View and Manage Discovered/Provisioned Circuits/VCs

Enable and Disable Service Discovery

Cisco EPN Manager uses the service discovery feature to automatically discover the circuits/VCs existing in the network and the circuits/VCs that are provisioned using the Provisioning Wizard.

The service discovery feature is enabled by default. You can choose to disable this feature. If you disable service discovery, all the discovered services in Cisco EPN Manager will be removed. However, the services that were provisioned using Cisco EPN Manager remain in 'Missing' state. Use the **History Settings** option to configure the maximum number of versions of a discovered Circuit/VC changes that are presented in the Circuit/VC History table. You must restart the server to apply the changes.

✎

| Note | The **History Settings** configuration is relevant only for discovered changes in optical circuits. |

To disable service discovery:

Step 1 From the left side bar, choose **Administration** > **Settings** > **System Settings**, then choose **Circuits/VCs** > **Discovery Settings**.

Step 2 Uncheck the **Enable Service Discovery** checkbox.

Step 3 Restart Service Discovery pod to apply your changes.

Circuit or VC States

Circuit or VC Primary States—conveys the most important state information for a circuit, in this order: Serviceability, Discovery, Alarm, Provisioning. It is normally shown in the first column of a circuit or VC table.

Circuit or VC Primary State	Icon	Serviceability	Discovery	Alarm	Provisioning
Missing	⬤	—	Missing	—	—
Down	⬇	Down	—	—	—
Critical	✖	—	—	Critical	—
Major	⚠	—	—	Major	—
Minor	⚠	—	—	Minor	—
Partially Down	◑	Partial	—	—	—
Admin Down	✖	Admin Down	—	—	—
Partially Discovered	◑	—	Partial	—	—
Failed	❗	—	—	—	(Create, modify, or delete) failed
In progress	⬤	—	—	—	(Create, modify, or delete) in progress
Warning	◆		—	Warning	—
Up	⬆	Up	—	—	—

Circuit or VC Serviceability State—this value is a combination of the circuit or VC's admin and operational states. The admin state is shown because it impacts service operability. For optical circuits, the admin state also determines whether the Activate and Deactivate actions are available. The operational state is shown to quickly identify whether a service is working or not.

Circuit or VC Serviceability State	Icon	Description
Admin Down		Circuit or VC manually shutdown by the administrator.
Down		Circuit or VC is operationally down and administratively up.
Up		Circuit or VC is operationally and administratively up.
Auto Up		Circuit or VC is operationally auto up and administratively up. Only certain devices support the Auto Up operational state.
Unavailable		Circuit or VC has not been discovered yet, or its operational status is unavailable.
Partial		Circuit/VC operational or administrative state is partial. • Partial admin state—The circuit or VC has a mixed administrative request (to activate some service resources and deactivate others), has a mix of resources that are administratively up and down, or has resources whose operational state is unavailable. • Partial operational state—The circuit or VC has a mix of some active and deactivated resources, or the operational state for some of its resources are unavailable.
Up - Unprotected		The circuit/VC that was configured with a protection path is operational but cannot switch to the alternate path because of severe failures. **Note** This serviceability status indication is supported for OCHCC WSON circuits with Y-Cable protection and protected ODU.

Following table provides details of the serviceability states of Circuits/VCs under various scenarios:

Technology	Service Type	Scenario	Serviceability State

Carrier Ethernet	EPL, EVPL, Access EPL, and Access EVPL	If the operational state of the endpoints (service instance / subinterface), cross connects, and pseudowire participating in the service is up	Up
		If the admin state of both the source and destination endpoints (service instance / subinterface) participating in the service is down	Admin Down
		In all the other scenarios, when at least one endpoint (service instance / subinterface), cross connect, or the pseudowire participating in the service is down	Down
	EP-LAN, EVP-LAN, EP-Tree, and EVP-Tree	If all the endpoints (service instance / subinterface), bridge domains, VFIs, and pseudowires participating in the service are up	Up
		If the operational state of at least two endpoints (service instance / subinterface) participating in the service are up and the rest of the endpoints are down	Partial
		If the admin state of all the endpoints (service instance / subinterface) participating in the service is down	Admin Down
		If the operational state of at least one endpoint (service instance / subinterface) participating in the service is up and the rest of the endpoints are down	Down

Circuit Emulation	All service types	If the operational state of the endpoints (cemGroup), underlying TDM controller, cross connect, and pseudowire participating in the service are up	Up
		If the admin state of both the source and destination endpoints (cemGroup) participating in the service is down	Admin Down
		In all the other scenarios, when the operational state of one of the endpoints (cemGroup), underlying TDM controller, cross connect, and pseudowire participating in the service is down	Down
MPLS	Unidirectional TE Tunnel	If the operational state of the tunnel interface is up	Up
		If the admin state of the tunnel interface is down	Admin Down
		In all the other scenarios, when the operational state of the tunnel is down	Down
	Bidirectional TE Tunnel	If the operational states of the interfaces on both ends of the tunnel is up	Up
		If the admin states of the interfaces on both ends of the tunnel is down	Admin Down
		In all the other cases, when the operational state of the tunnel interface is down	Down

Serial	RS232, RS422, and RS485	If the operational state of the endpoints (channelGroup), underlying Serial interface, cross connect, and pseudowire participating in the service are up	Up
		If the admin state of both the source and destination endpoints (channelGroup) participating in the service is down If the admin state of either source or destination endpoint (channelGroup) is down	Admin Down
		In all the other scenarios, when the operational state of one of the endpoints (channelGoup), underlying Serial interface, cross connect, and pseudowire participating in the service is down	Down
	Raw Socket	If server and all its associated client sessions are up	Up
		If server is up and all its associated client sessions are down	Down
		If the admin state of both the source and destination endpoints (channelGroup) participating in the service is down If the admin state of a server or admin state of all the participating clients are down	Admin Down
		If server and all its associated client sessions are down	Down

		If server is up and if any one of its associated clients is up	Partial
Layer 3 VPN		If the operational state of all the endpoints (subinterface, BDI, and BVI) participating in the service is up	Up
		If the operational state of at least two endpoints (subinterface, BDI, and BVI) participating in the service are up and the rest of the endpoints are down	Partial
		If the admin state of all the endpoints (subinterface, BDI, and BVI) participating in the service is down	Admin Down
		If the operational state of at least one endpoint (subinterface, BDI, and BVI) participating in the service is up and the rest of the endpoints are down.	Down
SR TE	SR Policy	If the operational state of the SR policy us up	Up
		If the admin state of the SR policy is down	Admin Down
		In all the other scenarios, if the operational state of the SR policy is down	Down

Circuit or VC Discovery State—Represents the latest state and structure of a service and its components, as discovered from the network. Having a Discovered version means that the application is actually monitoring the service itself, for example, it can define meaningful operational and performance data.

Pseudowire Serviceability State—The icons next to the **Link Name** represents the state that the pseudowire is in. The ↑arrow represents that the link is up while the ↓ arrow represents it is down.

Circuit or VC Discovery State	Icon	Description
Partial	◑	Circuit or VC partially discovered by Cisco EPN Manager; not all its expected entities have been discovered.

Full	✅	Circuit or VC fully discovered by Cisco EPN Manager, so Cisco EPN Manager can monitor the service and provide meaningful operational and performance data.
Missing	🚫	Circuit or VC not yet discovered by Cisco EPN Manager (though it may have been provisioned).
Resync	⋯	Circuit or VC is resynced.

Circuit or VC Provisioning State—Represents whether there is a provisioning intent for a circuit or VC and, if so, its status. If a reconciliation report has been generated, the state of the reconcile action is reflected.

Circuit or VC Provisioning State	Icon	Description
None	🚫	Circuit or VC was discovered but has not yet been provisioned. The circuit/VC must be promoted in order to modify or delete it.
Failed	❗	Action has failed.
In Progress	⋯	Action was initiated but not yet completed.
Planned	📅	Action is planned but not yet initiated.
Succeeded	✅	Action has completed successfully.

View Circuits/VCs

Cisco EPN Manager provides a variety of ways that you can view circuits/VCs:

To view circuit/VC information for:	See the procedures in:
A specific circuit/VC in a topology map, in a Circuit/VC 360 view, or in a Circuit/VC Details page	• Get Quick Information About a Circuit/VC: Circuit/VC 360 View, on page 11 • Get Comprehensive Information About a Circuit/VC: Circuit/VC Details Window, on page 17
A device	View a Specific Device's Circuits/VCs, on page 19
A device group in a topology map or in an expanded table	View a Device Group's Circuits/VCs, on page 20
All of Cisco EPN Manager	View All Circuits/VCs in Cisco EPN Manager, on page 21

View a Specific Circuit/VC's Details

Cisco EPN Manager provides different ways to view details about a specific circuit/VC, depending on how much detail you need:

View a Specific Circuit/VC in the Topology Map

When working with circuits/VCs, it is very useful to see how a circuit/VC is deployed within the existing network topology. Cisco EPN Manager overlays the circuit/VC on an existing topology map, clearly indicating the endpoints and midpoints of the circuit/VC, the role of the endpoint (where relevant), and relevant fault information for the circuit/VC. This overlay functionality is available in the geo map as well as the topology map.

