



## **Cisco Optical Network Planner Configuration Guide, Release 5.0**

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# CHAPTER 1

## Get Started with Cisco Optical Network Planner

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- [Supported Platforms, on page 1](#)
- [Supported Topologies , on page 2](#)
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## Cisco Optical Network Planner Overview

Cisco Optical Network Planner (Cisco ONP) is a tool to model and test Optical Transport Networks (OTN) and Dense Wavelength Division Multiplexing (DWDM) optical networks by using a graphical environment. The primary purpose of Cisco ONP is to design and validate networks of NCS 1004, NCS 1010, NCS 2000, and NCS 4000 series. Using the Cisco ONP tool, you create multiple instances of a network, modify different parameters at each instance, and compare. Cisco ONP generates a rack view of all the sites that are deployed in the network, shows the differences between the instances, and provides a complete Bill of Materials (BoM) for the network.

Cisco ONP models the network, generates the BoM, and provides detailed information about the network, such as Cabling report, Optical report, and Traffic matrix.

This chapter describes the features of Cisco ONP, protection scenarios, topology and service support, CSDL (Cisco Secure Development Lifecycle) compliance, and the setting up of the graphical display.

## Supported Platforms

Cisco ONP supports the following platforms:

Table 1: Supported Platforms and Releases

| Platforms | Recommended and Supported Releases     |
|-----------|--|
| NCS 1004  | 7.0.1                                  |
| NCS 2000  | 11.0.0, 11.1.0, 12.1.0, 12.2.0, 12.3.1 |
| NCS 4000  | 6.5.28                                 |
| NCS 1010  | 7.7.1                                  |

## Supported Topologies

Cisco ONP supports the following network topologies:

- **Linear**—In a linear topology, the nodes are arranged in a line and are connected to two other adjacent nodes. However, the first and last nodes are not connected.
- **Mesh**—In a mesh topology, each node is connected to one or more nodes. This configuration provides maximum redundancy to the network.
- **Ring**—In a ring topology, each node is connected to exactly two other nodes, forming a circular configuration. It requires at least three nodes to form a ring.

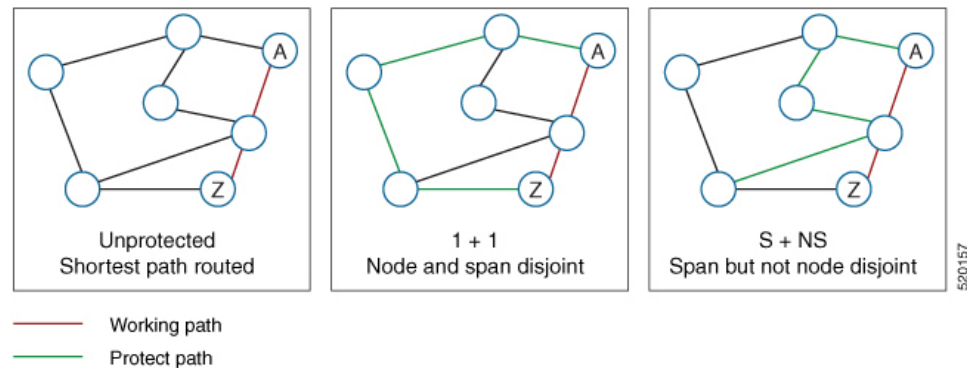
## Supported Protection Schemes

Table 2: Feature History

| Feature Name               | Release Information   | Feature Description   |
|----------------------------|-----------------------|---|
| Protection Types Supported | Cisco ONP Release 4.1 | <p>The following protection schemes are supported:</p> <ul style="list-style-type: none"> <li>• <b>1+R</b>: For each service, Cisco ONP automatically finds one working path. You can define the restoration path.</li> <li>• <b>1+1+R</b>: For each service, Cisco ONP finds one working path, and one protected path. You can define the restoration path.</li> <li>• <b>1+1+R+R</b>: For each service, Cisco ONP finds one working path and one protected path. You can define the restoration paths.</li> </ul> |

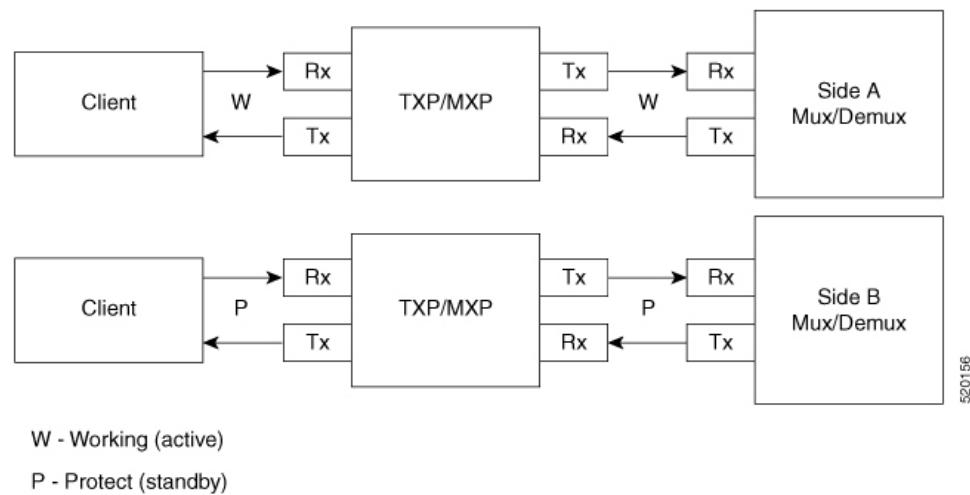
Cisco ONP supports the following protection schemes:

**Figure 1: Protection Schemes**



- **Unprotected**—In unprotected mode, the tool routes the service on the shortest path.
- **1+1**—Two client signals are transmitted to separate line cards or transponder cards instead of using Y-cable to split one client signal into two line cards or transponder cards. In client 1+1 protection, the failure and switchover are controlled by the client system. The following figure shows 1+1 protection.

**Figure 2: 1+1 Protection**



- **1+R**—Supported on SSON network. For each service, Cisco ONP automatically finds one working path. You can define the restoration path.
- **1+1+R**—Supported on SSON network. For each service, Cisco ONP finds one working path, and one protected path. You can define the restoration path.
- **1+1+R+R**—Supported on SSON network. For each service, Cisco ONP finds one working path and one protected path. You can define the restoration paths.
- **S+NS**—Supported on non-SSON network. Cisco ONP uses the shortest path for the working service, and the next shortest path for protection. The paths are span-disjointed but not node disjointed.
- **Unprotected Disjoint**—Supported on non-SSON network. Cisco ONP provides two cards following two completely disjoint paths in the network to reach their destination.

# Supported Services

Cisco ONP supports the following OTN demands:

- ODU-1,ODU-2,ODU-3,ODU-4
- GE – Gigabit Ethernet
- 10GE – 10-Gigabit Ethernet
- 100GE –100-Gigabit Ethernet
- STS-3
- STS-12
- STS-48
- STS-192
- VC-4-4
- VC-4-16
- VC-4-64
- STM-64

# Supported DWDM Channel Interfaces

See [Supported Cards and Pluggables, on page 177](#) and [Supported Optical Sources, on page 189](#) for the DWDM channel interfaces supported by Cisco ONP.

# Supported Fiber Types

Cisco ONP supports the following fiber types:

- G652-SMF-28E
- TWR
- MC
- TWPlus
- TWMinus
- TWClassic
- FL
- LS
- TL

- G652-SMF
- ELEAF
- True Wave

## Register New User

Use this task to register yourself as a user.

- 
- Step 1** In the browser URL field, enter the IP address or hostname of the Cisco ONP instance.
- Step 2** Click **Sign Up** in the Login page.
- Step 3** Enter the **Username**, **Email**, and **Password**, and click **Submit**.  
Click **Generate** if you want a system-generated password. Copy and paste the system-generated password in the **Password** field.
- Step 4** Click **Ok** in the **Success** dialog box.
- 

## Log in to Cisco ONP Web Interface

Use this task to log into the Cisco ONP web interface.

- 
- Step 1** In the browser URL field, enter the IP address or hostname of the Cisco ONP instance.  
If you are a new user, sign up. See [Register New User, on page 5](#), for more information.
- Note** If Google Chrome browser blocks your access to Cisco ONP due to self-signed certificate security, type **thisisunsafe** to proceed to the login page.
- Step 2** Enter the username and password in the **Username** and **Password** text boxes.
- Step 3** Click **Login**.
- 

## Cisco ONP Home Page

After your login, Cisco ONP displays its home page. The home page comprises of the following elements:

- Menu bar—Includes various menus such as File, Network, Export, Import, Manage, Logs, Job Monitor, Control Panel, and Help. See [Menu Bar, on page 165](#).
- Last Login—Shows the last date and time, when the user logged in to the Cisco ONP tool.
- Last Login IP—Shows the IP address of the client through which the user logged into the Cisco ONP tool previously.

- User name—Shows the name of the user, who has currently logged in to the Cisco ONP tool, for example: ADMIN.
- Reports tabs—Shows various reports under each tab. Report availability depends on whether a network is analyzed or not. Reports are also available in site properties after analyzing the network.
- Network tree—Displays the network name, and network elements, such as Sites, Fibers, Waves or Media Channels, SRLGs, and Subnet. See [Network Tree, on page 171](#).

## Change Password

The procedure to change your existing password is:

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5](#).

- 
- |               |  |
|---------------|--|
| <b>Step 1</b> | Click the login icon in the top-right corner of the home page.   |
| <b>Step 2</b> | Click <b>Change Password</b> to change the existing password.  |
| <b>Step 3</b> | In the <b>Change Password</b> dialog box, enter the <b>Old Password</b> , <b>New Password</b> , <b>Repeat New Password</b> . |
| <b>Step 4</b> | Click <b>Update</b> .  |
- 

## Reset Your Password

The following procedure shows how to reset the password.

- 
- |               |  |
|---------------|--|
| <b>Step 1</b> | In the browser URL field, enter the IP address or hostname of the Cisco ONP instance.                |
| <b>Step 2</b> | Click <b>Forgot Password ?</b> in the Cisco ONP login page. The <b>Forgot Password</b> page appears. |
| <b>Step 3</b> | Enter the registered email ID in the Forgot Password page.   |
| <b>Step 4</b> | Click <b>Continue</b> .  |
- A verification code is generated and sent to the registered email ID.
- |               |   |
|---------------|---|
| <b>Step 5</b> | Enter the verification code, new password and confirm password. |
| <b>Step 6</b> | Click <b>Continue</b> .   |
- 

## Sign Out from Cisco ONP

The procedure to sign out of Cisco ONP is:

- 
- |               |  |
|---------------|--|
| <b>Step 1</b> | Click the login icon in the top-right corner of the home page. |
|---------------|--|

**Step 2** Click **Sign Out** to log out of the Cisco ONP tool.

## Cisco Secure Development Lifecycle Compliance

*Table 3: Feature History*

| Feature Name                 | Release Information   | Feature Description   |
|------------------------------|-----------------------|---|
| CSDL Compliance Enhancements | Cisco ONP Release 4.1 | The following CSDL compliance enhancements are supported: <ul style="list-style-type: none"><li>• Displays the last login IP address of the client.</li><li>• Allows you to set a passphrase for encryption of credentials during the installation of LNI application and database.</li></ul> |

The following Cisco Secure Development Lifecycle (CSDL) compliancies are implemented:

- Check for the existence of new passphrases against a dictionary.
- Display of the last login date and time of the user in the user interface of the Cisco ONP tool.
- Display of the last login IP: The IP address of the client through which the user logged into the server, previously.
- Warning the users through pop-up messages about the impending passphrase expiration.
- Option to allow an admin user or any user with CONFIGURATION\_MANAGEMENT permission to set the lifetime of a passphrase and the grace period to change the passphrase through the system configuration tab.
- Prompt for user to change the passphrase through the passphrase change dialog box, when the admin user logs in for the first time.
- Option to allow the user to set a passphrase with a minimum of eight characters and a maximum of 127 characters as the length.
- The passphrase must include at least one lowercase alphabet, one uppercase alphabet, one number, and one special character.
- Option to allow the user to set a passphrase or key for encryption of credentials during the installation of Live Network Import (LNI) application. If not specified Cisco ONP uses the default key.
- Option to allow the user to set a passphrase with a minimum of eight characters and a maximum of 64 characters as the length, during the installation of Cisco ONP and LNI database.
- LNI application provides the details of all the ports used. See [Ports Used in LNI, on page 30](#).
- Option to allow the user to generate a password using **Generate Password** option.
- Display of the strength of the password set by the user.







