Provisioning an Ethernet Private Line (EPL) Virtual Connection

Cisco© EPN Manager 2.0

Job Aid

Core Software Group

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Basics

Overview

Ethernet private line virtual connections (EPL VCs) are a method by which you can provide customers with a dedicated point-to-point connection through the network for their Ethernet traffic.

For example, EPL VCs can support your customers' needs to:

- ❖ Connect remote offices with an enterprise home office.
- ❖ Consolidate servers that support remote locations in a data center.
- ❖ Simplify their data networks by leveraging your services.

The EPL VC supports a single service instance, transporting customer data from point to point by using two user-network interfaces (UNIs) on the source and destination devices on the network. EPL VCs provide a significant degree of protocol transparency, so that the connection between customer sites appears seamless to end users.
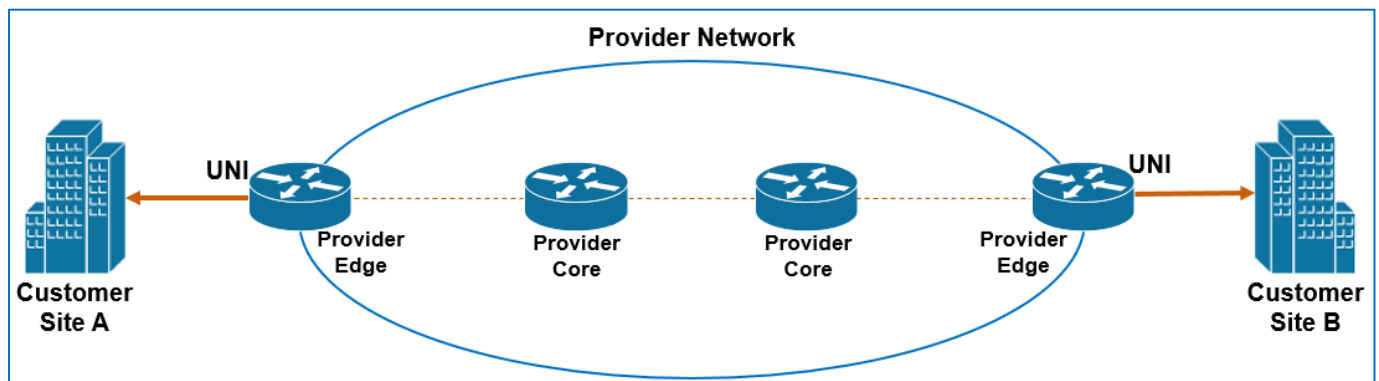
The Provisioning Wizard

You use the **Provisioning Wizard** to provision EPL virtual connections.
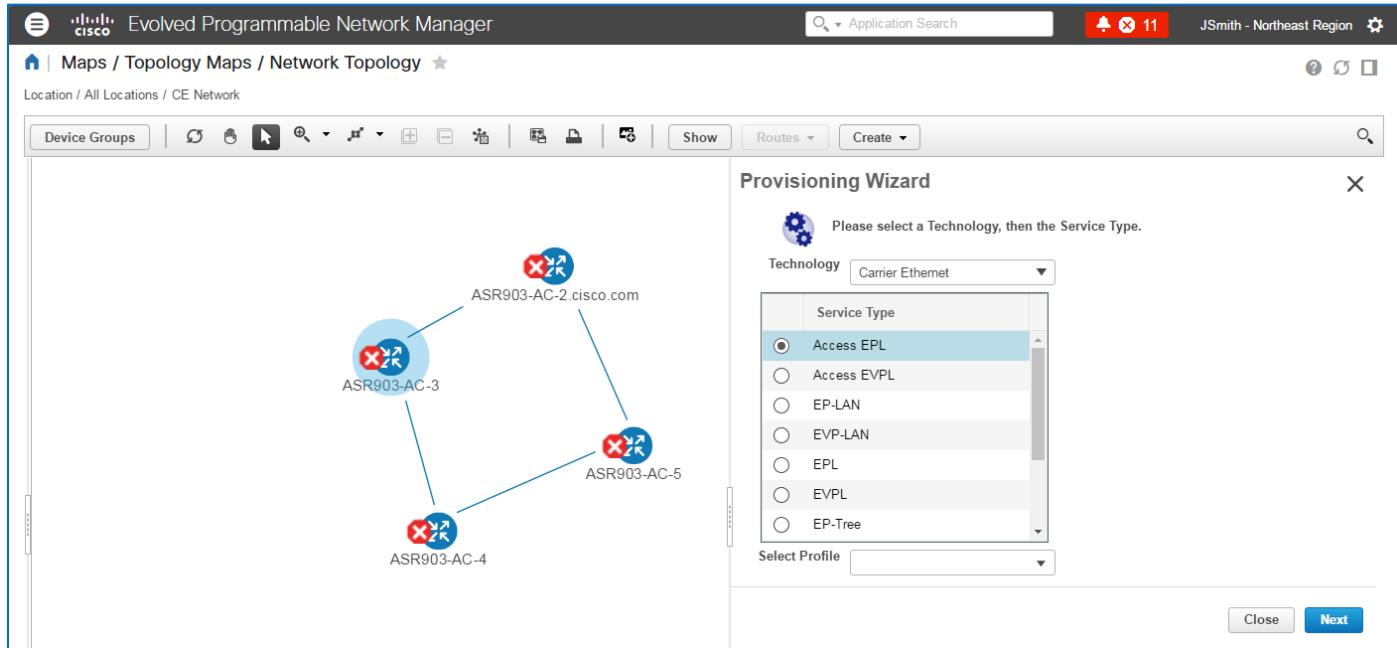
You can access the **Provisioning Wizard** in several areas of the application.

To access the Provisioning Wizard by using the topology map:

1. On the topology map, open the location that contains the devices that you need to provision.
2. Below the toolbar, click **Circuits/VCs**.
3. Beside the **Circuits/VCs** list heading, click the ellipsis button, and then click **Create**.
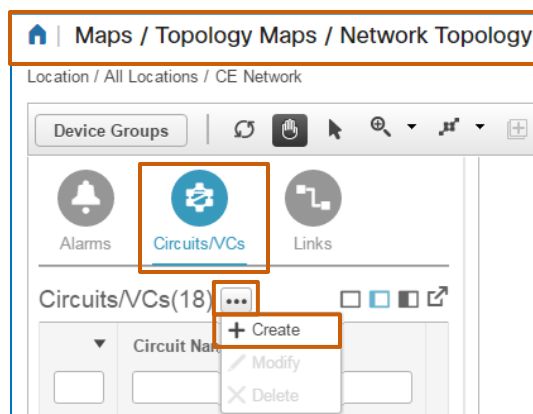
The system opens the **Provisioning Wizard** to the right of the map.

To access the **Provisioning Wizard by using the Configuration | Network submenu:**

❖ Click **Service Provisioning**.
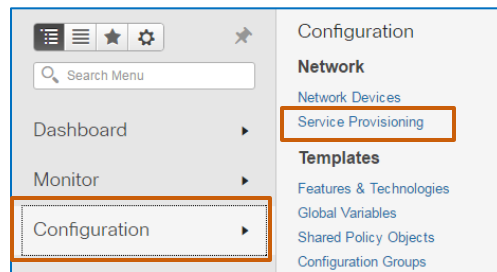
The system navigates to the topology map and opens the **Provisioning Wizard** to the right of the map.