For CE and CEM services that use the MPLS TE tunnels to traverse through the network, the underlying tunnel is also displayed in the topology map along with the service overlay. For information about how to assign a MPLS TE tunnel for a CE or CEM service, see Provision EVCs in a Carrier Ethernet Network and Provision Circuit Emulation Services .

Note	• The overlay cannot be displayed if the discovery state of the circuit is "Missing".
	• A circuit/VC might contain endpoints that cross device groups, meaning that one endpoint might belong to one group and another might belong to a different group. In this case, the full overlay cannot be shown. If an endpoint is not currently shown in the map, a notification link will appear at the top left of the map. Click the link to expand the map to show all the device groups that contain endpoints of the selected circuit/VC.
	• When the overlay is displayed, the Link Type filter is disabled.
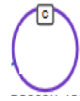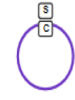
To display an overlay of a circuit/VC on the network topology:

Step 1 From the left sidebar, choose **Maps** > **Topology Maps** > **Network Topology**.

Step 2 Click the **Device Groups** button and select the required group.

Step 3 Go to the Circuits/VCs tab to see a list of the circuits/VCs associated with the selected group.

Step 4 Select the circuit/VC you want to see on the map.

The nodes and links that participate in the selected circuit are highlighted in the overlay and the rest of the devices in the map appear disabled. The name of the selected circuit is displayed just below the topology toolbar. To clear the overlay, click the 'x' button to the right of the circuit name. For a description of the overlay icons, see Circuit or VC Network Topology Overlay Icons.

Circuit or VC Network Topology Overlay Icons

Overlay Icon	Definition
A	Source endpoint
Z	Destination endpoint
AZ	EVC or CEM service with local switching
+	Endpoint included by the user during creation o **Note** "S" appears for both adjacent and n
−	Endpoint excluded by the user during the creati

Overlay Icon	Definition
	Endpoint with some ports that were either in routes of the circuit.
	E-TREE EVC endpoint that has been design
	S on the icon represents that the server is con
	C on the icon represents that the client is con
	S and C on the icon represents that both serv
	Selected endpoint.
	Hub; If the hub and root are on the same dev
	Link included during creation of the circuit.
	Link excluded during creation of the circuit.
	Endpoint with some ports that were either in participating in various routes of the same ci

Get Quick Information About a Circuit/VC: Circuit/VC 360 View

The Circuit/VC 360 view provides at-a-glance information about a specific circuit/VC. From the Circuit/VC 360 view, you can access detailed information about the circuit/VC and perform the actions described in Actions You Can Perform from the Circuit/VC 360 View, on page 15.

The Circuit/VC 360 view displays the circuit name, state, and general circuit/VC and performance information at the top of the view. More detailed information is provided in tabs in the lower part of the view.

Information Provided in Circuit/VC 360 View	Description
General information	Type of circuit/VC, its various states (discovery, serviceability, provisioning), the customer associated with the circuit/VC, and some audit information (when it was created, when it was last changed). For an explanation of circuit/VC states, see Circuit or VC States, on page 2.
	Note If the Provisioning state is **Create Failed**, click the associated *i* (**information**) icon to see the reason for the failure.
	Auto-Refresh— For real-time updates of status and troubleshooting, enable an on-demand refresh by clicking on the Refresh icon. Alternatively, you can also set the auto-refresh interval to 30 seconds, 1 minute, 2 minutes or 5 minutes from the drop-down list. Auto-Refresh is OFF by default.
	Note The Auto-Refresh setting is applicable only for the currently open 360 view popup window. If the view is closed and reopened or another view is opened, by default Auto-Refresh is Off.
	The reserved bandwidth utilization of the TE tunnel is displayed based on the bandwidth configured on the tunnel compared to the bandwidth configured on the Pseudowire associated to the tunnel.
Performance data	Graphs reflecting various aspects of the circuit/VC performance.
	Note For data to be shown in the graphs, the required monitoring policy must be activated for the relevant devices. For example, to view graphs that chart the number of Explicit Pointer Adjustment Relay counters (such L-bits and P-bits) that have been generated and received, both the CEM and Pseudowire Emulation Edge to Edge monitoring policies must be enabled. See Monitoring Policies Reference.
Alarms	Current alarms for the circuit/VC, including their severity, status, and the time they were generated.
Endpoints	Devices and interfaces that serve as endpoints for this circuit/VC.
EVIs	This tab displays the EVI endpoints. The **EVI Details** tab displays the EVI details, route targets, and route policies configured for the selected endpoints.

History	The **History** tab lists all versions of the circuit, allowing you to view the changes that have occurred since the circuit/VC was discovered or first deployed. You can open the Circuit 360 view for any of the versions listed to see its endpoints, alarms, and so forth.
	Note If you are looking at the Circuit 360 view for a historical circuit/VC, the **History** tab is not displayed.
	You can also view the configuration details for the circuit/VC's endpoints by doing the following:
	1. Locate the appropriate circuit/VC version and click its *i* (**information**) icon in the **Provisioning State** column.
	The **Device Configuration Details** pop-up window opens.
	2. Click the radio button for the endpoint whose configuration details you want to view.
	If the endpoint was successfully provisioned, its configuration is listed at the bottom of the pop-up window. If provisioning of the endpoint failed, a description of why provisioning failed is listed instead.
Related Circuits/VCs	Additional circuits within the selected circuit.

For EVCs, the following information is shown:

- Incoming Traffic—The sum of incoming traffic, in bits per second (bps), entering all the endpoint interfaces of the circuit/VC over time. The graph shows the last 24 samples of the total incoming traffic for all the endpoints in intervals of 1 minute. The pink bar shows the lowest level of incoming traffic while the blue bar shows the highest level of incoming traffic.

- Port Availability—Average availability of all the endpoints of the circuit/VC, expressed as a percentage, aggregated across all endpoints. Baseline is 100% unless any of the interfaces has been unavailable.

- Outgoing Traffic—The sum of traffic, in bits per second (bps), exiting all the endpoint interfaces of the circuit/VC over time.

- Loss—Average loss, expressed as a percentage, across all the endpoints of the circuit/VC.

- Delay—Average delay, in microseconds, across all the endpoints of the circuit/VC.

- Jitter—Average jitter, in milliseconds, across all the endpoints of the circuit/VC.

For optical circuits, the performance data is shown based on the following circuit types:

- OCHCC WSON—The total number of octets received on the interface, including frames, number of inbound packets with errors that prevented them from being delivered to a higher layer protocol, and number of severely errored seconds per line and multiplex sections.

- OCHNC WSON—The average, minimum, maximum optical signal to noise ratio (OSNR), and electrical signal to noise ratio (eSNR) for this circuit type.

- OCH-TRAIL WSON—The total number of uncorrectable words and the total number of errors corrected, in bits per second (bps), for this circuit type.

- OCH-Trail UNI—The total number of uncorrectable words and the total number of errors corrected, in bits per second (bps), and the minimum, average, and maximum output power received and transmitted, in decibel referenced to 1 watt (dBW) by this circuit type.

- ODU UNI—The total number of background block errors, total number of severely errored seconds, and errored seconds ratio for path monitoring.

- ODU Tunnel—The total number of background block errors, total number of severely errored seconds, and errored seconds ratio for section monitoring.

In addition, the average, minimum, and maximum amount of output power received and transmitted from the circuit is shown for all optical circuit types.

For Circuit Emulation services, the following information is shown:

- The total number of jitter buffer overruns for each circuit endpoint.
- The total number of Explicit Pointer Adjustment Relay counters (such as L-bits and R-bits) that were generated and received for each circuit endpoint.

For services on a Cisco ME 1200 device, information such as incoming and outgoing traffic, jitter, and availability is displayed.

For MPLS bidirectional TE tunnels, ensure that you activate the Interface Health monitoring policy so that the performance data is shown. See Monitoring Policies Reference for more information. The following performance data is shown:

- Traffic—The sum of traffic in both directions of the tunnel, in bits per second (bps).

- Availability—Average availability of the endpoints in the tunnel.

- Bandwidth Utilization—The percentage of bandwidth configured on the tunnel against the sum of the percentage of bandwidth configured on all the pseudowires associated with the tunnel.

- Actual Bandwidth Utilization—The percentage of bandwidth configured on the tunnel against the sum of the percentage of bandwidth utilized for the incoming and outgoing traffic in all the pseudowires associated with the tunnel.

For Carrier Ethernet services that have Y.1731 probes enabled, view the extended details of Y.1731 probes in the **Y.1731** tab.

Note   In the **Endpoints** tab, choose a relevant endpoint and then click the *i* icon to view the extended details.

To open the **Circuit/VC 360** view for a particular circuit or VC:

Step 1   Choose **Maps** > **Topology Maps** > **Network Topology**.

The network topology window opens. See Visualize the Network Topology for a description of the network topology window and its functionality.

Step 2   From the **Network Topology** page toolbar, click **Device Groups**.

