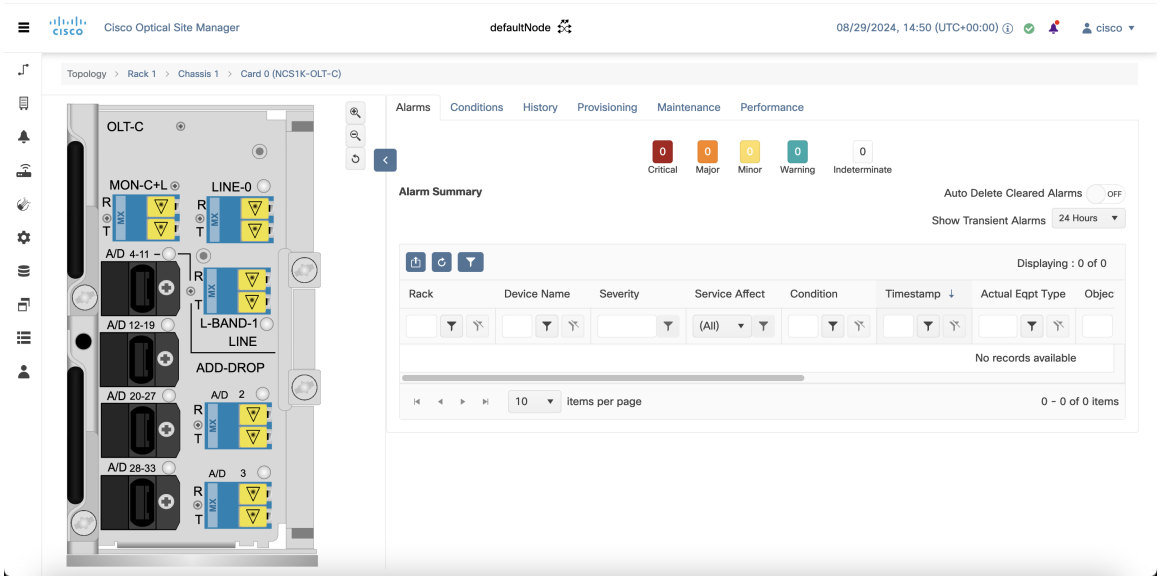


Provision Line Cards

This chapter describes the tasks related to provisioning the Cisco NCS 1000 line cards in Cisco Optical Site Manager.

Figure 1: Provision Line Cards



- Supported NCS 1000 line cards, on page 2
- Open the card view, on page 2
- NCS 1000 line card modes, on page 3
- Reset a line card, on page 12
- Provision trail trace monitoring, on page 13
- Provision ODU interfaces, on page 14
- Provision OTU interfaces , on page 16
- Provision Ethernet interfaces, on page 18
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- Provision optical threshold settings, on page 23
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- Provision FEC thresholds, on page 26

- Configure RMON thresholds, on page 27
- Configure loopback interfaces, on page 28
- Configure optical safety, on page 29
- Enable attention LED, on page 31
- PSM card protection mechanism, on page 32

Supported NCS 1000 line cards

Cisco Optical Site Manager supports configuration and management of line cards for these NCS 1000 devices.

- Cisco NCS 1014
- Cisco NCS 1010
- Cisco NCS 1004

For detailed information about the supported cards, refer to these topics:

- Cisco NCS 1014
- Cisco NCS 1010
- Cisco NCS 1004

Open the card view

Access detailed information and manage specific line cards within a rack or chassis.

Opening a card in Cisco Optical Site Manager allows you to:

- View detailed information about the card, including its status, type, alarms, and ports.
- Access various tabs for managing the card such as Alarms, Conditions, History, Circuits, Provisioning, Maintenance, Performance, and Inventory.
- Perform card-specific maintenance and provisioning tasks, including configuring ports, circuits, thresholds, and optical parameters.

Before you begin

Log into Cisco Optical Site Manager

Follow these steps to open a card:

Procedure

Step 1 Click **Topology**.

The **Topology View** page appears.

Step 2 Right-click the card from the rack view and select **Open Card**.

Alternatively, you can double-click the card to open the card view.

The card opens and displays its details in the right panel.

The right panel displays these tabs, which provide access to various management functions.

Tab	Description
Alarms	Lists current alarms (Critical, Major, Minor) for the card or node and updates them in real time.
Conditions	Displays a list of standing conditions on the card or node.
History	Provides a history of alarms including date, type, severity, and object.
Provisioning	Provides configuration options for the card or node, depending on the card type (for example, line thresholds or optics).
Maintenance	Performs maintenance tasks specific to the card or node.

NCS 1000 line card modes

These tables summarizes the card mode feature additions for NCS 1000 and related cards across recent releases.

Table 1: Features introduced in R25.3.1

Feature Name	Release Information	Description

Table 2: Features introduced in R25.1.1

Table 3: Features introduced in R24.3.1

Table 4: Features introduced in R24.1.1

Feature Name	Release Information	Description
Card Configuration Wizard Enhancements	Cisco IOS XR Release 24.1.1	The **Card Configuration Wizard** is updated to select the **MXP-1K** muxponder mode supported by the new NCS1K14-2.4T-X-K9 card.

You can use the add card mode feature in Cisco Optical Site Manager to configure NCS 1000 line cards. The configuration performed through the Card Configuration Wizard in Cisco Optical Site Manager allows you to:

- Select the card mode for NCS 1000 line cards
- Set trunk and client data rates tailored to your network requirements.
- Add internal patch cords by specifying ports and chassis details to establish virtual links.
- Configure trunk details including administrative state, frequency, baud rate, bits per symbol, and rate.

- Verify all configuration details in a recap window before applying the settings to ensure accuracy.

Configuring card modes

You can configure NCS 1000 line cards in various operational modes, such as Muxponder and Slice configurations. These modes determine how the line card processes data and manages traffic, enabling efficient client-to-trunk mapping.

Summary

The process is performed using the **Card Configuration Wizard** within Cisco Optical Site Manager. Card Configuration Wizard guides you through selecting the card mode, setting trunk and client data rates, adding internal patch cords, configuring trunk details, and verifying the configuration.