## CHAPTER 2

# Manage Users and Roles

- [User Roles in Cisco ONP, on page 9](#)
- [Grant Access to a New User, on page 10](#)
- [Remove Access to a User, on page 11](#)
- [Delete a User, on page 11](#)
- [Create a New User Group, on page 11](#)
- [Assign a User to a User Group, on page 12](#)
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- [Lock and Unlock an Individual User Account, on page 14](#)
- [Expire the Password Set by an Individual User, on page 14](#)
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- [Assign a Role to a User Group, on page 15](#)
- [Manage Password Through Dictionary, on page 15](#)
- [Retrieve System Logs , on page 16](#)

## User Roles in Cisco ONP

Initially, the administrator performs access control management tasks, like activating users after user sign-up, creating user groups, roles, and assigning roles and users to user groups. The admin or user with admin access grants access to the newly created user by activating the user. After the admin grants access, the new user will be notified by email (sent to the email address registered while signing up). It is only then that the new user is able to log in. By default, the following user roles are available in Cisco ONP.

1. **Admin:** The Admin user can create new user groups and assign user to user groups. Users are categorized into groups. There are certain predefined user groups in Cisco ONP. You cannot edit or delete these user groups. Admin can assign a group with a particular role. The role describes the actions that a particular user group can perform.
2. **Designer:** The Designer user can design a network. There are two ways to design a network.
  - Manual Design
  - Import Design

The designer user can create a network topology of any type (linear, ring, mesh) with Traffic, OLA, ROADM, and Passthrough sites, and assign the fibers with suitable spans between those sites. The designer

can only design the network and cannot analyze the network. The designer can view the reports, when any user shares the analyzed network.

3. **Planner:** The Planner user can design and analyze a network. After the Sites, Fiber spans, and Service demands are created, analyze the network to determine the network performance. Cisco ONP automatically optimizes the design and summarizes the optical transmission performance. In the analyzed state, all reports are available and updated. In the analyzed state, no aspect of the network design can be changed.
4. **Reader:** The Reader user can view users, user groups, roles, and permission. The Reader can also view the network topology, layout, connections, and BOM. By default, a user is assigned in the READ\_ONLY\_GROUP with a READER\_ROLE.

You can also create new roles. See [Create a New Role, on page 14](#).

Under **Control Panel > Roles** and **Control Panel > Permissions**, you can view the permissions applicable for each role and the actions that can be performed for each permission.

## Grant Access to a New User

All users with Admin role receive an email notification about new user registration.

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5](#) as a user with Admin role.

---

#### Step 1 Click **Control Panel**.

The **Access Control Management** page appears.

#### Step 2 You can change the state of a user from INACTIVE to ACTIVE by using either of two ways:

- a. From the **State** field, click **INACTIVE** in the respective user row.
- b. Select the user row and click **Update**.
  - In the **Update User** dialog box, select the **Group** and **State** from the respective drop-down lists.
  - Click **Save**.

#### Step 3 Click **OK** in the **Success** dialog box.

- Note**
- After the Admin grants access, the new user gets notified by email (sent to the email address registered while signing up). It is only then that the new user will be able to log in.
  - The admin assigns a newly created user with a Role and Group that determines what actions the user can perform.
-

# Remove Access to a User

Use this task to remove Cisco ONP access to a user.

## Before you begin

[Log in to Cisco ONP Web Interface, on page 5](#) as a user with Admin role.

- 
- Step 1** Click **Control panel**.  
The **Access Control Management** page appears.
- Step 2** You can change the state of a user from ACTIVE to INACTIVE by using either of two ways:
- From the **State** field, click **ACTIVE** in the respective user row.
  - Select the user row and click **Update**.
    - In the **Update User** dialog box, select the **Group** and **State** from the respective drop-down lists.
    - Click **Save**.
- Step 3** Click **OK** in the **Success** dialog box.
- 

# Delete a User

Use this task to delete a user.

## Before you begin

[Log in to Cisco ONP Web Interface, on page 5](#) as a user with Admin role.

- 
- Step 1** Click **Control panel**.  
The **Access Control Management** page appears.
- Step 2** Select the user to be deleted under the **USERS** tab and click **Delete**.
- Step 3** Click **Yes** in the **Warning** dialog box.  
The message *User deleted successfully* appears. You can delete another user only after this message appears.
- 

# Create a New User Group

Use this task to create a new user group.

**Before you begin**

[Log in to Cisco ONP Web Interface, on page 5](#) as a user with Admin role.

- 
- Step 1** Click **Control Panel**.  
The **Access Control Management** page appears.
- Step 2** Click the **USER GROUPS** tab.
- Step 3** Click **Create**.
- Step 4** In the **Create Group** dialog box, enter the **Group Name**.
- Step 5** Choose the appropriate role from the **Role** drop-down list. The available default roles are:
- ADMIN
  - PLANNER
  - DESIGNER
  - READER
- The **Role** drop-down list may also have user-defined roles that are listed under it.
- Step 6** Click **Save** to save the created user group.
- Step 7** Click **OK** in the **Success** dialog box.
- 

## Assign a User to a User Group

Use this task to assign a user to a user group.

**Before you begin**

[Log in to Cisco ONP Web Interface, on page 5](#) as a user with Admin role.

- 
- Step 1** Click **Control panel**.  
The **Access Control Management** page appears.
- Step 2** Under the **USERS** tab, select the user who is to be assigned to the new group.
- Step 3** Click **Update**.
- Step 4** In the **Update User** dialog box, perform the following:
- Select the appropriate group from the **Group** drop-down list.
  - Select **Active** or **Inactive** from the **State** drop-down list, to activate or inactivate the user in the group, respectively.
  - Click **Save**.
- Step 5** Click **OK** in the **Success** dialog box.

- Note**
- a. A user can belong to only one group.
  - b. Only one role can be assigned to any group.
  - c. All the users of a group have the same role as that of the group.
  - d. By default, a new user is assigned to the Read\_Only\_Group.
- 

## Set Password Expiration for Individual User

Use this task to set the expiration of the password set by the user.

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5](#) with Admin or Configuration\_Management permission.

---

- Step 1** Click **Control Panel**.  
The **Access Control Management** page appears.
- Step 2** Select the user under the **USERS** tab.
- Step 3** Click **Update**.
- Step 4** In the **Update User** dialog box, click the **PASSWORD EXPIRY** tab.
- Step 5** Enter values for the **Lifetime**, **Warning** and **Grace** fields.
- Step 6** Click **Save**.
- Note** The password expiry settings like lifetime, warning and grace time, take effect after the existing password is changed by the user.
- Step 7** Click **OK** in the **Success** dialog box.
- 

## Set Password Expiration for All Users

Use this task to set the expiration of the password for all users.

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5](#) with Admin or Configuration\_Management permission.

---

- Step 1** Click **Control Panel**.  
The **Access Control Management** page appears.
- Step 2** Click the **System Configuration** tab.
- Step 3** Enter values for the **Lifetime**, **Warning** and **Grace** fields.

**Step 4** Click **Update**.

**Note** The password expiry settings like lifetime, warning and grace time, take effect after the existing password is changed by the user.

---

## Lock and Unlock an Individual User Account

Use this task to lock or unlock an individual user account.

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5](#) as a user with Admin role.

---

**Step 1** Click **Control Panel**.

The **Access Control Management** page appears.

**Step 2** Click the **USERS** tab.

**Step 3** Select the user whose account you want to lock or unlock.

**Step 4** Click **Lock** to lock the user account, or click **Unlock** to unlock the locked user account.

**Note** The user of a locked account must contact the admin to unlock the user account.

---

## Expire the Password Set by an Individual User

Use the following task to expire the password set by an individual user.

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5](#) as a user with Admin role.

---

**Step 1** Click **Control Panel**.

The **Access Control Management** page appears.

**Step 2** Click the **USERS** tab.

**Step 3** Select the user whose password you want to expire.

**Step 4** Click **Expire**.

---

## Create a New Role

Use the following task to create a new role.

**Before you begin**

[Log in to Cisco ONP Web Interface, on page 5](#) as a user with Admin role.

- 
- Step 1** Click **Control Panel**.  
The **Access Control Management** page appears.
- Step 2** Click the **ROLES** tab.
- Step 3** Click **Create**.
- Step 4** In the **Create Role** dialog box, enter the **Role Name** and select the **Permissions** for the role.
- Note** You can select more than one permission.
- Step 5** Click **Save**.
- Step 6** Click **OK** in the **Success** dialog box.
- 

## Assign a Role to a User Group

Use the following task to assign a new role to a user group.

**Before you begin**

[Log in to Cisco ONP Web Interface, on page 5](#) as a user with Admin role.

- 
- Step 1** Click **Control Panel**.  
The **Access Control Management** page appears.
- Step 2** Click the **USER GROUPS** tab.
- Step 3** Select the user group whose role is to be updated.
- Step 4** Click **Update**.
- Step 5** In the **Update Group** dialog box, select the desired role from the **Role** drop-down list, and click **Save**.
- Step 6** Click **OK** in the **Success** dialog box.
- 

## Manage Password Through Dictionary

If a password exists in the predefined list of passwords under the **Content** column, the dictionary rejects the new password set by the user. You must have Admin or Configuration\_Management permission to view and modify the dictionary.

By default, the **Rejection Mode** toggle button is disabled. Enable the **Rejection Mode** toggle button to verify the password against dictionary. This password verification check against the dictionary happens during any one of the following events:

- New user sign-up

- Password change
- Password reset using forgot password option

The following is the procedure to verify, whether the new password set by the user exists in the list of predefined passwords:

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5](#) as a user with Admin role.

---

**Step 1** Click **Control Panel**.

The **Access Control Management** page appears.

**Step 2** Click the **DICTIONARY** tab.

**Step 3** Enter the password in the **Enter Passphrase** text box.

**Step 4** (Optional) Enter the limit (maximum number of matching passphrases) in the **Enter Limit** text box.

**Step 5** Click **Search**.

The matching passphrases get displayed.

**Note** If you have entered the limit, a number of search results matching the limit gets displayed. Otherwise, all matching passphrases get displayed.

---

## Retrieve System Logs

The System Logs page shows at logs the events that are initiated during a specific time interval. See [Logs , on page 168](#).

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5](#) as an admin or a user with User Management and Network Management permission.

---

**Step 1** Click **Logs**.

**Step 2** Click **Select Start Date**, and choose the start date. Similarly, click **Select End Date**, and choose the end date.

**Step 3** Click **FILTER** to retrieve the logs.

The following icons are available in the **System Logs** page:

| Icons          | Description                               |
|----------------|---|
| Export as CSV  | Exports the system logs to an Excel sheet |
| Export Archive | Exports the system logs as a zip file     |
| Import Archive | Imports the zip file                      |
| Refresh        | Refreshes the system logs page            |



| Icons      | Description               |
|------------|---------------------------|
| Clear Logs | Deletes the existing logs |

---





## CHAPTER 3

# Design and Analyze Networks

- [Design a Network Using Cisco ONP, on page 19](#)
- [Create Optical Subnet for Non-SSON Networks, on page 35](#)
- [Create Optical Subnet for SSON Networks, on page 36](#)
- [Convert Non-SSON Network to SSON Network, on page 37](#)
- [Share a Network, on page 38](#)
- [Analyze the Network, on page 39](#)
- [Upgrade the Analyzed Network, on page 41](#)
- [Upgrade LNI Network, on page 42](#)
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- [Plan Mode, on page 48](#)
- [Automatic Suggestion for Regeneration Sites in Plan Mode, on page 53](#)
- [Import Optical Sources, on page 54](#)
- [Download Optical Sources, on page 56](#)
- [Delete Optical Sources, on page 56](#)
- [Layout Template for NCS 2000 Network, on page 56](#)
- [Layout Visualization, on page 60](#)
- [Regenerate BoM Automatically, on page 68](#)
- [Add new Pluggables, Alarm Cables and 100G Client Bandwidth Licenses to BoM, on page 68](#)
- [Export IPC Report, on page 69](#)
- [Edit the Layout Manually for NCS 1010 Networks, on page 70](#)
- [View Internal Node Connections of NCS 1010 Network, on page 72](#)
- [Design Networks with SVO Card, on page 73](#)
- [Associate OLA or DGE Sites with SVO Cards, on page 74](#)
- [Export NETCONF XML File, on page 74](#)
- [Export NETCONF XML Files for Individual Sites, on page 75](#)
- [Upload NETCONF XML Files on SVO Web Interface, on page 75](#)
- [Upload NETCONF Files to NCS 1010 Device, on page 76](#)
- [Export Planning Data for Cisco Optical Network Controller, on page 76](#)
- [Upload Planning Data into Cisco ONC, on page 77](#)

## Design a Network Using Cisco ONP

You can design a network in one of the following ways:

- Manual Design—Create a network design using a design palette.
- Import Design—Import a network design from an Excel sheet, Live Network Import or from an existing network from CTP, or another instance of Cisco ONP.

