Provisioning an OCH Network Connection

Cisco© EPN Manager 2.0

Job Aid

Copyright Page

Provisioning an OCH Network Connection Job Aid

Basics

Overview

Introduction

Cisco© Evolved Programmable Network Manager (EPN Manager) design supports the rapid provisioning of optical circuits by operators with fundamental knowledge of networking and provisioning concepts.

The automated circuit provisioning, or auto-provisioning, process provisions a bi-directional, working route for the circuit based on the availability of applicable device ports, bandwidths, and frequencies, and brings the circuit online when the provisioning process is complete.

This design supports an environment that is highly responsive to customer orders and data transport requirements.

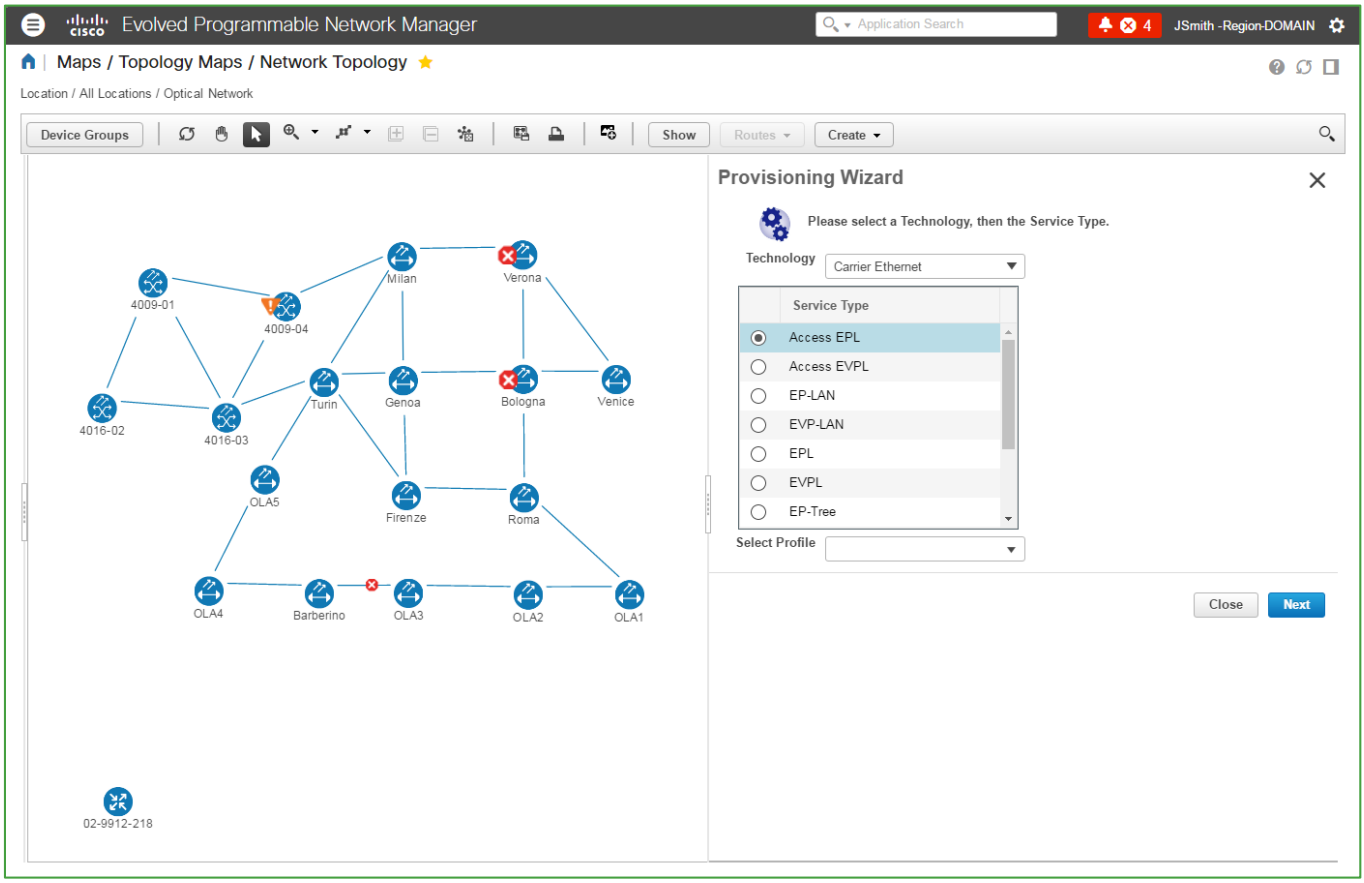
This job aid introduces you to:

- The auto- provisioning process.
- The types of settings that optical provisioners can configure for more complex orders, including the circuit:
  - Properties.
  - Route constraints.
- The methods available for validating and evaluating the provisioned circuit.

The Provisioning Wizard

As an operator, you use the automated circuit-provisioning functions, or auto-provisioning, in the **Provisioning Wizard** to fulfill orders for services.

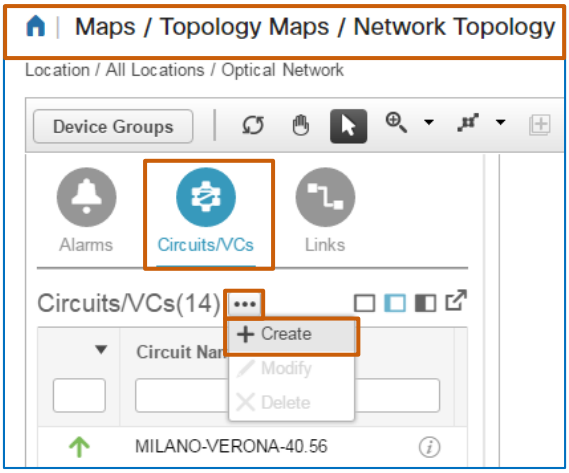
Provisioners who are fulfilling more complex orders for optical services also use the **Provisioning Wizard** to configure circuit, endpoint, and route settings, as needed.



You can access the **Provisioning Wizard** in several areas of the application.

To access the Provisioning Wizard by using the topology map:

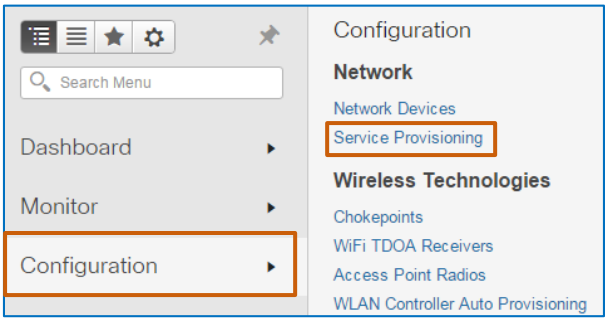
1. On the topology map, open the location that contains the devices that you need to provision.
2. Below the toolbar, click **Circuits/VCs**.
3. Beside the **Circuits/VCs** list heading, click the ellipsis button, and then click **Create**.



The system opens the **Provisioning Wizard** to the right of the map.

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

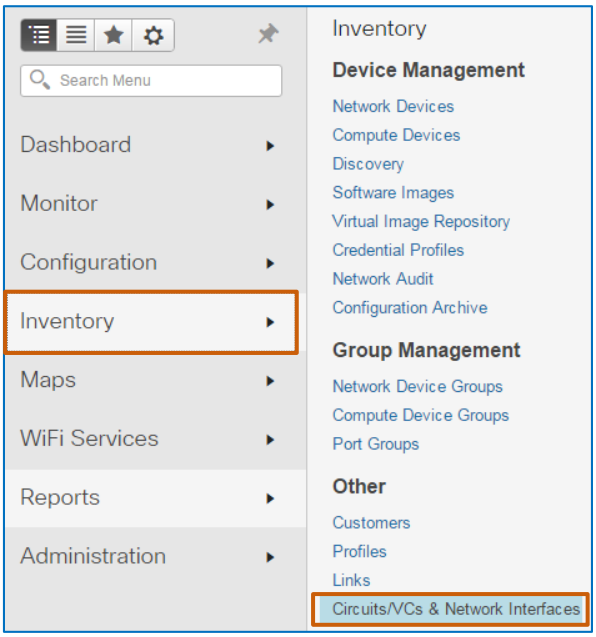
- Click **Service Provisioning**.



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

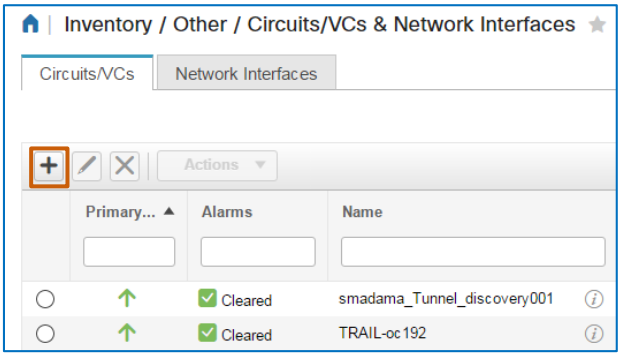
To access the Provisioning Wizard by using the Inventory | Other submenu:

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.

Skills

Network Operators

When performing straightforward circuit provisioning by applying the **Provisioning Wizard** default settings, you need the following experience.

Basic

- EPN Manager navigation and behaviors
- Networking and provisioning concepts

Optical Provisioners

When performing complex circuit provisioning by changing system default optical settings, you need the following experience.

Proficient

- EPN Manager navigation and behaviors

Expert

- Networking and provisioning concepts
- Optical networking technologies and devices

Fulfilling Orders for Optical Services

Fulfilling Optical Provisioning Service Requests

You, as a network operator, manage orders that you receive from the order management system.

In this case, you receive a request to provision an optical channel network connection (OCH NC) for network customer NDV Mobile. The request also indicates the device ports that you need to provision for the circuit.

Important Note: To prepare for configuring termination points when provisioning a circuit, you need to know the devices and ports that you need to configure as endpoints.

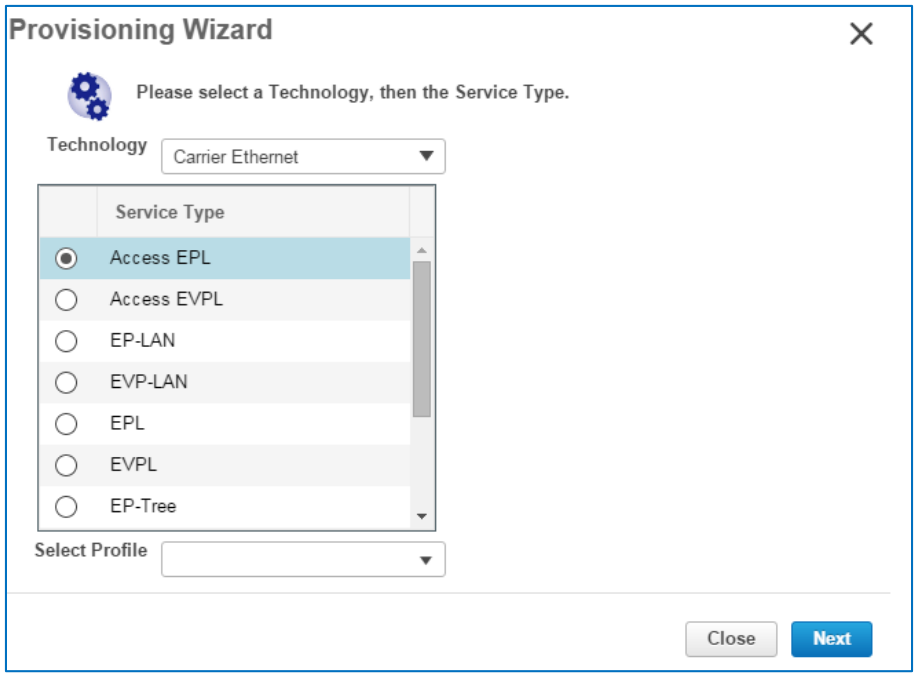
In situations in which optical provisioners are determining the devices and ports that want to support the circuit, they need to understand device relationships on the network.