Workflow

Perform these tasks to add a card mode using the **Card Configuration Wizard** in Cisco Optical Site Manager:

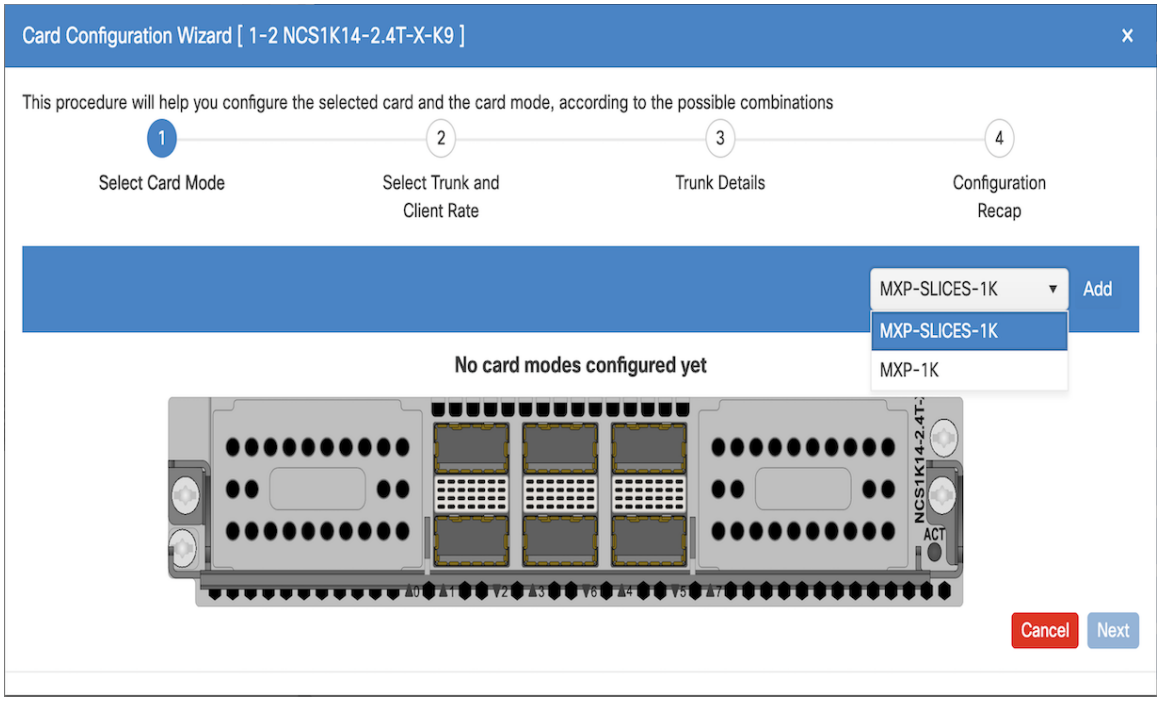
1. Select a card mode, on page 4
2. Select trunk and client data rate, on page 6
3. Add Internal Patch Cords, on page 7

   The Internal PC page is available only when the optical type is configured as ROADM.
4. Add trunk details, on page 9
5. Verify configuration details, on page 10

Select a card mode

The **Select Card Mode** in the Cisco Optical Site Manager **Card Configuration Wizard** allows you to choose from various card modes available for a line card.

Figure 2: Select card mode



Before you begin

Log into Cisco Optical Site Manager

Follow these steps to enter into the **Card Configuration Wizard** and select a card mode.

Procedure

Step 1 Open the **Card Configuration Wizard** in any of these ways.

From rack or card view	From the tabbed view
a. Right-click a line card. **b.** Click **Card Mode**. **c.** Select **Install**.	**a.** Click the **Provisioning** tab. **b.** Click the **Card Modes** section to expand it. **c.** Click the **Add Card mode** button.

Step 2 Select the card mode from the drop-down list and click **Add**.

Table 5: Supported card modes

For details on card modes for	refer to
NCS 1014	Configuring the Card Mode on NCS 1014 Line Cards
NCS 1004	Configuring the Card Mode on NCS 1004 Line Cards

Step 3 Click **Next**.

The card mode is added

What to do next

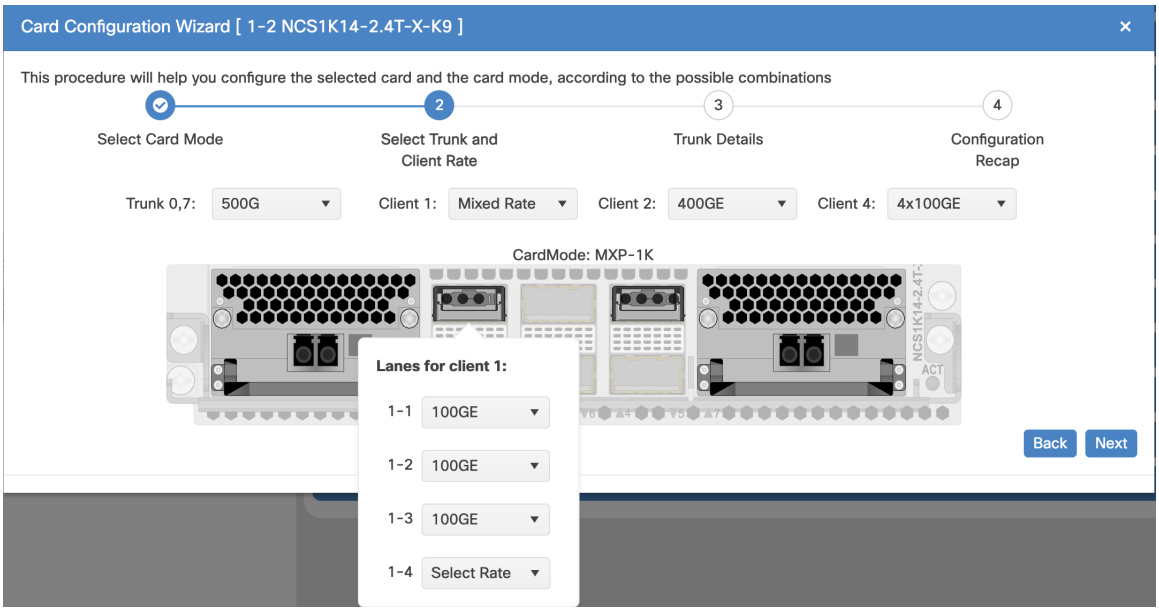
Select the Trunk and Client Data Rates.

Select trunk and client data rate

Use this task to select the trunk and client data rates for a card mode configured on an NCS 1000 line card. This step defines how the line card processes data and manages traffic efficiently.

This configuration helps you map client traffic to trunk ports and supports various card modes, including Muxponder and Slice configurations.

Figure 3: Select Trunk and Client Data Rate



Before you begin

Select a card mode, on page 4

Follow these steps to select the trunk and client port data rates in the **Card Configuration Wizard**.

Procedure

Step 1 Select the trunk data rate from the **Trunk** drop-down list.
The **Client** drop-down lists are displayed.

Step 2 Select the client data rates using one of these ways:

Table 6: Client data rate options

For mixed client data rate for client ports	For same client data rate for all client ports
From the **Client** drop-down lists, select the same data rate for each client port.	**a.** From the **Client** drop-down lists, select **Mixed Rate**. **Mixed rate configuration** information message is displayed. **b.** Close the message box. **c.** Right-click the lane in the line card image and select the data rate from the available drop-down lists.

Step 3 Click **Next**.

The system configures the trunk and client data rates for the selected card mode and maps client traffic as specified.