The **Device Groups** dialog box opens.

Step 3   Locate and click the device group that the circuit or VC is associated with, then close the dialog box.

Step 4   Click the **Circuits/VCs** tab.

Step 5   Locate the circuit or VC in the list and then click its *i* (**information**) icon.

Actions You Can Perform from the Circuit/VC 360 View

The following is a list of the actions you can perform from the **View** and **Actions** menus for the selected circuit or VC. The actions that are available will vary, depending on the type of circuit or VC that is selected:

- Choose **View > Details** to display further details about the circuit/VC. See Get Comprehensive Information About a Circuit/VC: Circuit/VC Details Window, on page 17.

✎

Note   The **View > Details** is not supported for the IOT services (RS232, RS422, RS485, Raw Socket, C37.94, EM-Voice, and X.21 service details).

- Choose **View > Service Trace** to trace the route of an optical circuit. See Trace and Visualize the Full Route of a Circuit .

- Choose **View > Dashboard** to view the service performance dashboard of the circuit/VC. See Set Up and Use the Dashboards.

- Choose **View > Performance** to view the circuit details and the CEM statistics of the CEM services.

- Choose **Actions > Add to Compare** to select the circuit or VC for a side-by-side comparison with another circuit or VC on the basis of information such as serviceability and provisioning state and raised alarms. See Compare Circuit/VC Information and Status.

- Choose **View > Multilayer Trace** to visualize a circuit in a graphical manner. See Trace and Visualize the Full Route of Circuits/VCs.

- Choose **Actions > Y.1564 Test** to test the performance of the CE circuit/VC end to end. See Running a Y.1564 Performance Test.

- Choose **Actions > Y.1731 Test** to test the performance of the CE circuit/VC end to end. See Performance Test Based on Y1731 for EVCs.

- Choose **Actions > BERT** to test the performance of the Circuit Emulation Services. See Performance Test for Circuit Emulation Services.

- Choose **Actions > Optical PM Parameters** to view the real time performance monitoring data of the optical circuit/VC. See Optical Performance Monitoring Parameters.

- Choose **Actions > PRBS Test** to test the performance of the optical circuit/VC end to end. See Run PRBS Test on Circuits (ODU UNI).

- Choose **Actions > Restoration Actions >Upgrade Restore** to upgrade the failed optical circuit to an active route and delete the old route where the failure occurred. See Restore a Circuit (Optical), on page 27.

- Choose **Actions > Restoration Actions >Manual Revert** to revert the optical circuit to its original route when the route has recovered from the failure. See Revert a Circuit (Optical), on page 28.

- Choose **Actions** > **Maintenance Actions** > **Repair** to repair the failed optical circuit on the same path where the failure has occurred. See Repair a Circuit (Optical), on page 29.

• Choose **Actions** > **Reroute Actions** > **Working Path** or **Protected Path** to reroute the traffic through the working path or protected path defined for the circuit. See Reroute a Circuit (Optical), on page 28.

• Choose **Actions > Activate** to allow the traffic to pass through the optical circuit. See Activate a Circuit (Optical), on page 26.

• Choose **Actions > Deactivate** to stop the traffic passing through the optical circuit. See Activate a Circuit (Optical), on page 26.

• Choose **Actions > Pseodowire OAM** or **LSP OAM** or **CFM OAM** or **SR TE OAM** option to troubleshoot a service failure using OAM commands. See Troubleshoot a Service Failure Using OAM Commands.

• Choose **Actions** > **Show in Topology** to view the circuit/VC overlay in the topology map.

• Click the *i* icon next to the Serviceability status to view additional information about a circuit failure. See Get More Information About a Circuit/VC Failure.

• Choose **Actions** > **Resync** > to perform the service discovery resync pertaining to a particular service. For more information, see Service Discovery Resync.

Compare Circuit/VC Information and Status

From the **Comparison View**, you can perform a side-by-side comparison of multiple circuits or VCs, viewing information such as discovery and provisioning state, raised alarms, and associated endpoints. To compare circuits or VCs, do the following:

Step 1 For each circuit or VC you want to compare:

a) Open its **Circuit/VC 360** view, as described in Get Quick Information About a Circuit/VC: Circuit/VC 360 View.

b) Choose **Actions** > **Add to Compare**.

The circuit or VC you selected is displayed at the bottom of the page. You can select a maximum of 4 circuits and VCs.

Step 2 Click **Compare**.

The **Comparison View** opens.

Step 3 From the drop-down list at the top of the view, specify whether the view will show all available information or just the information that is unique to each device.

Step 4 Click **Comparison View**, check the check box for the categories you want the view to display, and then click **Save**.

By default, all of the categories are already selected.

Step 5 Scroll down the page to view the information provided for each category you selected.

Note the following:

• The **Comparison View** only displays information for two circuits or VCs at a time. If you selected more than two, you will need to toggle to the circuits or VCs that are not currently displayed.

• To reorder the circuits or VCs you have selected, click **Rearrange**.

• Each circuit or VC's **View** and **Actions** menu is identical to the ones provided in its **Circuit/VC 360** view. If you select an option, the corresponding page opens.

- You can minimize and maximize the categories displayed, as needed.

- The **Comparison View** is also available for devices, interfaces, and links. Whenever you select any of these elements from their respective 360 view for comparison, they are displayed in the corresponding tab. This allows you to switch between element types, as needed.

- When you are done comparing circuits or VCs, click **Back** at the top of the view and then click **Clear All Items** at bottom of the page. If tabs for other element types are still displayed, you will need to clear them as well.

Get Comprehensive Information About a Circuit/VC: Circuit/VC Details Window

The Circuit/VC Details window provides additional details about a specific circuit/VC, including the attributes defined for the circuit/VC. The information shown in the displayed page varies depending on the type of circuit/VC. You can also perform certain actions from the Circuit/VC Details Window, for example, modify/delete the circuit/VC, create a new circuit/VC, run a performance test.

To access the Circuit/VC Details window, click on the circuit/VC name hyperlink in any of the circuit/VC tables. Alternatively, you can access the Circuit/VC details window from the Circuit/VC 360 view, as follows:

Step 1 Access the Circuit/VC 360 view for the required circuit/VC. See Get Quick Information About a Circuit/VC: Circuit/VC 360 View, on page 11.

Step 2 Choose **View > Details**. See Provision EVCs in a Carrier Ethernet Network and Provision Circuits in an Optical/DWDM Network for description of the attributes in the Circuit/VC details page.

The details are displayed in two tabs:

- **Summary**: Displays circuit information such as the circuit discovery and provisioning states, acceptance threshold, WSON label, circuit type, wavelength associated with the circuit, protection status, and more.

- **Ports**: Displays ports information such as the ports associated with the circuit, their port roles, the IP addresses associated with the ports, and more

Actions You Can Perform from the Circuit/VC Details Page

From the Circuit/VC Details window, you can do the following:

- Modify the circuit/VC (action available for circuits/VCs provisioned using Cisco EPN Manager). See Modify a Circuit/VC, on page 26.

- Delete the circuit/VC (action available for circuits/VCs provisioned using Cisco EPN Manager, not for discovered circuits/VCs). See Delete a Circuit/VC, on page 33.

- Create a new circuit/VC. Clicking the Create button opens the Provisioning Wizard, enabling you to create a new circuit/VC. See Provision EVCs in a Carrier Ethernet Network and Provision Circuits in an Optical/DWDM Network.

- Choose **Actions > Y.1564 Test** to test the performance of the CE circuit/VC end to end. See Running a Y.1564 Performance Test.

• Choose **Actions > BERT** to test the performance of the Circuit Emulation Services. See Performance Test for Circuit Emulation Services.

• Choose **Actions > Optical PM Parameters** to view the realtime performance monitoring data of the optical circuit/VC. See Optical Performance Monitoring Parameters.

• Choose **Actions > PRBS Test** to test the performance of the optical circuit/VC end to end. See Run PRBS Test on Circuits (ODU UNI).

• Choose **Actions > Restoration Actions >Upgrade Restore** to upgrade the failed optical circuit to an active route and delete the old route where the failure occurred. See Restore a Circuit (Optical), on page 27.

• Choose **Actions > Restoration Actions >Manual Revert** to revert the optical circuit to its original route when the route has recovered from the failure. See Revert a Circuit (Optical), on page 28.

• Choose **Actions** > **Maintenance Actions** > **Repair** to repair the failed optical circuit on the same path where the failure has occurred. See Repair a Circuit (Optical), on page 29.

• Choose **Actions > Activate** to allow the traffic to pass through the optical circuit. See Activate a Circuit (Optical), on page 26.

• Choose **Actions > Deactivate** to stop the traffic passing through the optical circuit. See Activate a Circuit (Optical), on page 26.

• Choose **Actions > Resync** to resynchronize circuit. See Resynchronize a Circuit/VC, on page 32.

View and Compare Versions of a Circuit (Optical)

Use the Circuit History page to compare two versions of an optical circuit. From the Circuit History page, you can:

• Get a simple visualization and integrated view of the events that occurred in an optical circuit.