This understanding helps ensure that provisioning is successful.

As soon as you initiate the process, the system begins circuit provisioning and brings the circuit online when the process is complete.

To start this use case:

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



Auto-Provisioning Process Overview

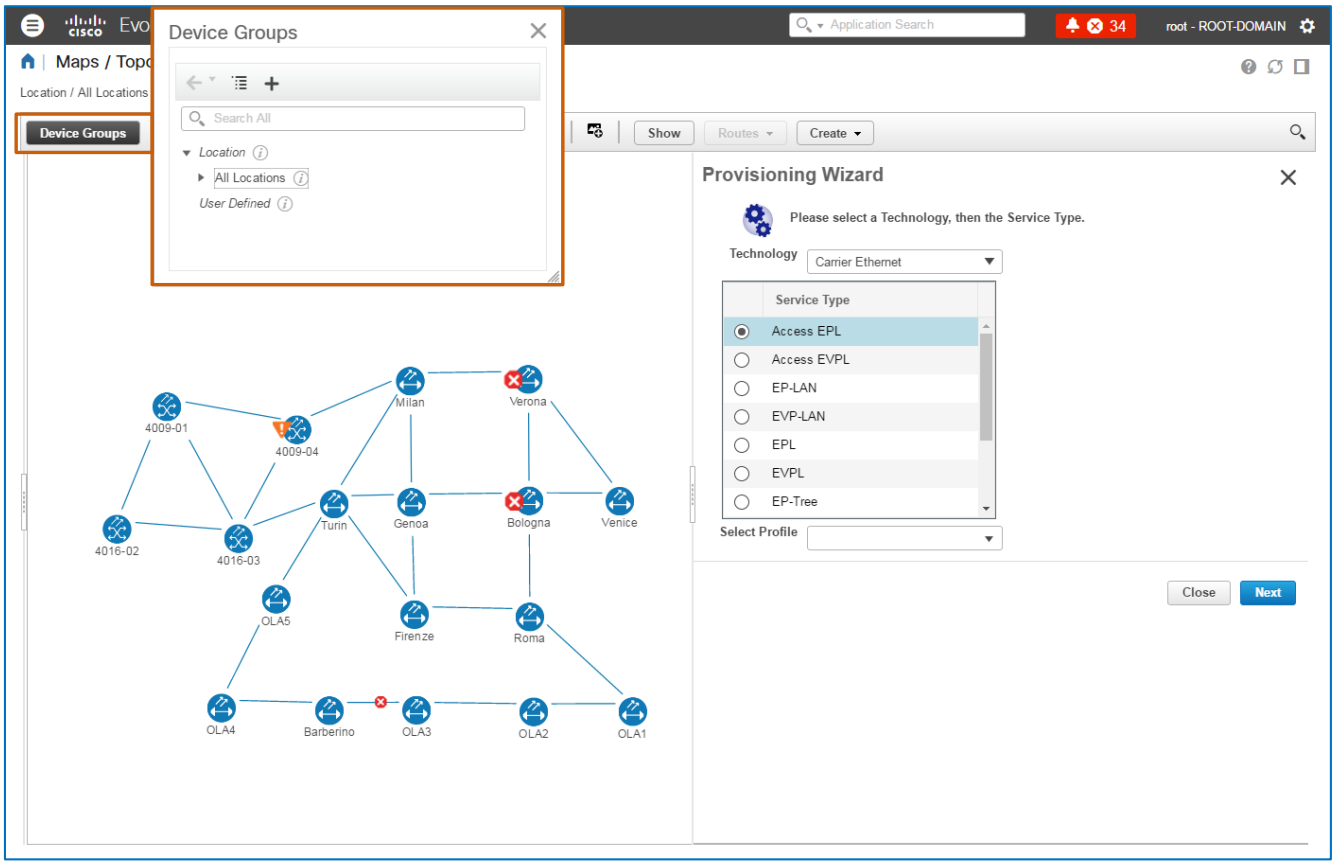
To complete the use case, follow these steps:

- With the applicable device group open on the map, in the **Provisioning Wizard**, select the optical technology, and then provision the OCH NC circuit.

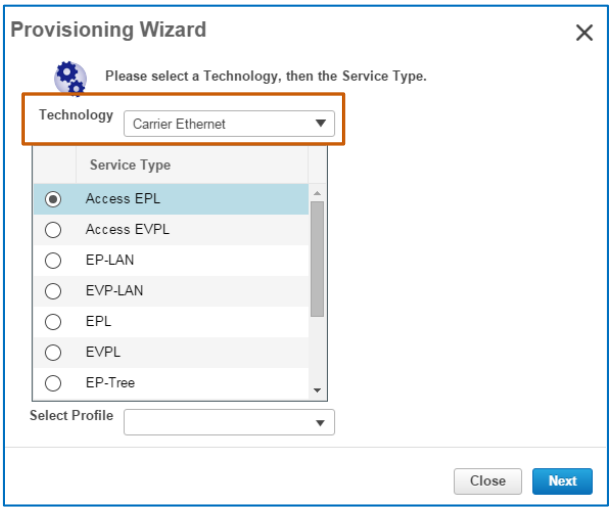
Auto-Provisioning Process Steps

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.

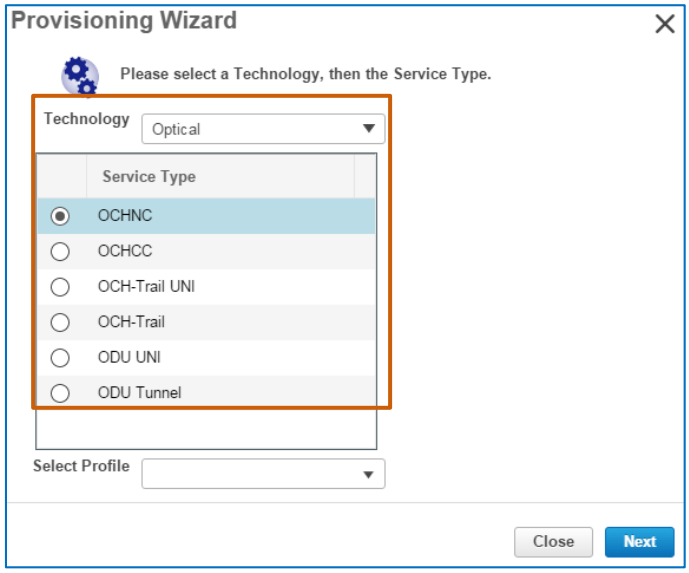


When you open the **Provisioning Wizard**, the first page populates with the **Carrier Ethernet** service types by default.

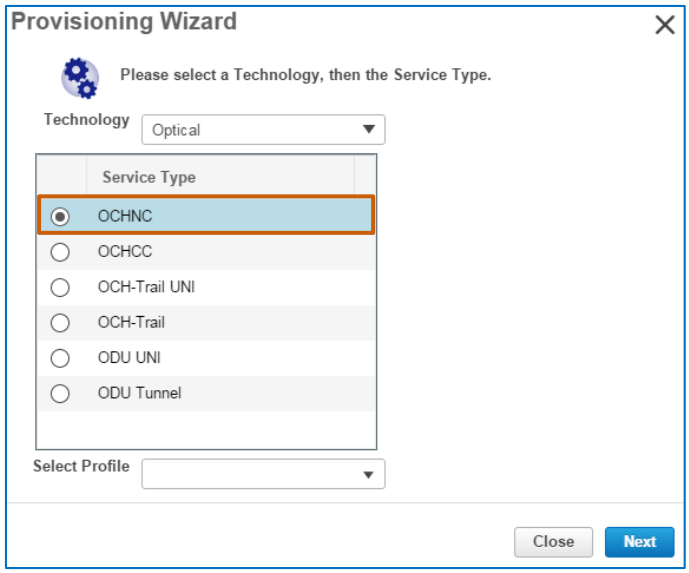


2. In the **Technology** drop-down list, select **Optical**.

   The page updates to display the optical service types.



3. In the **Service Type** list, select the circuit that you are provisioning.



Note: When you provision circuits automatically, the system configures the applicable settings, which vary based on the technology and circuit type that you are provisioning.

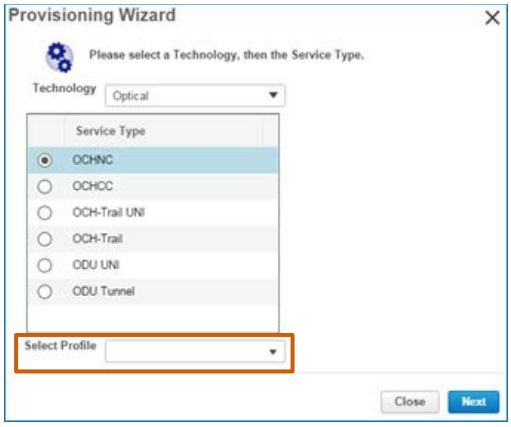
Provisioners can configure these settings, as needed, during complex provisioning.

4. 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.

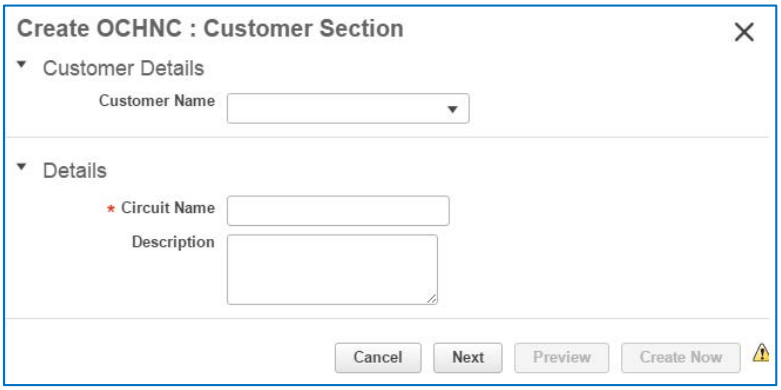
Then, users can apply an applicable profile based on the circuit that they need to provision by using **Select Profile**.

In automated provisioning, you do not select a profile.



5. To continue, click **Next**.

The **Customer Section** page opens.



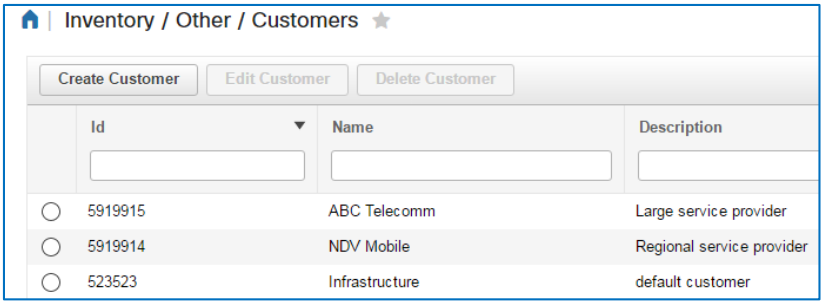
Important Note: Beginning on the **Customer Section** page, the wizard provides a **Cancel** button.