What to do next

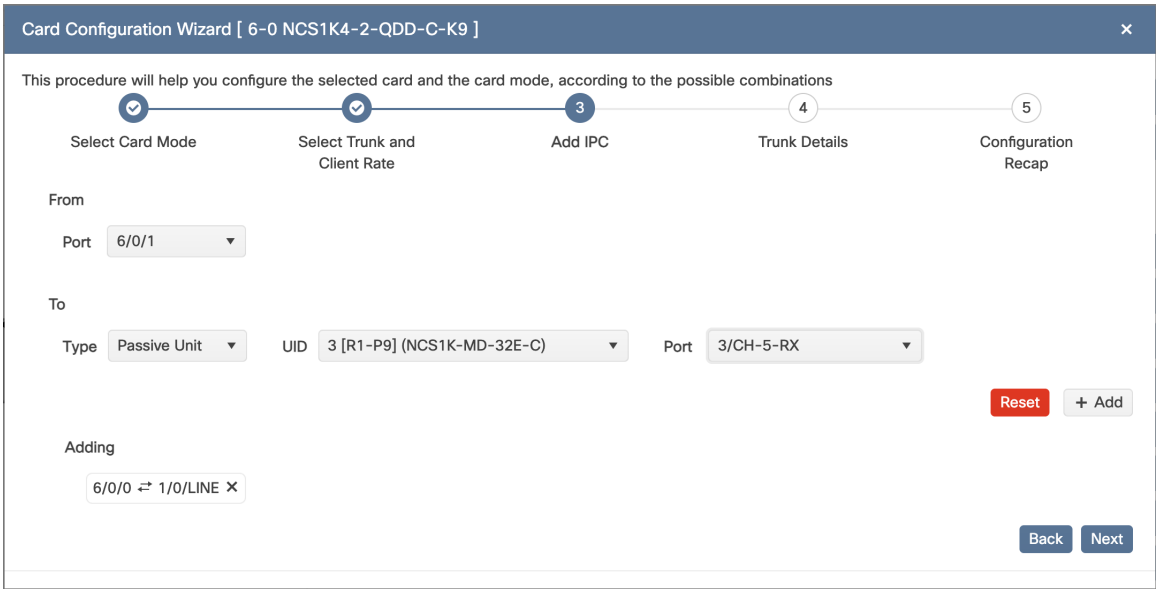
If optical type is	then
txp	Add trunk details, on page 9
roadm	Add Internal Patch Cords, on page 7

Add Internal Patch Cords

You add Internal Patch Cords to establish internal connections that optimize data flow to enable efficient client-to-trunk mapping. IPC links trunk and client ports across line cards. They are necessary when the optical type is set to ROADM.

This task involves creating IPC that are virtual links between network termination points, such as OSC ports, transponder or muxponder trunk ports, line ports, and passive device ports within the node.

Figure 4: Add IPC



Before you begin

Select trunk and client data rate, on page 6

Follow these steps to add IPC in the **Card Configuration Wizard**.

Note **Add IPC** page is only available if optical type is configured as *roadm*.

Procedure

Step 1 Select the port from the **Port** drop-down list in the **From** section.

Step 2 In the **To** section, perform these steps:

Use this table to choose the correct option based on your need:

Table 7: IPC drop-down lists displayed based on device type

To create an IPC for a	Select an option from these drop-down lists
• Chassis • Passive Chassis	• UID • Slot • Port
Passive Unit	• UID • Port

Step 3 Click the **Add** button.

Step 4 (Optional) Remove the internal patch cord using one of these methods:

- To remove a single internal patch cord, click the cross (x) icon next to the internal patch cord under the **Adding** section.
- To remove all added internal patch cords, click the **Reset** button.

Step 5 Click **Next**.

The IPC are added and displayed.

What to do next

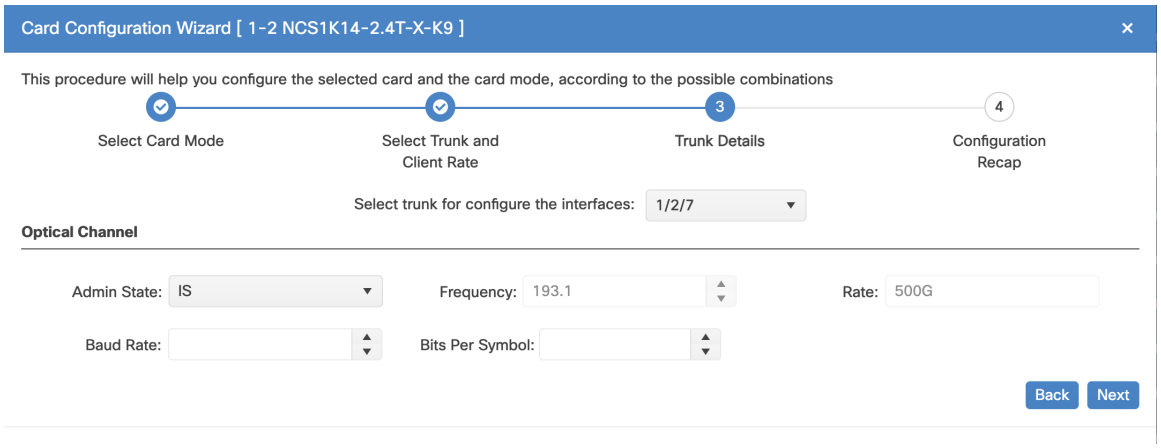
Add the Trunk Details to configure the interfaces.

Add trunk details

Add trunk details to specify trunk interface parameters. These parameters help establish trunk connections, enabling efficient data transport and client-to-trunk mapping.

You can configure trunk port details using the **Card Configuration Wizard** for line cards by selecting parameters such as admin state, frequency, baud rate, bits per symbol, and rate.

Figure 5: Add Trunk Details



Before you begin

If optical type is configured as	then ensure
roadm	Add Internal Patch Cords, on page 7
txp	Select trunk and client data rate, on page 6

Follow these steps to add the trunk details in the **Card Configuration Wizard** to configure the interfaces.

Procedure

Step 1 Select the trunk port from the **Select trunk for configure the interfaces** drop-down list.

Step 2 Select these parameters from their corresponding drop-down lists in the **Optical Channel** section:

- **Admin State**
- **Frequency**
- **Baud Rate**

  Note
  Cisco Optical Site Manager displays the Baud Rate value with seven digits after the decimal point.

- **Bits Per Symbol**
- **Rate**

Step 3 Click **Next**.

The trunk details are configured.