• View the alarms associated with an event.

• View information about a failure that occurred in an optical circuit.

• Compare the route changes in a circuit.

For example, consider that there is a restoration that has occurred in an optical circuit. Using the Circuit History page, you can:

1. View the list of changes that had occurred in the circuit.

2. If there is a protection switch action or a reroute that had occurred in the circuit, you can click the *i* icon in the Type column to see the details of the event that has caused the protection switch action or the reason for the failure occurred because of the reroute action.

3. Click the *i* icon in the Time Stamp column to see the alarms that are associated with the event.

4. You can further compare the route changes between the active path and the path at the time of protection switch.

5. You can also choose to compare the route changes between the active path and the original path or between the original path and the path at the time of protection switch to view the difference in the participating nodes and take action on the affected nodes.

To view the history of an optical circuit:

Step 1   From the left side bar, choose **Maps** > **Topology Maps** > **Network Topology.**

Step 2   Click **Device Groups**, and then select the location in which the required circuit/VC was created.

    Note   By default, **All Location** group is selected.

Step 3   Close the **Device Groups** popup window.

Step 4   In the **Network Topology** window, click **Circuits/VCs**.

Step 5   Select the optical circuit for which you want to view the history. The overlay of the circuit is displayed on the map.

Step 6   Click the **Circuit History** hyperlink that appears right below the topology toolbar.

The **Circuit History** area is displayed next to the topology map and lists the various versions of the circuit. The active route of the circuit is selected by default and it is displayed on the map.

Step 7   Select a history version from the list displayed in the **Circuit History** area to compare it with the current version.

The overlay on the map changes based on your selection and displays both, the active route and the history version. You can select and compare only two versions at a time.
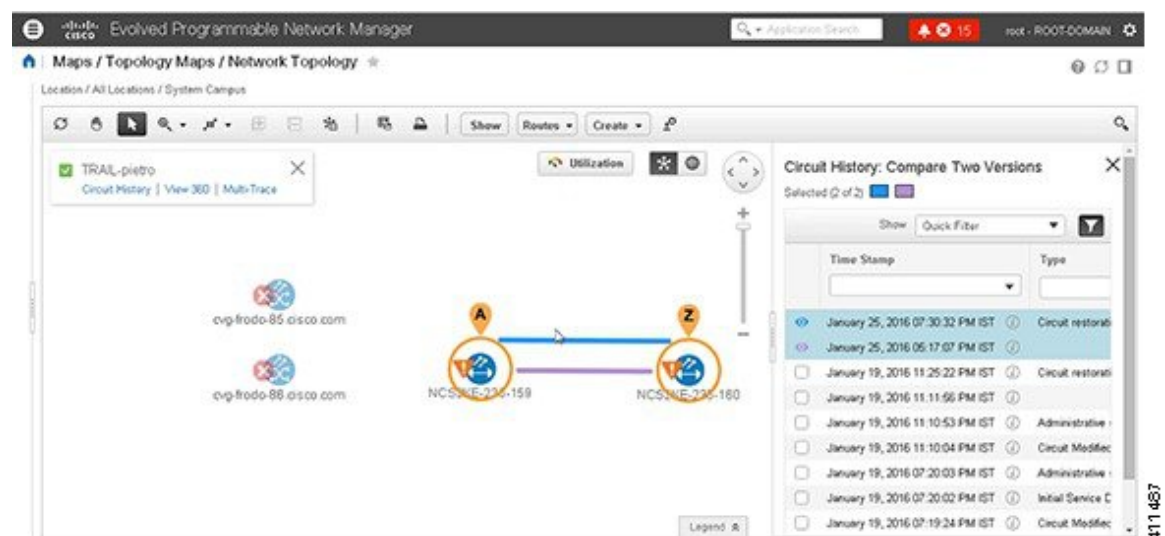
View a Specific Device's Circuits/VCs

Use the Device 360 view to see a list of all the circuits/VCs in which a specific device participates. This is useful when a specific device is having a problem and you want to see which services it will affect.

To view a list of circuits/VCs in which a device participates:

Step 1   Click the required device in the network topology (**Maps** > **Topology Maps** > **Network Topology**).

Step 2   Click **View 360** in the popup window.

Step 3 Go to the Circuit/VC tab in the Device 360 view to see a table listing the relevant circuits for that device. The table lists the circuit/VC name, the circuit/VC type, when it was created/modified, and the current status of the circuit/VC.

View a Device Group's Circuits/VCs

View a Device Group's Circuits/VCs List in the Topology Window

Cisco EPN Manager displays discovered and provisioned circuits/VCs in the Circuits/VCs tab on the left side of the network topology window. The list of circuits/VCs is filtered according to the selected device group. You can get details about the circuit/VC by clicking on the circuit/VC name to launch the Circuit/VC Details window or by clicking the information icon and launching the Circuit/VC 360 view.

The Circuits/VCs tab lists discovered circuits/VCs and the latest version of circuits/VCs provisioned using Cisco EPN Manager. The circuits/VCs are sorted by primary state (default).

To view a list of circuits/VCs in the network topology window:

Step 1 Choose **Maps** > **Topology Maps** > **Network Topology** in the left navigation pane. The network topology window opens.

Step 2 Click the **Device Groups** button and select the group of devices you want to show on the topology map.

Step 3 Go to the Circuits/VCs tab to see a list of circuits/VCs relevant to the selected device group.

Step 4 Select a circuit/VC to view an overlay of the circuit/VC in the network topology, meaning that the circuit/VC endpoints and path are shown on top of the physical topology. Click on the circuit name hyperlink to see circuit details or click on the information icon next to the circuit/VC name to open the Circuit/VC 360 view.

Step 5 To open a tabular view of the circuits/VCs in a separate window, click **Circuit/VCs** below the list of circuits/VCs.

View a Device Group's Circuits/VCs in an Expanded Table

From the network topology window, you can open a table of circuits/VCs associated with the selected device group in a separate browser window. The table provides more information about each circuit/VC and is also sortable and searchable, enabling you to find information easily. This table is particularly useful for identifying the provisioning status of circuits/VCs, as well as their management status within Cisco EPN Manager. For an explanation of circuit/VC states (and their icons, see Circuit or VC States, on page 2).

By default, the circuits/VCs table sorts the circuits/VCs by primary state. You can change how the table is sorted as required.

The expanded circuits/VCs table works together with the Network Topology window so that if you select a circuit/VC in the table, the circuit/VC will be represented graphically in the Network Topology window in the context of the topology map.

To open an expanded and more detailed tabular list of circuits in a separate window:

Step 1 Choose **Maps** > **Topology Maps** > **Network Topology** in the left navigation pane. The network topology window opens.

Step 2 Click the **Device Groups** button and select the group of devices you want to show on the topology map.

Step 3   Go to the Circuits/VCs tab to see a list of circuits/VCs relevant to the selected device group.

Step 4   Click the **Circuit/VCs** hyperlink below the list of circuits/VCs to open a separate window containing a list of circuits/VCs relevant to the selected device group.

- See more information about the circuit/VC by displaying the Circuit/VC 360 view. See View Circuits/VCs, on page 8.

- View the circuit/VC on the map, as an overlay on top of the displayed devices. See View a Specific Circuit/VC in the Topology Map, on page 9.

- Launch the Provisioning Wizard to provision circuits/VCs. See Create and Provision a New Carrier Ethernet EVC and Provision Circuits in an Optical/DWDM Network.

- See more information about a circuit failure. See Get More Information About a Circuit/VC Failure.

- Select a circuit/VC for modification, deletion, circuit trace, and performance test. See the following topics for more information:

    - Modify a Circuit/VC, on page 26

    - Delete a Circuit/VC, on page 33

    - Run a Performance Test on a Circuit/VC

View All Circuits/VCs in Cisco EPN Manager

The **Circuits/VCs & Network Interfaces** page lists all of the circuits and VCs that Cisco EPN Manager is currently managing. From here, you can quickly locate a specific circuit or VC by filtering the list using basic criteria such as name, type, or customer. You can view the number of EFPs that Cisco EPN Manager has provisioned. If all the EFPs are provisioned, the number of EFPs will match the number of services. You can identify all of the circuits and VCs that have severe alarms or are in a specific state. (For a description of circuit and VC states (including primary states), see Circuit or VC States, on page 2.) You can also perform circuit and VC management tasks and run performance tests. To use this page, do the following:

Note   After a device that is participating in a circuit or VC is removed from Cisco EPN Manager, the corresponding circuit or VC is still listed on the **Circuits/VCs & Network Interfaces** page.

Step 1   Choose **Inventory** > **Other** > **Circuits/VCs & Network Interfaces.**

Step 2   Perform any of the following actions:

- Find specific circuits or VCs by using one of the quick filter fields. For example, enter **L3VPN** in the **Type** field to list all circuits and VCs of that type or click the **Serviceability** quick filter field and then choose **Down** to view all circuits and VCs that are currently down.

- View a specific circuit or VC in the topology map by clicking its radio button and then choosing **Actions** > **Show in Topology**.

- With a circuit or VC selected, use the **Actions** menu to activate circuits or VCs and run performance tests.