Use caution when canceling the provisioning process. When you cancel, the wizard automatically returns to the initial page with its default settings and discards any information that you have added.

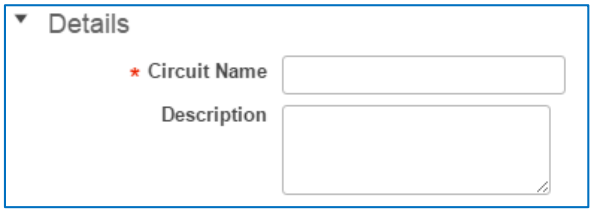
The system does not prompt or alert you that it will not retain your changes.

6. On the **Customer Section** page, 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 then associate them with network services during provisioning. This association supports identifying service users during monitoring and troubleshooting activities.



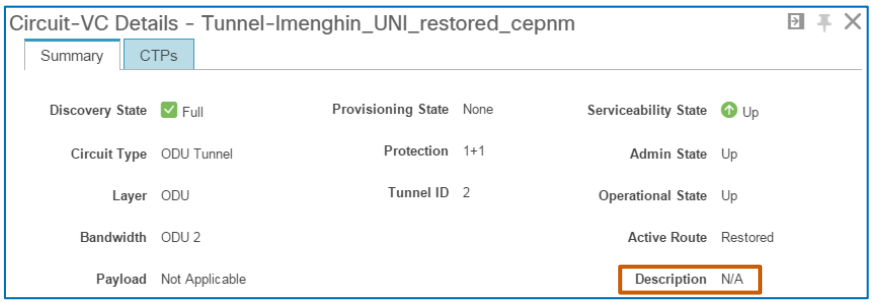
7. In the **Details** section, type a name for the circuit, and optionally, type additional information about the circuit based on operational or business requirements.



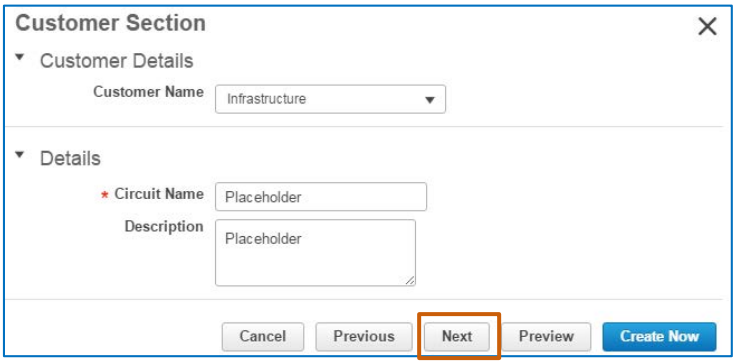
Important Note: When you type the circuit name, which is a required field, the **Preview** and **Create Now** buttons become available.

To provision the circuit successfully, you need to click **Next** to continue the process because you have not yet configured the devices and interfaces that will support the circuit.

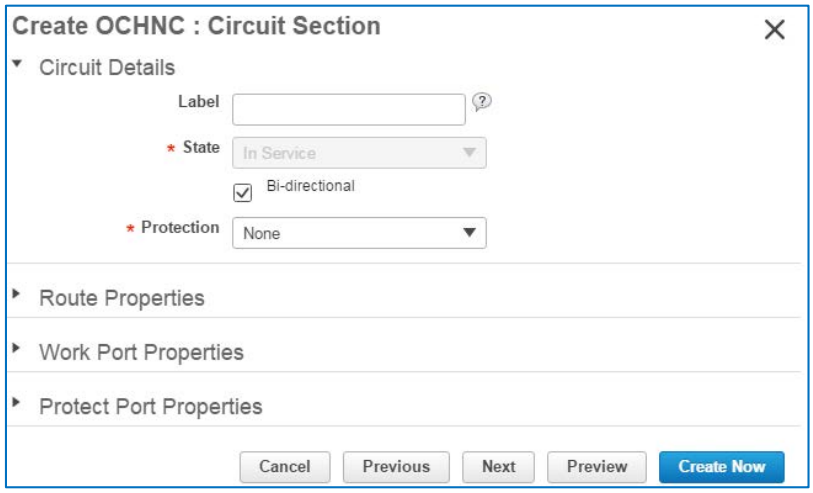
Note: When you add a description, it appears in the **Circuit/VC 360⁰ View** pop-up window details.



8. To continue, click **Next**.



The **Circuit Section** page opens.

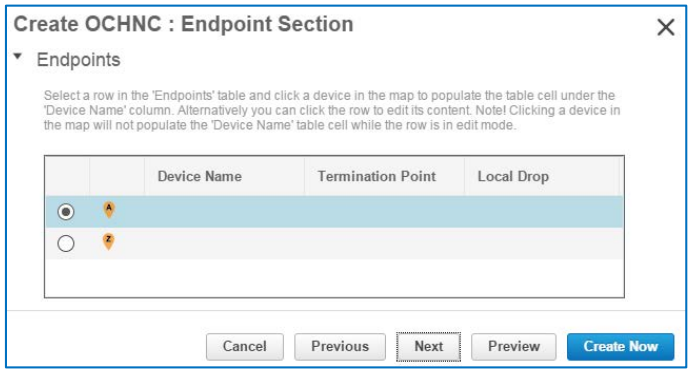


9. On the **Circuit Section** page, accept all of the system default settings.

Note: In complex provisioning scenarios, optical provisioners can configure circuit, route, and port properties on this page.
For more information, refer to the **Configuring Circuit Properties** topic.

10. To continue, click **Next**.

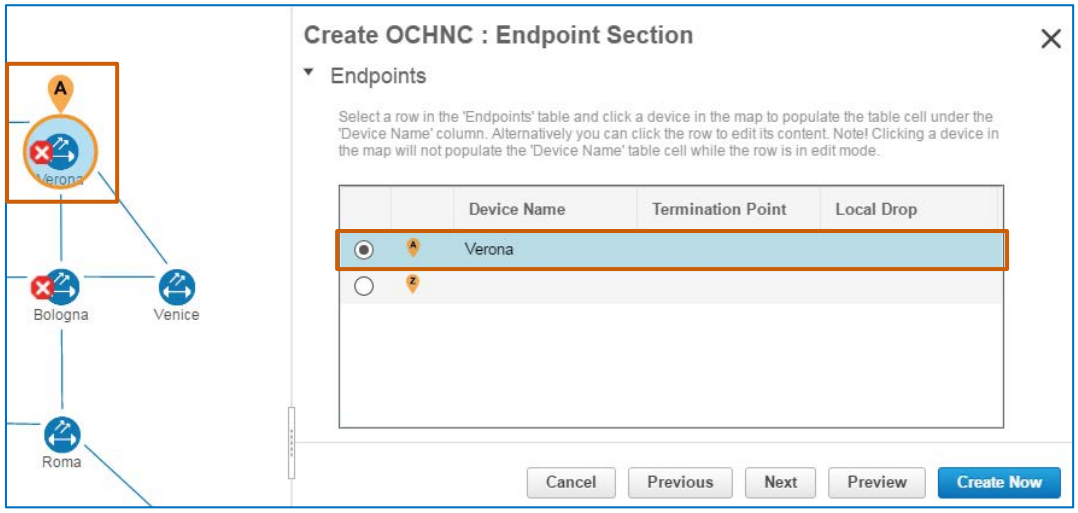
The **Endpoint Section** page opens and the system selects the alpha (**A**) endpoint row by default.



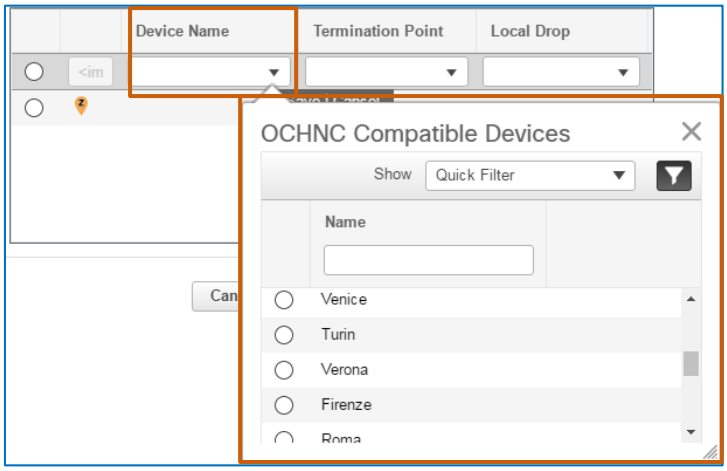
Tip: If you open the **Endpoint Section** page and the endpoint rows do not appear, click **Cancel**.
The wizard returns you to the initial page with its default settings. Re-enter the data up to the point of opening the **Endpoint Section** page. The endpoints rows will be available editing.

11. To select the **A** endpoint, on the map, click the icon of the device with the port that you need to configure.

The system applies the **A** icon to the device icon and, in the **A** endpoint row, populates the **Device Name** field with the device name.

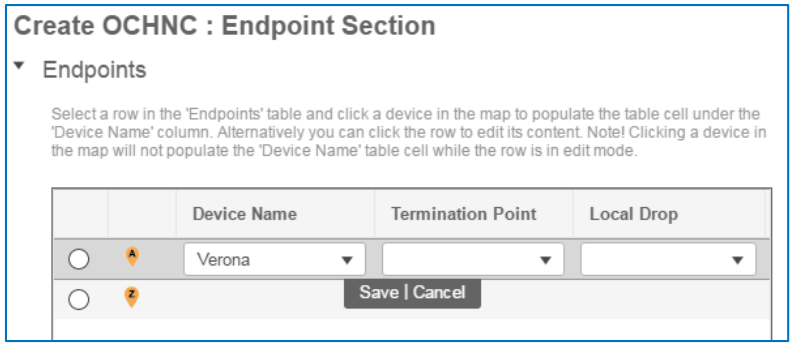


Tip: You also can click the **Device Name** field in an endpoint row to open a list of compatible devices from which you can select an endpoint.



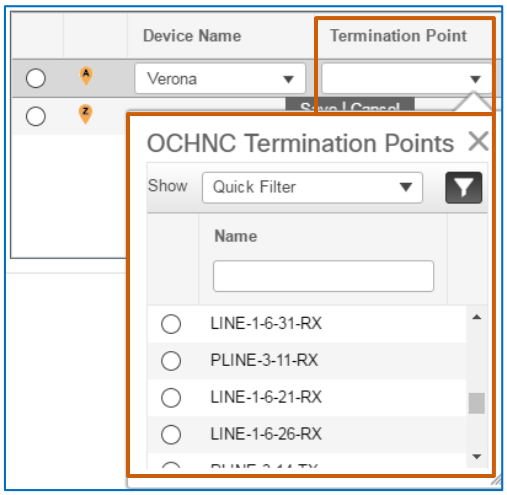
12. To select the **A** endpoint device ports to use for communication, click the **A** endpoint row.

The row becomes available for editing and the system populates the **Termination Point** drop-down list with all of the device's ports that are available for provisioning.