What to do next

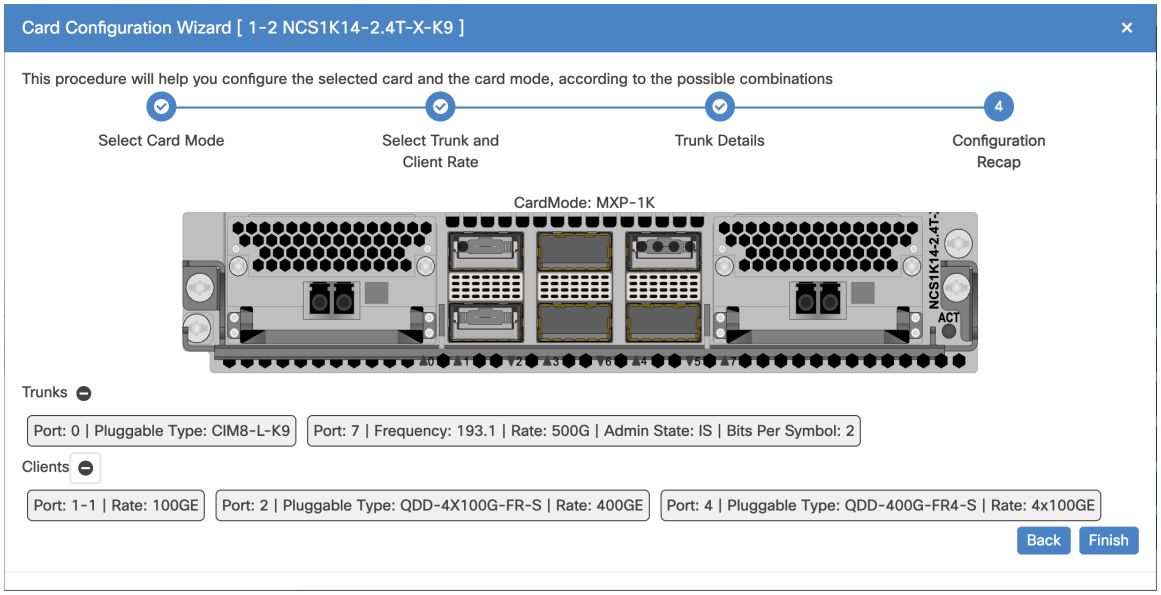
Verify configuration details, on page 10

Verify configuration details

After you add a card mode, verify configuration details to ensure that all selected settings, such as trunk and client configurations, are correct and consistent before adding the card mode.

In the **Card Configuration Wizard**, verify the configuration in the **Configuration Recap** window for the **Trunk** and **Client** sections.

Figure 6: Verify Configuration Details



Before you begin

Add trunk details, on page 9

Follow these steps to verify the card mode configuration details.

Procedure

Step 1 Click to expand the *Trunk* and *Client* sections to verify the configured details.

Step 2 Click **Finish** to add the card mode.

Verifying the configuration details ensures that the card mode is added with the correct parameters.

Edit card mode for NCS 1000 cards

Edit the card mode for NCS 1000 line cards to update the line card configuration to reflect the new trunk and client data rates.

Before you begin

Log into Cisco Optical Site Manager

Follow these steps to edit the trunk and client port data rates for a card mode configured on a for a NCS 1000 line card.

Procedure

Step 1 Open the **Card Configuration Wizard** in any of these ways.

From rack or card view	From the tabbed view
a. Right-click a line card. **b.** Click **Card Mode**. **c.** Select **Install**.	**a.** Click the **Provisioning** tab. **b.** Click the **Card Modes** section to expand it. **c.** Click the **Add Card mode** button.

Step 2 Select the trunk and client data rates.

For more details about selecting trunk and client data rates, see Select trunk and client data rate, on page 6.

The updated trunk and client details are displayed in the **Card Modes** section of the **Provisioning** tab.

Reset a line card

Reset a line card to recover from operational issues or to reinitialize the card.

- Choose a soft reset when you need to reboot the line card and reload software without removing power or disrupting traffic on active or standby control cards.
- Choose a hard reset when you need to remove power to clear all memory, equivalent to reseating the card, after placing the card in standby or maintenance mode to avoid traffic disruption.

This task is performed from the NFV view by using the context menu on the line card in the rack.

Before you begin

Log into Cisco Optical Site Manager

Follow these steps to reset a line card.

Procedure

Step 1 In the NFV view, right-click the line card in the rack.

The context menu for the selected line card appears.

Step 2 Select **Soft Reset** or **Hard Reset**.

A confirmation message appears.

Step 3 Click **Yes** to confirm.

The system performs the selected reset operation on the line card.

The line card is reset based on the selected option (soft reset or hard reset).

Provision trail trace monitoring

Provision trail trace monitoring to configure parameters that monitor the integrity and connectivity of optical transport paths. This is done by setting and verifying trail trace identifiers (TTI) on OTU and ODU interfaces.

Trail trace monitoring can be configured at different levels, such as Section (OTU interfaces) and Path (ODU interfaces). You can configure parameters such as transmit and expected trace strings, detection modes, and alarm propagation settings.

Before you begin

- Log into Cisco Optical Site Manager
- Open the card view, on page 2

Follow these steps to configure the parameters for trail trace monitoring.

Procedure

Step 1 Click the **Provisioning** tab.

Step 2 Click the **Trail Trace Monitoring** section to expand it.

Step 3 From the **Level** drop-down list, select any of these options:

To	Select
List all the OTU interfaces	**Section**
List all the ODU interfaces	**Path**

Step 4 Modify required settings as listed in this table.

Table 8: Trail Trace Identifier Settings

Parameter	Description	Options
Port	Displays the port number.	This field is not editable.
Legacy Tx-TTI	Set the current transmit string of the TTI. This is the string that network transmits at the beginning of a path. It helps the far-end device verify the source and integrity of the connection.	Valid values: 0-64 bytes

Parameter	Description	Options
Legacy Expected-TTI	Set the TTI value that the network device expects from the far end of the optical path. The device continuously compares the *Legacy Rx-TTI* with this expected value to verify the integrity and correctness of the connection.	0-64 bytes
Legacy Rx-TTI	Displays the trail trace identifier string that your network device receives from the remote (far-end) device over a monitored path.	This field is not editable.
Alarm Propagation	If a discrepancy is detected between the expected and received trace, it raises an alarm. If set to *true*, the alarm is propagated downstream to the other nodes.	Available options: • true • false
Detect Mode	Enable this mode to allow the system to automatically detect and display the trail trace identifier (TTI) received from the far end of an optical path. • When this mode is enabled, the device does not compare the *Legacy Rx-TTI* to a pre-configured expected value. • Instead, it simply captures and shows the actual TTI being received from the remote end.	Available options: • Disabled • Enabled • SAPI • DAPI • SAPI-and-DAPI

Step 5 Click **Apply**.

After provisioning, the system continuously monitors the trail trace identifiers on the specified interfaces. Any mismatch between the expected and received trace strings triggers alarms.

Provision ODU interfaces

To ensure proper operation and monitoring of the ODU layer in the optical transport network, configure the ODU settings on optical line cards. Adjust these settings to manage signal quality, set error thresholds, and control client interface behavior.

Set parameters for ODU interfaces, such as Signal Fail Bit Error Rate (SF BER), Signal Degrade Bit Error Rate (SD BER), squelch mode (which controls laser behavior on signal loss), and squelch hold-off time.