• Create, modify, delete, or force delete circuits and VCs by clicking the appropriate button in the **Circuits/VCs &
Network Interfaces** page toolbar, which opens the provisioning wizard.

Identify and Manage Discovered Circuits/VCs

Cisco EPN Manager discovers existing network circuits/VCs and displays them in the Circuit/VC list.
Discovered circuits/VCs are automatically named by the system. The names for EVCs begin with **EvcLink_**
(for example, EvcLink_Vpls_Bridge_318#318#VFIVPLS2_541549_10.56.23.48#1).

Note When circuits/VCs are discovered, the system identifies whether they are optical, CE, or L3VPN circuits/VCs,
but it cannot identify the exact *type* of CE circuit/VC. For example, CE circuits/VC will display **EVC** in the
Type column but not the type of EVC, such as EPL, E-LAN, and so on. For optical, the exact *type* of circuit
is displayed.

You can do the following with discovered circuits/VCs:

• Identify discovered circuits/VCs in the Circuit/VC list by name or in the table of circuits/VCs by state,
Discovered.
• View details about the discovered circuits/VCs in the Circuit/VC 360 view, including the endpoints of
the circuit/VC.
• View an overlay of the circuit/VC on the network topology.
• View fault information for the circuit/VC.
• Promote a discovered circuit/VC, after which you can edit or delete it (applies to optical circuits and
selected EVCs. See Promote a Discovered Circuit/VC Before Modifying/Deleting, on page 24.
• Do a performance test.

Show/Hide Implicit Circuits

A circuit is classified as implicit if it is an underlying or "carrying" circuit of another circuit. For example, an
OCHTRAIL circuit could be a carrying circuit (and implicit) for an OCHCC circuit. By default, all circuits
are listed in the circuit lists. However, you can hide implicit circuits from the lists, if required. When implicit
circuits are hidden, they will not be displayed in the circuit lists but you can see them in the Carrying Circuits
tab of the Circuit 360 view.

To hide implicit circuits from the circuit lists:

Step 1 From the left sidebar, choose **Administration > Settings > System Settings**.

Step 2 From the System Settings menu, choose **Circuits/VCs > Circuits/VCs Display**.

Step 3 Uncheck the Show Implicit Circuits/VCs check box.

Filter and Export the Circuit/VC list Based on a User Defined Field

You can create a user defined field, assign a value to the field, and associate it to a circuit/VC. You can then sort, filter, and export the circuit/VC list based on the user defined field.

For example, if you want to filter the circuit/VC list based on the service impact, you need to:

• Create a user defined field, named Service Impact

• Select the circuit/VC to which you want to associate the user defined field, Service Impact

• Assign the value as Critical, Moderate, or Low for the Service Impact field

• Sort, filter, and export the circuit/VC list based on the service impact value

Note You can create a maximum of 10 user defined fields.

Step 1 To create a user defined field, do one of the following:

• Choose **Administration** > **Settings** > **System Settings** > **General** > **User Defined Fields**, and then click the '+' icon to create a new label and description. Click **Save**.

Note You cannot assign a value to the user defined field from the **Administration** menu.

• Choose **Inventory** > **Other** > **Circuits/VCs & Network Interfaces**, select a circuit/VC, and then choose **Actions** > **Manage User Defined Fields** . Click the '+' icon to create a user defined field, its description, and value. Click **Save**.
• Choose **Maps** > **Topology Maps** > **Network Topology**, go to the **Circuits/VCs** tab, and then click the Circuits/VCs hyperlink below the list of circuits/VCs. An expanded table of circuits/VCs opens in a separate window. Select a circuit/VC, and then choose **Actions** > **Manage User Defined Fields** . Click the '+' icon to create a user defined field, its description, and value. Click **Save**.

Step 2 In the Circuits/VCs & Network Interfaces page or in the expanded table of circuits/VCs, click the settings icon at the top right of the page, and then choose **Columns**.

Step 3 Choose the user defined field you have created, and then click **Close**. The user defined field with the assigned value is displayed as a column in the table of circuits/VCs.

Step 4 Click the Export icon next to the Settings icon at the top right of the table to export the data from the table to a file (CSV format).

You can delete the user defined field only from **Administration** > **Settings** > **System Settings** > **General** > **User Defined Fields**.

Display the Routes Associated With a Circuit

Use the network topology **Routes** drop-down menu to display specific routes associated for a circuit in the circuit overlay. Cisco EPN Manager calculates the routes from the links within a service. You can also filter the overlay based on the selected routes.

Note This feature is supported only on point-to-point CE services, optical circuits, and CEM services.

Step 1 From the left sidebar, choose **Maps** > **Topology Maps** > **Network Topology**.

Step 2 From Device Groups list, select the required group. Cisco EPN Manager lists the circuits associated with the selected group in the Circuit/VCs tab.

Step 3 Click **Circuit/VCs**, and then select the circuit you want to display.

Step 4 From the **Routes** drop-down list, choose the required route type.

Note The route types are based on the routes configured on the selected circuit.

Promote a Discovered Circuit/VC Before Modifying/Deleting

Discovered circuits need to be promoted before they can be modified or deleted. After being promoted, the circuit/VC's provisioning state changes to Promote Successful.

Note Promotion is supported for Optical circuits, MPLS-TE, SR-TE and for basic EVCs that do not have additional configurations, such as LMI, QoS, G.8032, ICCP-SM. Promotion is supported if the underlying core is VPLS (for E-LAN and E-Tree EVCs). If a discovered circuit/VC cannot be promoted, it cannot be modified or deleted. Also, promotion is supported for Circuit Emulation' services, Unidirectional, Bidirectional, and L3VPN services.

Promotion of the CE services with CFM parameters such as CFM Domain name, CFM Domain level, Maint. Assoc. Name Type, ITU Carrier Code, ITU MEG ID Code, Continuity check interval, and IPSLA probes is supported. ITU Carrier Code and ITU MEG ID code will appear if ITU is selected in the Maint. Assoc. Name Type drop down list. Promotion of custom profile name for IPSLA probes in XR devices is not supported. The services will get promoted using custom profile name, but will not be listed during modification of the service.

Promotion of ICC-based CFM configuration on IOS XE and IOS XR devices is supported, except for the ME1200 devices. ICC based CFM is not supported for EVPN VPWS. EVPN based E-LAN service are not supported for promotion.

To promote a discovered circuit/VC:

Before you begin

For successful promotion of L3VPN services, ensure that the route distinguisher for the L3VPN service is specified in the format **rd device_ip:number**.

For example:

```
vrf definition vdvvgfr420
  rd 10.104.120.133:420
  vpn id 36B:420
  !
address-family...
```

Step 1 From the left sidebar, choose **Maps** > **Topology Maps** > **Network Topology**. The network topology window opens.

Step 2 Click the **Device Groups** button and select the required group.

Step 3 Go to the Circuits/VCs tab and click the **Circuits/VCs** link to open an extended table of circuits/VCs in the selected group.

Step 4 Select the discovered circuit/VC you want to promote.

To identify L3VPN services that are discovered from the device but not promoted, filter out L3VPN services that have the provisioning status 'None'. You can also identify discovered services using the Name field of the L3VPN service. The Name field for L3VPN services that are discovered are represented with the service's unique VLAN IDs.

To identify MPLS TE services that are discovered from the device but not promoted, filter out MPLS TE services that have the provisioning status 'None'. You can also identify discovered services using the Name field of the MPLS TE service.

Step 5 Click **Modify**. The Provisioning Wizard opens.

Step 6 For optical circuits, modify the circuit as required, then click **Create**.

Step 7 For EVCs, do the following:

a) In the Endpoints Details page, select an endpoint. Fields relevant to the selected endpoint are displayed below.

b) Specify the type of endpoint by selecting UNI or ENNI from the dropdown list, and enter a name for the endpoint. For UNIs, you can also set bundling and multiplexing attributes.

c) Select the next endpoint and define its type, name, and attributes.

d) Click **Next**.

e) In the Manage Discovered Service: Service Details page, select the Type of service. The available types in the list are derived from the types of endpoints and UNI options you defined. For example, if you defined a UNI with All to one Bundling option, EPL, EP-LAN, and EP-Tree will be available in the list. If you define an ENNI, only Access EPL will be available in the list. You can go back and redefine your endpoints if necessary.

f) Give the service a name. Provide a description and specify a customer, if required.

g) For E-Tree EVCs, specify the role of each endpoint (root or leaf) in the Endpoint Designation table. The role you specify here must match the role that is configured on the device.

h) Click **Save**. The EVC will appear with its new name in the Circuits/VCs list and its status will be Created and Deployed.

i) You can now select the promoted EVC in the list and modify or delete it.

Step 8 For L3VPN services, do the following:

a) Give the service a name. Provide a description and specify a customer, if required, and click **Next**.

b) In the **Deployment Action** drop-down menu, specify the task (Preview or Deploy) that must be taken up when the VPN service promotion process is completed, and click **Next**.

c) Specify the UNI name, the MTU value, and whether service multiplexing should be enabled.

    d) Click **Save**. The L3VPN service will appear with its new name in the Circuits/VCs list and its status will be Promote Successful.

    e) You can now select the promoted L3VPN service from the list and modify or delete it.