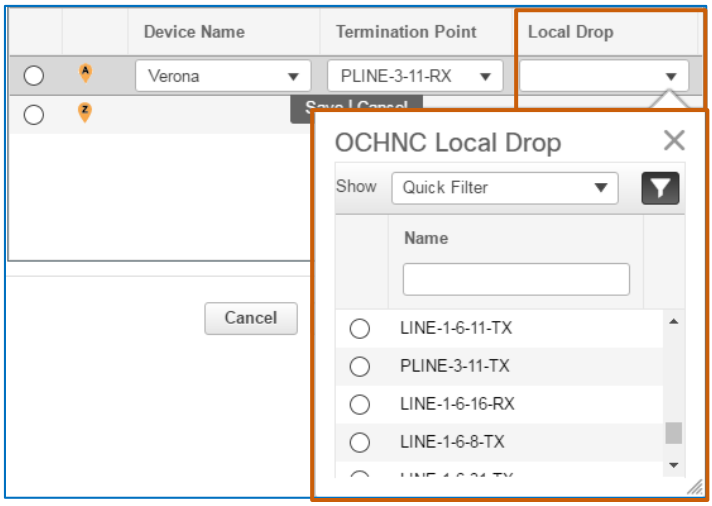
13. On the **A** endpoint device, to configure the communication direction between the **A** and **Z** endpoints:

    a. In the **Termination Point** drop-down list, select the device receiving (RX) port, which indicates the port that introduces the signal into the system and transmits data to the termination endpoint (TX) port on the **Z** endpoint.



Important Note: When populating the **Termination Point** drop-down list, the system filters the list to display the ports that are applicable to the devices that you select, and that are available for provisioning.

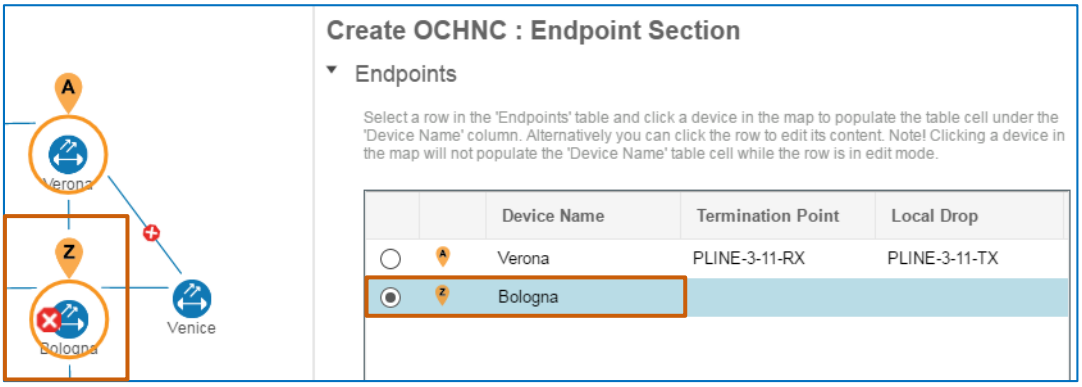
    b. In the **Local Drop** drop-down list, select the device port, which indicates the transmitting (TX) port to which the **Z** endpoint local drop (RX) port transmits data.



    c. Below the row, click **Save**. The system saves your changes.

14. To select the **Z** endpoint, click the **Z** row option button, and then, on the map, click the icon of the device with the port that you need to configure.

The system applies the **Z** icon to the device icon and, in the **Z** endpoint row, populates the **Device Name** field with the device name.



15. To select the **Z** device ports to use for communication, click the **Z** endpoint row.

    The row becomes available for editing and the system populates the **Termination Point** drop-down list with all of the device's ports.

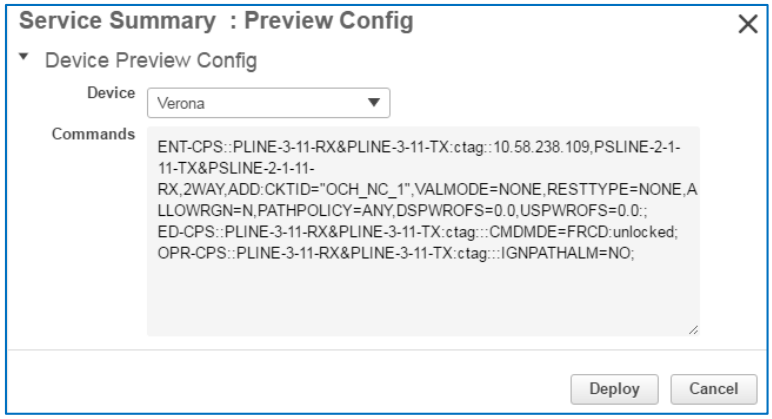
16. On the **Z** endpoint device, to configure the communication direction between the **Z** and **A** endpoints:

    a. In the **Termination Point** drop-down list, select the device transmitting (TX) port, which indicates the port that receives the data from the termination endpoint (RX) port on the **A** endpoint.
    b. In the **Local Drop** drop-down list, select the device port, which indicates the receiving (RX) port that introduces the signal into the system and transmits data to the local drop (TX) port on the **A** endpoint.
    c. Below the row, click **Save**. The system saves your changes.

17. To evaluate the TL1 output that the system will send based on the settings, click **Preview**.

Tip: Cisco recommends that you preview the TL1 output before deploying it to help ensure that provisioning will occur as expected.

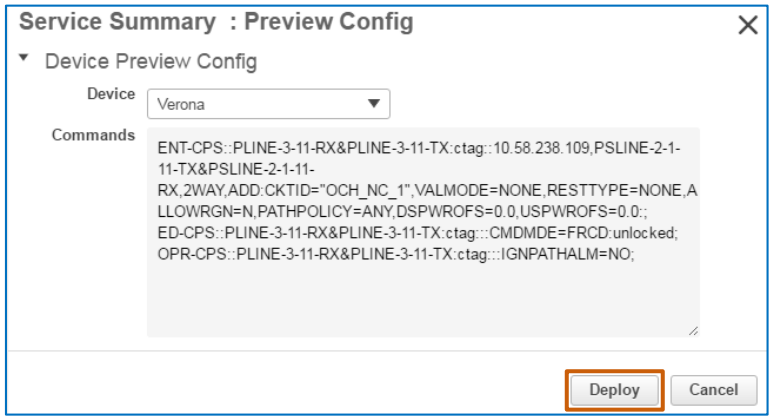
In the wizard, the **Service Summary: Preview Config** page opens. The **Device** field indicates the **A** endpoint and the **Commands** field displays the TL1 output that the system will send to the **A** endpoint device.



Note: When provisioning OCH services on NCS 2000 devices, you see only one device in the preview because OCH services are GMPLS-signaled from one end only.

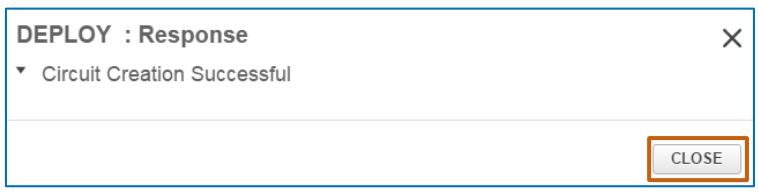
In this case, EPNM instructs the first device on how to provision the service, and then the control plane on that device handles provisioning the service end-to-end.

18. To start the auto-provisioning process, in the **Service Summary: Preview Config** dialog box, click **Deploy**.



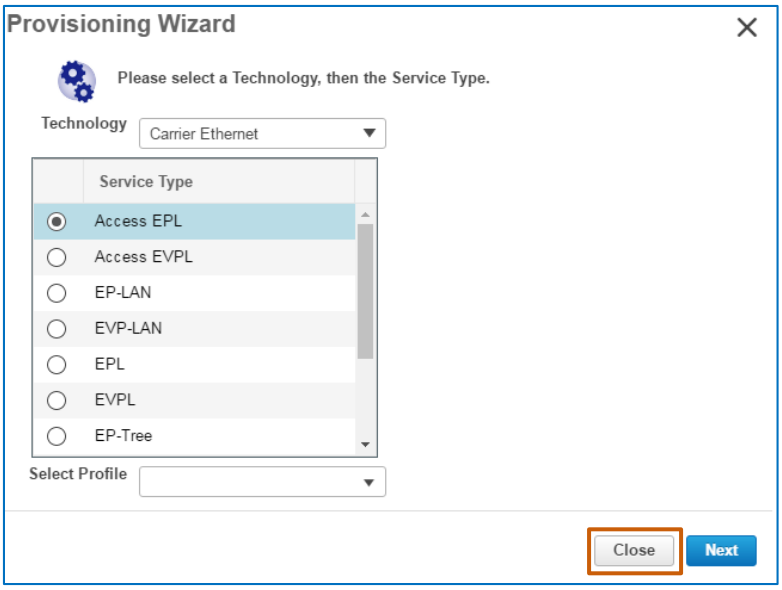
The system starts the provisioning action. When the system has deployed the TL1 output, a system message opens in the wizard, indicating deployment results.

19. To continue, on the **Deploy: Response** page, click **Close**.



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

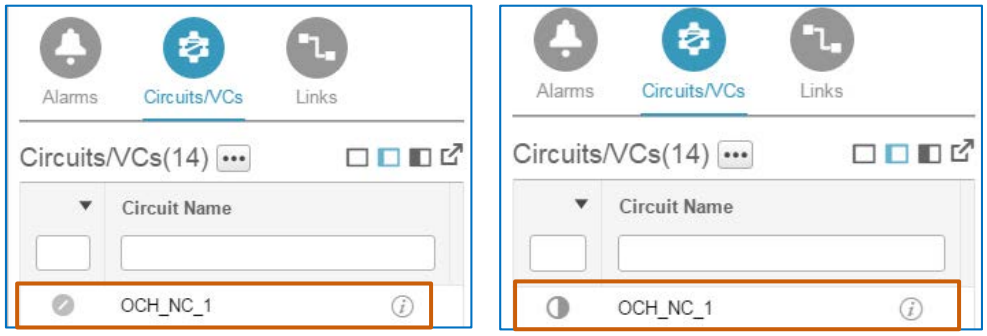
20. In the **Provisioning Wizard**, click **Close**.



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 the circuit is online and EPN Manager has discovered it, the icon transitions to a green arrow  icon. At this point, the process is complete and the circuit is available on the network.

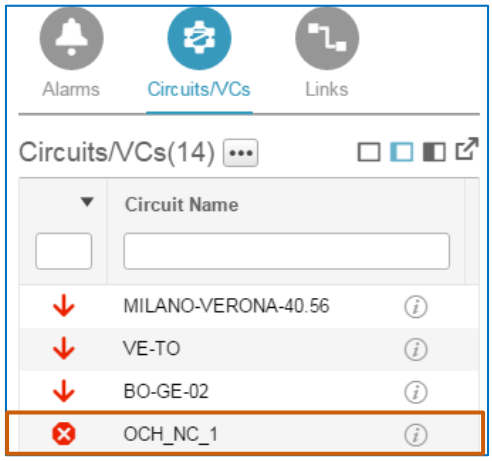
Note: The provisioning process for an auto-provisioning task takes approximately 5 minutes to complete.

In more complex provisioning scenarios, the system can take significantly more time. For example, the timeline will be longer when provisioning a circuit with complex working and protection route settings combined with a series of working and protected route constraints.