Before you begin

- Log into Cisco Optical Site Manager

- Open the card view, on page 2

Follow these steps to modify the ODU settings of a card.

Procedure

Step 1 Click the **Provisioning** tab.

Step 2 Click the **ODU Interfaces** section to expand it.

Step 3 Modify required settings as described in the #unique_113 unique_113_Connect_42_ID9913, on page 15table.

Table 9: ODU Interface Settings

Parameter	Description	Options
Port	(Display only) Displays the port name.	—
Description	Displays the description of the port.	—
SF BER	Sets the signal fail (SF) bit error rate (BER).	Only 1E-5 is allowed.
SD BER	Sets the signal degrade (SD) bit error rate (BER).	• 1E-5 • 1E-6 • 1E-7 • 1E-8 • 1E-9
Squelch Mode	When a LOS is detected on the near-end client input, the far-end client laser is turned off. It is said to be squelched. Alternatively, an AIS can be invoked. The OTU2-XP card supports Squelch Mode parameter when the card mode is set as Regenerator. The valid values are Squelch and AIS. When the card mode is set to Transponder or Mixed, the Squelch Mode cannot be changed and the parameter defaults to the Squelch value.	• Squelch • AIS
SquelchHold Off Time	Sets the period in milliseconds that the client interface waits for resolution of issues on the trunk side. The client squelching starts after this period.	• Disable • 50 ms • 100 ms • 250 ms • 500 ms

Parameter	Description	Options
Service State	Displays the service state.	—
Rate	Displays the rate.	—

Step 4 Click **Apply**.

After you provision the ODU interfaces with the desired signal thresholds and squelch behavior, you can monitor and handle signal degradation or failure more effectively.

Provision OTU interfaces

Configure OTU (Optical Transport Unit) interfaces on optical line cards to manage forward error correction, synchronization, and interoperability, as well as related settings.

Use this task to adjust OTU parameters such as HD FEC mode, interoperability with non-native equipment, synchronization support, and administrative synchronization status message settings for optimal network performance and compatibility.

Before you begin

- Log into Cisco Optical Site Manager
- Open the card view, on page 2

Follow these steps to modify the OTU settings of the card.

Procedure

Step 1 Click the **Provisioning** tab.

Step 2 Click the **OTU Interfaces** section to expand it.

Step 3 Modify the required settings described in the #unique_114 unique_114_Connect_42_ID9913, on page 16 table.

Table 10: OTU Interface Settings

Parameter	Description	Options
Port	(Display only) Displays the port name.	—
Description	Displays the description of the port.	—

Parameter	Description	Options
HD FEC	Sets the OTN lines to forward error correction (FEC).	• DISABLE_FEC • EFEC • EFEC_14 • EFEC_17 • HG_FEC_20 • HG_FEC_7 • STANDARD_FEC
Interop Mode	Enables interoperability between line cards and other vendor interfaces.	• InteropNone • InteropEnable
Supports Sync	(Display only) Displays the SupportsSync card parameter. If the value is true, the card functions as a NE timing reference.	• true • false
Sync Msg In	Sets the EnableSync card parameter. Enables synchronization status messages (S1 byte), which allow the node to choose the best timing source.	• true • false

Parameter	Description	Options
Admin SSM In	Overrides the synchronization status message (SSM) and the synchronization traceability unknown (STU) value. If the node does not receive an SSM signal, the system uses the STU value.	• G811 • STU • G812T • G812L • SETS • DUS • PRS • ST2 • ST3E • ST3 • SMC • ST4 • RES • STU_SDH • DUS_SDH • SSM_FAILED • RES_SDH • TNC
Rate	Displays the rate.	—
Service State	Displays the service state.	—

Step 4 Click **Apply**.

The system saves your changes, and the modified OTU settings are displayed for the selected card.

Provision Ethernet interfaces

Provision Ethernet interfaces by configuring Ethernet port parameters on a network card or device, ensuring proper operation and network integration.

Set operational parameters such as speed, duplex mode, MTU size, Forward Error Correction (FEC), Auto-Negotiation, and service state.

Before you begin

- Log into Cisco Optical Site Manager
- Open the card view, on page 2

Follow these steps to provision the parameters for the Ethernet interfaces of a card.

Procedure

Step 1 Click the **Provisioning** tab.

Step 2 Click the **Ethernet Interfaces** section to expand it.

Step 3 Click the **Edit** button.

Step 4 Modify any of the Ethernet settings as described in the #unique_115 unique_115_Connect_42_ID8852, on page 19 table.

The available parameters depend on the card mode.

Step 5 Click **Apply**.

The system saves your changes, and the modified ethernet interface settings are displayed for the selected card.

Table 11: Ethernet Settings

Parameter	Description	Options
Port	(Display only) Displays the port number	—
Description	Description of the port.	—
Speed	Sets the expected port speed.	—
MTU	Sets the maximum size of the Ethernet frames that are accepted by the port. The port must be in OOS or locked state.	Numeric. • Default value: 1548 • Valid range: 64 – 9700
FEC	Sets the FEC mode. When set to On, FEC is enabled.	• NA • Auto (default) • On • Off
Duplex	Sets the expected duplex capability of ports.	• Full • Half
Mapping	Sets the mapping mode.	• CBR • GFP

Parameter	Description	Options
Auto Negotiation	Enables or disables auto-negotiation on the port.	• Disabled • Enabled
Squelch Mode	Sets the squelch mode.	• Disable • Squelch • LF
Squelch Hold Off Time	Sets the period in milliseconds that the client interface waits for resolution of issues on the trunk side. The client squelching starts after this period or local fault is sent.	• Disable • 50 ms • 100 ms • 250 ms • 500 ms
Service State	Displays the service status of the port.	

Provision optical channels

Provision Optical Channels involves configuring parameters for optical channels on network cards within DWDM (Dense Wavelength Division Multiplexing) systems. The process sets attributes, including:

- reach
- forward error correction (FEC) standards
- transmit power
- frequency
- wavelength
- chromatic dispersion thresholds
- administrative states

Use this task to establish and optimize the optical signal path for data transmission across the network. This action enables reliable, high-capacity transport of client signals over the optical infrastructure.

Before you begin

- Log into Cisco Optical Site Manager
- Open the card view, on page 2

Follow these steps to configure the parameters for the optical channels on the card.

Procedure

Step 1 Click the **Provisioning** tab.

Step 2 Click the **Optical Channel** section to expand it.

Step 3 Click the **Edit** button.

Step 4 Modify the required parameters in the Table 12: Optical Channel Settings, on page 21 table.

Step 5 Click **Apply**.

The system saves the changes. The modified optical channel parameters are displayed for the selected card.