## Manually Design a Network Using Cisco ONP

**Table 4: Feature History**

| Feature Name                       | Release Information   | Feature Description  |
|------------------------------------|-----------------------|--|
| Greenfield NCS 1010 Network Design | Cisco ONP Release 5.0 | You can design and validate NCS1010 optical line system. This feature helps to create OLT-C, OLT-R-C, ILA-C, ILA-R-C, and ILA-2R-C based NCS 1010 networks using fixed grid add/drop MD-32-ODD, MD-32-EVEN and flex grid add/drop BRK-24, BRK-16, and BRK-8 passive modules. |

**Table 5: Feature History**

| Feature Name   | Release Information   | Feature Description   |
|--|-----------------------|---|
| Multi-Layer Platform (MLP) Greenfield Design with NCS 4k-1k-2k | Cisco ONP Release 4.1 | <p>This feature allows you to perform the following:</p> <ul style="list-style-type: none"> <li>• Supports NCS 4K-1K-2K multi-platforms</li> <li>• Visualizes new layout for Txp and SVO for NCS 2000 node</li> <li>• Supports different OTN service types with protection</li> <li>• Edits layout for NCS 4000 and NCS 1004 nodes</li> </ul> |

You can create any of the following network designs:

- Spectrum Switched Optical Network (SSON) that uses flexible spectrum allocation, where the required minimum spectral resources are allocated adaptively based on traffic demand and network conditions
- Non-SSON network that allocates single spectrum (fixed spectrum) irrespective of the traffic demand and network conditions
- NCS 1010 network

Perform the following steps to create a network in the Cisco ONP:

**Before you begin**

[Log in to Cisco ONP Web Interface, on page 5.](#)

- 
- Step 1** Choose **File > New**.  
The **Create New Network** dialog box appears.
- Step 2** From the **L0 Network Platform** drop-down list, choose one of the following:
- NCS 2000—To create a non-SSON network that contains NCS 2000 and NCS 4000 nodes, or an SSON network including NCS 2000, NCS 1004, and NCS 4000 nodes
  - NCS1010—To create a network that contains only NCS 1010 nodes
- Step 3** If you want to create an SSON network, check the **SSON Network** check box, else leave the **SSON Network** check box unchecked.  
This option is not for the NCS 1010 network.
- Step 4** Choose the **System Release** for NCS 2K from the drop-down list.  
You cannot change the system releases that are available for NCS 1010, NCS 4K and NCS 1K.
- Step 5** Click **Create**.  
You can view a map and the design palette. For more information, see [Design Palette, on page 172](#).
- Step 6** Click the **Drawing Tool** icon (pencil and ruler crossed).
- Step 7** Add sites to the map using the drawing tool.
- a) Zoom into the map to the desired level. Click any of the site icons (**ROADM**, **OLA** or **Traffic(4K-1K-2K)**), and drag it to the sites on the map. Drag or click the map where a site has to be placed, when the cursor changes to the site icon.  
  
SRLG is not supported in the SSON networks  
Traffic node is not supported on the NCS 1010 network.
  - b) Click the **Fiber** icon and drag it to connect from one site to another site. Continue this for all sites.  
  
**Note** By default, the fiber length is updated as 1 km for all the fibers. If you want the length to be auto updated based on the x, y coordinates, then enable the **Use Coordinates Distance** property under the network properties.
- Step 8** Create services between the sites (only for SSON and non-SSON networks).  
Cisco ONP provides only OTN service.
- a) Click the **Drawing Tool** icon and select **OTN Service** (Green in color).
  - b) Add the service between the existing Traffic sites on the map.
- Step 9** Create circuits (for NCS 1010), media channels (for SSON), or waves (for non-SSON) between the sites.
- a) Click the **Drawing Tool** icon, and select **Circuit** (purple in color), **Media channel** (purple in color), or **Waves** (red in color).
  - b) Add the circuit, media channel, or waves between the existing sites on the map.

In the left pane, you can view a network tree panel with a default network name. The network elements added are displayed in the tree panel.

- Step 10** Choose **File > Save As**.
- Step 11** Enter a network name in the **Give a Network Name** dialog box.
- Step 12** Click **Save**.

## Create Shared Risk Link Group

You can use the Shared Risk Link Group (SRLG) feature for routing protected services. You can create SRLGs through the Excel import file SRLG tab or through the Cisco ONP GUI using the following procedure:



**Note** SRLG is supported only for the non-SSON network including the traffic nodes.

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5.](#)

- Step 1** Click the network tree panel in the left.
- Step 2** Expand **Fibers**.
- Step 3** Check the check box next to each fiber in the same SRLG.
- Step 4** After all fibers are checked, right-click, and select **Create SRLG**.
- SRLG is created with a unique name. You can rename the SRLG.

## Import Network Using Excel Sheet

Use this task to import a network into Cisco ONP, using an Excel sheet.

**Table 6: Feature History**

| Feature Name                            | Release Information   | Feature Description  |
|---|-----------------------|--|
| CX Unified Planning Tool Network Import | Cisco ONP Release 5.0 | The integration between CX Unified Planning Tool (UPT) and Cisco ONP enables you to import the networks created and analyzed in Cisco CX UPT into Cisco ONP. This helps you avoid recreating the networks that are already created in UPT. This feature allows you to import networks having NCS 1010 and NCS 2000 nodes into Cisco ONP. |



**Note** By default, the system release of the Excel imported network is 11.0.



**Note** From Release 5.0, Cisco ONP supports import of networks created using CX UPT via Cisco ONP Import Excel option. CX UPT does not populate the *DWDMChannel Type* and *Add/Drop Type* values in the Excel sheet. If the values are not found in the Excel sheet, then Cisco ONP picks the default options. By default, **DWDMChannel Type** is *NCS1004\_QPSK\_SP\_16QAM\_200G\_27%SD FEC\_60GBd* and **Add/Drop Type** is *Colored*. We recommend you to check the *DWDMChannel Type* and *Add/Drop Type* values before importing the Excel sheet into Cisco ONP to avoid any discrepancies.

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5.](#)

### Step 1 Choose **File** > **Download Import Template**.

The template has the following mandatory tabs, and the respective fields to be filled in the Excel sheet.

| Tabs         | Description  |
|--------------|--|
| Network      | Label (name of the network), Platform (NCS1010/NCS2000)  |
| Sites        | Site Label, Type, X coordinates, Y coordinates, Pre Equip Degree, Grooming Site, CLLI code, and Site Address, and Degree (Scalable upto degree)  |
| Spans        | Span label, A (Source site name), Z (Destination site name), Kms (Distance), Loss, A_Edge, Z_Edge, AZ_Loss, ZA_Loss, AZ_Kms, and ZA_Kms.   |
| OTNDemands   | Primary Path and Secondary Path (Work and Protect Path for NCS4000 OTN Services), Demand Label, A (Source), Z (Destination), Y (Tertiary Source), B (Tertiary Destination), Type of Demand, Quantity, and Protection.<br><br>Note: Y and B can be used with Unprotected Disjoint Service.                            |
| DWDMChannels | Primary Wavelength and Secondary Wavelength (Work and Protect Wavelength for NCS2000 non-SSON waves), Primary Path and Secondary Path (Work and Protect Path for NCS2000 Wave/Media Channel and NCS1010 circuit), A/D Type (Colored/Colorless/Contentionless), Channel label, A, Z, Wavelength, Protection, and Type |
| SRLG         | SRLG Label and Spans.  |

**Step 2** Fill the network details in the template file or edit the current network file, and save the file.

**Step 3** Choose **Import** > **Excel**.

**Step 4** Browse, select the saved file, and click **Import**.

## Cisco Transport Planner Network Import Support

You can import the networks that are created and analyzed from Cisco Transport Planner (CTP) to Cisco ONP, to avoid recreating the networks that are already created in CTP. The CTP network files are in .mpz format. You can, release upgrade, the imported networks.



### Note

- Network must be in design-analyzed or upgrade-analyzed mode.
- You cannot import networks which are earlier than Release 11.0.

### Supported Hardware

- Optical source files and transponders

See [Supported Optical Sources, on page 189](#), and [Supported Cards and Pluggables, on page 177](#).

- Contentionless, colorless, and colored point-to-point demands
- Flex network
- Gain Equalizer



### Note

The Gain Equalizer node changes as a ROADM node when you unlock the site after the release upgrade.

- ROADM-SMR-9 and SMR-20
- All flex supported amplifiers, controller cards, and chassis types

## Import MPZ Design File

Use this task to import .mpz file from CTP to Cisco ONP.



### Note

Importing of mpz networks with P-Ring and A2A demands is not supported. Hence, we recommend you to delete these demands in CTP, reanalyze the networks in CTP and import the mpz into Cisco ONP.

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5](#) as a user with network creation permission.

Import the required optical source files and layout template using **Manage > Optical Source** and **Manage > Optical Source** options. For more information, refer [Manage Alien](#) and [Import Layout Template for NCS 2000 Network in to Cisco ONP Database](#).

Delete the parameters that are not supported by Cisco ONP from the .mpz file and then import the .mpz file to Cisco ONP.



- 
- Step 1** Choose **Import > MPZ**.  
The **Import File (.mpz)** dialog box appears.
- Step 2** Browse to the .mpz file stored in your local system.
- Step 3** Click **Import**.  
The .mpz file gets imported to Cisco ONP.
- Note** If you view a blank screen when you click waves in the network tree, refresh the browser.
- Step 4** Choose **Network > Upgrade** or **Network > Release Upgrade** to make any changes on the imported network.
- Note**
- You cannot go back to design mode on the imported mpz network.
  - The wave label of imported mpz network in Cisco ONP is the service name present in the CTP properties window.
- 

## Export the CPZ File

Cisco ONP stores the network design file as .cpz file in its database. You can export the design file into your local system.

- The .cpz file of a network in the design mode includes design file, layout template, and optical source details.
- The .cpz file of a network in the analyze mode includes a design file, analyze file, ANS file, per side ANS file, BOM, error messages, trace files, layout template, mpz, and report.
- For the network in upgraded mode, you can export only the last child in the parent child hierarchy.
- You can export only one network at a time.

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5](#)

- 
- Step 1** Choose **File > Open**.  
The **Select Network To Open** dialog box appears.
- Step 2** Click the network that you want to export, from the list of networks.  
The network opens.
- Note** If you view a blank screen when you open a network, refresh the browser, or log in to Cisco ONP again.
- Step 3** Choose **Export > CPZ**.  
The **Export .cpz file** dialog box appears.

- Step 4** Rename the file if required.
- Step 5** Click **Export**.
- Step 6** Save the file in your local system.
- 

## Import CPZ File

You can import the cpz network design files that are exported from another Cisco ONP instance.



---

**Note** You can import only the networks that are exported from the current release.

---

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5.](#)

---

- Step 1** Choose **Import** > **CPZ**.  
The **Import .cpz file** dialog box appears.
- Step 2** Click **Choose file**, and select a cpz network design file that you want to import into Cisco ONP, from your local system.
- Step 3** Click **Import**.  
If the names of the optical source and layout template files available in the Cisco ONP database and the imported network file are the same, you are prompted to confirm whether you want to overwrite the existing file.
- Note** The error message "**Network already exists in the system with another user. New network will be created**" is just an information. You do not need to perform any action. Cisco ONP automatically imports as a new network specific to the user. There is no impact on the already existing network.
- Step 4** Check the **Overwrite Network** check box, if you want to overwrite the existing file.  
If you leave the check box unchecked, Cisco ONP saves the imported network as a new network.
- Step 5** Choose the optical source files and layout template that you want to replace.  
If you do not choose the optical source or the layout template file, the files will not be imported.
- Step 6** Click **Confirm**.  
The imported network is saved in the Cisco ONP database.
-

# Live Network Import

Table 7: Feature History

| Feature Name        | Release Information   | Feature Description   |
|---------------------|-----------------------|---|
| Live Network Import | Cisco ONP Release 4.1 | This feature allows you to import a live deployed network having NCS 1004, NCS 2000, and NCS 4000 nodes into Cisco ONP, using the LNI (Live Network Import) import template. This feature also allows you to view network topology, BOM, and layout report. |

The Live Network Import (LNI) feature allows you to perform a live import of network having NCS 1004, NCS 2000, and NCS 4000 nodes into Cisco ONP. You must have Network Management role to perform the LNI operation. After importing you can visualize the complete deployed network details in Cisco ONP. Map shows the network topology, and you can view the node, fiber, OTN service, and media channel properties in the Network Tree, and the Entity Editor.