To access the **Provisioning Wizard by using the Inventory | Other submenu:**

1. Click **Circuits/VC & Network Interfaces**.
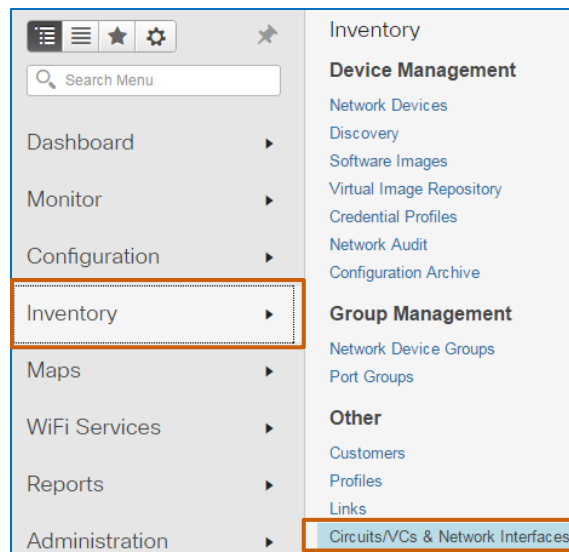
The **Circuits/VC & Network Interfaces** page opens with the **Circuits/VCs** tab active by default.

2. On the **Circuits/VC & Network Interfaces** page, on the toolbar, click **Create**.
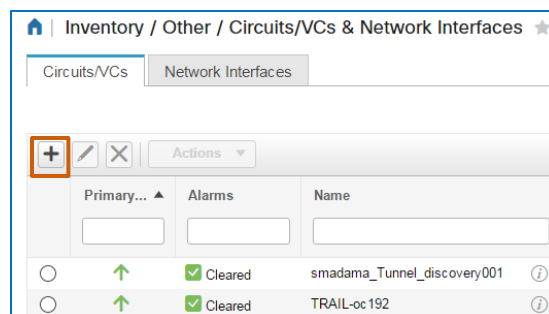
The system navigates to the topology map and opens the **Provisioning Wizard** to the right of the map.

Provisioning Pre-Requisites

Before provisioning devices:

- ❖ The device discovery process must be completed and include the devices that require provisioning.
- ❖ After discovery, EPN Manager must be actively managing the devices.
- ❖ The Interior Gateway Protocol (IGP) and, for most provisioning, the Multiprotocol Label Switching (MPLS) must be configured on the network.

> **Important Note:** In some cases, you can provision a service without IGP configured, but the service will not be operationally up when the system discovers it.

> **Note:** Depending on the network type, there are additional tasks that need to occur to prepare for provisioning.
>
> For more information, refer to the **Cisco Evolved Programmable Network Manager 2.0 User and Administrator Guide**.

Skills

To perform this task, you need to be a Carrier Ethernet provisioner with the following experience.

Proficient

- ❖ EPN Manager navigation and behaviors

Expert

- ❖ Networking and provisioning concepts
- ❖ Carrier Ethernet networking technologies and devices

Connecting Two Customer Sites

Use Case Scenario

ABC Telecomm needs to connect their corporate headquarters with a new satellite sales office. To help ensure secure, direct connectivity between the two sites, the network administrator wants you to provision an Ethernet Private Line (EPL) virtual connection.
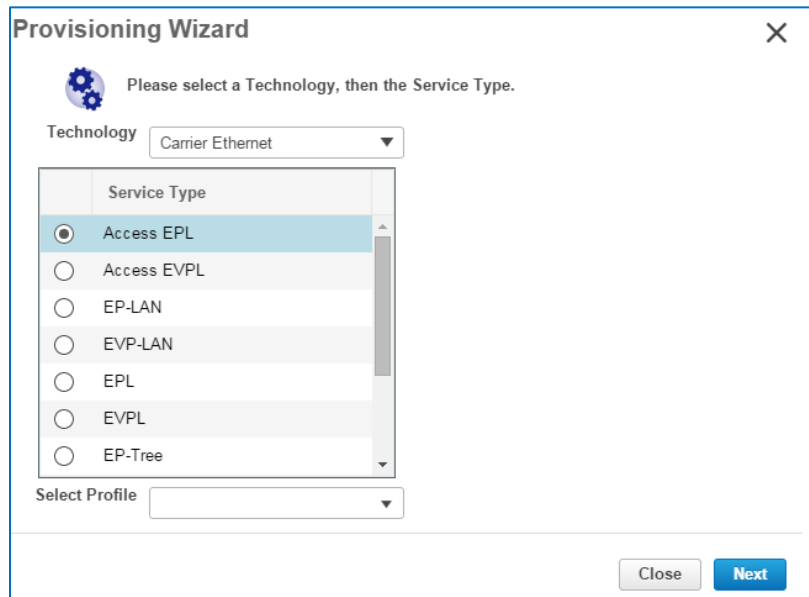
This type of connection provides the customer with a seamless experience because the network does not change or alter the traffic when using an EPL.

Because you are provisioning an EP Line virtual connection, you need to configure new UNIs for the A and Z sides of the connection.

You have the service request, which includes the devices and UNI configurations that you need to provision the service.

To start this use case:

❖ Based on your location in the application, open the **Provisioning Wizard**.

Process Overview

To complete the use case, follow these steps:

❖ With the applicable device group open on the map, in the **Provisioning Wizard**, select the Carrier Ethernet technology, and then provision the Ethernet private line virtual connection.