Table 12: Optical Channel Settings

Parameter	Description	Options
Port	(Display only) Displays the port name.	—
Description	Type the description of the port.	—
Admin State	Sets the port service state unless network conditions prevent the change.	• Unlocked (ETSI)/ IS (ANSI) • Locked, disabled (ETSI)/ OOS, DSBLD (ANSI) • Locked, maintenance (ETSI)/ OOS, MT (ANSI) • Unlocked, automaticInService (ETSI)/ IS, AINS (ANSI)
Service State	Displays the service state.	—
Reach	Indicates the distance from one node to another node.	• Auto Provision • List of reach values
SD FEC	Indicates the standard FEC.	• SD_FEC_15_DE_OFF • SD_FEC_15_DE_ON • SD_FEC_20 • SD_FEC_25_DE_OFF • SD_FEC_25_DE_ON • SD_FEC_7

Parameter	Description	Options
Tx Power (dBm)	Sets the Tx power on the trunk port.	The range is –10.0 to 0.25 dBm.
PSM Info	When enabled on a TXP or MXP trunk port that is connected to a PSM card, it allows fast switching on the cards.	• NA • Enable • Disable
Frequency (THz)	Sets the frequency in THz	-
Wavelength (nm)	Displays the wavelength, which is set based on the **Frequency**.	-
Tx Shutdown	(Display only)	• true • false
Width (GHz)	(Display only)	-
CD (Working Range) High (ps/nm)	Sets the threshold for maximum chromatic dispersion.	-
CD (Working Range) Low (ps/nm)	Sets the threshold for minimum chromatic dispersion.	-
Target Power	Sets the Rx VOA target power. **Note** You cannot configure this parameter if **Fixed Ratio** is already configured.	• Valid range: -19 dBm to +3 dBm • Default value: -2.0 dBm
Fixed Ratio	Sets the Rx VOA fixed ratio. **Note** You cannot configure this parameter if **Target Power** is already configured.	• Valid value: 0.0 dBm
Rate	Displays the rate.	—

Change Trunk Port Parameters

Adjust trunk port parameters to ensure proper configuration. You can enable or disable the port, set the frequency or wavelength, and optimize data transmission rates for network traffic and operational requirements.

Use this task to modify trunk port settings. Typically, you access these settings through management interfaces and adjust parameters such as administrative state, frequency, baud rate, and bits per symbol.

Before you begin

Log into Cisco Optical Site Manager

Follow these steps to configure the trunk port parameters.

Procedure

Step 1 Right-click a trunk port in the Rack, Chassis, or Card view and click **Change Trunk Details**.
The **Change Configuration** dialog box is displayed.

Step 2 Select the **Admin State** to change the admin status of the trunk port to *Out of Service* or *Automatic in Service*.

Step 3 Enter or select the frequency in the **Frequency** field.

The wavelength of the trunk port is automatically selected based on the frequency configured.

Step 4 Enter or select the **Baud Rate** or **Bits Per Symbol**.

For more details about these fields, see Table 12: Optical Channel Settings, on page 21

Step 5 Click **Apply**.

After changing the trunk port parameters and applying the configuration, the updated settings are saved and reflected in the system's provisioning interface.

Provision optical threshold settings

Set the limits for optical performance parameters that trigger alarms or threshold crossing alerts (TCAs). This enables proactive monitoring and management of optical signal quality when parameters exceed or fall below defined thresholds.

Provisioning optical threshold settings involves configuring threshold crossing alert values for optical parameters on network cards such as SVO, OSCM, OSC-CSM, or DWDM cards. These thresholds include these parameters:

- received/transmitted optical power
- laser bias
- chromatic dispersion
- OSNR
- polarization mode dispersion

Note This feature is not supported for the FX-MXP card mode of the OTN-XP card.

Before you begin

- Log into Cisco Optical Site Manager
- Open the card view, on page 2

Follow these steps to set the threshold crossing alert values on the card.

Procedure

Step 1 Click the **Provisioning** tab.

Step 2 Click the **Optics Thresholds** section to expand it.

Step 3 Choose the type of threshold that you want to change, *15 Min* or *24 Hour*.

Step 4 Click **Add Optical Threshold** button.
New Optical Threshold dialog box is displayed.

Step 5 In the **New Optical Threshold** dialog box, add these details:

a) Select the **Interface** from the drop-down list.
b) Select **Granularity** from the drop-down list to set the threshold crossing alert for 15-minute or 24-hour interval.
c) Select **Location** from the drop-down list.
d) Select **Direction** from the drop-down list.
e) Select the performance monitoring type from the **PM Type** from the drop-down.
f) Select the parameter for which you want to set the threshold value from the **PM Type Extension** drop-down list.

For more details about the parameters, see Table 13: Performance Monitoring Parameters, on page 24.

g) Enter the minimum threshold value in the **Low** field and the maximum threshold value in the **High** field.

Step 6 Click **Apply**.

After configuring and applying the optical threshold settings, the system monitors the optical parameters against these thresholds. Alarms are raised when thresholds are crossed.

Table 13: Performance Monitoring Parameters

Use this parameter	to
amplifierTilt	configure the thresholds for ingress or egress amplifier tilt.
amplifierGain	configure the thresholds for ingress or egress amplifier gain.
opticalPower	configure the thresholds for total Rx or Tx power.
opticalPowerOSC	configure the thresholds for total Rx or Tx OSC power.
opticalPowerBackReflection	configure thresholds for optical power back reflection.
opticalPowerBackReflectionRatio	configure threshold to monitor and limit the amount of optical signal reflected back toward the transmitter.
Raman - 1	configure threshold to monitor and control the performance of the first Raman amplifier, ensuring optimal signal amplification in the optical link.

Configure G.709 thresholds

Define limits for key OTN performance parameters that trigger alarms or threshold crossing alerts (TCAs). By establishing these limits, network operators can proactively monitor the health and quality of OTN links, detect degradations or faults early, and maintain network reliability and performance.

Provisioning G.709 thresholds involves setting performance monitoring (PM) threshold values for OTN ports compliant with the ITU-T G.709 standard. These thresholds apply to various PM parameters and can be configured for Near End or Far End monitoring. The monitoring can occur over two time intervals:

- fifteen minutes
- one day

Before you begin

- Log into Cisco Optical Site Manager
- Open the card view, on page 2

Follow these steps to provision the G.709 performance monitoring thresholds for the OTN ports.

Procedure

Step 1 Click the **Provisioning** tab.

Step 2 Click the **G.709 Thresholds** section to expand it.

Step 3 Select the value for the G.709 PM thresholds, and click **Apply**.

For more details about the parameters, refer to the Table 14: G.709 PM Thresholds, on page 25.

After you provision the G.709 thresholds and apply the configuration, the system continuously monitors the OTN ports against these thresholds. If any parameter exceeds its configured limit, the system generates an alert.

Table 14: G.709 PM Thresholds

Parameter	Description
ES (Errored Seconds)	The number of errored seconds recorded during the PM time interval.
SES (Severely Errored Seconds)	The number of severely errored seconds recorded during the PM time interval.
UAS (Unavailable Seconds)	The number of unavailable seconds recorded during the PM time interval.
BBE (Background Block Error)	The number of background block errors recorded during the PM time interval.