## Perform Live Network Import

Use this task to perform live import of a network:

### Before you begin

- Perform LNI only when the network is in stable or running state. Do not perform LNI during the maintenance period for software upgrade.
- Configure all the mandatory parameters on the circuit.
- Make sure that the following Cisco IOS XR Software Maintenance Updates (SMUs) are loaded on the NCS 4000 devices on top of Cisco IOS XR Release 6.5.28:
  - ncs4k-6.5.28.CSCvu93045.tar
  - ncs4k-sysadmin-6.5.28.CSCvt67465.tar
  - ncs4k-6.5.28.CSCvv79518.tar
- Make sure that there is a provision for opening three TL1 sessions per NCS 2000 device for Live data collection. NCS 2000 devices should not be overloaded with too many TL1 sessions.
- Make sure that the fibers are configured with same channel numbers (Spectral Density, ex: 91.0/82.0) on both source and destination ends.
- Check the card label set for the following NCS 2000 cards and update it if there are not aligned.

| PID               | Card Label  |
|-------------------|-------------|
| NCS2K-16-AD-CCOFS | AD-16-FS    |
| NCS2K-20-SMRFS    | SMR20-FS-CV |

| PID                | Card Label   |
|--------------------|--------------|
| NCS2K-20-SMRFS-L   | SMR20-FS     |
| NCS2K-9-SMR17FS    | SMR9-17-FS   |
| NCS2K-9-SMR24FS    | SMR9-24-FS   |
| NCS2K-9-SMR34FS    | SMR9-34-FS   |
| NCS2K-9-SMR34FS-L  | SMR9-34-FS   |
| 15454-M-RAMAN-COP= | OPT-RAMP-COP |
| 15454-M-RAMAN-CTP= | OPT-RAMP-CTP |
| NCS2K-OPT-EDFA-35  | OPT-EDFA-35  |

- You must install Microsoft Excel in the Client Machine from where browser is launched to open Cisco ONP application.
- [Log in to Cisco ONP Web Interface, on page 5](#)

**Step 1** Choose **Export > Download LNI Import Template**, and download the template which is in the form of an Excel sheet.

**Step 2** Fill the template with the details of all the nodes belonging to the network to be imported and save the file.

The following fields are mandatory:

- Node IP
- User Name
- Password
- Connectivity Type—TL1 for NCS 2000 nodes and NETCONF for NCS 1004 and NCS 4000 nodes
- Connectivity port—830 for NCS 4000 and NCS 2000 nodes

**Note** Enter a value in the range of 60–180 in the Connectivity Timeout field or leave the field empty.

**Step 3** Choose **Import > Live Import**.

**Step 4** Browse and choose the saved file.

**Step 5** If you want to clean the existing LNI database of the nodes and perform a fresh import, check the **Fresh Import (Cleanup LNI Database)** check box.

**Note** We recommend fresh import of the live network.

Leave this check box unchecked, if you want to import the details of only few of the nodes which had issues during the previous import.

**Note** LNI import is not user-specific. When you perform a fresh import, Cisco ONP overwrites all the LNI data that are imported by the other users.

**Step 6** Click **Import**.

**Step 7** In the **Device Onboarding** dialog box, click **OK**.

**Note** If you try to import a network of unsupported version, the device collection does not happen, and an error message "device collection failed" appears. See [Supported Hardware and Software for LNI, on page 32](#).

**Step 8** Click **Job Monitor**, and click **Check Progress** for the IMPORT\_LIVE\_NETWORK task, to view the status of the LNI operation in the **LNI Progress** dialog box. Click **Refresh** to see the updated status.

After LNI is completed, the job is removed from the **Job Monitor** page.

**Step 9** Click **Logs** to view the list of events that are related to the LNI operation, as logs.

**Step 10** After the completion of the LNI operation, choose **File > Open**.

The format of the LNI imported network filename is LNI\_<Date>\_<Time>.

**Step 11** Click the imported network name to view the network under the **Map** tab and its corresponding network tree in the left panel.

The aggregated node including NCS 1004, NCS 2000, and NCS 4000 is indicated in purple color, and the aggregated node including NCS1004 and NCS 2000 is indicated in orange color in the network tree. You can view the tag **Imported from Network** in the top-right corner.

**Note**

- Even If some errors occur during the LNI operation, the LNI operation is not canceled. In such case, when you open the imported network, a warning message is displayed.
- You can view the errors under the **Elements > Messages** tab.
  - Device collection failure is listed under critical messages.
  - Reason for failure is listed under noncritical messages.
- If both NCS and Non-NCS PIDS are present in the inventory, Cisco ONP enables the **Enable NCS** option. You can edit this option during upgrade after unlocking the site, if necessary.
- Service path for the restored circuits is displayed as follows in the Cisco ONP UI:
  - Primary Path: Working path before restoration
  - Secondary path: Protected path
  - Restoration path: Current work path after restoration

**Note**

If the circuit is not in the restored state, the restoration path is not shown.

- SSON circuits carrying protected OTN services are merged as Client 1+1 protected Media Channel. Due to this, you may see difference in total number of SSON circuits between the imported network in Cisco ONP and the actual network.
- If LNI is not installed properly, you may encounter the errors such as LNI failure or LNI not able to purge the data. In such cases, we recommend starting and stopping the LNI services in the server where Cisco ONP and LNI are installed using the following commands:
  - Stop the LNI services.
 

```
root:~/$ONP_HOME# cd LNI
root:~/$ONP_HOME/LNI# bash ciscolniinstaller.sh -o stop -t update -m offlinemode
```
  - Start the LNI services.
 

```
root:~/$ONP_HOME/LNI# bash ciscolniinstaller.sh -o start -t update -m offlinemode
```

**Note**

Wait for a minimum of five minutes after starting the services, for the LNI services to resume before triggering new live network import. You can

**Step 12**

Click the **BOM** tab to view the BOM details of the network.

**Note**

The PIDs of prototype cards are shown as "NA" in the BOM details of the LNI network.

You can export the CPZ, import the CPZ, and share the imported network. You can check the properties of the network using the **Entity Editor**.

## Ports Used in LNI

LNI application uses the following ports. If any port is shut down due to any failure, then the service is restarted by the Docker system.

| Port | Service                          | Usage  |
|------|----------------------------------|--|
| 8761 | Eureka Service                   | Registration and discovery service, which holds the information about all microservice applications  |
| 8080 | API Gateway                      | Receives all the incoming requests, and then delegates the requests to internal microservices like LNI Broker  |
| 8080 | Collector Service                | Collects metrics and operation data from the devices   |
| 8080 | Device Manager                   | Responsible for device onboarding process  |
| 8080 | Inventory Service                | Provides inventory data  |
| 9888 | TL1 plug-in Service              | South bound interface plug-ins for TL1 protocol-based NCS 2000 devices   |
| 8888 | NCS 2K Inventory Adapter Service | Adapter module to transform NCS 2000 device response from collector to Cisco ONP NCMS schema-based POJO  |
| 8888 | NCS 4K Inventory Adapter Service | Adapter module to transform NCS 4000 device response from collector to Cisco ONP NCMS schema-based POJO  |
| 8888 | NCS 1K Inventory Adapter Service | Adapter module to transform NCS 1004 device response from collector to Cisco ONP NCMS schema-based POJO  |
| 9976 | NETCONF plug-in Service          | South bound interface plug-ins for NETCONF based 1K/4K devices   |
| 8888 | LNI Broker Service               | Provides interfaces for Cisco ONP BE service to trigger live network import  |
| 8085 | Topology Service                 | Provides network topology data   |
| 8090 | Circuit Service                  | Provides network circuit data  |
| 8024 | NETCONF Adapter Service          | Common adapter for Topology and Circuit services   |
| 8888 | Model Aggregator Service         | Aggregates inventory, topology, and circuit details under NCMS schema-based networks   |
| 8092 | TL1 Adapter Service              | Common adapter for Topology and Circuit Service  |
| 5601 | Kibana                           | Data visualization and exploration tool that is used for log and time-series analytics, application monitoring, and operational intelligence use cases<br><br><b>Note</b> The default Edge browser on Windows OS is not supported for viewing the Kibana logs. Cisco recommends using Firefox or Chrome browser for viewing the Kibana logs. |
| 2181 | Zookeeper                        | Keeps track of status of the Kafka cluster nodes, and also keeps track of Kafka topics, partitions publish-subscribe messaging system that enables inter service communication   |

| Port  | Service | Usage   |
|-------|---------|---|
| 9092  | Kafka   | Publish-subscribe messaging system that enables inter-service communication |
| 27017 | Mongo   | Database to persist services data   |

## Supported Hardware and Software for LNI

The following table describes the software versions and hardware requirements of the network imported through LNI.

**Table 8:**

| Property         | Values   |
|------------------|--|
| <b>Network</b>   |  |
| Network Type     | SSON   |
| Platform         | ETSI   |
| System Release   | NCS 2000: R11.1, and R11.1.1.2<br>NCS 1004: XR 7.0.1<br>NCS 4000: XR 6.5.2.8 |
| <b>Site/Node</b> |  |
| Site Type        | 4K-1K-2K: ADD/DROP, 1K-2K;Regen,<br>2K:ROADM/OLA                             |
| ROADM            | SMR-20, SMR-9-17FS, SMR-9-34FS, SMR-9-24FS                                   |
| Amplifier        | RAMAN-CTP, RAMAN-COP, EDFA35-24,<br>EDFA35-35                                |
| Degree Mesh Type | DEG-5/UPG-4  |
| Chassis Type     | 4K: NCS4016, 2K:NCS2006, 1K:NCS1004  |
| Power Supply     | 4K-DC, 1K-DC, 2K-DC40  |
| ECU              | ECU-S  |
| Controller Card  | TNCS-2, TNCS-20  |
| Channel Rule     | 82   |
| Line Cards       | NCS1K4-1.2T-K9=, NCS4K-4H-OPW-QC2  |
| Evolved Mesh     | ON and OFF   |
| Node Protection  | 2K: Separated shelves, 4K: Single shelf                                      |



| Property                   | Values                                     |
|----------------------------|--|
| Mpo16Lc                    | MPO-16LC Unit                              |
| Mpo16ToMpo08               | MPO16TO2MPO8Cable                          |
| Cascaded SMR               | Yes  |
| Enable NCS                 | Yes  |
| Use Payg                   | No   |
| Connection Verification    | Yes, No                                    |
| MF Unit                    | MF-6RU, MF6-10RU, or MF-1RU                |
| Structure                  | Line, Multidegree, Terminal                |
| Scalable upto degree       | 4, 8, 12                                   |
| Power redundancy           | Yes  |
| IP Address                 | IPv4                                       |
| <b>Fiber</b>               |  |
| OSC Frame Type             | Auto                                       |
| DCN Extension              | Yes  |
| ENE/GNE                    | Yes  |
| Length                     | Yes  |
| Loss                       | Yes  |
| Measurement Unit           | KM   |
| Length based Loss          | No   |
| Raman Amplified            | Yes  |
| Fiber Type                 | G652-SMF-28E                               |
| Connector Loss A           | Yes  |
| Connector Loss B           | Yes  |
| Cross OSC and Parallel OSC | Yes  |
| <b>Media Channel</b>       |  |
| Traffic Type               | NCS1004_SP_16QAM_16QAM_300G_27%SDFEC_60GBd |
| Protection                 | Unprotected, and 1+R                       |
| Path                       | Actual Path                                |

| Property            | Values  |
|---------------------|---|
| Regen               | Regen site  |
| Multicarrier        | No  |
| Contentionless      | Yes   |
| Circuit State       | Restored, Unrestored                                    |
| <b>Service</b>      |   |
| Service Type        | 100GE, 10GE, STM-64                                     |
| Protection          | 1+1, Unprotected, 1+R, 1+1+R, 1+1+R+R                   |
| Path                | Actual Path   |
| Client Type (1K)    | OTU4  |
| Interface Type (1K) | BH  |
| Trunk Mode (1K)     | 200G, 300G  |
| Baud Rate (1K)      | 60 and 69 GBd   |
| Client Pluggable    | ONS-QSFP28-LR4=,<br>QSFP-100G-SR4-S=,ONS-QSFP-4X10-MLR= |

## Limitations of LNI

The LNI feature has the following limitations:

- You cannot perform multiple LNI at the same time.
- Scheduled LNI is not supported.
- LNI does not support the following:
  - Non-SSON Network import
  - Non-Contentionless configuration import
  - Circuit import with NCS 2000 Transponder or Muxponder cards
- Chassis position in layout may not be accurate in the live imported network.