Provisioning an Ethernet Private Line (EPL) Virtual Connection Job Aid

Process Steps

Based on the use case, follow these steps:
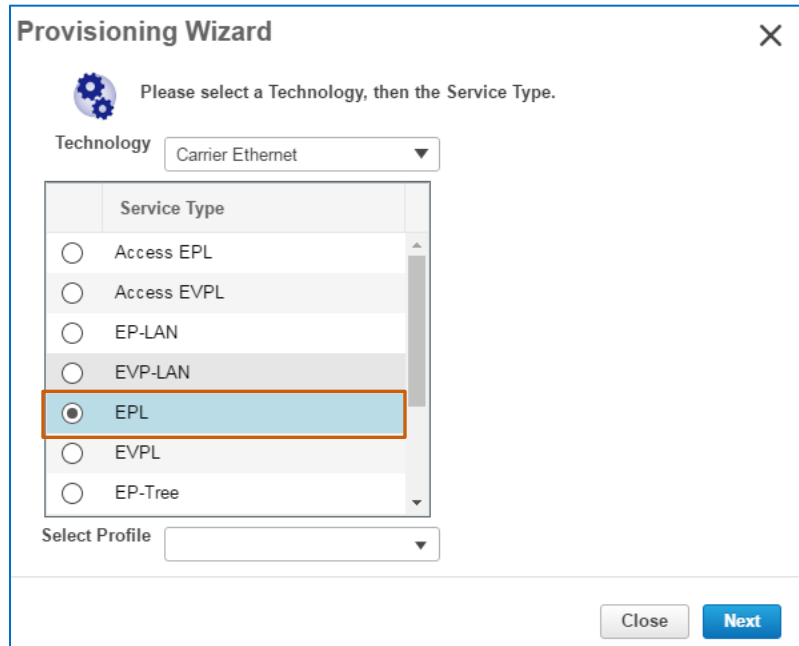
1. With the **Provisioning Wizard** open, on the topology map, open the device group that contains the devices on which you need to provision services.
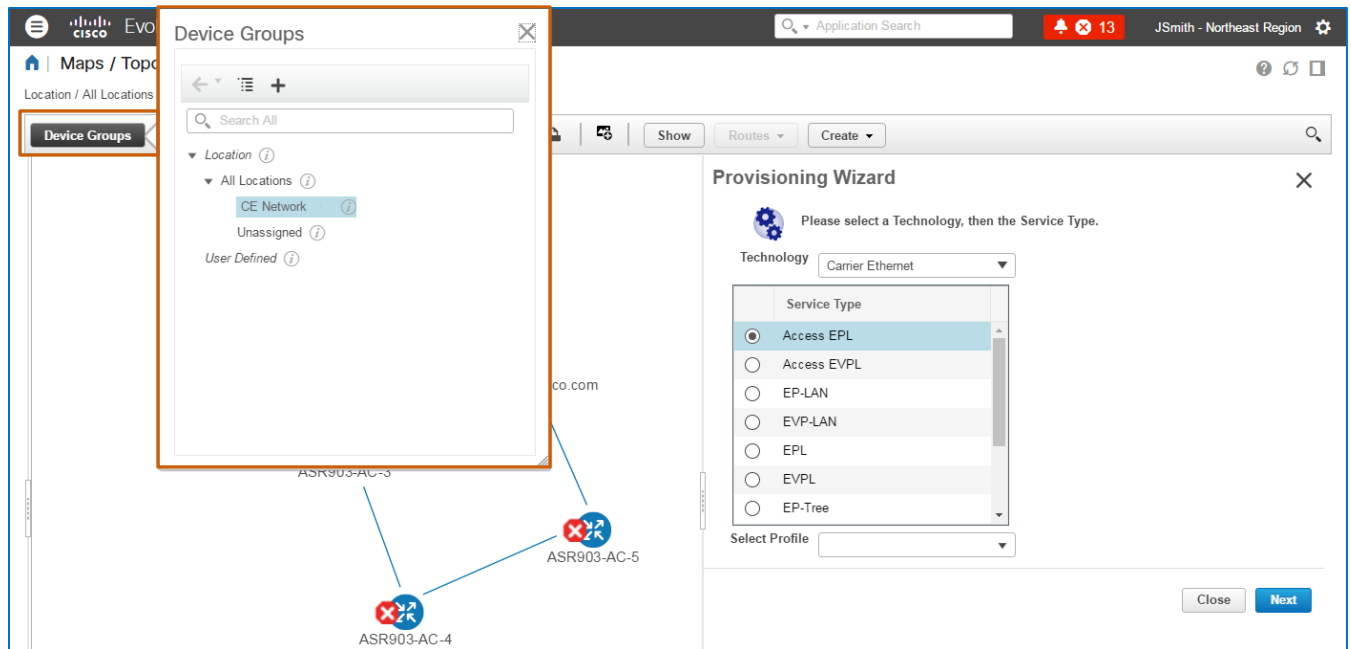
When you open the **Provisioning Wizard**, the first page populates with the **Carrier Ethernet** service types by default.
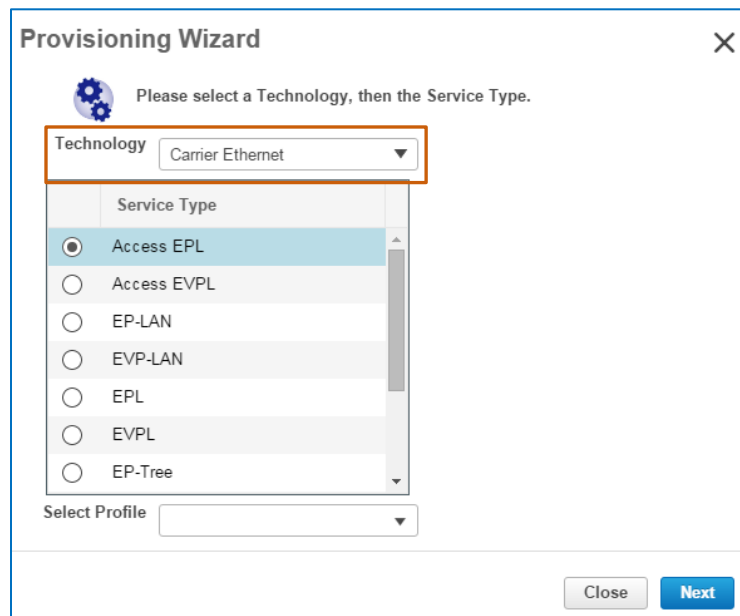
2. In the **Service Type** list, select the circuit that you are provisioning.

3. In the **Select Profile** drop-down list, accept the default selection, which is blank.
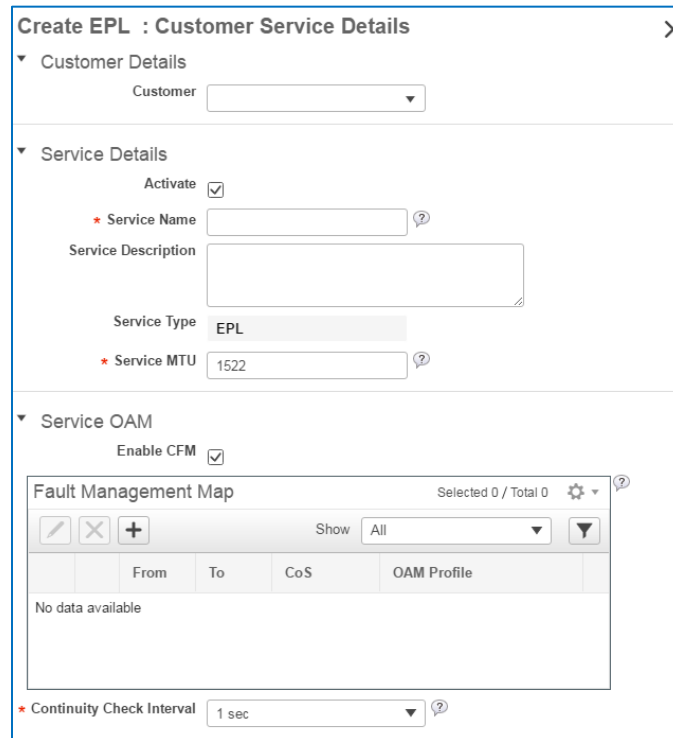
> **Note:** When provisioning tasks include common sets of configurations that users provision on a regular basis, they can define those parameters in profiles to automate and expedite complex provisioning tasks.
>
> Then, users can apply an applicable profile based on the circuit that they need to provision by using **Select Profile**.
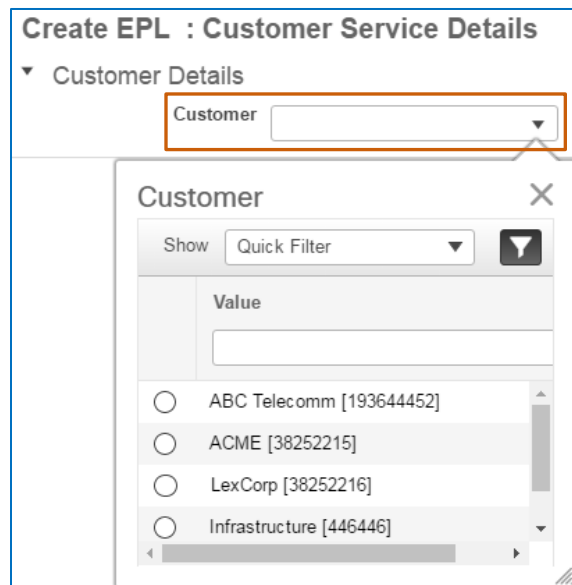
4. To configure the service details, click **Next**.