In this case, the OCH NC circuit is up and at least one device is reporting a critical alarm.

Note: When circuits are up and indicating alarms, the system displays an indicator for the highest severity alarm that at least one of the devices is reporting.

This feature can prompt you to take action, as needed, to clear any issues that might affect the service that you provisioned.



Note: This job aid introduces you to use several methods of validating and evaluating a circuit. Future demonstrations and related job aids will address evaluating and resolving alarm situations.

To validate or review the provisioned circuit in more detail:

- You can use the methods available for validating and evaluating it.

Tip: To see the types of default data that the system is applying during auto-provisioning, you can review the optical provisioning settings for complex orders.

Optical Provisioning Settings for Complex Orders

When fulfillment requests require complex configuration, optical provisioners can configure provisioning settings.

Important Note: Optical provisioners require expert knowledge of optical networking technologies and devices to configure provisioning settings most effectively and efficiently.

This knowledge also helps avoid incorrectly provisioned circuits or provisioning failures.

Note: The system settings that optical provisioners can configure vary based on the technology and service type that they are provisioning. The settings that this job aid addresses are available when provisioning OCH network connection circuits.

Tip: You can accept the default settings that are applicable, configuring only those settings that the circuit requires.

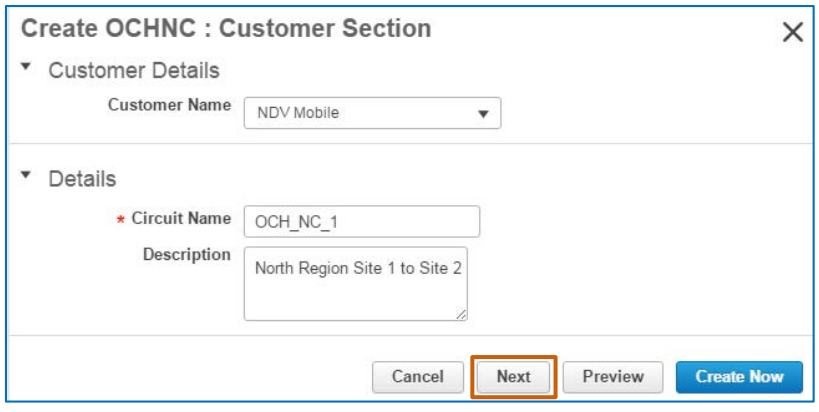
To prepare for complex provisioning:

- Identify the devices and associated ports that will support each circuit endpoint.

Tip: When identifying devices and ports, it is optimal to understand their relationships in the network, which can help ensure that the circuit behaves as expected when it comes online.

To provision an OCH NC circuit and configure specific settings:

1. Follow auto-provisioning process steps 1 through 8, and then go to step 2.
2. To configure the circuit properties, click **Next**.



The wizard opens the **Circuit Section** page.

Note: For more information on the types of circuit settings that optical provisioners can configure, refer to the **Configuring Circuit Properties** topic.

3. To configure the device endpoints, click **Next**, and then follow auto-provisioning process steps 10 through 16.
4. To configure route constraints, which specify the working and protection routes that the circuit can use, on the **Endpoint Section** page, click **Next**.

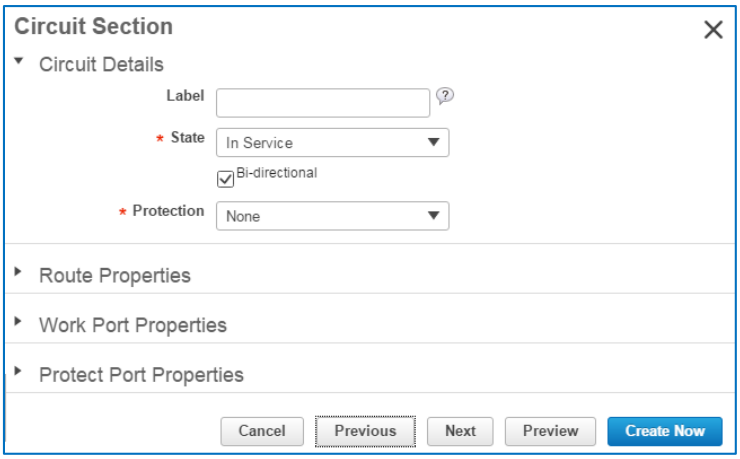
The C**onstraints Section** page opens.

Note: For more information on configuring circuit routes, refer to the **Configuring Circuit Route Constraints** topic.

5. To start the provisioning process, follow auto-provisioning process steps 17 through 20.
6. The system provisions the circuit following the auto-provisioning process.
7. To validate or review the provisioned circuit in more detail, you can use the methods available for validating and evaluating it.

Configuring Circuit Properties

After adding the customer and circuit names, the **Circuit Section** page opens with the **Circuit Details** open by default.



Note: The following section summarizes the circuit settings that are available for configuration.

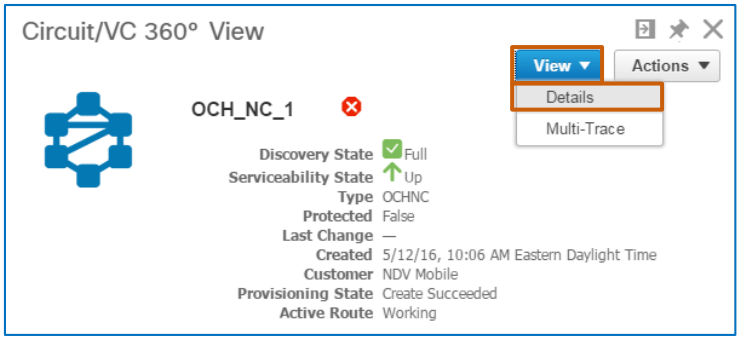
For field level definitions, refer to the **Circuit Section Reference** for the **OCH Circuit Types** topic of the **Cisco Evolved Programmable Network Manager 2.0 User and Administrator Guide**.

Circuit Details

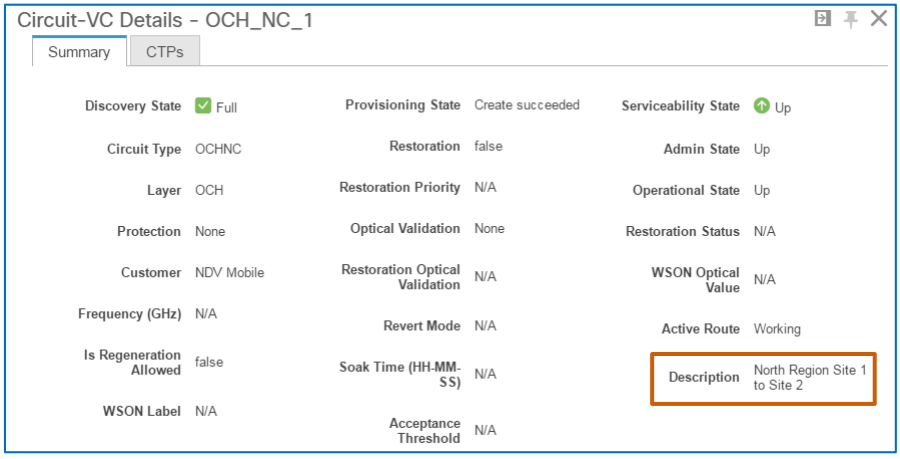
In the **Circuit Details** section, optical provisioners can:

- Add a unique attribute to distinguish circuit use or other information

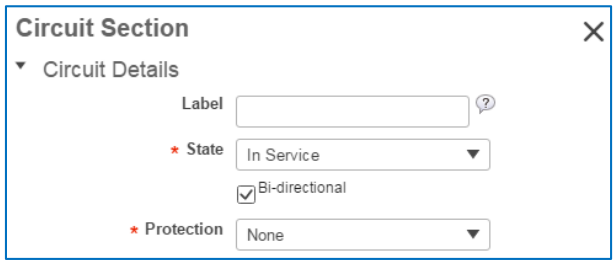
Note: When you add label information, it appears in the Description field, which you access by opening the **Circuit/VC 3600 View** pop-up window, and then selecting **Details** in the **View** drop-down menu.



The pop-up window refreshes to display circuit details.



- Configure whether the state of the circuit is online or offline when provisioning is complete.
- Configure whether the system applies an applicable method of keeping a circuit online in the event of failure of the primary, or working, route, referred to as protection.

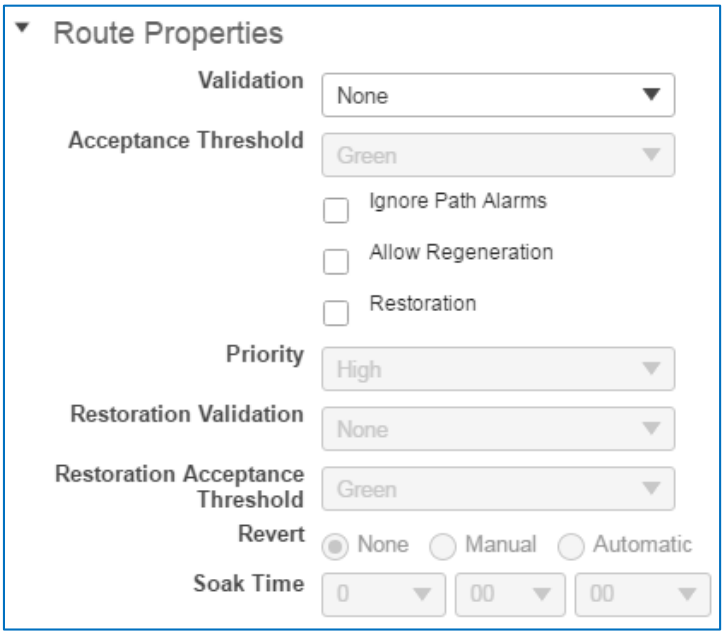


Route Properties

In the **Route Properties** section, optical provisioners can:

- Configure a minimum, standardized threshold of quality to the circuit's working route.
- Configure whether, in the event that the primary circuit route does not meet the quality threshold, the system can attempt to provision alternate route that does meet the quality threshold.
- When you allow restoration, configure a minimum, standardized threshold of quality to the circuit's alternate route.

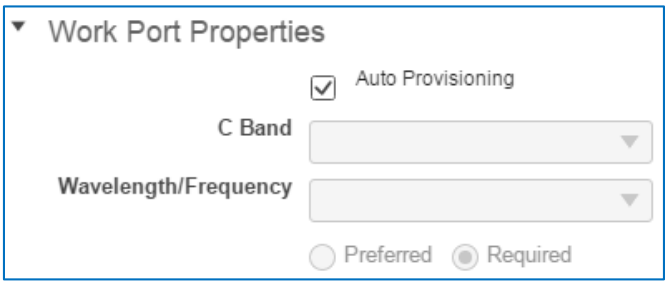
Important Note: When you configure a threshold, the system must be able to find a route that meets the minimum quality standard that you set or provisioning will fail.