**Workaround:** NCS 2000, NCS 1004, and NCS 4000 chassis are placed in separate racks for a better view of the layout. You can edit the same after network upgrade and analysis.

- If X, Y coordinates are not configured in the devices, nodes are overlapped in the Cisco ONP map.

**Workaround:** Configure X, Y coordinates before importing the network for a better view of the topology in Cisco ONP map; otherwise, you can drag and drop the nodes in the Cisco ONP map and adjust the node position after importing.

- Scalable up to degree parameter is not imported from the real device. Cisco ONP chooses the maximum scalable up to degree based on the number of line sides and contentionless sides present on the node.

**Workaround:** You can unlock node after upgrading and change the scalable up to degree. After unlocking the site, use layout template to rearrange the layout.

- Cisco ONP imports the proto-PID, if any, present in inventory, and show as N/A PID in the Cisco ONP BOM.
- Duplicate media channel label is not supported. If there are multiple media channels with same label present in the network, only one media channel is imported and the rest of them are discarded.
- Fiber name, source, and destination names may not match between the first and the second import. Source and destination site names may interchange for bidirectional fibers.
- If the regenerated demand is in restored state, the restored path is shown as working or protected path, and the service protection is shown as 1+R in Cisco ONP. The restoration details will not be available.
- Service protection type is shown as 1+1+R or 1+1+R+R only if restoration path is available. Otherwise, service protection type will be shown as 1+1.
- Preprovisioned cards are not listed in the Cisco ONP BOM, and they are populated after successful upgrade and analysis of the LNI network. Make sure that the cards are equipped to retrieve the PID details.
- Fibers may not be associated with correct optical subnet if the fibers are not configured with the same channel number at both source and destination ends. Due to this amplifier output power may not be within valid range. Hence, you either correct channel number at both source and destination nodes and re-import the network, or associate the fiber with correct optical subnet after network upgrade in Cisco ONP.

## Create Optical Subnet for Non-SSON Networks

An optical subnet is a collection of spans with certain associated properties. When you create a new network, Cisco ONP automatically creates an optical subnet that is associated to the network. At least one optical subnet must exist for each network.



**Note** Check the **Current Subnet** check box in the properties window, to make the subnet you created as the current subnet. You cannot uncheck the **Current Subnet** check box.

The following procedure creates an optical subnet for Non-SSON networks:

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5.](#)

- Step 1** Click **Subnet** in the network tree panel.
- Step 2** Right-click **Optical Subnet**.
- Step 3** Click **Create Optical Subnet**.

The **Create Optical Subnet** dialog box appears.

- Step 4** From the **Cband Rules** drop-down list, choose the C-band design rules for the new optical subnet that you want to create.
- Step 5** Click **Save**.

A new optical subnet with the design properties you selected is created and placed in the network tree panel under **OpticalSubnet**.

**Note** You can select new Cband rules from the **Cband Rules** drop-down list in the properties window.

**Note** You can add a fiber to a subnet from the **Fiber links** drop-down list in the properties window.

You can also add a fiber to a subnet from the network tree panel. To add a fiber to a particular subnet in the network tree panel, perform the following steps:

- Right-click the required optical subnet and select **Edit Fibers**.

An **Info** dialog box appears displaying "*Do you want to continue?*".

- Click **OK**.

The UI freezes. You can only select a fiber from the map.

- Select the required fiber and click the **Done** button appearing near the zoom icon.

The fiber now appears in the **Fiber links** field. When you select the optical subnet, its corresponding fiber is highlighted in the map.

When a fiber is added to one of the subnets, it will be automatically removed from the other subnets. Only one subnet rule will be associated with one fiber.

---

## Create Optical Subnet for SSON Networks

The following procedure creates an optical subnet for SSON networks:

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5.](#)

- 
- Step 1** Click **Subnet** in the network tree panel.
- Step 2** Right-click **Optical Subnet**.
- Step 3** Click **Create Optical Subnet**.
- The **Create Optical Subnet** dialog box appears.
- Step 4** From the **Spectral Density** drop-down list, choose the spectral density for the new optical subnet that you want to create. The **Name**, **CBand Rules**, and **Maximum Number of Channels** the you seen in the **Create Optical Subnet** dialog box, are set based on the spectral density that you have selected.
- Step 5** Click **Save**.

A new optical subnet with the design properties you selected is created and placed in the network tree panel under **OpticalSubnet**.

**Note** You can select a new spectral density from the **Spectral Density** drop-down list in the properties window.

**Note** You can add a fiber to a subnet from the **Fiber links** drop-down list in the properties window.

You can also add a fiber to a subnet from the network tree panel. To add a fiber to a particular subnet in the network tree panel, perform the following steps:

- Right-click the required optical subnet and select **Edit Fibers**.

An **Info** dialog box appears displaying "*Do you want to continue?*".

- Click **OK**.

The UI freezes. You can only select a fiber from the map.

- Select the required fiber and click the **Done** button appearing near the zoom icon.

The fiber now appears in the **Fiber links** field. When you select the optical subnet, its corresponding fiber is highlighted in the map.

When a fiber is added to one of the subnets, it will be automatically removed from the other subnets. Only one subnet rule will be associated with one fiber.

---

## Convert Non-SSON Network to SSON Network

The following procedure converts non-SSON networks to SSON networks:

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5.](#)

---

**Step 1** Choose **File > Open**.

The **Select Network To Open** dialog box appears.

**Step 2** Click a non-SSON network that you want to convert to SSON.

The network opens. Ensure that the network is in **Design Mode**.

**Step 3** Choose **Network > SSON Convert**.

**Step 4** Click **Ok**.

The error message, "Network cannot be converted to SSON due to following errors : [Network contains waves with invalid traffic types: [100G-SD-FEC, 200G-SD-FEC]]" appears.

**Step 5** Choose **Network > Entity Editor > Services**.

**Step 6** Expand **Waves** and navigate to trail, and click a trail.

**Step 7** Choose any CFP-2optical source from the **Src Card Type** drop-down list.

**Step 8** Click **Update**.

**Step 9** Choose **File > Save**.

**Step 10** Choose **Network > SSON Convert**.

- Note**
- Select SSON optical source from the **Traffic Type** drop-down list in the properties window.
  - You cannot convert a non-SSON network with Traffic Sites to SSON.
  - To convert a non-SSON network to SSON network in **Analyze** mode, upgrade or release upgrade the analyzed network. In the **Upgrade** mode, or **Release Upgrade** mode network, unlock all the channels, and force CFP-2 optical source.
- 

## Share a Network

Use these steps to share a network with one or more users or user groups:

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5.](#)

---

**Step 1** Choose **File > Open**.

The **Select Network To Open** dialog box appears.

**Step 2** Select a network from the list of networks.

The map of the selected network opens.

**Step 3** Choose **File > Share**.

**Step 4** Select one or more users or user groups from the **Share Network** dialog box.

**Step 5** Click **Share**.

You can share the network with selected users or user groups in read-only mode.

---

## Access a Shared Network

Use these steps to access a network shared by another user:

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5.](#)

---

**Step 1** Choose **File > Open Shared Network**.

The **Select Network To Open** dialog box appears with a list of networks that are shared by other users.

**Step 2** Click a network name from the list.

The shared network opens in read-only mode.

**Step 3** Choose **File > Save As**.

**Step 4** Enter the name in the **Give a network name** dialog box, and click **Save**.

A copy of the shared network is saved.

**Note** You can work on this copy of network, depending on the privileges of your user role. For example, if your user role is Designer, you can change the design of the saved copy of the shared network, but you cannot analyze the shared network.

**Step 5** (Optional) Share the updated network with other users.

---

## Unshare a Network

Use these steps to unshare a network with one or more users or user groups:

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5.](#)

---

**Step 1** Choose **File > Open**.

The **Select Network To Open** dialog box appears.

**Step 2** Click a network from the list of networks.

The network opens.

**Step 3** Choose **File > Share**.

**Step 4** In the **Share Network** dialog box, remove the name of one or more users or user groups from the list.

**Step 5** Click **Share**.

The shared network is no longer available to the users or user groups that are removed.

---

## Analyze the Network

The Analyze tool allows you to analyze the network after design completion.

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5.](#)

---

**Step 1** Choose **File > Open**.

The **Select Network To Open** dialog box appears.

**Step 2** Click a network that you want to analyze, from the list of networks.

The network opens.

**Step 3** Choose **Network > Analyze**.

The Cisco ONP analysis progress indicator indicates the analysis status.

If there is any failure in the analysis stage, a dialog box appears with the message, “Analysis Failed.”

**Step 4** Choose the **Elements > Messages** tab to see the list of error details in the analyzed network..

By default, it shows only the key messages when the **Critical Only** toggle button is enabled. If you want to view the entire network message, disable the **Critical Only** toggle button.

**Step 5** If you find an error message under the **Messages** tab, resolve the error and analyze the network again. Repeat this step until all errors are resolved.

## Bottom-Up Flow

Bottom-up support enables step-by-step creation of a network. Adding all the services and waves on day 0 itself is not mandatory to analyze the network and view reports. Bottom-up flow enables you to build a network over a period.

Day 0: Create a network with only the topology added. Add all sites and add fibers between them. Analyze the network and view the reports without adding any services or waves.

Day 1: Add waves between the sites that are added on Day 0 and newly added sites and fibers. Analyze the network and view the reports.

Day 2: Add services and tag waves that are created on Day 1 and newly added sites and fibers. Analyze the network and view the reports.



**Note** After you have created the topology with sites and fibers added, you can add either a service or a wave. You need not follow any specific order.

Bottom-up flow is applicable only for Non-SSON networks. In order to achieve this, you must set A2A mode as A2A\_fast in network properties. You can also set the A2A channel type as contentionless, colorless, and colored.

## Idle Timeout in the Analyze Mode

If you keep the browser idle for more than 15 minutes, you are logged out of Cisco ONP. The default timeout is set to 15 minutes. The System Admin can disable this feature by changing the enabled option in the configuration file on the server to false. You can change the default time of 15 minutes by editing the duration option in the configuration file.

During a long network analyze cycle, you get logged out due to idle timeout, and the network analysis runs in the background. When you log back, the same network opens in one of the following states:

- If the analysis is still on, the analysis progress bar is shown, and you cannot perform any other action.
- If the analysis is complete, the network opens in the Analyze mode.
- If the analysis has failed, the network opens in the design mode, and you can view the reason for failure on the **Elements > Messages** page.



The session time out does not redirect you to the login page always; so, reload or enter the URL again.

## Upgrade the Analyzed Network

*Table 9: Feature History*

| Feature Name                         | Release Information   | Description  |
|--------------------------------------|-----------------------|--|
| NCS 1010 Network Upgrade Flexibility | Cisco ONP Release 5.0 | After a network is analyzed, all the network elements get locked. With this feature, you can selectively unlock certain network elements to upgrade the network further. This helps in preventing accidental updates to the part of the network that does not need any modification. |

Cisco ONP allows you to upgrade an existing network that is in analyzed mode. You can modify certain properties of a network element in the network while retaining the existing network layout and design in the locked state. Upgrade is supported for NCS2K, NCS4K-2K, NCS4K-1K-2K and NCS1010 networks.

Use these steps to upgrade your network:

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5.](#)

- 
- Step 1** Choose **File > Open**.
- The **Select Network To Open** dialog box appears.
- Step 2** Click the analyzed network that you want to upgrade.
- The network opens.
- Step 3** Choose **Network > Upgrade**.
- Step 4** Click **Yes** in the **Warning** dialog box.
- The message “Network Upgraded Successfully” appears. The network goes into upgrade mode and network elements such as sites, fiber, waves (for non-SSON), media channel (for SSON), and circuits (for NCS 1010) are locked.
- Step 5** Right-click the network element that you plan to modify from the network tree panel, and click **Unlock**. You can unlock individual element and one at a time for multiple elements until the lower level in the network tree hierarchy.
- For example, you can hierarchically unlock at the node level, side level, side add/drop card level, and side amplifiers level.
- If you want to change only the add/drop between MD-32-ODD/Even or BRK\_24/16/8 in the NCS 1010 network, you can unlock the add/drop without unlocking the network elements that are higher in the hierarchy.
- Step 6** You can make the following modifications according to your requirement:
- Edit the properties of network elements.

- b) Delete the network elements from the network.
- c) Add a new site, wave, services, demands, optical subnet, or fiber into the network map.

The newly added elements are automatically displayed in the network tree panel, and by default, remain unlocked.

