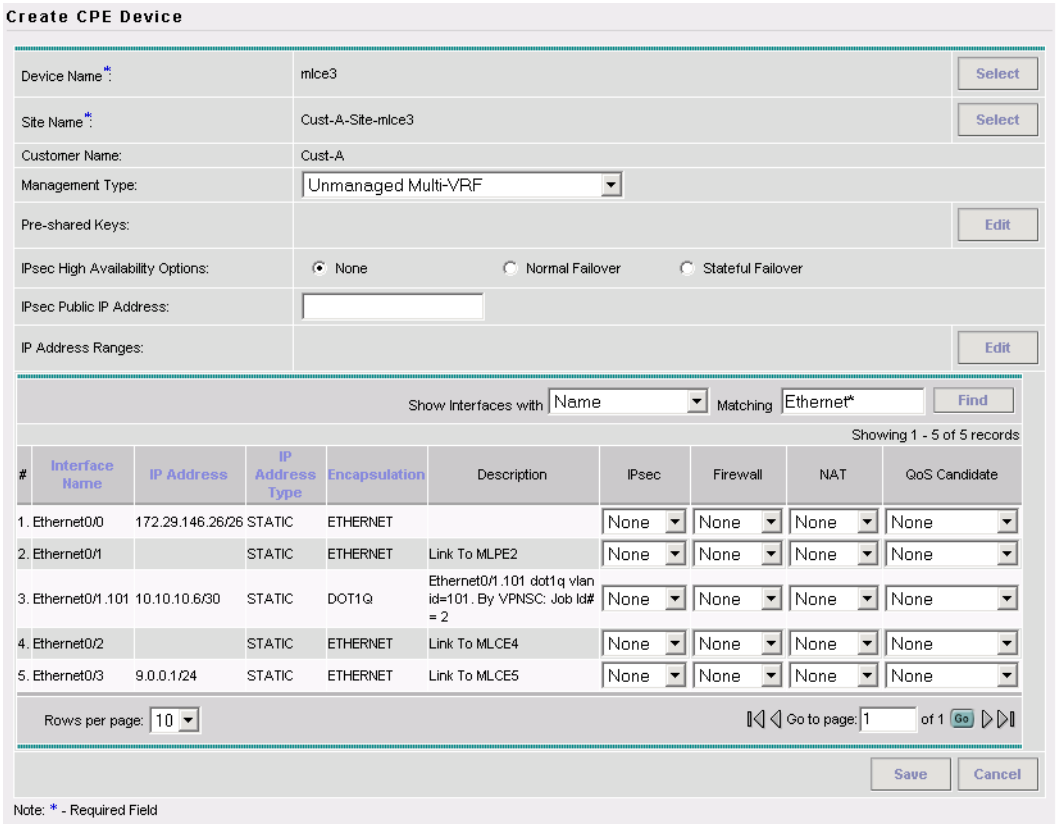
Step 4 In the Device Name field, click **Select**.

The Choose Device window appears.

Step 5 Check to choose a device, then click **Select**.

The Create CPE Device window reappears, as shown in Figure 2-7.

Figure 2-7 Create CPE Device



Step 6 From the drop-down list, choose a Management Type (**Unmanaged Multi-VRF**).

Step 7 Click **Save**.

The Create CPE Device window appears showing the Unmanaged Multi-VRF CPE Device you have created.

Creating New Provider PE

This section contains the following sections:

Overview of ISC Providers

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)

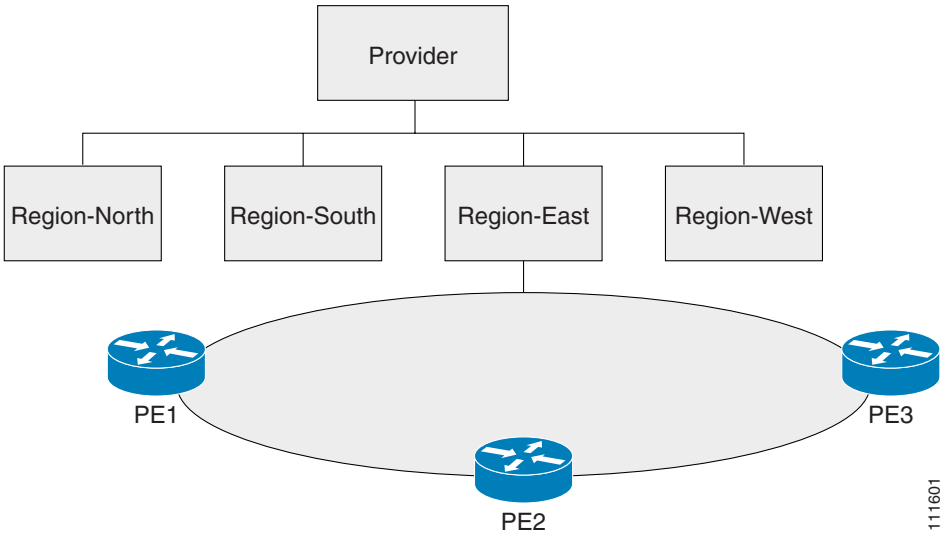
In ISC, a provider administrative domain (PAD) is a single AS. It is not a specific service provider, rather it is a logical container for Regions and PEs.