Step 9 For MPLS TE Tunnel services, do the following:

    a) Give the service a name if required. Provide a description and specify a customer, if required, and click **Next**.

    b) Click **Save**. The MPLS TE Tunnel service will appear in the Circuits/VCs list and its status will be Promote Successful.

    c) You can now select the promoted MPLS TE Tunnel service from the list and modify or delete it.

Note   Default values for affinity and priority are re-configured in the modify flow after promotion of a tunnel.

          MPLS TE tunnels discovered with lockdown on working path will lose the lockdown upon being modified and promoted.

Modify a Circuit/VC

You can modify circuits/VCs that are in the following provisioning states: Defined, Deployed, Failed, or Discovered. For more information about the provisioning states, see Circuit or VC States, on page 2.

Note   You cannot change the UNI or endpoint selections. However, you can change the name of the UNI. If you want a different device to be an endpoint, you must delete the circuit/VC and create a new one.

For E-LAN and E-TREE EVCs, you can add or delete endpoints (sites).

To modify a circuit/VC:

Step 1 From the left sidebar, choose **Maps** > **Topology Maps** > **Network Topology**.

The network topology window opens.

Step 2 From the toolbar, click **Device Groups** and then select the required group.

Step 3 Click the **Circuits/VCs** tab and then click the radio button for the circuit or VC you want to modify.

Step 4 From the **Circuits/VCs** pane toolbar, click the pencil (**Modify**) icon.

The Provisioning Wizard opens and displays information for the selected circuit or VC.

Step 5 Edit the circuit or VC as required, and then redeploy it. See Provision EVCs in a Carrier Ethernet Network and Provision Circuits in an Optical/DWDM Network.

Activate a Circuit (Optical)

You can activate an optical circuit to determine if the traffic is passing through it. You can activate circuits that are discovered and deployed in the network. Also, the admin status of the circuit must be Down.

Step 1   From the left side bar, choose **Maps** > **Topology Maps** > **Network Topology**.

Step 2   Click the **Device Groups** button and select the device group within which the required circuit/VC was created.

Step 3   In the **Circuits/VCs** tab, locate the optical circuit that you want to activate and click the information icon to access its Circuit/VC 360 view.

Step 4   Choose **Actions** > **Activate** to enable the traffic to pass through the optical circuit.

> **Note**   You can also activate the optical circuit from the Circuit/VC Details window and from the multilayer trace view. See View Circuits/VCs, on page 8 and Trace and Visualize the Full Route of Circuits/VCs.

Step 5   Redeploy the optical circuit.

You can also choose to deactivate the optical circuit to stop the traffic passing through it. Ensure that the circuit is discovered and deployed in the network and the admin status of the circuit is Up. Click **Actions** > **Deactivate**.

Restore a Circuit (Optical)

You can restore an optical circuit when it encounters multiple successive failures and reroute the failed circuit over a new route.

You can restore or revert optical circuits that meet the following conditions:

- Circuit's provisioning state is Deployed or Discovered.

- The Restoration attribute for the circuit is set to true.

- The Revert mode for the circuit is set to manual or automatic.

To restore an optical circuit:

Step 1   From the left side bar, choose **Maps** > **Topology Maps** > **Network Topology**.

Step 2   Click the **Device Groups** button and select the device group that contains the failed optical circuit.

Step 3   In the Circuits/VCs tab, locate the failed optical circuit and click the information icon to access its Circuit/VC 360 view.

Step 4   Choose **Actions > Restoration Actions > Upgrade Restore** to upgrade the failed optical circuit to an active route and delete the old route where the failure occurred.

> **Note**   You can also restore the failed optical circuit from the Circuit/VC Details window and from the multilayer trace view. See View Circuits/VCs, on page 8 and Trace and Visualize the Full Route of Circuits/VCs.
>
> Upgrade restore option will be disabled for circuits which are non-revertible.
>
> When restoration is enabled , if required you will be allowed to add constraints.
>
> On NCS2K devices for OCH-Trail WSON circuits the restoration status parameter is set to **Restored** only if the circuit is configured as **Revertive**.

You can also choose to revert the optical circuit to its original route when the route is recovered from the failure. Click **Actions > Restoration Actions > Manual Revert**.

Revert a Circuit (Optical)

You can revert an optical circuit to its original route when the route has recovered from a failure. This feature is available for all SVO circuits that are provisioned or discovered in Cisco EPN Manager.

To revert an optical circuit:

Step 1 In the left side bar, choose **Maps** > **Topology Maps** > **Network Topology**.

Step 2 Click the **Device Groups** button and select the device group that contains the failed optical circuit.

Step 3 In the **Circuits/VCs** tab, locate the failed optical circuit and click the information icon to access its **Circuit/VC 360** view.

Step 4 Choose **Actions > Restoration Actions > Manual Revert** to upgrade the failed optical circuit to an active route and delete the old route where the failure occurred.

If the NE-Disconnected alarm on a working path or a restored path is not cleared, the circuit fails to revert. You can view the reason for the failure under the **History** tab.

On NCS2k SVO devices for OCH-Trail and OCH-NC circuits, the default number of retry attempts for **Restoration** and **Revert** is 12 and the default duration between retry attempts is 5 minutes.

You can change the default number of restoration and revert attempts using the **/opt/CSCOlumos/conf/optical-mp.properties** file. Use the parameter **restorationRestoreAttempts** to change the number of restoration attempts and **restorationRevertAttempts** to change the number of revert attempts.

Reroute a Circuit (Optical)

You can reroute a circuit to its working path or protected path so that you can perform network maintenance activities without interrupting the service. The reroute operation is available for all WSON circuits that are provisioned or discovered in Cisco EPN Manager.

Note   The reroute operation is not available for circuits that has the restoration status as "Restored" or "Revertible".

Promote the discovered circuit before initiating re-route.

Step 1 From the left side bar, choose **Maps** > **Topology Maps** > **Network Topology**.

Step 2 Click the **Device Groups** button and select the device group within which the required circuit/VC was created.

Step 3 In the **Circuits/VCs** tab, locate the optical circuit that you want to reroute and click the information icon to access its Circuit/VC 360 view.

Step 4 Choose **Actions** > **Reroute Actions** > **Working Path** or **Protected Path** to reroute the traffic through the working path or protected path defined for the circuit.

Note   You can also reroute the optical circuit from the multilayer trace view. See Trace and Visualize the Full
Route of Circuits/VCs.

Repair a Circuit (Optical)

You can manually repair and resync a circuit path when a circuit is restored but remains in **Partial** state due
to a fiber disconnect. This feature is available for all SVO circuits that are provisioned or discovered in Cisco
EPN Manager.

To repair an optical circuit:

Step 1   In the left side bar, choose **Maps** > **Topology Maps** > **Network Topology**.

Step 2   Click the **Device Groups** button and select the device group that contains the failed optical circuit.

Step 3   In the **Circuits/VCs** tab, locate the failed optical circuit and click the information icon to access its Circuit/VC 360 view.

Step 4   Choose **Actions** > **Maintenance Actions > Repair** to repair the failed optical circuit on the same path where the failure
has occurred.

It takes approximately 10 minutes for the repair to take place. If the circuit is not repaired, a description of why it failed
is listed under the **History** tab.

If the **NE-Disconnected** event on a working path is cleared, you do not need to manually delete and repair
orphan cross-connection circuits in the Circuit/VC 360° page. Any orphan cross-connection circuit that is
associated with a disconnected node is automatically deleted. If the **Discovery State** of the circuit remains
Partial after the orphan cross-connection circuit is deleted, the circuit is automatically repaired and resynced
without the need to do it manually.

Compare and Reconcile Provisioned and Discovered Versions of a Circuit/VC

Note   This functionality is supported for Carrier Ethernet VCs, Circuit Emulation, and Serial services only.

When you provision a circuit/VC using Cisco EPN Manager, the relevant CLI commands are configured on
the devices participating in the circuit/VC. After a circuit/VC is provisioned using Cisco EPN Manager, the
system discovers the provisioned circuit/VC from the network. In some cases, there might be differences
between the provisioned CLI and discovered CLI, for example, if a configuration change was made on a
device after provisioning. Cisco EPN Manager allows you to compare the provisioned and discovered versions
of a circuit/VC and generate a reconciliation report showing the differences. Based on the report, you can
decide whether to keep the discovered version or revert to the provisioned version. If you choose to keep the
discovered version, the circuit/VC in the Cisco EPN Manager is synched with this version.

The comparison and reconciliation functionality is accessed from the circuit/VC tables.

The functionality is disabled if the circuit/VC discovery state is Missing or the provisioning state is None, In Progress, or Delete Succeeded.

To compare and reconcile a circuit/VC:

Step 1 Open a table of circuits/VCs, either the full table of all circuits/VCs in the system (**Inventory > Other > Circuits/VCs and Network Interfaces)** or a list of circuits/VCs for a specific device group (**Maps > Network Topology > Circuits/VCs tab > Circuits/VCs link**).