**Note** You can insert a node in the upgrade mode only for the unlocked fiber. Therefore unlock the fibers that are connected to the node and add nodes to the network.

**Step 7** Choose **File > Save**.

**Step 8** Choose **Network > Analyze**.

After the analysis is completed, the newly added elements are locked, and the optical reports and installation parameters of the upgraded network are updated.

When you add services or fibers while upgrading a network that has where layout template is applied, the template gets updated with the newly added service or fiber. You can export this template, make changes and reapply it to another network.

**Step 9** Choose **Network > Design** to further upgrade the newly upgraded network design.

When you upgrade a network every time, Cisco ONP saves the new version of the network as a child network, and maintains the parent and child relationship.

## Upgrade LNI Network

*Table 10: Feature History*

| Feature Name        | Release Information   | Feature Description  |
|---------------------|-----------------------|--|
| Upgrade LNI Network | Cisco ONP Release 4.1 | This feature allows you to upgrade and modify the imported LNI (Live Network Import) network as required. You can also correct LNI errors, reanalyze the network, and view the updated parameters such as BOM, layout, connections, and optical results. |

The Upgrade feature can be used to correct LNI errors, modify the network, reanalyze the network and view updated BOM, Layout, Connections, and Optical Results.

Use these steps to upgrade the LNI network:

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5.](#)

**Step 1** Choose **File > Open**.

The **Select Network To Open** dialog box appears.

- Step 2** Click a network imported through LNI that you want to upgrade.  
The network opens.
- Step 3** Choose **Network > Upgrade**.
- Step 4** Click **Yes** .  
The message “Network Upgraded Successfully” appears. After upgrading the network, the network goes into upgrade mode, and network elements such as Sites, Fiber, OTN Services and Media Channels are locked.  
You can modify certain properties of the network element, while retaining the existing network layout and design locked.
- Step 5** Right-click the network element that you plan to modify from the network tree panel, and click **Unlock**. You can unlock individual element and multiple elements until the lower level in the network tree hierarchy.  
For example, you can unlock node level, side level, side add/drop card level, and side amplifiers level.
- Step 6** You can make the following modifications according to your requirement:  
a) Edit the properties of network elements.  
b) Delete the network elements from the network.  
c) Add a new site, wave, services, demands, optical subnet, or fiber into the network map.  
The newly added elements are automatically displayed in the network tree panel, and by default, remain unlocked.
- Note**
- Unlocking media channel has few constraints. See [Media Channel Unlocking Scenarios, on page 44](#).
  - Cisco ONP automatically sets the scalable up to degree value based on certain design rules, as this value is not present in the network that is imported through LNI. Hence, we recommend you to check and update the actual scalable up to degree value, if necessary.
- Step 7** Choose **File > Save**.  
When you upgrade a network every time, Cisco ONP saves the new version of the network as a child network, and maintains the parent and child relationship.
- Step 8** Choose **Network > Analyze**.
- Note** Analysis is successful only if a consistent and valid network is imported from LNI.
- Step 9** If the analysis fails, go to **Elements > Messages** tab and check for the failure reason.
- Step 10** If any validation error is thrown from any component, resolve the issue by manually changing the network or by reimporting the LNI networks after correcting some configuration on the live network. See [Possible Error Scenarios and the Workarounds, on page 45](#).
- Step 11** Re-Analyze the network.
- Step 12** Click **Layout** tab and edit the layout manually to adjust chassis or card position for NCS 4000 and NCS 1004 platforms. See
- Step 13** Click the **BOM** tab, and the **Results** tab to view the BOM and optical results.

- Note**
- a. If the LNI inventory has any unconnected cards, that will be removed from the CONP reports after upgrading and analyzing the LNI network.
  - b. The following PIDs are added in the Cisco ONP BOM after upgrading and analyzing the LNI network. These PIDs are not part of the LNI network BOM.
    - Pre-provisioned PIDs
    - Release software PIDs
    - Optical cables—Cables used for Internal Patch-cord Connection (IPC) is not imported in LNI as this data cannot be retrieved from device
    - Attenuators
    - SMR port license PIDs—Only SMR card PID is imported as part of LNI. If licensed PID is retrieved, corresponding port licenses are added after upgrading and analyzing the LNI network, based on the number of ports used
    - USB cables—Added if pre-provisioned passive cards present
    - Blank cards—Blank cards are not imported. They are added in Cisco ONP after upgrading and analyzing the LNI network

## Media Channel Unlocking Scenarios

The following table explains the various media channel conditions and the unlocking possibilities.

**Table 11:**

| Conditions  | Unlocking Possibilities  |
|---|--|
| Channel has OTN services going over it. For 4K-2K, the service is directly mapped to the channel, and for 4K-1K-2K, the service is mapped via OTU4 trail. | Cisco ONP throws an error indicating that there are OTN services associated with the media channel. You can neither update nor delete the channel. To unlock and delete the media channel, unlock associated OTN services first and then unlock the media channel.   |
| Channel does not have OTN services going over it. For example, in case of 4K-1K-2K, the media channel carries empty OTU4s.                                | <p>Cisco ONP allows you to unlock the channel but does not automatically clear the properties of the channel or its child entities such as Trail and Section, irrespective of whether the properties are user-defined or auto-assigned. Also, the channel is not unlocked automatically, if it has any associated OTU4.</p> <p>After unlocking the channel, you can delete the channel, but cannot update the properties of the channel or its child entities. (When the properties of the media channel or its child entities are auto-assigned, only wavelength is cleared and set to Auto, and all other properties are not cleared.)</p> |

| Conditions  | Unlocking Possibilities   |
|---|---|
| Channel has neither OTN services nor OTU4(s) going over it. In case of 4K-1K-2K networks, Media Channel does not carry even empty OTUs. | <p>Cisco ONP allows you to unlock the channel and automatically clears auto-assigned properties. After unlocking you can perform the following:</p> <ul style="list-style-type: none"> <li>• Update various properties of the channel and its child entities.</li> <li>• Delete the channel.</li> </ul> |

## Possible Error Scenarios and the Workarounds

Following table describes the workarounds for the errors that are shown under the **Elements > Messages** tab.

**Table 12: Error Scenarios and the Workarounds**

| Error Message  | Workarounds   |
|--|---|
| Device Authentication failure  | Check the username and password of the device, which is given in LNI input Excel and retry LNI import with valid device credentials.  |
| Device collection failed or Device not reachable.  | Check for any connectivity issue in the setup, fix it and retry LNI import.   |
| In Site4.A, output power setting is not supported by the amplifier.  | Unlock C-Band amplifiers for side A inside Site4 in the Network tree and force the valid output power. If not sure, set it to Auto and analyze. Cisco ONP chooses the best value based on the configuration.                                      |
| Cannot Route demand! Did not find any valid Omnidirectional Side.  | For protected OTN service or SSON service, a minimum of two contentionless sides must be present on the source and destination sites. Check and add contentionless sides on the target service source and destination site and analyze.           |
| <ul style="list-style-type: none"> <li>• Demand OTU3 has unrecognized type [OTU3]</li> <li>• ServiceGroup does not support the demandType OTU3 for OTU3</li> </ul> | Only 100GE, 10GE, and STM-64 service rates are supported. If any other service rate is present in the network, unlock the specific service, change it to one of the supported service types and update the ODU time slot accordingly and analyze. |
| Primary OTN Demand [100GE_Flex] has invalid Timeslot ranges. Allowed ranges are [1-80]   | 100GE service type must have ODU time slot in the range of 1–80. If any other value is set, update the correct value or leave it blank so that Cisco ONP can set it to the correct value.   |
| Cannot complete mesh connections at Site3.   | Unlock the site and reanalyze.  |
| No OTN demand found for NCS4K trunk port - NCS4016-B - OTU40/8/0/1.  | No action required. This is an information message to the user.   |

| Error Message  | Workarounds  |
|--|--|
| Fiber between Node1.A and Node2.B has an invalid value in connector loss value           | Unlock the corresponding fiber couple and update the correct connector loss value to be greater than zero. The typical value is 0.2. |
| Fiber between Nod1.C and Node2.C has an invalid value in Tot SOL Loss w/o Connectors.    | Unlock the corresponding fiber couple and update the correct Tot SOL Loss w/o Connectors. The value should be greater than zero.     |
| Span Fiber-2 is forced as Raman but no traffic is present.                               | Remove Raman forcing on the fiber, or check and force the path for any service so that it goes through Raman enabled span.           |
| Couple Fiber-2 has Raman enabled on the duct but corresponding Raman Forcing is missing. | Force RAMAN-CTP or COP on the Fiber-2 connecting node interface or remove RAMAN forcing on the Fiber-2                               |



**Note** No specific action is required for noncritical messages. These are just information messages to the user.

## Upgrade the Software Release of a Network

*Table 13: Feature History*

| Feature Name    | Release Information   | Feature Description  |
|-----------------|-----------------------|--|
| Release Upgrade | Cisco ONP Release 4.1 | This feature allows you to choose the NCS 2000 system release to the desired release (11.1.0, 12.0.1, or 12.1.0), while performing the release upgrade of CTP network, Cisco ONP network, network imported through Excel, and LNI network. |

You can upgrade the software version of a network that is imported from CTP, the network created in Cisco ONP, LNI Network, and Excel imported network to any desired release. Release upgrade is supported for both SSON and non-SSON networks having NCS 2000 nodes with ROADM, OLA, Traffic, or the Passthrough functionality.

Release upgrade is supported starting with NCS 2000 Release 11.1.0.



**Note** NCS 2000 supports SVO from the Release 12.1.0.

The following table lists the releases to which the existing system release can be upgraded, for each type of network..

| Network                | Upgrade Release  |
|------------------------|--|
| CTP network (.mpz)     | <ul style="list-style-type: none"> <li>• From 11.0.0 to 11.1.0, 12.1.0, 12.2.0, and 12.3.1</li> <li>• From 11.1.0 to 12.1.0, 12.2.0, and 12.3.1</li> </ul>   |
| Cisco ONP network      | <ul style="list-style-type: none"> <li>• From 11.0.0 to 11.1.0, 12.1.0, 12.2.0, and 12.3.1</li> <li>• From 11.1.0 to 12.1.0, 12.2.0, and 12.3.1</li> <li>• From 12.1.0 to 12.2.0, and 12.3.1</li> </ul>  |
| Excel imported network | <ul style="list-style-type: none"> <li>• From 11.0.0 to 11.1.0, 12.1.0, 12.2.0, and 12.3.1</li> </ul>  |
| LNI network            | <p>11.1.0 to 12.0.1, 12.1.0, and 12.3.1</p> <p>11.1.0 to 12.1.0, 12.2.0, and 12.3.1</p> <p><b>Note</b> You cannot directly release upgrade an LNI network. Perform the following:</p> <ul style="list-style-type: none"> <li>• Upgrade the LNI network. see <a href="#">Upgrade LNI Network, on page 42</a>)</li> <li>• Analyze the network. (see <a href="#">Analyze the Network, on page 39</a>)</li> <li>• Release upgrade the analyzed LNI network.</li> </ul> |

**Before you begin**

[Log in to Cisco ONP Web Interface, on page 5.](#)

- 
- Step 1** Choose **File > Open**.  
The **Select Network To Open** dialog box appears.
- Step 2** Click the network in which you want to perform system release upgrade.  
The network opens.
- Step 3** Choose **Network > Release Upgrade**.
- Step 4** Choose the **System Release** of NCS 2000, to which you want to upgrade, from the drop-down list.
- Step 5** Click **Submit**.  
The upgraded network is saved as a child network.  
The network elements are locked in the network tree after the release upgrade. You can unlock and modify the elements.

**Note** If the PMD coefficient does not get updated with the expected value, update the fiber type first, followed by the PMD value when you edit the fiber properties.

## Plan Mode

*Table 14: Feature History*

| Feature Name                      | Release Information   | Feature Description  |
|-----------------------------------|-----------------------|--|
| What-if Analysis for OTN Services | Cisco ONP Release 4.1 | This feature extends the current implementation of What-if analysis for the OTN Services that are connecting the aggregated nodes. The failure report includes the number of failed services, restored services, and unrestored services. This feature is supported for SSON (4K-1K-2K and 1K-2K) and non-SSON (4K-2K) networks. |

Plan mode enables you to perform what-if analysis on the existing network resources, such as failing and restoring the fiber, OTN services, and site. This mode is applicable only for PLANNER and ADMIN roles. This mode simulates the actual network behavior during failure and determines whether a service can be rerouted; however, this mode does not suggest how to turn-up new wave lengths, insert new nodes, cards, or ports, and so on.