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 2-8 Overview of an ISC Provider



Creating Device Groups

Step 1 Log into ISC.

Step 2 Go to **Service Inventory > Inventory and Connection Manager > Device Groups.**

The Device Groups window appears.

Step 3 Click **Create**.

The Create Device Group window appears.

Step 4 In the Name field, enter the Device Group Name.

Step 5 Click **Save**.

Creating Providers and PEs

Step 1 Log into ISC.

Step 2 Go to **Service Inventory > Inventory and Connection Manager > Providers.**

The Providers window appears.

Step 3 Click **Create**.

The Create Provides window appears.

Step 4 In the Name field, enter a provider name.

Step 5 In the BGP AS (Boarder Gateway Protocol Autonomous System) field, enter a a valid value (1-65535).

Step 6 Enter contact information is applicable.

Step 7 Click **Save**.

Creating Region for PE

Step 1 Log into ISC.

Step 2 In the Selection pane, click **Provider Regions**.

The Provider Regions window appears.

Step 3 Click **Create**.

The Create Provider Region window appears.

Step 4 In the Name field, enter a provider region name.

Step 5 In the Provider field, accept the default value, if one is shown, or to choose a provider, click **Select**.

Step 6 Click **Save**.

Editing PEs

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:

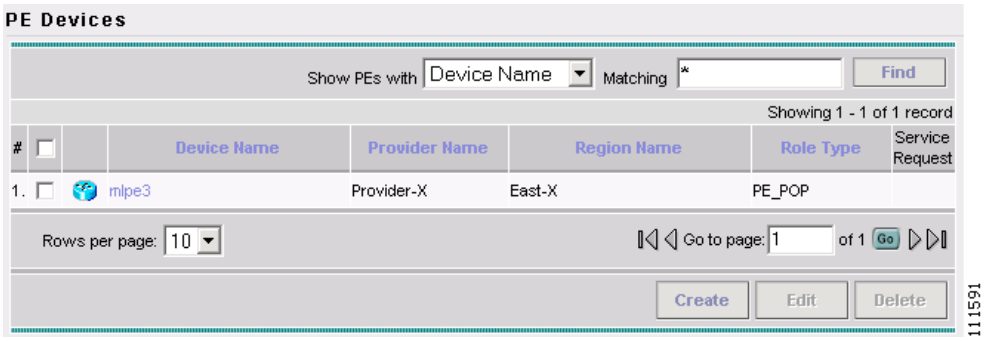
Step 1 Open a new browser and log into ISC.

Step 2 Go to **Service Inventory > Inventory and Connection Manager.**

Step 3 In the Selection pane, click **PE Devices**.

The PE Devices window appears, as shown in Figure 2-9.

Figure 2-9 PE Devices



Step 4 Choose the PE Device.

Step 5 Click **Edit.**

The Edit PE Device window appears.

Step 6 Make required changes, then click **Save**.

Creating Access Domains

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 Access Domains, page 2-16
- Creating Access Domains, page 2-17

Overview of Access Domains

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

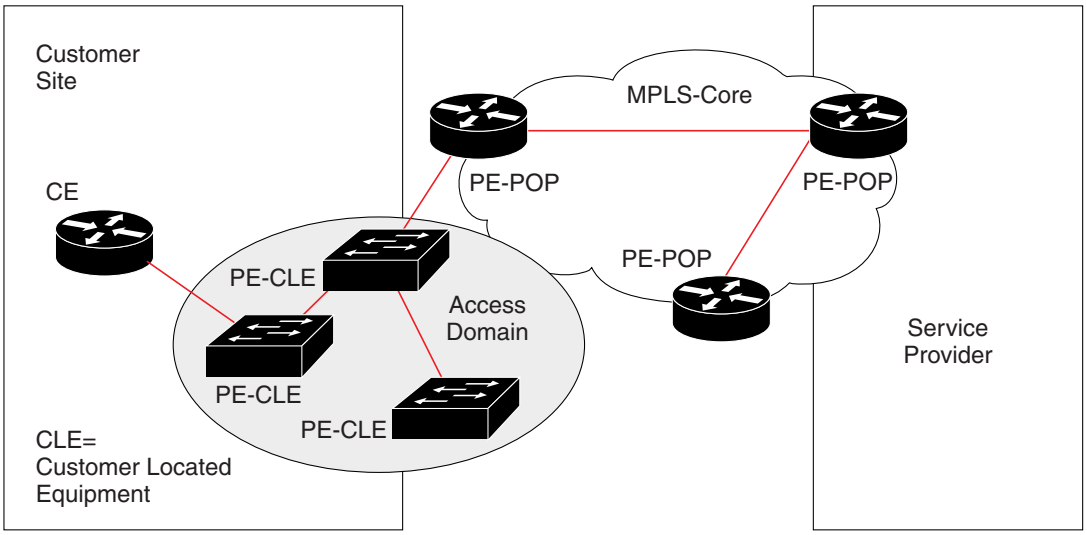
The Layer 2 Ethernet switching domain that connects a PE to a CE is called an Access Domain. All the switches attached to the PE-POP belong to this Access Domain. These switches belong to the Provider and are defined in ISC as PE-CLE.