Step 2 In the circuits/VCs table, locate and select the required circuit/VC.

Step 3 Choose **Actions > Reconciliation Report**.

A comparison report is displayed, showing the differences in provisioned and discovered attributes on specific devices in the circuit/VC. If there are no differences between the provisioned and discovered attributes, "No data available" is displayed in the report.

Note For EVPN based services, EVI parameters like RD, RT, and Control Word are excluded from the report.

Step 4 After you have reviewed the report, you can choose to save the discovered version to the database as the current version of the circuit/VC or to revert to the provisioned version. At the top of the page, select the Provisioned or the Discovered radio button and click **Reconcile**.

If you chose Provisioned, the circuit/VC will be redeployed and the attribute values of the original provisioned circuit/VC will be configured on the devices. If you chose Discovered, the discovered circuit/VC will be stored in the database and this version will replace the original provisioned version. The provisioning status will indicate whether the reconcile action was successful.

Step 5 If the system requires your input to complete the reconciliation, the Provisioning Wizard will be launched. Fill in the required information and redeploy the circuit/VC.

Initiate a Protection Switch Action on a Circuit (Optical)

You can initiate a protection switch action on an optical circuit to switch over the traffic from one path to another path. For example, the traffic in an optical circuit is flowing through a working path and the working path is damaged. You can initiate a protection switch action on this circuit to switch over the traffic from the working path to the protected path.

Note You can initiate protection switch actions only on optical circuits in which the 1+1 or 1+1+R protection type is enabled. For more information about the protection types, see Circuit Section Reference for OTN Circuit Types.

To initiate a protection switch action:

Step 1 From the left sidebar, choose **Maps** > **Topology Maps** > **Network Topology**.

Step 2 Click **Device Groups**, and then select the location in which the required circuit/VC was created.

Step 3 Close the **Device Groups** popup window.

Step 4   In the **Network Topology** window, click **Circuits/VCs**.

Step 5   On the **Circuits/VCs** tab, locate the required circuit/VC and click the *i* icon next to the circuit/VC name. The Circuit/VC 360 view appears in a separate popup window.

Step 6   Choose **Actions** > **Protection Actions**, and then choose the required protection switch action.
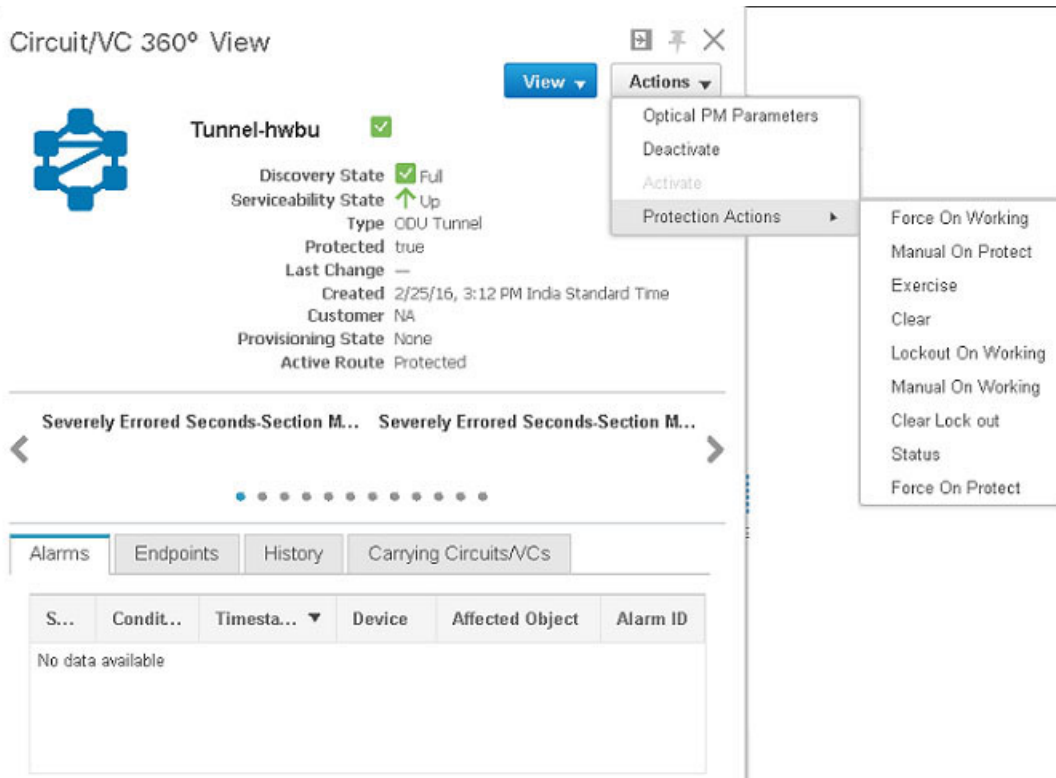
The following table provides a detailed description of each of the protection switch actions.

Protection Switch Action	Description	Applicable when:
Force On Working	Configures the working path to carry traffic over the network.	The current state of the protection switch action is 'Manual On Protect' or 'Manual On Working'.
Manual On Protect	Switches the traffic manually from the working to the protected path.	There is no protection switch action initiated on the circuit.
Clear	Clears the protection switch state on the circuit.	The current state of the protection switch action is not 'Lockout On Working'.
Exercise	Checks if an ODU subcontroller is ready for a protection switch.	There is no protection switch action initiated on the circuit.
Manual On Working	Switches the traffic manually from the protected path to the working path.	There is no protection switch action initiated on the circuit.

Lockout On Working	Configures an ODUk subcontroller as a locked out resource in the ODU subcontroller group. Locks the circuit so that its traffic cannot be switched to the working path.	The current state of the protection switch action is not 'Lockout On Working'.
Clear Lock out	Clears the 'Lockout On Working' switch state for the circuit.	The current state of the protection switch action is 'Lockout On Working'.
Status	Displays the details of ODU subcontroller group and the protection switch state specified in the AID.	Available for all protected optical circuits.
Force On Protect	Configures the protected path to carry traffic over the network.	The current state of the protection switch action is 'Manual On Protect' or 'Manual On Working'.

Resynchronize a Circuit/VC

When there is any issue with circuit/VC, such as primary or discovery state is down, or the link between the participating devices is missing, you can resynchronize the circuit. Cisco EPN Manager synchronizes the circuit with the participating devices on a best-effort to resolve the issue.

To resynchronize the circuit/VC:

Step 1 Access one of the following pages:

- Circuit/VC 360 View. See Get Quick Information About a Circuit/VC: Circuit/VC 360 View, on page 11.

- Circuit/VC Details Window. See Get Comprehensive Information About a Circuit/VC: Circuit/VC Details Window, on page 17.

- Multi-Layer Trace View. See Trace and Visualize the Full Route of a Circuit

Step 2 Choose **Actions** > **Resync**.

The discovery state of the circuit will change to Resync when the resync action is in progress. Once the action is completed, the discovery state will change to Full or Partial.

Service Discovery Resync

You can resync the supported serial services, IOT CEM and IOT CEM variants X.21 C 3794, MPLS-TE, CE, L3VPN, SR-TE, CEM over T1/E1/E3/T3/SONET/SDH services, if there are any conflict changes on the devices.

In the service 360 view area, from the Action drop-down list, choose Resync to update the related entities, that is, you can perform the service resync pertaining to a particular service.

Note   View the current status in the Discovery State field. The resynced status and timestamp are displayed in the Manual Resync State.

Delete a Circuit/VC

You can choose to either delete or force delete a circuit/VC.

You can delete circuits/VCs that are in the following provisioning states: Create/Modify Succeeded or Create/Modify/Delete Failed.

As a network administrator you can force delete an MPLS TE tunnels and Layer 3 link for the selected services in the circuit VCs window. This option will be available when there is a failure in previous delete operation or a Service is in missing state.You can force delete circuits/VCs that are in the Delete Failed provisioning state. When you force delete a circuit/VC, it is removed from the Cisco EPN Manager database. The circuit/VC will not appear in the circuit/VC tables.

Caution   However, the force delete option may not remove the configurations from all the devices participating in the circuit/VC. You may need to manually clean up the devices.

Note   The force delete option is not available for optical circuits.

To delete or force delete a circuit/VC:

Step 1   From the left sidebar, choose **Maps** > **Topology Maps** > **Network Topology**.

The network topology window opens.

Step 2   From the toolbar, click **Device Groups** and then select the required group.

Step 3   Click the **Circuits/VCs** tab and then click the radio button for the circuit or VC you want to delete.

Step 4   From the **Circuits/VCs** pane toolbar, do one of the following:

- From the X (Delete) icon drop-down list, choose **Force Delete**. A confirmation message is displayed. A corresponding job is created in the Jobs dashboard and you can monitor the progress. After the job is completed, the circuit/VC is removed from the Cisco EPN Manager database.
- Click the X (**Delete**) icon. The Provisioning Wizard opens and displays information for the selected circuit or VC.