The network can enter the **Plan** mode only from the **Analyze** mode. The what-if analysis can be done on the NCS 2000 aggregated node (ROADM, OLA, Passthrough), Traffic node (1K-2K, 4K-2K and 4K-1K-2K), the node created in Cisco ONP, CTP imported (mpz), and LNI imported networks.

## Enter the Plan Mode

The following procedure shows how to enter the Plan mode:

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5](#) as a user with admin or planner role.

**Step 1** Open the network in Analyze mode.

**Step 2** Choose **Network > Enter Plan Mode**.

Switching to Plan Mode progress bar appears. The message, *Entered Plan Mode successfully* appears in the **Success** dialog box.



## Exit the Plan Mode

The following procedure shows how to exit the Plan mode:

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5](#) as a user with admin or planner role.

- 
- Step 1** Open the network in the Analyze mode.
- Step 2** Choose **Network** > **Exit Plan Mode**.
- 

## Fail a Fiber

The following procedure shows how to fail a fiber or a list of fibers in the Plan mode:

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5](#).

- 
- Step 1** Expand the **Fibers** option in the network tree panel.
- Step 2** Right-click the fiber, and click **Fail**. You can choose multiple fibers to fail by checking the check boxes next to the fibers. All media channels or waves, OTN services, and demands that pass through the failed fiber fail. You can see the failed media channels from the Map option or from the network tree.

- Note**
- You can also fail a fiber or undo a fiber failure from Map.
  - You can view the unrestored channel details in the failure report and the reason for restoration failure under **Elements** > **Messages** tab.
  - Failed channels are indicated with a red cross symbol, impacted fibers are marked with yellow cross symbol, and the restored channels with a green tick symbol.
- 

## Undo Fiber Failure

The following procedure shows how to undo fiber failure in the Plan mode:

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5](#).

- 
- Step 1** In the network tree panel, click **Fiber**.
- Step 2** Right-click the failed fiber, and click **Undo Fail**.
-

## Create a Failure Set

You can click any set of fibers or sites, right-click, and fail them. The failed fibers or sites are marked with a red cross mark beside them. You can also choose multiple fibers or sites.

- Cisco ONP saves the user created failure sets.
- You can save multiple failure sets under a given failure group.

The following procedure shows how to create a failure set:

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5.](#)

---

**Step 1** Right-click the **Failure Groups** option in the network tree panel.

**Step 2** Click **Add Failure Group**.

A Failure group gets created.

**Step 3** Choose the **Fibers or Sites** to fail by checking the check boxes next to the them.

**Step 4** Right-click the chosen **Fibers or Sites** and click **Fail**.

**Step 5** Select the network name, and right-click.

**Step 6** Click **Add Failure Set**.

**Step 7** Select the Failure Group to which the failed fibers or sites must be added.

The Failure Set gets created under the Failure Group. The failed fibers or sites are added to the created **Failure Set**.

**Note** If networks have dark fibers (which does not carry any traffic), that path is not considered for restoration.

---

## Fail a Site

The following procedure shows how to fail a site or a list of sites in the Plan mode.

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5.](#)

---

**Step 1** Expand the **Sites** option in the network tree panel.

**Step 2** Right-click the site, and click **Fail**. You can choose multiple sites to fail by checking the check boxes next to the sites.

You can also fail a site from the network map view.

---

## Undo Site Failure

The following procedure shows how to undo the site failure in the Plan mode:

**Before you begin**

[Log in to Cisco ONP Web Interface, on page 5.](#)

**Step 1** In the network tree panel, click **Site**.

**Step 2** Right-click the failed site, and click **Undo Fail**.

You can also undo the site failure from the network map view.

## Failure Report

The failure report shows the following parameters:

| Report                     | Description   |
|----------------------------|---|
| <b>Failed Fibers</b>       | Shows the failed fibers in the network.   |
| <b>Failed Sites</b>        | Shows the failed sites in the network.  |
| <b>Impacted Fibers</b>     | Shows the fibers that are impacted due to the site failure.   |
| <b>Total Channels</b>      | Shows the total number of media channels in the network.  |
| <b>Failed Channels</b>     | Shows the total number of media channels that are passing through the failed ducts or sites in the network.   |
| <b>Restored Channels</b>   | Shows the total number of media channels that are restored from the failure state.  |
| <b>Unrestored Channels</b> | Shows the total number of media channels that are not restored from the failure state due to the unavailability of alternate paths.   |
| <b>Fiber HotZones</b>      | Shows the fibers that have utilized greater than or equal to 80% of the bandwidth. You can modify the threshold by updating the value in the Feature.Properties file. <ul style="list-style-type: none"> <li>• <b>Fiber</b>: Shows the fibers that are listed under fiber hot zones.</li> <li>• <b>Utilization Before (%)</b>: Shows the percentage of bandwidth that is utilized before the channel restoration.</li> <li>• <b>Utilization After (%)</b>: Shows the percentage of bandwidth that is utilized after the channel restoration.</li> </ul> |
| <b>Total Services</b>      | Shows the total number of services going through the fiber that was failed.   |
| <b>Failed Services</b>     | Shows the number of failed services going through the fiber that was failed.  |
| <b>Restored Services</b>   | Shows the number of restored services going through the fiber that was restored.  |
| <b>Unrestored Services</b> | Shows the number of unrestored services going through the fiber that was restored.  |

:

## Export Failure Report

The following procedure shows how to export the failure report.

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5.](#)

---

Choose **Export > Failure Report** to export the failure report as an Excel sheet.

You can save the Excel sheet.

---

## Export Failure Report from Map

The following procedure shows how to export the failure report from the map:

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5.](#)

---

**Step 1** Click **Failure Report** under **Map**.

**Step 2** Click **Export** to export the failure report as an Excel sheet. You can save the Excel sheet.

---

## Restore Failed Channels

The following procedure shows how to restore the failed fibers:

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5.](#)

---

**Step 1** Choose **Network > Enter Plan Mode**.

**Step 2** Click **Restore**.

The message, "Restoration is in progress" appears.

**Step 3** Click **Failure Report** to view the number of media channels that are restored or unrestored.

**Note** Restored channels are indicated with a green color tick mark in the network tree and map.

All media channels or waves, and demands that pass through the restored fiber also get restored. The Path Computation Element (PCE) supports the restoration of the OTN services based on the optical feasibility and OTN constraints.

---

# Automatic Suggestion for Regeneration Sites in Plan Mode

Table 15: Feature History

| Feature Name                                | Release Information   | Feature Description   |
|---|-----------------------|---|
| Automatic Suggestion for Regeneration Sites | Cisco ONP Release 5.0 | Cisco ONP displays feasibility report in the Plan mode. This report automatically suggests regeneration sites for the channels with high and marginal risk of failure. You can incorporate these regeneration sites in the optical network to make the channel optically feasible. This feature avoids multiple iterations required to manually create the regeneration sites and test the optical feasibility of large networks. |

Cisco ONP submits the networks that are not optically feasible (the channels that have marginal and high risk of failure assessed based on the EOL and SOL indicated as red, and orange in the **Optical Results** page). PCE runs a regen suggestion algorithm and suggests the regeneration sites. When you enter the plan mode, Cisco ONP displays regen sites in the **Feasibility Report** displayed at the bottom of the map. You can apply the suggested regen sites to make the network optically feasible.

Auto regen site suggestion is supported for both SSON and non-SSON network that has contentionless channels or waves between NCS2K (ROADM) or 4K-1K-2K (TRAFFIC) sites.

If the channels have already regen forced, the regen suggestion is shown at sections level.

The Feasibility Report table includes the following fields:

Table 16: Feasibility Report

| Field            | Description  |
|------------------|--|
| Channel Name     | Displays the list of channels (trail and sections) that are not optically feasible.                              |
| Alarm            | Displays the color of alarm (red, orange, or yellow)   |
| Paths            | Displays the actual path of the channel as hyperlink. If you click the link, the path is highlighted in the map. |
| Suggested Regens | Displays the intermediate sites that can be used as regen sites so that the channel becomes optically feasible.  |

You can also export the report by clicking **Export**.

The **Suggested Regen** field is displayed as NA for the following reasons:

- The channels with yellow alarms, as the loss is negligible.
- When the loss is high and the number of available intermediate sites are not enough to compensate the overall loss.
- The intermediate sites where no contentionless sides are added will not be considered for regen sites.

## Apply Suggested Regen

Use this task to apply the suggested regeneration sites to make the network optically feasible.

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5](#) as a user with admin or planner role.

**Step 1** [Enter the Plan Mode, on page 48.](#)

**Step 2** Choose **Network > Open Feasibility Report**.

The **Feasibility Report** is displayed at the bottom of the map.

**Step 3** Select the channels for which regeneration has to be applied and click **Apply**.

**Step 4** Click **Ok** in the **Suggested Regen Applied** dialog box.

**Step 5** Click **Exit Plan Mode**.

**Step 6** Click **Yes** in the **Warning** dialog box.

The network gets auto upgraded and saved as a new network. The channels with regens applied are unlocked with the Regen Sites property auto updated and noneditable.

**Step 7** Analyze the network.

In the **Optical Results** page, the SOL, and EOL fields become green, and the channels are not displayed in the feasibility report again when you switch to the plan mode.

## Import Optical Sources

*Table 17: Feature History*

| Feature Name                            | Release Information   | Feature Description  |
|---|-----------------------|--|
| Create Optical Source using Excel Sheet | Cisco ONP Release 5.0 | You can create an optical source by defining the details of interfaces and the corresponding optical classes in an Excel template. This feature provides you the flexibility to create any required optical source based on existing or new traffic resources. |

Optical Source Wavelength is a way to connect a DWDM interface from any external element to a third-party optical network.

Use this procedure to import an optical source:

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5.](#)

If you want to import the optical source from an Excel sheet, download the template by choosing **Export > Optical Source Template**. Fill the necessary details in the **Interfaces** and **Optical Classes** sheets of the downloaded template and save the file.

The fields (columns D, E, F) that are not mandatory are hidden in the Interfaces sheet of the template. You can expand the columns and fill the details.

---

#### Step 1 Choose **Manage > Optical Source**.

The **Manage Optical Source** dialog box appears. The default optical sources available in the server are:

- OpticalSources\_NCS2K\_400GXP-LC\_NCS4K-4H-OPW-QC2
- NCS1004\_OpticalSources\_V3
- ONS-CFP2D-400G-C-OpticalSources-V2.mxd
- QDD-400G-ZRP-S-OpticalSources-V2.mxd

**Note** By default, all existing optical source files are loaded in the server.

#### Step 2 To import optical source as .mxd file:

- a) Click **Add**.
- b) Choose **Optical Source (.mxd)**

The **Import Optical Source (.mxd)** dialog box appears.

- c) Click **Choose File** and browse to the .mxd file stored in your local system, and click **Import**.

After the optical source is imported, a list of related interfaces appears.

#### Step 3 To import the optical source from an Excel sheet:

- a) Click **Add**.
- b) Choose **Optical Source (.xlsx)**

The **Import Optical Source (.xlsx)** dialog box appears.

- c) Click **Choose File** and browse to the .xls file (optical source template) saved in your local system, and click **Import**.
- d) Choose the **Release Version** of the NSC2K network.
- e) Select the interface.
- f) Click **Create**.

After the optical source is imported, a list of related interfaces appears.

#### Step 4 Choose the interfaces to import by checking the check box next to them. The selected interfaces get added to **Type** drop-down list in the properties window of the network tree.

When you create waves, you can use the interfaces in the **Type** drop-down list.

---

## Download Optical Sources

Use this procedure to download an optical source:

---

- Step 1** Choose **Manage > Optical Source**.  
The **Manage Optical Source** dialog box appears.
- Step 2** Choose an optical source to download.
- Step 3** Click **Download** and select one of the following options to download the optical sources.
- **.mxd**—Downloads the selected optical sources as .mxd file.
  - **.xlsx**—Downloads only the optical sources which were created and added using the Excel template, as .xls file. Others such as the optical sources which were directly added as .mxd file, are not included in the .xls file.
  - **.xml**—Downloads the optical source data as .xml file. This file contains the application codes for circuit provisioning in Cisco ONC and can be loaded into Cisco ONC to create circuits with these optical source interfaces.
- 

## Delete Optical Sources

Use this procedure to delete an optical source:

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5.](#)

---

- Step 1** Choose **Manage > Optical Source**.  
The **Manage Optical Source** dialog box appears.
- Step 2** Choose an optical source to delete.
- Step 3** Click **Delete** to delete the selected optical sources.
- 

## Layout Template for NCS 2000 Network

Layout templates are reusable templates that are used to design layout configurations for the NCS 2000 network. When you have an NCS 2000 network with fixed layout rules applicable for multiple nodes, you can use these templates to accurately set up the layout for those nodes. These templates save you time, effort, and they minimize errors.