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 2-10 shows an overview of an ISC Access Domain.

Figure 2-10 Overview of an Access Domain



Creating Access Domains

Step 1 Log into ISC.

Step 2 Go to **Service Inventory > Inventory and Connection Manager.**

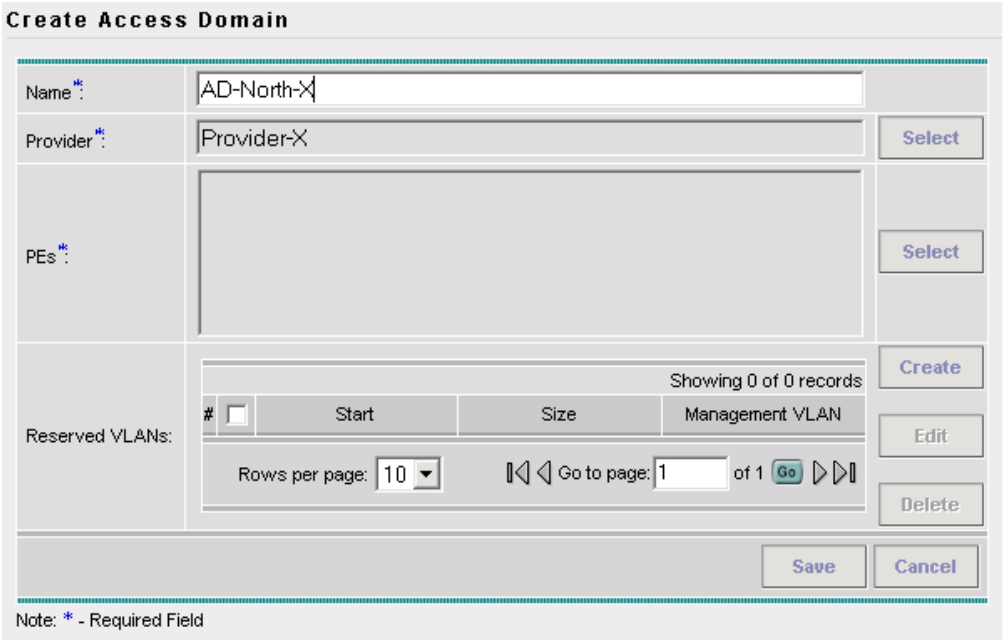
Step 3 In the Selection pane, under **Providers**, click **Access Domains**.

The Access Domains window appears.

Step 4 Click **Create**.

The Create Access Domain window appears, as shown in Figure 2-11.

Figure 2-11 Create Access Domain



Step 5 Enter an Access Domain Name.

Step 6 Choose a Provider.

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

The Show PEs window appears.

Step 8 Choose a PE.

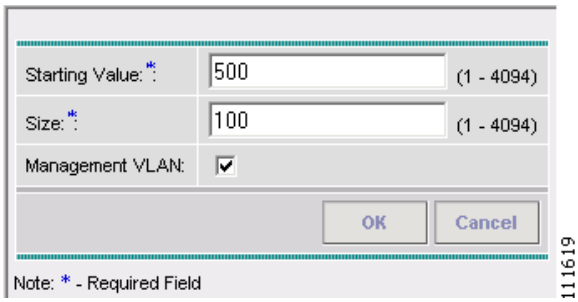
Step 9 Click **Select**.

You are returned to the Create Access Domain window.

Step 10 For Reserved VLNs, click **Create**.

The Create Reserved VLAN window appears, as shown in Figure 2-12.

Figure 2-12 Create Reserved VLAN



Step 11 Enter a Starting Value.

Step 12 Enter a Size.

Step 13 Choose **Management VLAN**.

Step 14 Click **OK**.

The Access Domains window appears showing that the Access Domain has been saved in the Repository.