The **Customer Service Details** page opens and includes sections to configure:

- ❖ Customer details.
- ❖ Service details.
- ❖ The service operations, administration, and maintenance (service OAM) function.
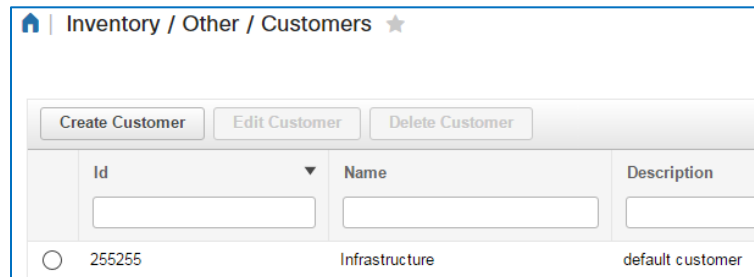
5. In the **Customer Details** section, in the **Customer Name** drop-down list, select the name of the customer who will use the service, when applicable.
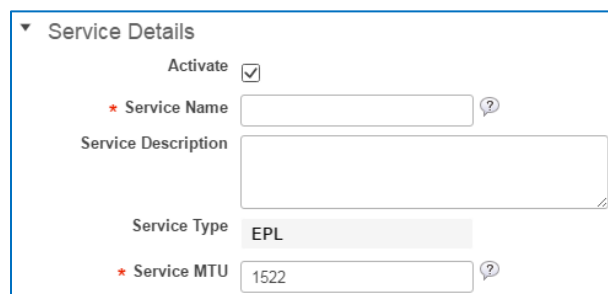
Note: System users can add customers in EPN Manager and associate them with network services during provisioning. This association

supports identifying service users during monitoring and troubleshooting activities.
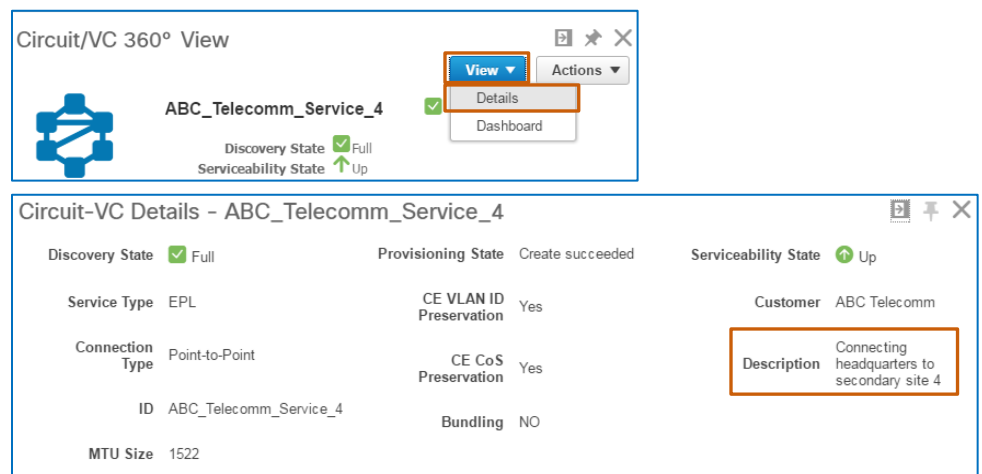
6. In the **Service Details** section:

a. To have the service operationally up when provisioning is complete, accept the default selection of the **Activate** check box.

b. In the **Service Name** field, type a name for the circuit that makes its use recognizable.

c. To indicate the use of service, optionally, in the **Service Description** field, type additional information about the service based on operational or business requirements.

Note: When you add a description, it appears in the **Circuit/VC 360^0 View** pop-up window details.

Note: The system populates the read-only **Service Type** field with the service that you selected in step 2.

d. To define the maximum transmission unit size of the service, in the **Service MTU** field, type the value in bytes.

> **Important Note:** The service's maximum transmission unit (MTU) size must be lower than or equal to the MTU size that you define on each user network interface (UNI), which you configure later in this task.
>
> Proper sizing helps ensure that the UNI can accommodate the traffic frame size.
>
> MTU values must fall between 1522 and 9216.
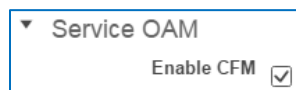
7. In the **Service OAM** section, to enable and configure the connectivity fault management (CFM) components on the source and destination UNIs:
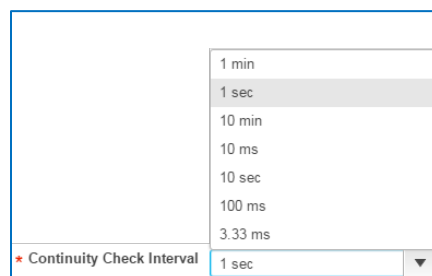
> **Note:** Configuring CFM components allows the system to monitor and report on the Ethernet service that you are provisioning by using the Ethernet Operations, Administration, and Management (EOAM) protocol.
>
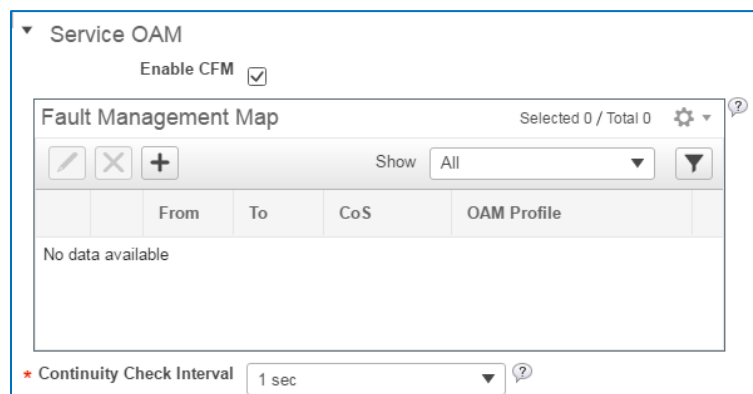> For detailed information, refer to the **Cisco Evolved Programmable Network Manager 2.0 User and Administrator Guide**.

a. To enable continuity check messages, accept the default selection of the **Enable CFM** check box.

❖ To change the time interval that the system transmits continuity check messages, which support monitoring for connectivity failures, in the **Continuity Check Interval** drop-down list, select the time period.

> **Important Note:** Continuity check message transmissions cause management traffic on the network. Shorter time intervals increase network traffic, which can affect network performance.

b. To configure a probe that reports specific measurements about the service, on the **Fault Management Map** toolbar, click **Add Row**.

A blank row opens in the list.

Fault Management Map			Selected 1 / Total 1 ⚙ ▼
✎ ✕ **+ Add Row button**			▼ ▼
	From	To	CoS	OAM Profile
1 ⊙		▼	▼	▼	▼
	Save | Cancel			

> **Tip:** Configuring measurement probes allows the system to collect and report information about service performance, which supports monitoring and troubleshooting activities.
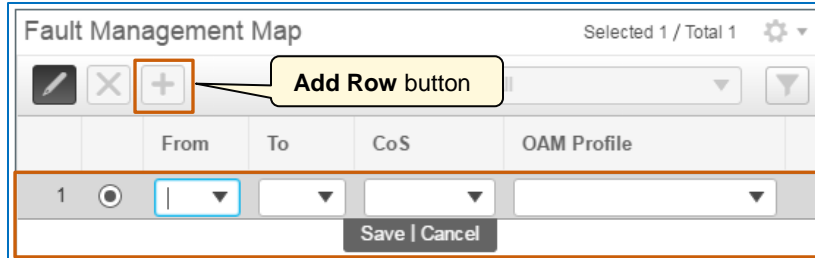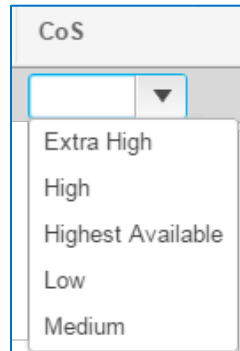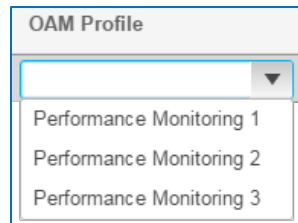
i. To configure the direction in which the probe will run:
   - In the **From** drop-down list, select the initiating UNI.
   - In the **To** drop-down list, select the destination UNI.

ii. To define the class of service requirement that the system uses to prioritize data packets between the UNIs, in the **CoS** drop-down list, select the service level.