Step 5   Click **Next** to go to the **Service Details** page.

Step 6   In the Deploy area, specify what you expect the delete operation to accomplish:

- Delete the circuit or VC from devices and Cisco EPN Manager—This will remove the configurations from all the devices participating in the circuit or VC and will also remove it from the database. The circuit or VC will not appear in the circuit and VC tables and no history will be available for it.

• Delete the circuit or VC from devices only—The circuit and VC history will remain in the database but all relevant configurations will be removed from the devices participating in the circuit or VC.

Note These options are only available in the wizard when deleting an EVC/OVC with "failed" status, for example, "Create failed," Modify failed," and so on.

Step 7 In the **Deployment Action** field:

• Choose **Preview** to view the configurations that will be deployed to the relevant devices before the actual deployment.

• Choose **Deploy** to deploy the changes without previewing them.

Step 8 Click **Submit**.

• If you selected **Preview** in the previous step, a Preview Config page is displayed. If you are satisfied with the changes, click **Deploy**.

• If you selected **Deploy** in the previous step, the configurations are deployed to the devices immediately.

A confirmation message is displayed when the deployment is complete.

To view the details of configuration, configuration errors, rollback configuration, and rollback configuration errors for each device participating in the circuit/VC, click the *i* icon next to the **Provisioning** column in the Deleted Circuits/VCs tab in the extended tables. The *i* icon is available for all provisioning states, except None. For information about how to access the extended tables, see View Detailed Tables of Alarms, Network Interfaces, Circuits/VCs, and Links from a Network Topology Map.

Note If you delete a circuit on the device that is being managed by Cisco EPN Manager through another EMS or directly through the CLI, NETCONF, TL1 interfaces without using Cisco EPN Manager, the circuit is not deleted automatically in Cisco EPN Manager. You must use the **Delete** or **Force Delete** option to delete the circuits.

Delete or Force Delete an L3VPN Service

You can delete or force delete L3VPN services that were originally created using Cisco EPN Manager. L3VPN services that were only discovered but not created using Cisco EPN Manager cannot be deleted.

To delete or force delete an L3VPN service:

Step 1 In the left pane, choose **Maps** > **Network Topology**.

Step 2 In the Circuits/VCs panel, click the **Circuit/VCs** link to display all services in Cisco EPN Manager.

Step 3 Select the service that you want to delete or force delete. You can type the service's name in the **Name** filter to filter out the required L3VPN service and click the X (**Delete**) icon.

Step 4 Alternately, from the **Circuits/VCs** pane toolbar, do one of the following::

a) Choose the service that you want to delete and click the X (**Delete**) icon.

The Provisioning Wizard opens and displays information for the selected circuit or VC.

Click Next to proceed to the Service details .

The L3VPN Provisioning wizard displays the VRFs, endpoints, and other details associated with the selected L3VPN.

b) From the X (Delete) icon drop-down list, choose **Force Delete**. A confirmation message is displayed. A corresponding job is created in the Jobs dashboard (**Administration** > **Dashboard** > **Job Dashboard** > **User Jobs** > **Force Delete Circuit**) and you can monitor the progress. After the job is completed, the Layer 3 link is removed from the Cisco EPN Manager database.

Also, use the Force Delete option when you are not able to proceed with the Service deletion from the GUI.

Step 5   Select **Submit** to preview the configuration that is to be pushed on the device.

Step 6   Review the configuration and click **Deploy** to confirm. A confirmation message is displayed when the deployment is complete.

The selected L3VPN service is deleted from the device.

| **Note** | If the selected L3VPN service uses integrated routing and switching (BVI/virtual interfaces), then deleting the L3VPN service automatically deletes the associated BVI/virtual interface from the device. The BGP and VRF settings associated with the L3VPN service are also deleted. |

Step 7   To verify that the selected L3VPN was deleted from the device, view the complete list of L3VPN services from the Circuits/VCs list.

Step 8   To view the device configurations of the force deleted services, click the *i* icon next to the Provisioning column in the **History** tab in the **Deleted Circuit/VCs** tab. In the Circuit /VC 360* View window, click the *i* icon that is available for all provisioning states, except **None** to view the configuration details of the selected devices.

Figure 1: Circuit /VC 360* View

Delete an L3VPN Service Endpoint

You can delete L3VPN service endpoints for L3VPN services created using Cisco EPN Manager. Endpoints associated with L3VPN services that are discovered but not created using Cisco EPN Manager cannot be deleted.

To delete an L3VPN service endpoint:

Step 1   In the left sidebar, choose **Maps** > **Topology Maps** > **Network Topology**.

Step 2   In the Circuits/VCs panel, click the **Circuit/VCs** link to display all services in Cisco EPN Manager.

Step 3   Select the service that you want to delete. You can type the service's name in the **Name** filter to filter out the required L3VPN service.

Step 4   Click the pencil**Modify** icon.

The L3VPN Provisioning wizard displays the VRFs, endpoints, and other details associated with the selected L3VPN.

Step 5   Choose **Delete Endpoint** and click **Next**.

Step 6   Choose the IP endpoints that must be disassociated from the selected L3VPN service. For single endpoint VRFs, deleting the endpoints turns the VRF ineffective and the VRF then acts as a dangling VRF. To associate newer endpoints with this ineffective VRF, you need to further edit the VRF's attributes.

Step 7   Click **Next** to preview the configuration that will be pushed to the device.

Step 8   Review the configuration and click **Deploy** to confirm and deploy your changes to the device.

The selected L3VPN service endpoint is deleted from the device.

Delete or Force Delete an MPLS TE Service

You can delete or force delete MPLS TE services that are in the following provisioning states: Planned, Succeeded, Failed, or None. For more information about the provisioning states, see Circuit or VC States, on page 2.

Note   You cannot delete an MPLS TE service if it is being used by a CEM service or a Carrier Ethernet circuit/VC.

Step 1   From the left pane, choose **Maps** > **Topology Maps** > **Network Topology**.

Step 2   Click **Device Groups**, and then select the location in which the required circuit/VC was created.

Step 3   Close the **Device Groups** popup window.

Step 4   In the **Network Topology** window, click **Circuits/VCs**.

Step 5   In the **Circuits/VCs** tab, click the Circuits/VCs hyperlink located below the list of circuits/VCs.

Step 6   In the displayed table of circuits/VCs, select the MPLS TE service that you want to delete.

Step 7   Click the delete icon or Force Delete to open the Provisioning Wizard and display information for the selected MPLS TE service.

Step 8   From the **Deployment Action** drop-down list, choose one of the following option:

 • **Preview**—View the configurations that will be deployed to the relevant devices before the actual deployment.
 • **Deploy**—Deploy the changes without previewing them.

Step 9   Click **Submit**.

 • If you selected Preview in the previous step, Cisco EPN Manager displays a Preview Config page. If you are satisfied with the changes, click **Deploy**.

 • If you selected Deploy in the previous step, Cisco EPN Manager deploys the configurations to the devices immediately.

To view the details of device configuration of the force deleted services, click the *i* icon next to the Provisioning column in the **History** tab in the **Circuit/VC 360*** window. The *i* icon is available for all provisioning states, except **None**.

Cisco EPN Manager displays a confirmation message when the deployment is complete.

Manage Provisioned Network Interfaces

Cisco EPN Manager provides a table of interfaces that have been provisioned as network interfaces (UNIs or ENNIs) so that you can view details for and manage network interfaces independently of provisioned circuits/VCs. The table provides information about each network interface, including its identifying information, the device it belongs to, the actual interface on the device, and the number of services in which the network interface is currently participating.

You can view:

- The network interfaces in a specific device group (from the Network Topology window).

- All network interfaces managed by Cisco EPN Manager (from the Inventory menu).

You can edit a network interface by clicking the **Edit** button. This launches the wizard where you can make changes to the network interfaces as required. Keep in mind that if the network interface is associated with multiple services, your edit operation will affect all of those services.

You can delete a network interface as long as it is not participating in any circuits.

Step 1 To view and manage the network interfaces that belong to a specific device group:

a) In the left sidebar menu, choose **Maps** > **Topology Maps** > **Network Topology**.
b) Click the **Device Groups** button and select the required group.
c) In the **Circuits/VCs** tab, click the **Network Interfaces** hyperlink (below the table).

Step 2 To view and manage all network interfaces managed by Cisco EPN Manager, choose **Inventory** > **Other** > **Network Interfaces**.

Delete Network Interfaces

From the Network Interfaces table, you can delete a UNI/ENNI if it is not currently participating in any circuits.

To delete a network interface:

Step 1 In the left sidebar, choose **Maps** > **Topology Maps** > **Network Topology**.

Step 2 Click the **Device Groups** button and select the required group.

Step 3 In the Circuits/VCs tab, click the Network Interfaces hyperlink to display the Network Interfaces table.

Step 4   Select the network interface you want to delete and click the **Delete** button. If the network interface is participating in one or more circuits/VCs, the Delete button will be disabled. In the No. of Circuits/VCs column, you can see the number of circuits/VCs in which the network interface is included.

Delete Network Interfaces