Parameter	Description
FC (Failure Counter)	The number of failure counts recorded during the PM time interval.

Provision FEC thresholds

Define limits for Forward Error Correction (FEC) performance parameters that trigger threshold crossing alerts (TCAs) or alarms. FEC uses Reed-Solomon RS (255,239) encoding to correct and detect errors on optical links, improving signal quality and reducing the need for signal regeneration.

Provisioning FEC thresholds involves setting performance monitoring (PM) threshold values for FEC parameters on optical cards such as transponders or muxponders. These thresholds apply to key FEC metrics, such as BIT-EC and UNC-WORDS. The metrics are measured during these specified monitoring intervals:

- fifteen minutes
- one day

Before you begin

- Log into Cisco Optical Site Manager
- Open the card view, on page 2

Follow these steps to configure the FEC thresholds for the card.

Procedure

Step 1 Click the **Provisioning** tab.

Step 2 Click the **FEC Thresholds** section to expand it.

Step 3 Select the value for the FEC PMs and click **Apply**.

You can set the FEC thresholds for fifteen minutes or one day intervals.

Step 4 Select a performance monitoring type from the options in this table.

PM type	Description
BIT-EC	Sets the value for bit errors corrected.
UNC-WORDS	Sets the value for uncorrectable words.

The system continuously monitors the FEC parameters against these thresholds. When the number of corrected bit errors or uncorrectable words exceeds the configured limits within the selected interval, alerts are generated.

Configure RMON thresholds

RMON thresholds establish monitoring parameters that alert network operators to abnormal conditions. These parameters help detect and resolve network issues early. As a result, network performance and reliability are maintained at optimal levels.

RMON thresholds define specific limits on network performance variables monitored by devices. These thresholds specify conditions that trigger alarms or events when network statistics exceed or fall below set values, enabling continuous observation of Ethernet ports or interfaces.

Before you begin

- Log into Cisco Optical Site Manager
- Open the card view, on page 2

Follow these steps to provision the RMON thresholds on the control card.

Procedure

Step 1 Click **Provisioning**, then click **RMON Thresholds**.

Step 2 Click the + button.

The **Create RMON Threshold** dialog box appears.

Step 3 Specify the parameters in the **Create RMON Threshold** dialog box.

For more details about the parameters, refer to Table 15: RMON threshold parameters, on page 27.

Step 4 Click **Apply**.

Once RMON thresholds are configured, the system tracks the selected variables against the defined rising and falling limits during sampling intervals. Alarms activate when values surpass rising thresholds. They clear when values drop below falling thresholds. This process enables the system to trigger events repeatedly when thresholds are crossed.

Table 15: RMON threshold parameters

Parameter	Description
Port ID	The identifier for the port that you configure the RMON threshold for.

Parameter	Description
Variable	The specific MIB variable to be sampled. This variable must be any of these ASN.1 primitive type: • INTEGER\ • Counter32 • Counter64 • Gauge • TimeTicks
Alarm Type	Indicates which threshold crossing triggers the alarm: • Rising • Falling • Rising or Falling
Sampling Type	The method used to sample the variable: • **Absolute**: the threshold to use the total number of occurrences, regardless of the time period • **Relative**: restricts the threshold to use the number of occurrences within the user-set sample period.
Sampling Period	The interval in seconds over which the data is sampled and compared against the thresholds.
Rising Threshold	The threshold value that triggers a rising alarm event when the sampled statistic rises to or above it. **Note** For a rising type of alarm, the measured value must move from below the falling threshold to above the rising threshold. For example, if a network is running below a rising threshold of 1,000 collisions every 15 seconds and a problem causes 1,001 collisions in 15 seconds, the excess occurrences trigger an alarm.
Falling Threshold	The threshold value that triggers a falling alarm event when the sampled statistic falls to or below it.

Configure loopback interfaces

A loopback is a logical interface that enables testing of network ports and circuits. This helps to identify and isolate faults before live traffic is transmitted.

Loopbacks facilitate troubleshooting by confirming the operational status of interfaces, cabling, and device components. This improves network reliability and performance.

Note This feature is not supported for the FX-MXP card mode of the OTN-XP card.

Loopbacks test and diagnose network interfaces by routing traffic back to the source. They isolate faults in line cards or optical paths by verifying signal integrity and device programming.

Caution This task is traffic-affecting.

Before you begin

- Log into Cisco Optical Site Manager
- Open the card view, on page 2
- Configure loopback only when the card is in maintenance service state. If you need to place trunk ports in a locked maintenance state, see Provision optical channels, on page 20.

Follow these steps to configure loopback on the card.

Procedure

Step 1 Click the **Maintenance** tab.

Step 2 Click the **Loopback** section to expand it.

Step 3 From the **Loopback Type** drop-down list, select any of these options for each port required:

- Terminal
- Facility
- Terminal-Drop
- Facility-Drop

Step 4 Select the admin state from the **Admin State** drop-down list.

Step 5 Click **Apply**.

The selected port transmits traffic, which is looped back either internally or at the line interface. This setup allows you to verify signal flow and detect errors such as loss of signal or CRC errors. Loopback states are maintained in the maintenance administrative state. You can verify these states using show commands.

Configure optical safety

Configure optical safety parameters to ensure compliance with laser safety standards. The system can automatically shut down or control laser output power during fault conditions such as fiber breaks or signal loss.

Optical safety provisioning protects optical components and personnel from hazardous laser exposure. This process includes configuring parameters for automatic laser shutdown (ALS) modes, optical safety remote

interlock (OSRI), and recovery pulse settings on various optical cards, such as line cards, amplifier cards, and service channel cards.

Before you begin

- Log into Cisco Optical Site Manager
- Open the card view, on page 2

Follow these steps to configure the optical safety parameters for cards.

Procedure

Step 1 Click the **Maintenance** tab.

Step 2 Click the **Optical Safety** section to expand it.

Step 3 Modify required settings as described in the Table 16: Optical safety parameters for cards, on page 30 table.

Step 4 Click **Apply** to save the changes.

The system monitors optical signals. When needed, it automatically activates safety mechanisms, such as ALS, to shut down laser output.