CoS
- Extra High
- High
- Highest Available
- Low
- Medium
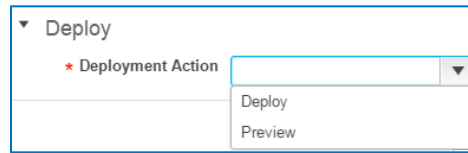
iii. To configure the measurements that the probe captures in support of fault monitoring, in the **OAM Profile** drop-down list, select the monitoring level.

OAM Profile
- Performance Monitoring 1
- Performance Monitoring 2
- Performance Monitoring 3

> **Note:** OAM profiles are specific to EPN Manager.
> For more information, refer to the **Cisco Evolved Programmable Network Manager 2.0 User and Administrator Guide**.

iv. To save the **Service OAM** configuration, click **Save**.
v. To configure additional probes, repeat step 7b. Then, go to step 8.

8. To configure what you want to occur when provisioning is complete, in the **Deployment Action** drop-down list:

❖ To configure the system to present a preview of the CLI code that it will deploy to the endpoints before deploying it, select **Preview**.

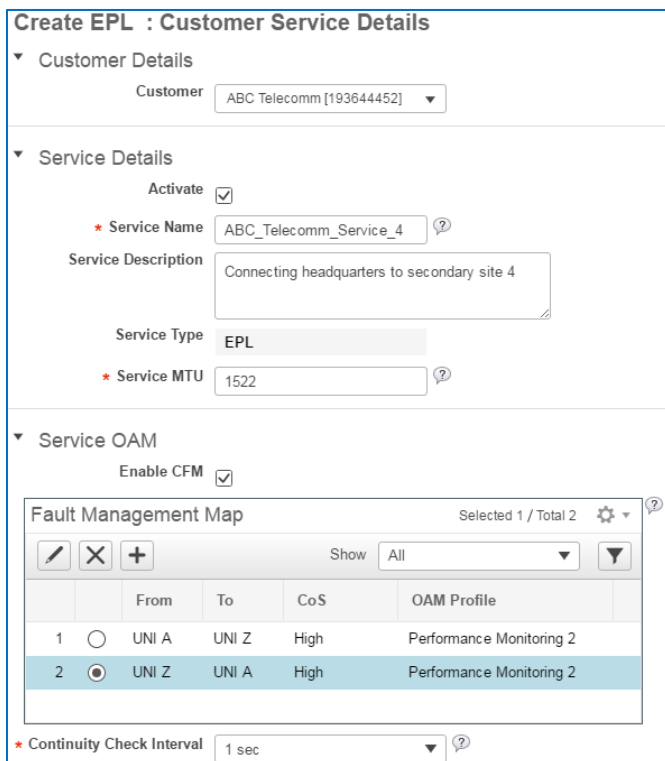> **Tip:** Cisco recommends that you preview CLI code before deploying the configuration. This approach helps you to avoid unexpected results or operational issues.
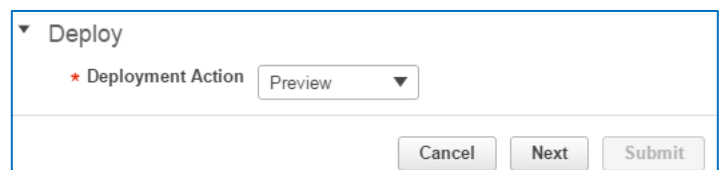>
> When you determine that you need to make changes, you can cancel provisioning at this point, and make the corrections that you need.

❖ To configure the system to deploy the configuration to the endpoints immediately without reviewing the CLI code, select **Deploy**.

The following screenshots illustrate the selections that support this use case.

9. To configure each of the UNI endpoints, click **Next**.

The **UNI A** page opens and the system selects the **Create New UNI** checkbox by default.

> **Tip:** When other users configure UNIs, the device interfaces that comprise the UNI are no longer available for use.

> To determine whether to use an existing UNI or add a new one, you need to identify whether the device interfaces that you need are included in existing UNIs.

10. To indicate whether you are configuring a new UNI or selecting an existing UNI:

   ❖ To configure a new UNI, accept the default selection of the **Create New UNI** check box. Go to step 11.
   ❖ To provision the service on an existing UNI, clear the **Create New UNI** check box. The system closes the **New UNI Details** section.

   ◆ Select the existing UNI to use for the service in the **UNI Name** drop-down list, and then go to step 12.

> **Note:** When configuring a new UNI, the configuration options, including the new UNI and new service details, vary based on the type of connection that you are configuring.

11. To configure the device and interface for UNI A, in the **New UNI Details** section:

   c. To configure the UNI so that it is in an operationally up state when provisioning is complete, accept the default selection of the **Activate** check box.
   d. In the **UNI Name** field, type a name for UNI.
   e. To indicate the device and interface that require the UNI:

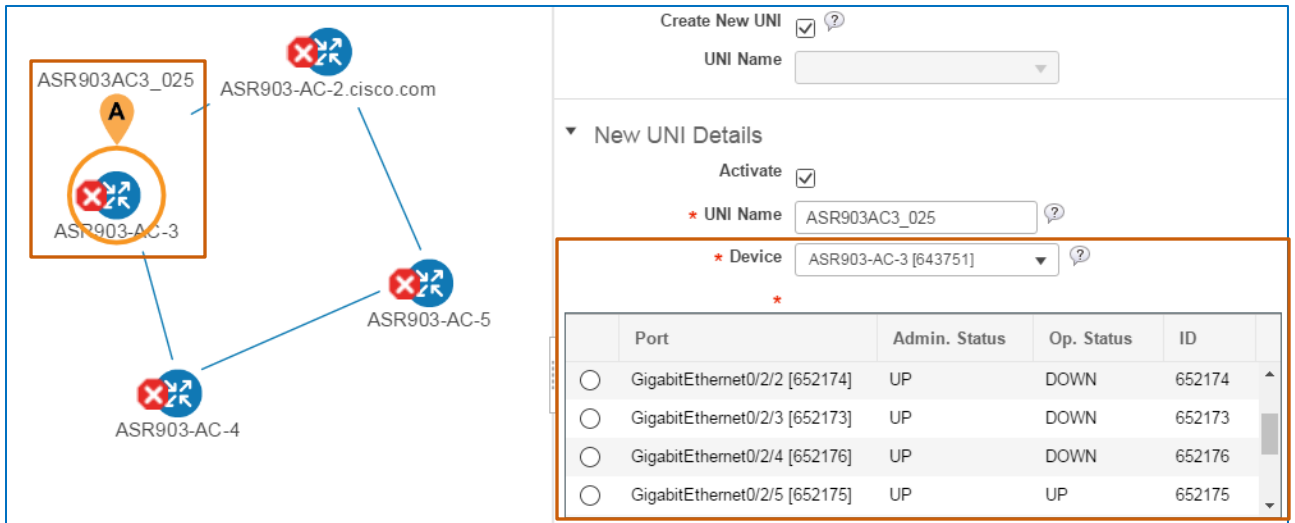   i. On the map, to indicate the device that will support UNI A, click the device icon.