Work Port Properties

In the **Work Port Properties** section, optical provisioners can:

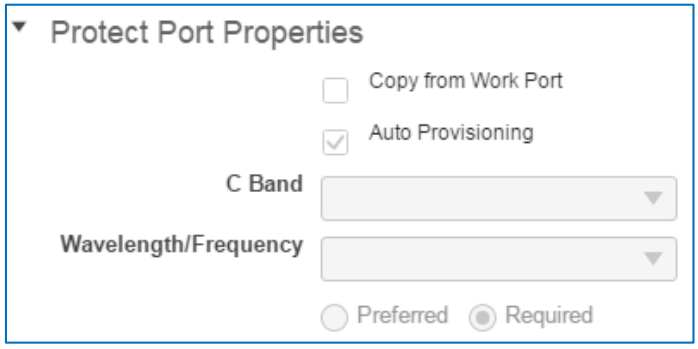
- Configure the bandwidth and frequency of the ports of the endpoint devices that comprise the circuit's working route.



Protect Port Properties

In the **Protect Port Properties** section, optical provisioners can:

- When configuring a protected route, configure the bandwidth and frequency of the ports of the endpoint devices that comprise the circuit's protected, or alternate, route.

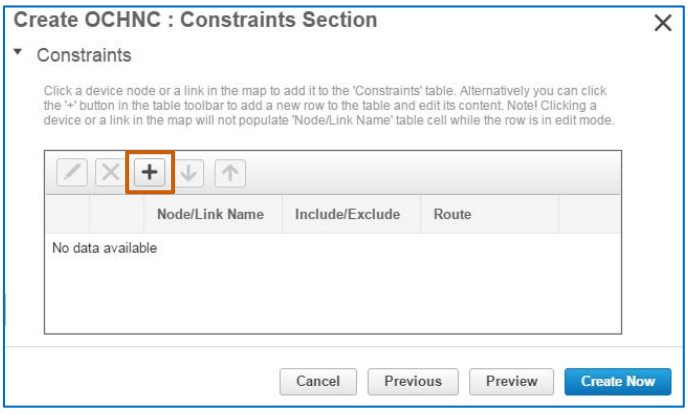


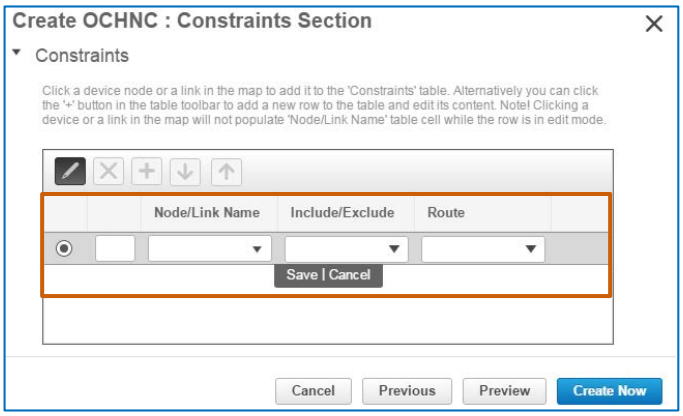
Configuring Circuit Route Constraints

After adding the circuit endpoints, click **Next**. The **Constraints** page opens.

In the **Constraints** section, optical provisioners can:

- Configure specific routes for the circuit to follow by indicating:
  - The devices that you want to include in or exclude from the route.
  - Whether the route constraints apply to the working route, a protected route, or both.





Validating and Evaluating Provisioned Circuits

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

Reviewing Maps

Topological and geographical maps provide a visual representation of circuit 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 Circuit Details

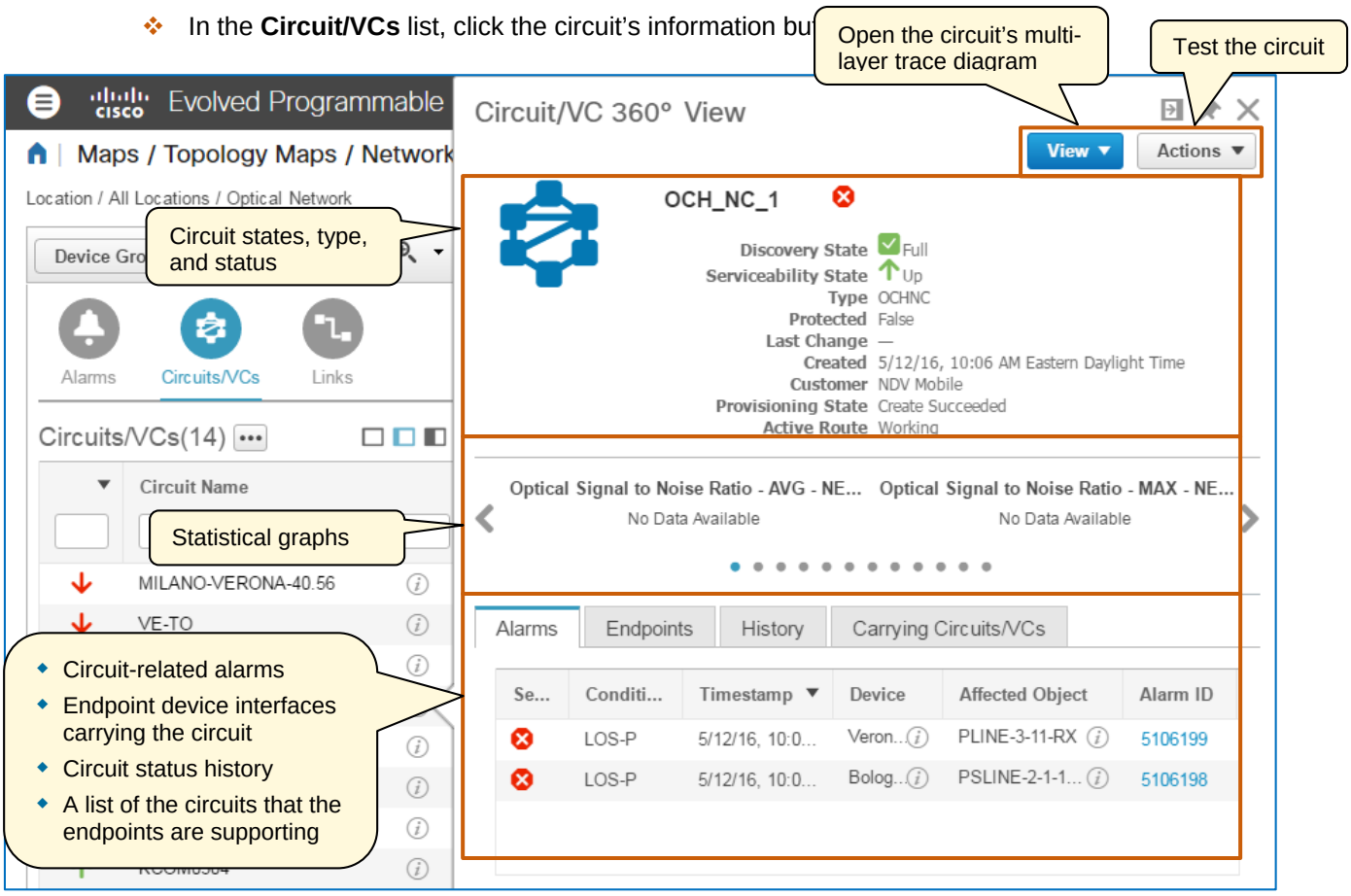
The Circuit/VC 360^0 View

The **Circuit/VC 360^0 View** pop-up window provides detailed information about the circuit.

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

To open the view:

- In the **Circuit/VCs** list, click the circuit's information bu



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 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 working route that the OCH network connection uses to carry traffic. During auto-provisioning, the system configures the circuit to support bi-directional traffic by default.

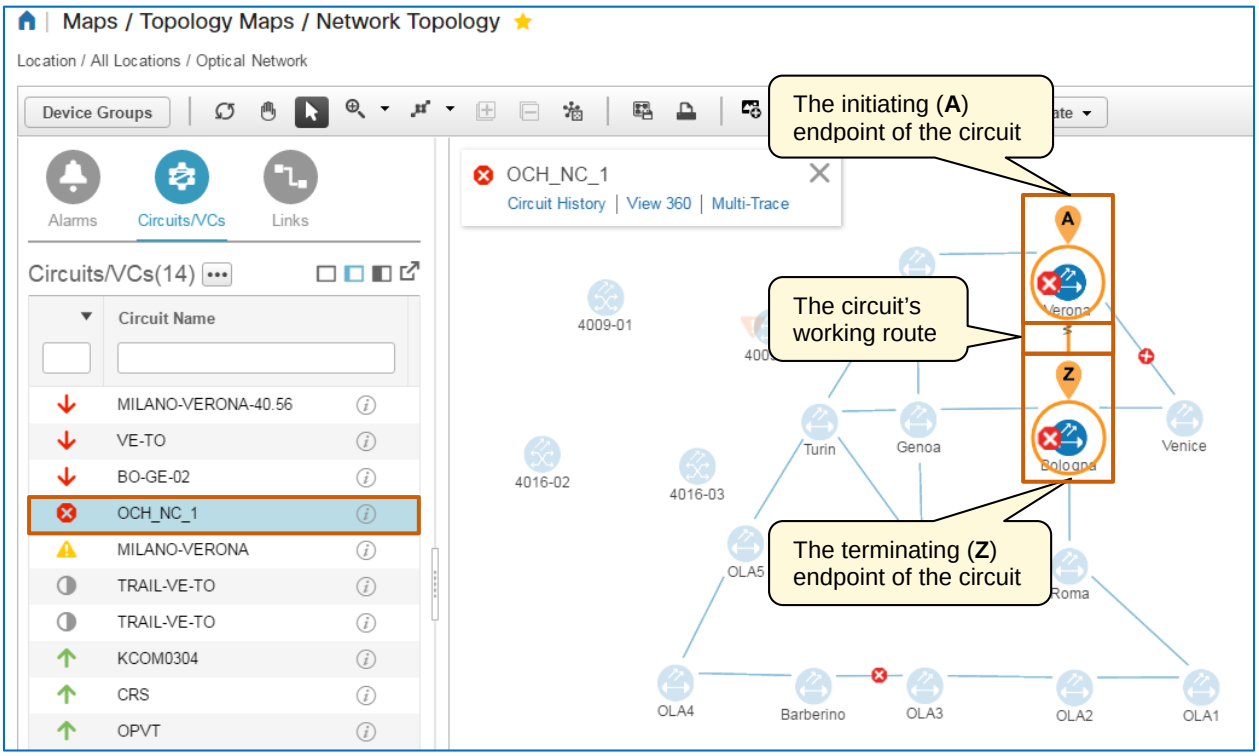
The overlay also indicates the device endpoints that support the circuit, including the initiating, or **A**, and the terminating, or **Z**, endpoint. When the traffic is bi-directional, the endpoints do not indicate traffic flow.

Note: When the circuit is uni-directional, traffic flows from the circuit's **A** endpoint to its **Z** endpoint.

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 devices and associated route or routes.