Table 16: Optical safety parameters for cards

Parameter	Description	Options
Interface	(Display only) Displays the port name, port type, and direction.	—
Supported Safety	(Display only) Displays the supported safety mechanism.	• ALS for line cards and control cards. • ALS-OSRI for amplifier cards.
ALS Mode	Automatic laser shutdown mode. ALS mode is disabled for RX ALS interfaces.	From the drop-down list, choose one of the following: • ALS-Disabled—Deactivates ALS. • Automatic Restart—(Default) ALS is active. The power is automatically shut down when needed, and it automatically tries to restart using a probe pulse until the cause of the failure is repaired. • Manual Restart

Parameter	Description	Options
OSRI	Optical safety remote interlock. The default value is OSRI-OFF. When set to OSRI-ON, the TX output power is shut down. **Note** OSRI configuration is not supported on the transponder and muxponder cards.	From the drop-down list, choose one of the following: • OSRI-OFF • OSRI-ON
ALS Status	(Display only) ALS status of the device.	• Working • Shutdown
Recovery Pulse Interval (Sec.)	Displays the interval between two optical power pulses.	60 to 300 seconds.
Recovery Pulse Duration (Sec.)	Displays the duration of the optical power pulse that begins when an amplifier restarts.	2 to 100 seconds
Manual Restart	Triggers manual restart for the ALS interface. Manual restart does not occur if Mode is set to Automatic Restart or Disabled.	—

Enable attention LED

The Attention LED feature helps field engineers identify specific devices—ports, line cards, chassis, or controller cards, within a network installation. Use it during maintenance or troubleshooting.

Table 17: Feature History

Feature Name	Release Information	Description
Enable Attention LED on Demand	Cisco IOS XR Release 24.1.1	You can now turn on the Attention LED by selecting *true* from the **Attention Led for** drop-down list in the **Provisioning** tab. The Attention LED is available for specific ports, chassis, line cards, and controller cards. Once turned on, it will help field engineers quickly identify the relevant device at the installation location for maintenance or troubleshooting.

The attention LED can be enabled on specific ports, chassis, line cards, or controller cards. This feature helps with troubleshooting and maintenance because it allows field engineers to locate the device in its installed location.

Before you begin

- Log into Cisco Optical Site Manager
- Open the card view, on page 2

Follow these steps to enable the attention LED:

Procedure

Step 1 Click the **Provisioning** tab.

Step 2 Click the **Attention Led** section.

Step 3 Perform any one of these steps to turn on the attention LED:

To turn on the attention LED of	perform these steps.
• a chassis provisioned on the rack or • all the ports on a line card	Select *true* from the **Attention Led for** drop-down list, then click **Apply**.
a specific port of a line card	**a.** Click **Edit**. **b.** Select *true* corresponding to the port you want to blink the Attention LED, then click **Apply**.

Step 4 Select *false* from the drop down list and click **Apply** to turn off the Attention LED for a chassis or port.

When enabled, the Attention LED flashes on the selected device or port. This makes it easier for field personnel to physically identify the equipment and reduces the time spent locating devices, improving efficiency in troubleshooting and maintenance.

PSM card protection mechanism

PSM card protection switching is a high-availability mechanism that automatically transfers optical traffic from a primary Protection Switching Module (PSM) card to a redundant standby PSM card in the event of a failure or degradation of the active card.

- It provides automatic failover, ensuring continuous operation and minimizing service interruption.
- It enhances the overall reliability and uptime of the optical transport network.
- It is typically implemented in one-plus-one or one-to-one protection schemes to maintain optical signal integrity.

Types of Protection Switching

The PSM card supports the following types of protection switching:

- Revertive Protection Switching: Traffic automatically returns to the working path from the protection path once the fiber issue is resolved and the Loss of Signal (LOS) alarm is cleared on the working path.
- Non-Revertive Protection Switching: Once traffic is switched to the protection path due to a signal failure, it remains on the protection path even after the failure on the working path is resolved.

Enable the revertive protection switching

Protection switching offers a safeguard against optical fiber faults. When a failure is detected, the system automatically switches live traffic from the working path to the protection path. This process ensures uninterrupted data transmission.

Revertive switching is one of the two protection switching modes. In non-revertive mode, traffic remains on the protection path even after the working path is restored. The revertive mode includes a configurable Wait to Restore (WTR) timer that delays the switch back to the working path to ensure stability.

Before you begin

- Log into Cisco Optical Site Manager
- Open the card view, on page 2

Follow these steps to enable revertive protection switching on the PSM card:

Procedure

Step 1 Click the **Maintenance** tab.

Step 2 Click the **Protection** section to expand it.

Step 3 Click the **Edit** button.
The fields in the table become editable.

Step 4 Select **true** from the drop-down list under the **Revertive** column.

Step 5 Specify the time in seconds under the **Wait to Restore** column.

Wait to Restore (WTR) is the time delay (in seconds) applied after a Loss of Signal (LOS) alarm on the working path is cleared. Once the WTR timer expires, traffic is switched back to the working path.

Step 6 Click **Apply**.
Revertive protection switching is enabled on the card.

Revertive protection switching automatically switches traffic back to the working path after the fault is cleared and the WTR timer expires. This process minimizes service disruption and optimizes network performance.

What to do next

-

Configure the non-revertive protection switching

Non-revertive protection switching ensures that, once traffic is switched to the protection path due to a signal failure, it remains there even after the failure on the working path is cleared.

Non-revertive switching contrasts with revertive switching, where traffic automatically returns to the working path after fault resolution. Non-revertive mode is often used to maintain traffic on the protection path until a manual switch is performed or other conditions are met. It is also applicable in MPLS-TE path protection and EVPN configurations to control failover behavior.

Before you begin

- Log into Cisco Optical Site Manager
- Open the card view, on page 2

Follow these steps to enable or disable non-revertive protection switching on a PSM card interface:

Procedure

Step 1 Click the **Maintenance** tab.

Step 2 Click the **Protection** section to expand it.

Step 3 Select the check-box corresponding to the PSM switch and then click **Protection Switch** button. The **New Switch Command** dialog box is displayed.

Step 4 Complete these steps to enable non-revertive switching in the **New Switch Command** dialog box:

a) Select the interface you want to lockout from the **Target Interface** drop-down list.
b) Select **Lock-Out** from the **Switch Command** drop-down list.
c) Click **Apply**.

Step 5 Complete these steps to disable non-revertive switching:

a) Select **Release** from the **Switch Command** drop-down list.
b) Click **Apply**.

Traffic remains on the protection path after a failure is cleared. This behavior avoids potential disruptions that can result from switching paths repeatedly. When non-revertive mode is disabled, traffic reverts automatically to the original working path once it is restored.

Perform a manual switch

A manual switch lets you transfer traffic between the working and protection paths. Typically, this switch is used during scheduled maintenance or when manual intervention is necessary.

Before you begin

- Log into Cisco Optical Site Manager
- Open the card view, on page 2

Follow these steps to perform a manual switch:

Procedure

Step 1 Click the **Maintenance** tab.

Step 2 Click the **Protection** section to expand it.

Step 3 Select the check-box corresponding to the PSM switch and then click **Protection Switch** button. The **New Switch Command** dialog box is displayed.

Step 4 Select the interface you want to manually switch to from the **Target Interface** drop-down list.

Step 5 Select **Manual-Switch** from the **Switch Command** drop-down list.

Step 6 Click **Apply**.

The system status shows the manual switch state and confirms that the traffic is switched.