> **Note:** To use the device during configuration, EPN Manager must manage the device.

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The system applies the A icon to, and adds the UNI name above, the device icon on the map, populates the **Device** drop-down list with the device name, and populates the list below it with the device's ports.

ii.   To indicate the interface that will support UNI A, in the list, click the interface option button.

Important Note: To prepare for UNI configuration, you need to know the devices and ports that you need to configure and understand their relationships to other devices and the network.

This understanding helps ensure that provisioning is successful.

f.   Optionally, in the **UNI Description** field, type additional information about the UNI.

g.   To define the maximum transmission unit size of a packet passing through the interface, in the **MTU** field, type the value in bytes.
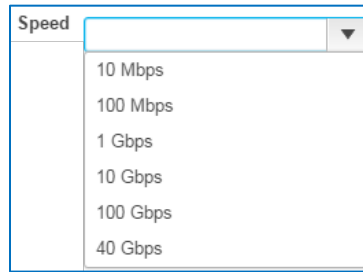
Important Note: The UNI's maximum transmission unit (MTU) size must be greater than or equal to the MTU that you defined for the service in step 6d.
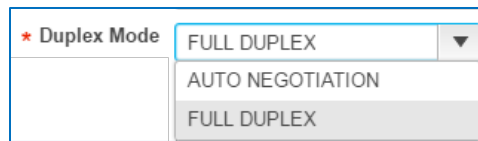
When configuring the packet MTU size for a UNI, the UNI A and UNI Z sizes must match.

MTU values must fall between 1522 and 9216.

h. To configure the interface speed, in the **Speed** drop-down list, select the speed.

i. To configure the method of bi-directional data transmission for the EPL, in the **Duplex Mode** drop-down list:

❖ To configure simultaneous communication in both directions between the UNI and the customer's access switch, select **FULL DUPLEX**.

> **Important Note:** Both the UNI that you are configuring and the access switch must support full duplex mode.
>
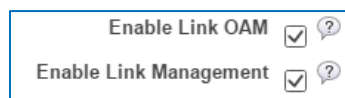> If either side does not support full duplex mode, the system will disable the interface.

❖ To configure the system to apply the mode that the network device and customer access switch negotiate based on what they can support, select **AUTO NEGOTIATION**.

> **Note:** In auto-negotiation mode, the system attempts to use the full duplex mode first.
>
> When either the network device or the customer's access switch cannot support full duplex mode, the system will use half duplex mode.

j. To enable IEEE 803.1ah link operation and maintenance, which supports the reporting of events that relate to the state of the link between the UNI and its associated access switch, select the **Enable Link OAM** check box.
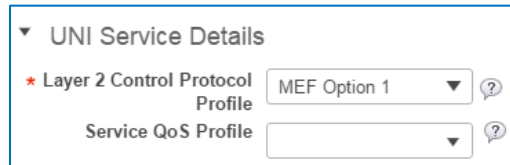

k. To enable the customer's access switch to collect information about the UNI to which it is connected, accept the default selection of the **Enable Link Management** check box.
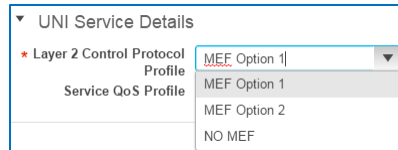
> **Tip:** Allowing the customer's access switch to collect UNI information can help the customer with inventory, connectivity, and critical event monitoring, and with troubleshooting.

12. To configure the attributes that define how the virtual connection will operate on the UNI:

    a. To configure the protocols that the service will allow to pass through the tunnel, in the **Layer 2 Control Protocol Profile** drop-down list, select the profile.

> **Note:** Layer 2 Control Protocol Profiles are defined by the Metro Ethernet Forum (MEF) 6.1 **Ethernet Services Definitions**.
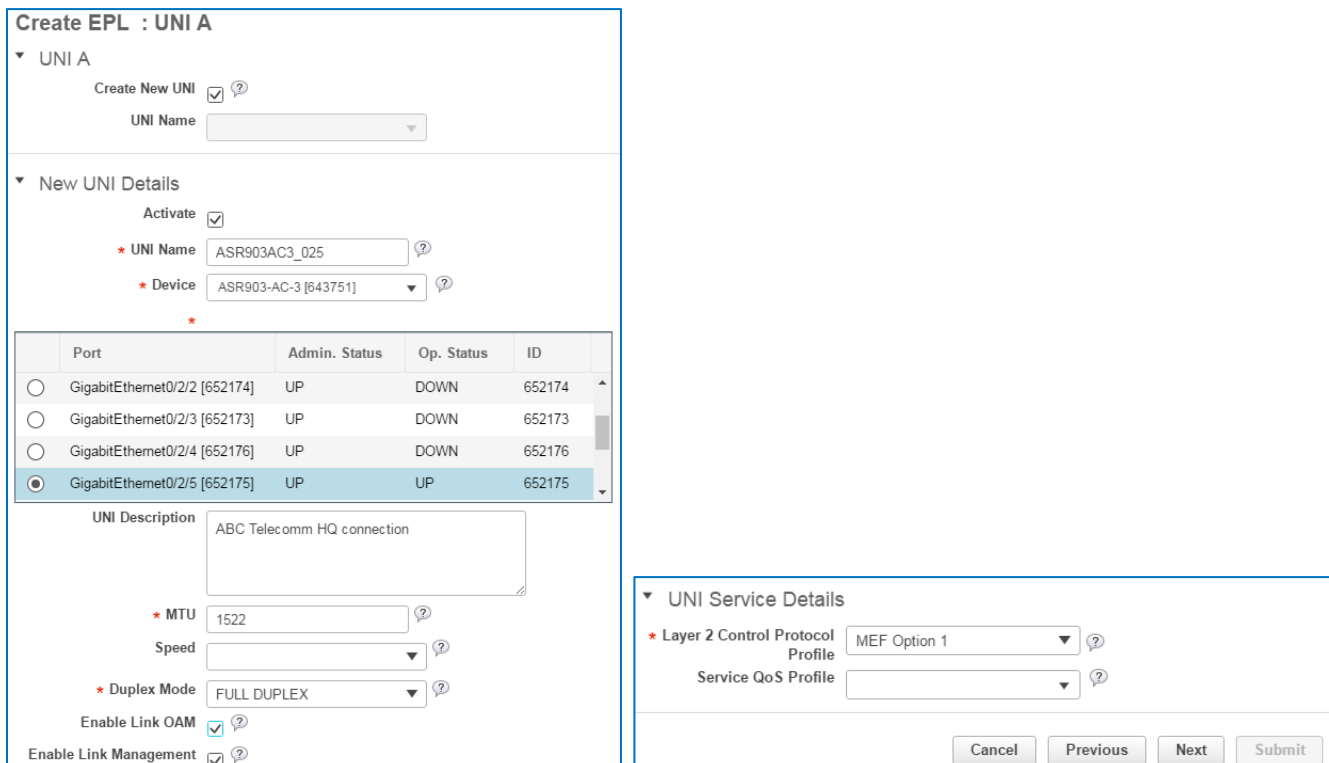
    b. To assign a quality of service profile that a system user has configured, in the **Select QoS Profile** drop-down list, select the profile.