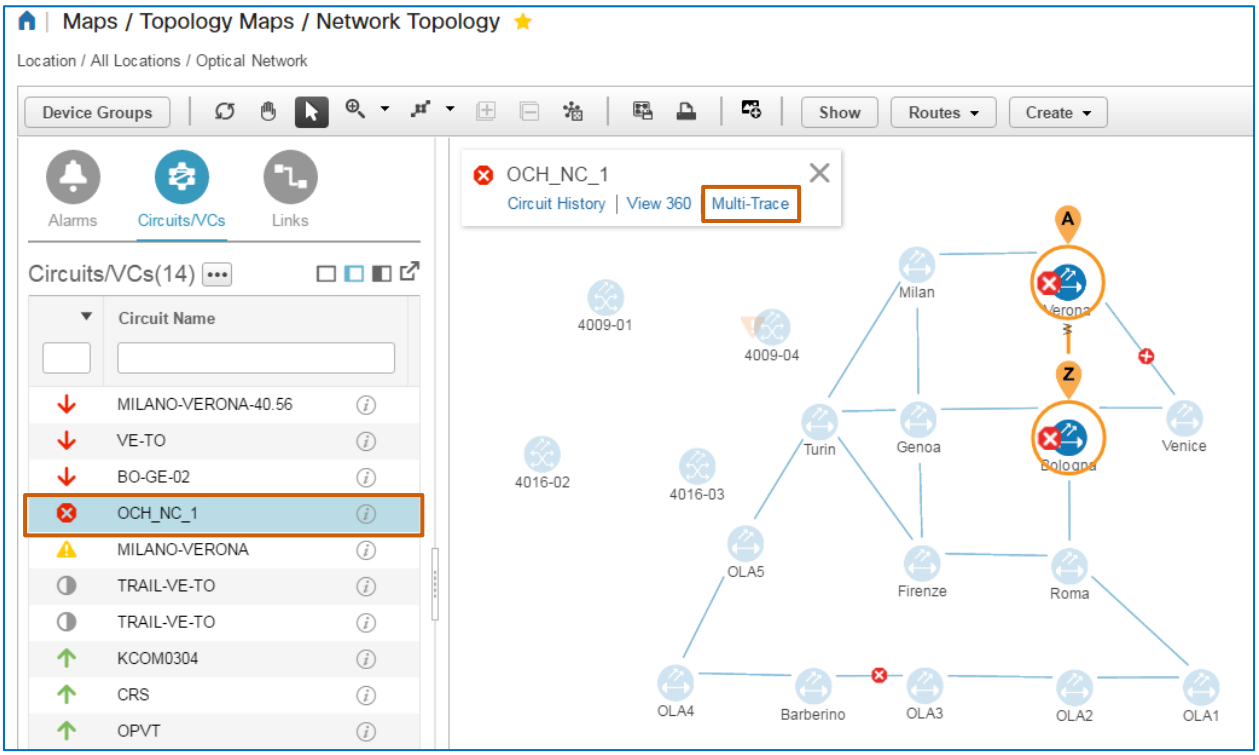
The Circuit Multi-Trace Diagram

As you continue validating that the OCH network connection is provisioned as intended, you can review the circuit's multi-trace diagram. The diagram provides a detailed view of the optical technology layers that are supporting the circuit's route.

Tip: The **Multi-Trace** diagram is helpful when evaluating issues or alarms that the system is reporting on the circuit, also.

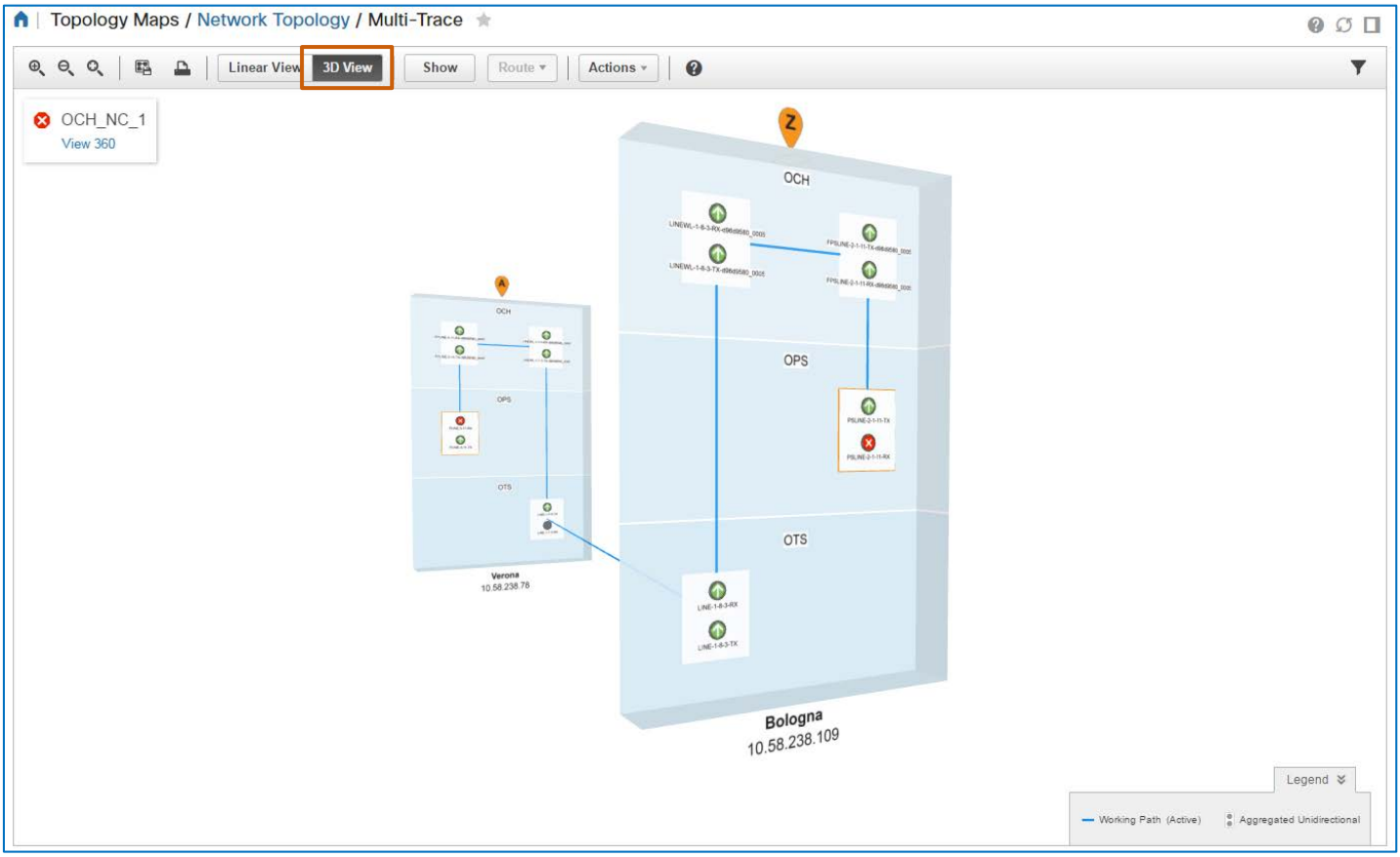
To open the multi-trace:

- In the **Circuit/VCs** list, select the circuit row, and then click **Multi-Trace**.

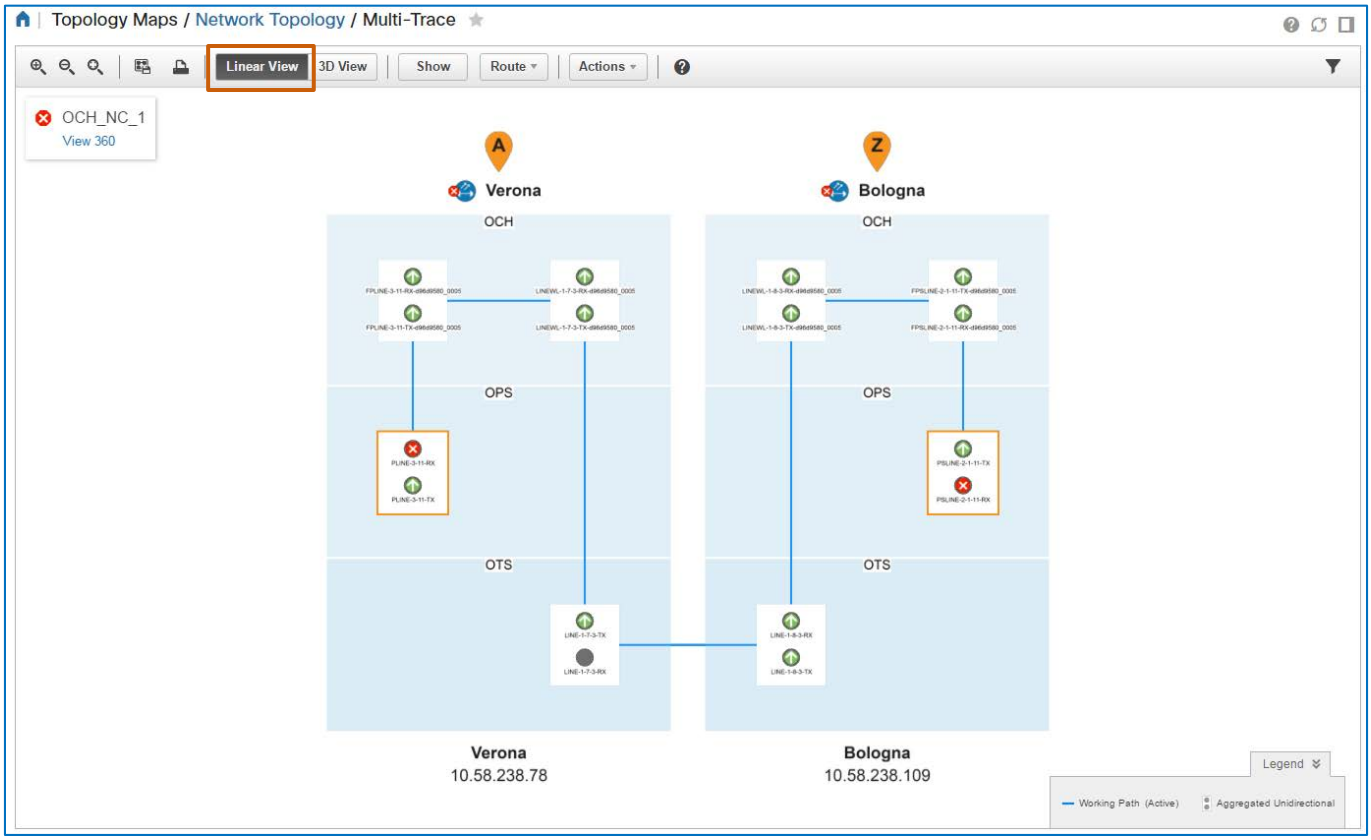


The **Multi-Trace** page opens. The trace illustrates the circuit connectivity from the **A** endpoint device to the **Z** endpoint device through the applicable intermediate points on the optical technology layers.

You can apply a three-dimensional view…



…or linear view to the diagram.