> **Note**: System users can configure QoS profiles to manage the speed available to the customer on the interface that you are adding and provisioning.
>
> Based on the profile that you apply here, the system can prioritize the customer's traffic based on service level agreements, operational requirements, or other factors.
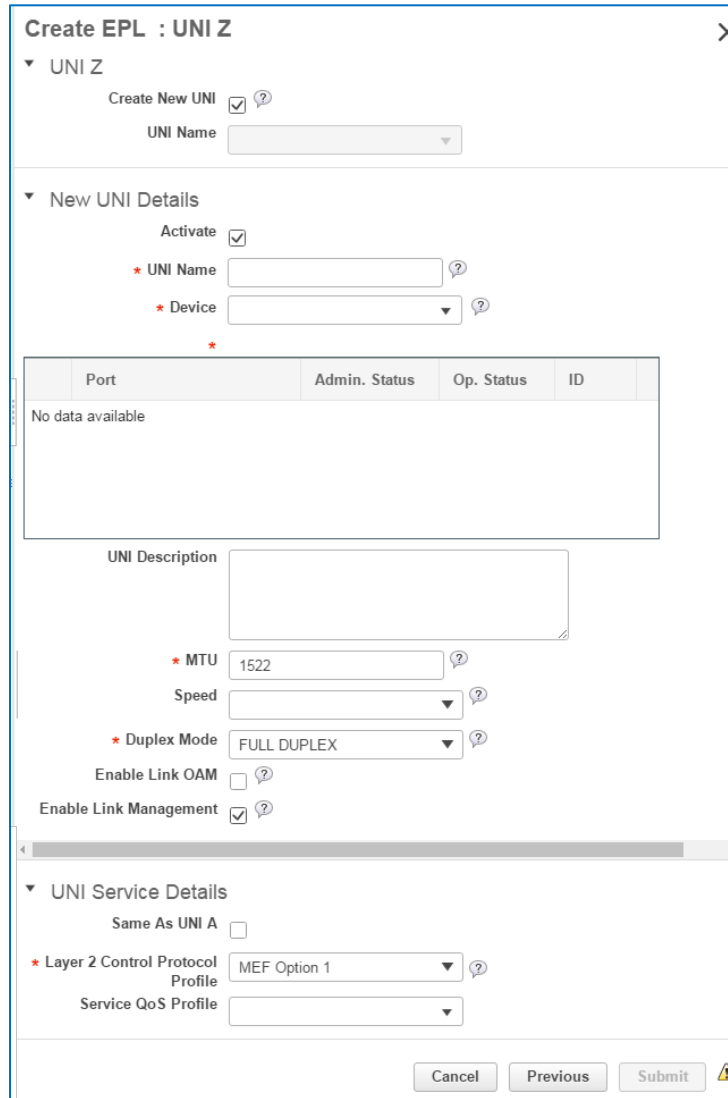
The following screenshots illustrate the selections that support this use case.

13. To configure the **UNI Z** endpoint, click **Next**.

    The **UNI Z** page opens.

14. On the **UNI Z** page, return to step 10 for the **Z** endpoint, and then go to step 15.
15. In the **UNI Service Details** section, to configure the attributes that define how the virtual connection will operate on the UNI:

    ❖ To apply the same profiles that you applied to UNI A, select the **Same As UNI A** checkbox, and then go to step 16.
    ❖ To select different profiles, repeat step 12, and then go to step 16.

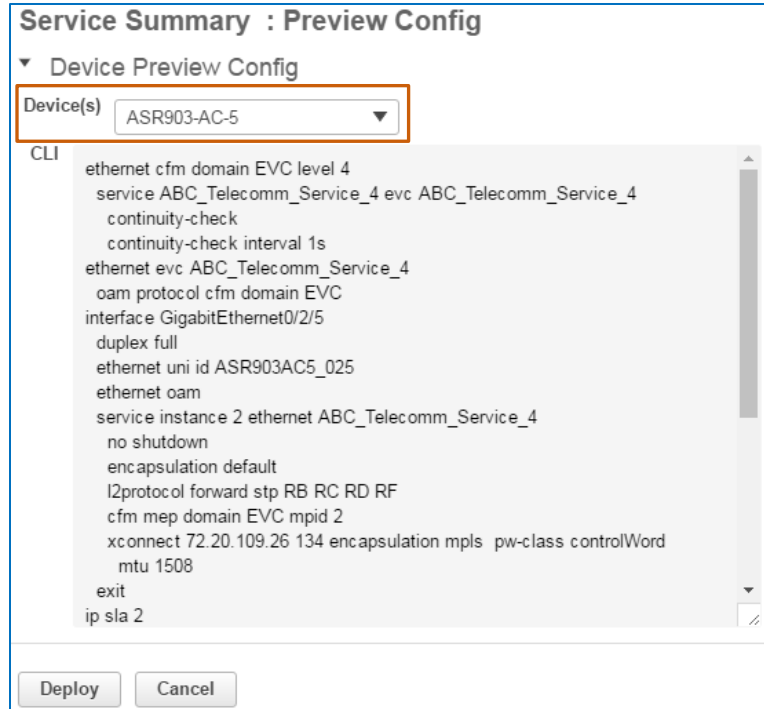16. With the UNI Z settings indicated, click **Submit**.

    ❖ If you selected **Preview** in step 8, the system opens the **Service Summary: Preview Config** page.

        ◆ In the **Device** drop-down list, select a device endpoint and, in the **CLI** field, review the CLI commands that the system will send to that device.

        Go to step 17.

```
Service Summary  : Preview Config
▼  Device Preview Config
Device(s)   ASR903-AC-5                            ▼
CLI
        ethernet cfm domain EVC level 4
          service ABC_Telecomm_Service_4 evc ABC_Telecomm_Service_4
            continuity-check
            continuity-check interval 1s
        ethernet evc ABC_Telecomm_Service_4
          oam protocol cfm domain EVC
        interface GigabitEthernet0/2/5
          duplex full
          ethernet uni id ASR903AC5_025
          ethernet oam
          service instance 2 ethernet ABC_Telecomm_Service_4
            no shutdown
            encapsulation default
            l2protocol forward stp RB RC RD RF
            cfm mep domain EVC mpid 2
            xconnect 72.20.109.26 134 encapsulation mpls  pw-class controlWord
              mtu 1508
          exit
        ip sla 2

   Deploy      Cancel
```

    ❖ If you selected **Deploy** in step 8, the system starts the provisioning process.

        When the system has deployed the CLI commands, a system message opens in the wizard, indicating deployment results. Go to step 19.

17. To review the CLI commands that the system will deploy to the **UNI A** device, in the **Device(s)** drop-down list, select the device.
18. To start the provisioning process, in the **Service Summary: Preview Config** dialog box, click **Deploy**.

    The system starts the provisioning action. When the system has deployed the CLI commands, a system message opens in the wizard, indicating deployment results.

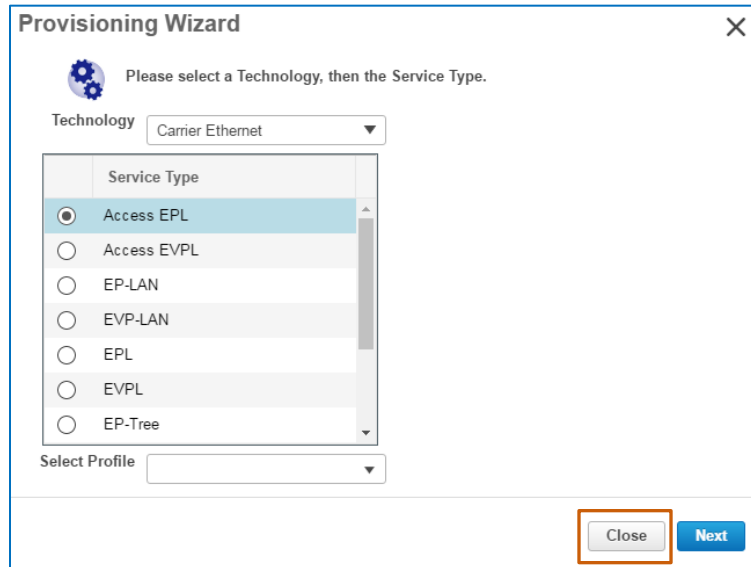19. To close the **Provisioning Wizard**, on the **Deployment** page, click **Close**.

```
Deployment  : Successful !

   Close
```

    The message closes, and the system returns to the **Provisioning Wizard** start page.

20. On P**rovisioning Wizard** default page, click **Close**.

The **Provisioning Wizard** closes.

In the **Circuit/VCs** list, the system lists the circuit with a gray **Missing** icon [ ], which indicates that the system has not yet added or discovered the circuit.

As circuit provisioning progresses, the icon transitions to a gray **Partially Discovered** icon [ ].

When EPN Manager has discovered the circuit, the icon transitions to a green check mark [ ].

When the circuit is in a serviceability up state, which the system can report next point it synchronizes the device inventory, the icon transitions to a green arrow icon [ ]. At this point, the process is complete and the circuit is available on the network.

> **Note:** The provisioning process takes approximately 5 minutes to complete.
>
> In more complex provisioning scenarios, the system can take significantly more time.

To validate or review the provisioned virtual connection in more detail, you can use the methods available for validating and evaluating it.

Validating and Evaluating Provisioned Virtual Connections

Based on the level of detail that you want to review, EPN Manager presents virtual connection data, statistics, and performance information by using several methods.

Reviewing Maps

Topological and geographical maps provide a visual representation of the virtual connection relationships among devices in the network.

To learn more about reviewing information by using maps, **refer to the Navigating Cisco EPN Manager 1.2** job aid.

Reviewing Virtual Connection Details

The Circuit/VC 360^0 View

The **Circuit/VC 360^0 View** pop-up window provides detailed information about the virtual connection that is provisioned.

It reports the virtual connection's status, statistics, and current alarms, if alarms are occurring. It also presents key relationships and details about the connection endpoints.

To open the view:

❖ In the **Circuit/VCs** list, click the virtual connection's (VC's) information icon.

Open the VC's multi-layer trace diagram

Test the VC

VC states, type, and status

Statistical graphs

VC-related alarms
Endpoint device interfaces carrying the VC
VC status history
A list of the VCs that the endpoints are supporting

Note: When reviewing the information in the pop-up window, keep in mind that the system begins reporting statistical data and alarms based on the system monitoring policies and reporting parameters that administrators or users can configure.

Monitoring policies define such parameters as device polling frequency, the types of data to report, and reporting thresholds. This means that you might not see statistics, alarms, or other data immediately after device provisioning.
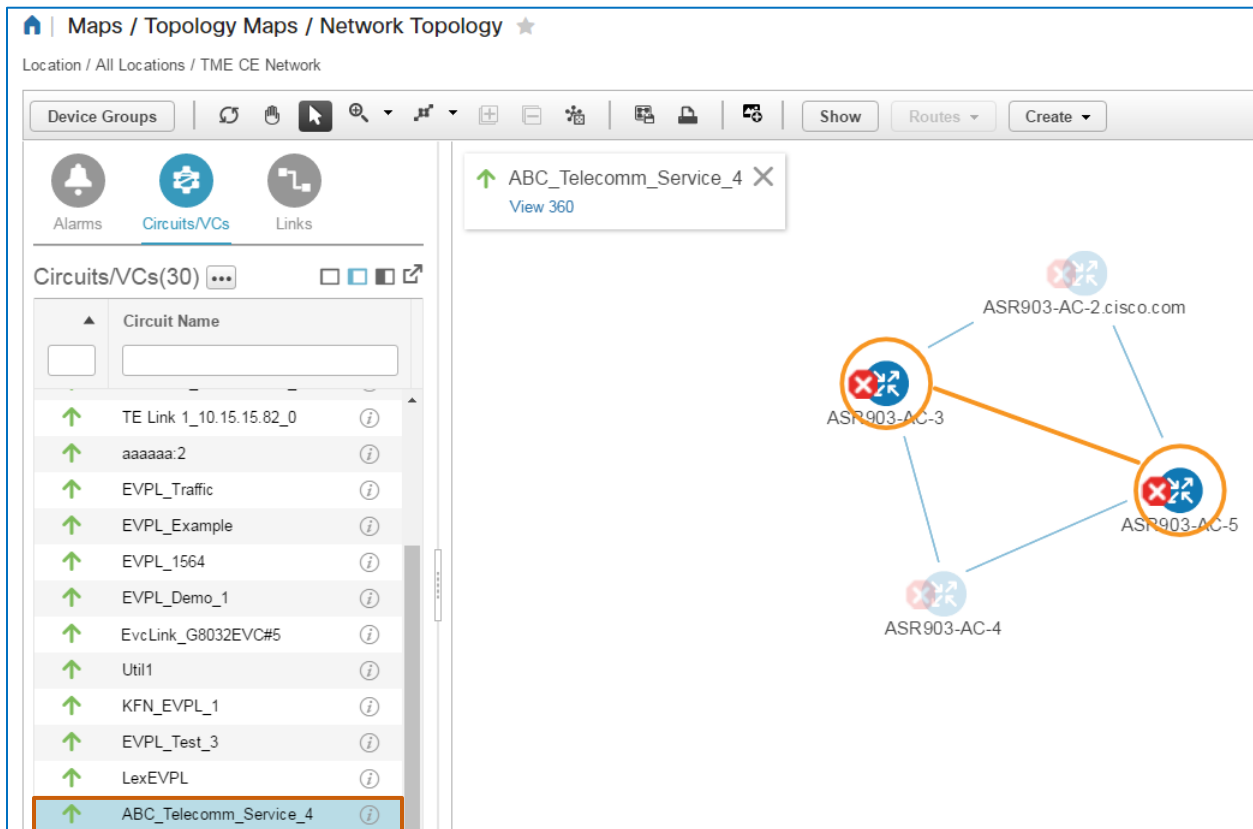
The Circuit Overlay

The circuit overlay displays the device connectivity that supports the EP Line virtual connection.

Reviewing the circuit overlay after provisioning helps you to ensure that, at a device level, provisioning has occurred as expected.

To review a circuit's overlay:

❖ In the **Circuit/VCs** list, select the circuit row. The overlay appears indicating the device connectivity.

You successfully provisioned an Ethernet Private Line service for a customer that establishes a point-to point connection for the customer's Ethernet traffic.

Video Demonstration

Watching Demonstrations

To watch a demonstration:

❖ Click the associated link, which opens an MP4 file.

Based on your system and configuration, you might need to start the video manually.

Notes: Video download and streaming times can vary.
Demonstrations do not include narration.

Connecting Two Customer Sites

Watch the Demonstration

To review the process to provision an Ethernet private line virtual connection, watch the **Connecting Two Customer Sites** video.
Approximate runtime: **12:00**

Links

To Product Information

Visit the Cisco Web site to learn more about EPN Manager.

Visit the Cisco Web site to review or download technical documentation.

To Training

Visit the Cisco Web site to access other EPN Manager learning opportunities.

Visit the Cisco Web site to access learning opportunities for other Cisco products.

To Contact Us

Send us a message with questions or comments about this job aid.