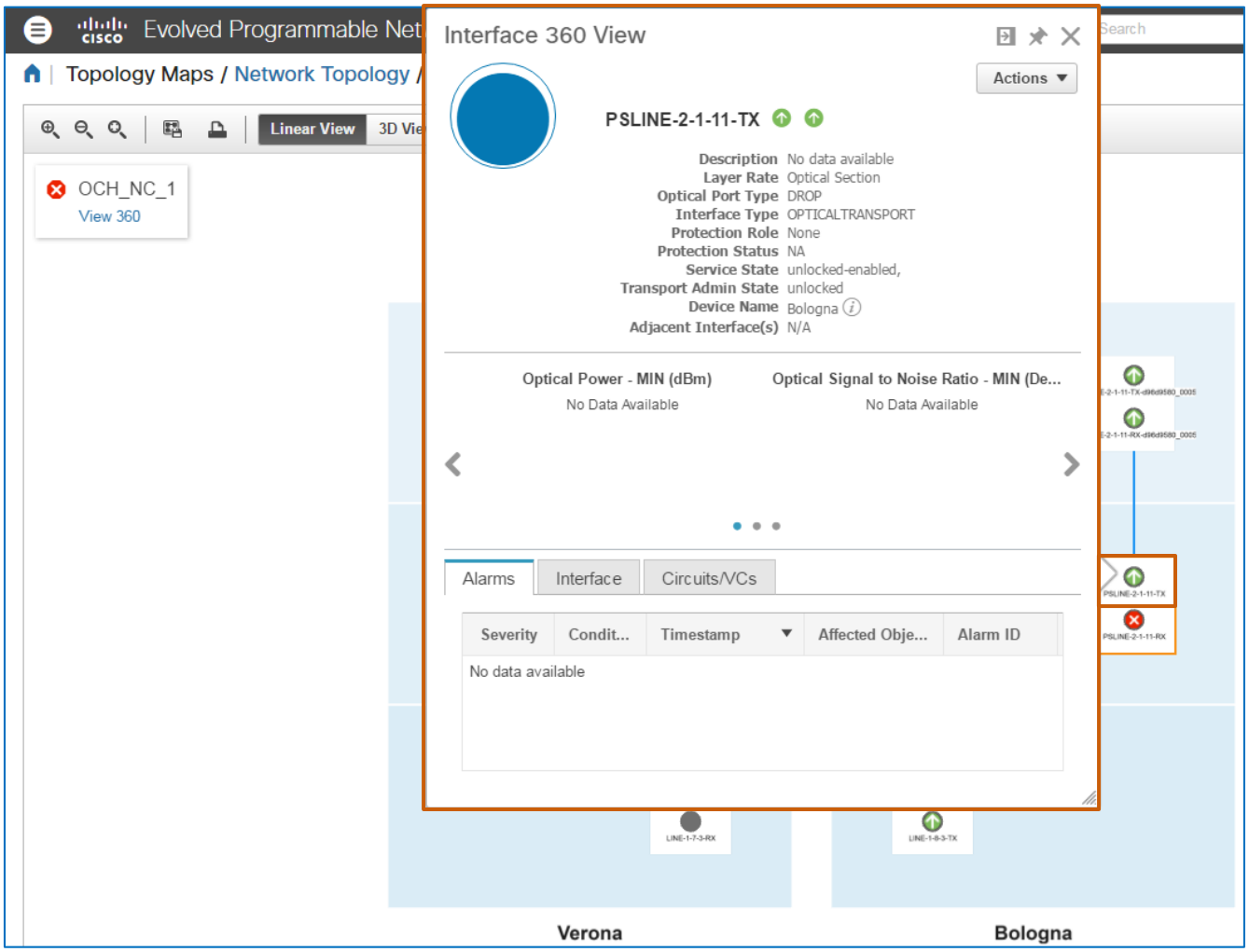


The trace provides tools to manage the diagram layout and the data that appears, and to review circuit details or take actions, such as circuit testing.

You can manage the circuit components at an interface level by opening the **Interface 360 View** pop-up window.

To open the view:

- Click the interface button.



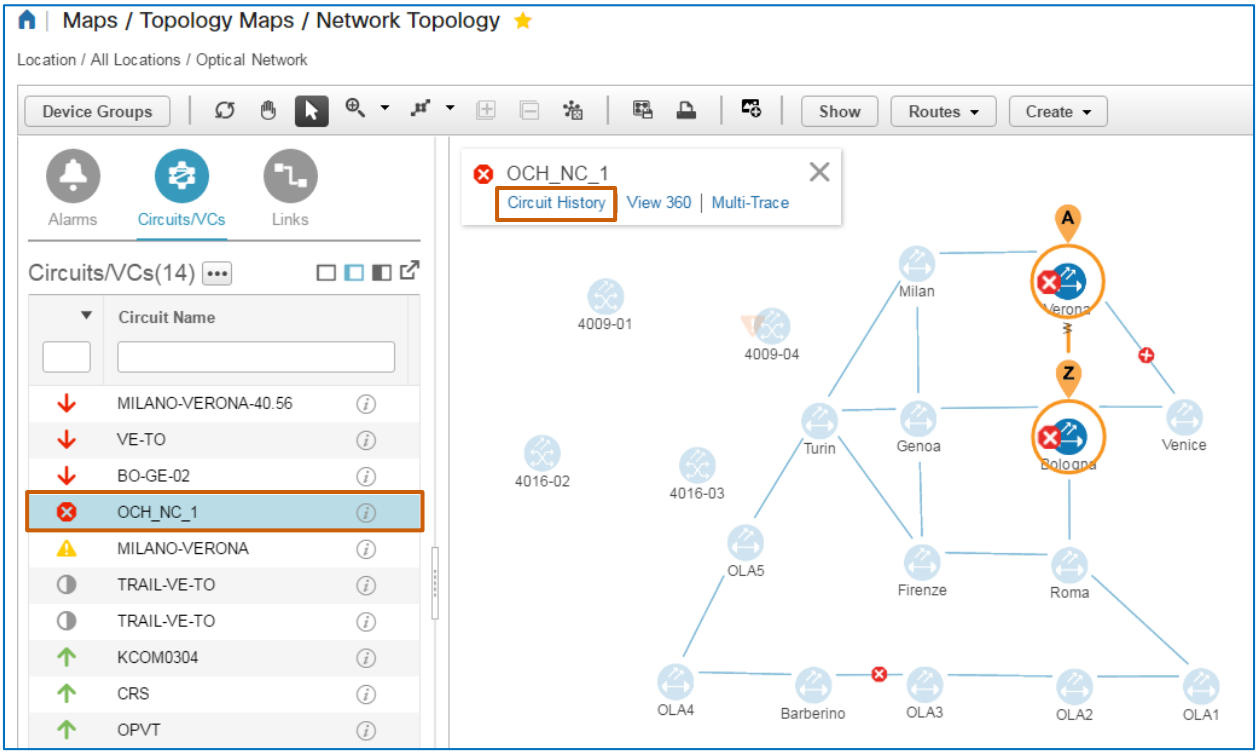
The Circuit History

When provisioning is complete, the system begins building the circuit history, which captures all of the device or system changes that affect the circuit.

When you initially provision a circuit, you can refer to the history to validate the system has discovered the circuit and determine whether any other changes have occurred immediately after provisioning that affect it.

To open the circuit history:

- In In the **Circuit/VCs** list, select the circuit row, and then click **Circuit History**.

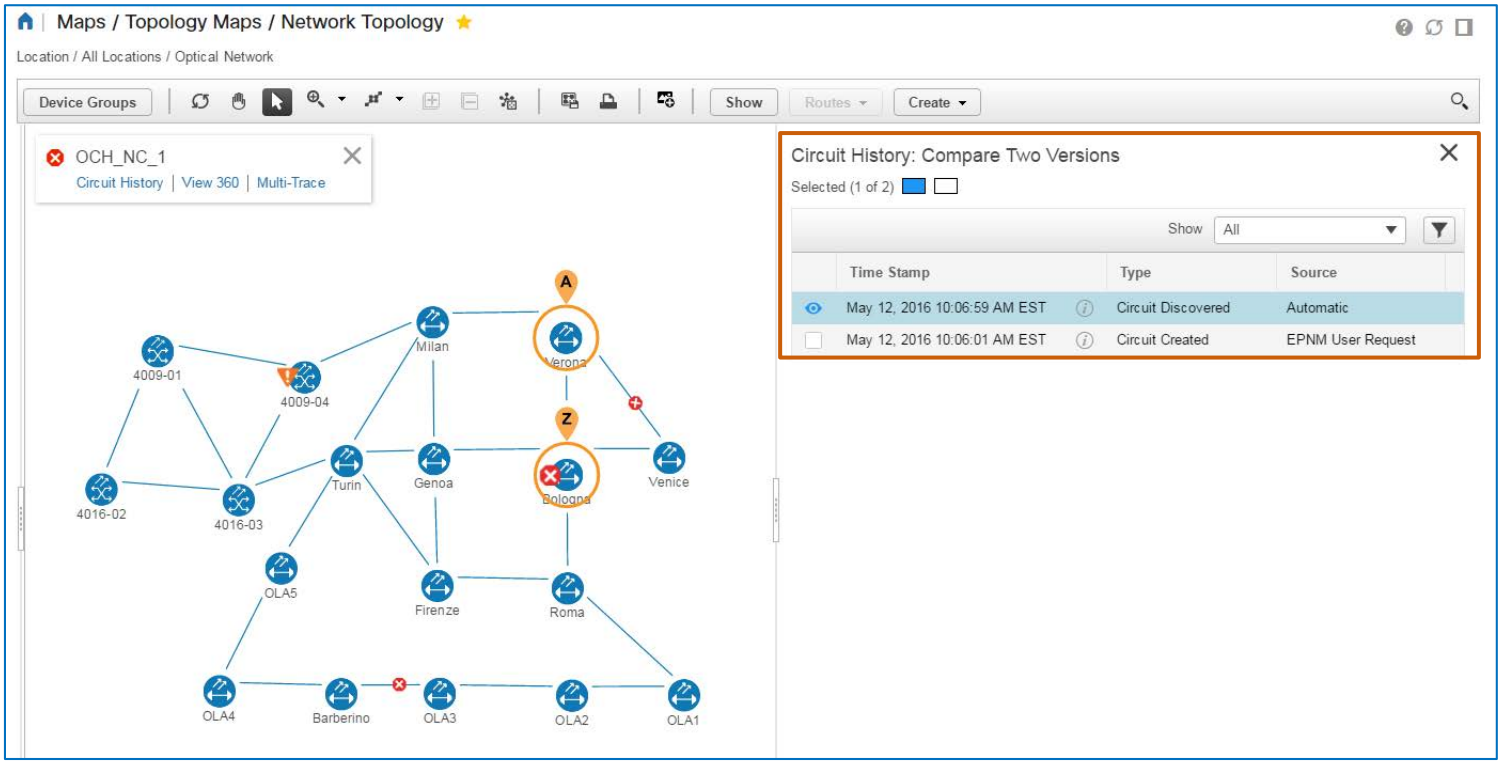


The **Circuit History** opens on the right side of the map and lists the network activity that affects the circuit.

Note: In new (greenfield) deployments, the history of a newly provisioned circuit reports two actions:

- The first entry reports that the commands that you configured in EPN Manager have been deployed to the network, which then follows those commands to execute the provisioning process.
- When provisioning is complete, the circuit history reports that EPN Manager has discovered the provisioned circuit, which means it is available for use.

In previously existing (brownfield) deployments, the circuit history reports only whether EPN Manager has discovered the circuit.



Tip: Information in the circuit history can be helpful when you are evaluating issues or alarms that the system is reporting on the circuit.

You can review actions that the system or system users have taken that might be affecting the circuit's behavior or connectivity. For example, changes might occur that cause the circuit to switch from the working route to the protected route based on the route configuration.

Video Demonstration

Watching Demonstrations

To watch a demonstration:

- Click a 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.

Fulfilling Orders for Optical Services

Watch the Demonstration

To review the process for provisioning an OCH NC circuit, watch the **Fulfilling Orders for Optical Services** video.
Approximate runtime: 11:00

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.

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