**Note** Layout template is not supported for a mix of TXP and Real card label of transponders.

## Export Layout Template

*Table 18: Feature History*

| Feature Name                | Release Information   | Feature Description   |
|-----------------------------|-----------------------|---|
| Layout Template Enhancement | Cisco ONP Release 4.1 | This feature allows you to export the layout template for an individual site or for all the sites. The layout template export is possible only if the network is analyzed in Cisco ONP Release 4.1. The export of layout template is supported on 4K, 4K-1K-2K, and 2K nodes. |

Use the following procedure to export the layout template of a specific site or all sites:

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5.](#)

- 
- Step 1** Choose **File > Open**.  
The **Select Network To Open** dialog box appears.
- Step 2** Click the network whose network layout template you want to export.  
The network opens.
- Step 3** Choose **Network > Analyze**.  
**Note** Network must be successfully analyzed to proceed further.
- Step 4** Click the **Layout** tab.
- Step 5** Click the name of a site in the left side panel, for which you want to download the layout template.
- Step 6** Hover the mouse pointer over the **Export** icon and click **Layout Template** for **Current site** or **All Sites**.  
The **Export Layout Template** dialog box appears.
- Step 7** Click **Export**.

**Note**

- We recommend that you export the layout template only in the analyze mode. Exporting layout templates in the upgrade and release upgrade modes may be inaccurate.
- You can export the layout template for node of the type 4000 and 1000, but the exported layout template will contain only the layout of NCS 2000 nodes. To export the layout template for the node type NCS4K-1K-2K and NCS1K-2K, perform the following:
  - Right click the site name in the **Layout** panel, and click **Export**.
  - Click **OK** to export the layout template in text format.
- The NCS 2000 layout template is in XML format.

---

## Import Layout Template for NCS 2000 Network in to Cisco ONP Database

Use the following procedure to import a template for NCS 2000 Network into the Cisco ONP database:

**Before you begin**

[Log in to Cisco ONP Web Interface, on page 5.](#)

- 
- Step 1** Choose **Manage > Layout Templates**.
  - Step 2** Click **Add** in the **Manage Layout Template** dialog box.
  - Step 3** Click **Choose Files** and select a template from your local system.
  - Step 4** Click **Import**.

The template is imported to the Cisco ONP database.

---

## Download Layout Template for NCS 2000 Network

Use the following procedure to download a template from the Cisco ONP database:

**Before you begin**

[Log in to Cisco ONP Web Interface, on page 5.](#)

- 
- Step 1** Choose **Manage > Layout Templates**.
  - Step 2** In the **Manage Layout Template** dialog box, choose the template that you want to download.  
You can also choose multiple templates.
  - Step 3** Click **Download**.  
Save the template into your local system.
-

## Delete Layout Template for NCS 2000 Network

Use the following procedure to delete a NCS 2000 Network template from the Cisco ONP database:

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5.](#)

- 
- Step 1** Choose **Manage > Layout Templates**.
- Step 2** In the **Manage Layout Template** dialog box, choose the template that you want to download.  
You can also choose multiple templates.
- Step 3** Click **Delete** to delete the template from the Cisco ONP database.
- 

## Apply NCS 2000 Layout Template into a Site

Use this task to apply the NCS 2000 Layout template into a site. The site can be NCS4K-2K, NCS1K-2K-4K, or NCS1K-2K, but the template will be applied only to the NCS 2000 section of that site.

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5.](#)

- 
- Step 1** Choose **File > Open**.  
The **Select Network To Open** dialog box appears.
- Step 2** Click the network where you want to apply the layout template into an NCS 2000 site.  
The network opens.
- Step 3** Choose **Network > Entity Editor**.
- Step 4** In the **Entity Editor** window, expand **Sites** and choose the site.
- Step 5** In the right pane, choose the required template from the **Layout Template** drop-down list.
- Note** Make sure that the other properties under **Layout** section such as **Chassis Type**, **Power Supply**, **Controller Card**, **Node Protection**, **Redundant Controller Card**, and **MF-Unit** are set to *Auto*. Otherwise the **Layout Template** drop-down list remains disabled.
- 

## Import NCS 1000 and NCS 4000 Layout Template into NCS1K-2K and NCS4K-1K-2K Sites

Use this task to import NCS 1000 and NCS 4000 layout templates that were exported, into 4K-2K and NCS4K-1K-2K Sites.

**Before you begin**

[Log in to Cisco ONP Web Interface, on page 5.](#)

- 
- Step 1** Choose **File > Open**.  
The **Select Network To Open** dialog box appears.
- Step 2** Click the network that has the site to which you want to apply the layout template.  
The network opens.
- Step 3** Click the **Layout** tab.
- Step 4** Add the required NCS 4000 and/or NCS 1000 chassis, cards, and pluggables to the required slot of the added chassis.  
See [Edit the Layout Manually, on page 61](#)
- Step 5** Click **Edit** to enter the edit mode.
- Step 6** Right click the name of a site on which you want to import the layout template, and click **Import**.
- Step 7** Choose the layout template that you want to import into the site and click **OK**  
The layout template gets applied to the site.
- Note** When you modify an exported template, ensure to rename the modified template before reapplying it to a site in the upgrade mode so that the changes in the template reflect in the layout view.
- 

## Layout Visualization

*Table 19: Feature History*

| Feature Name                  | Release Information   | Feature Description   |
|-------------------------------|-----------------------|---|
| Layout Visualization and Edit | Cisco ONP Release 4.1 | This feature allows you to view and adjust the position of NCS 4016 and NCS 1004 chassis and cards in the layout. This feature is supported only on 4K-1K-2K and 1K-2K aggregated nodes and not supported on stand-alone NCS 2000 node. |

This feature allows you to visualize the layout of a network, designed using Cisco ONP. You can view the arrangement of racks, chassis inside the racks and cards inserted in the chassis. When you click a particular Rack or Chassis or Card in the **Layout** panel, the corresponding Rack or Chassis or Card gets highlighted in the Layout image. You can zoom in and zoom out the Layout image.

## View Network Layout

The procedure to view the network layout is as follows:

**Before you begin**

[Log in to Cisco ONP Web Interface, on page 5.](#)

- 
- Step 1** From the **File** menu, click **Open**.  
The **Select Network To Open** dialog box appears.
- Step 2** Click the network to open from the list of available networks.
- Step 3** Choose **Network > Analyze**.  
**Note** Network must be successfully analyzed to proceed further.
- Step 4** Click the **Layout** tab.
- Step 5** In the **Layout** panel on the left side, click the site.  
**Note** The OLA sites are highlighted in green color, ROADM sites in blue color and Aggregated nodes in purple color.  
Passthrough sites are not listed under layout.  
For NCS 1010 network, Aggregated nodes are not available.
- Step 6** Click any rack under a site to visualize the rack view of the network under **Layout** tab.
- Step 7** Click any chassis under a rack to visualize the chassis view of the network.  
**Note** When you click the Aggregated node under **Layout** panel, NCS 1004, NCS 2000 and NCS 4000 series chassis are placed in separate racks.  
You can click the screenshot icon to take screenshot of all racks layout of the selected site.
- 

## Edit the Layout Manually

The Manual layout edit feature is used to adjust the position of NCS 4016 and NCS 1004 chassis and cards in the layout.

The procedure to edit the layout manually is as follows:

**Before you begin**

[Log in to Cisco ONP Web Interface, on page 5.](#)

- 
- Step 1** Choose **File > Open**.  
The **Select Network To Open** dialog box appears.
- Step 2** Click the network to open from the list of available networks.  
Choose the network where 4K-1K-2K and 1K-2K aggregated nodes are added. This feature is not supported on NCS 2000 node.
- Step 3** Choose **Network > Analyze**.

**Note** Network must be successfully analyzed to proceed further.

**Step 4** Click the **Layout** tab.

**Step 5** Click **Edit** to enter the Edit mode.

**Step 6** Select the Chassis (4K-1K-2K and 1K-2K) or Card from a particular rack.

**Step 7** Drag and drop the selected Chassis or Card from a particular rack to the empty slot in the same or different Chassis or Rack.

**Step 8** To add pluggables to a particular card, perform the following steps:

**Note** Make sure to add the required cards.

a) Select the Rack.

The cards available in the Rack are displayed.

b) Select the card to which you want to add pluggables.

The ports available in the card are displayed.

c) Select the pluggable for each port.

The following pluggables are displayed:

| Card             | Supported Pluggables  |
|------------------|---|
| NCS4K-4H-OPW-QC2 | <ul style="list-style-type: none"> <li>• ONS-QSFP8-LR4=</li> <li>• QSFP-110G-SR4-S=</li> <li>• ONS-QSFP-4*10-MLR=</li> </ul>  |
| NCS4K-4H-OPW-LO  | <ul style="list-style-type: none"> <li>• ONS-QSFP8-LR4=</li> <li>• QSFP-100G-SR4-S=</li> <li>• ONS-QSFP-4*10-MLR=</li> </ul>  |
| NCS1K4-1.2T-K9=  | <ul style="list-style-type: none"> <li>• ONS-QSFP8-LR4=</li> <li>• QSFP-100G-SR4=</li> <li>• ONS-QSFP28-LR4-S=</li> <li>• QSFP-100G-CWDM4-S=</li> <li>• QSFP-100G-SM-SR=</li> </ul> |

d) Click the Tick icon.

**Step 9** Click **Done** to save the changes in the Layout.

## View the Layout Details Using Tooltip

You can hover over the Racks or Chassis or cards in the Rack and view the details using Tooltip. Click **See More Details** to view the details of port no. type, pluggables and rates.

## Copy the Configurations of a Particular Node to Another Node

The configuration can be copied from one node to another node only for the manual 4K-1K layout movement. It is not supported for NCS1010 layout movement.

The procedure to copy the configurations of a particular node to another node of a different site is as follows:

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5.](#)

- 
- Step 1** Choose **File > Open**.  
The **Select Network To Open** dialog box appears.
- Step 2** Click the network to open from the list of available networks.
- Step 3** Choose **Network > Analyze**.  
**Note** Network must be successfully analyzed to proceed further.
- Step 4** Click the **Layout** tab.
- Step 5** Select the Rack, Chassis, or Card of a particular site.
- Step 6** Select the site to where you want to copy the configurations to, from the **Copy To** drop-down list.
- Step 7** Click **New Rack** to add a new rack. The configuration gets copied to the new rack.
- Step 8** Click **Done** to save the changes in the Layout.  
**Note** You can also cut, copy, and delete Racks, Chassis, and Cards in the Chassis from the Layout.
-

## Export Port Usage of LNI Network

Table 20: Feature History

| Feature Name                    | Release Information   | Feature Description  |
|---------------------------------|-----------------------|--|
| Multi-Layer Connections Phase 1 | Cisco ONP Release 4.1 | <p>This feature provides the connection trace of a service across various interfaces in a network. This feature allows you to export the following:</p> <ul style="list-style-type: none"><li>• Consolidated port usage report based on network in addition to the internal port details which you can view by hovering the mouse pointer over the tooltip</li><li>• Port usage report based on sites</li><li>• Port usage report only for LNI imported networks</li></ul> |

Use the following procedure to export the port usage details of an LNI network:

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5.](#)

- 
- Step 1** Choose **File > Open**.  
The **Select Network To Open** dialog box appears.
- Step 2** Click the LNI network whose port usage you want to export.  
The network opens.
- Step 3** Choose **Network > Analyze**.  
**Note** Network must be successfully analyzed to proceed further.
- Step 4** Click the **Layout** tab.
- Step 5** Click the name of a site in the left side panel, for which you want to download the port usage.
- Step 6** Mouse hover the **Export** icon and click **Port Usage** for **Current site** or **All Sites**.  
The **Export Port** dialog box appears.
- Step 7** Click **Continue**.  
The port usage details are exported in the Excel sheet format.



**Note**

- If you modify any services in the NCS 4000 node after upgrading the LNI network, the changes will not get updated in the port usage details.
- The demand labels seen against the trunk ports of NCS4K-DWDM line card in the port mapping report are not logically related to the NCS 4000 trunk ports, but are related to NCS 1004 client ports.

## Define Multilayer Connections for SSON Network

*Table 21: Feature History*

| Feature Name                            | Release Information   | Feature Description   |
|---|-----------------------|---|
| NCS4K-1K-2K Multilayer Connection Trace | Cisco ONP Release 4.2 | <p>You can define Multilayer Connections (MLC) such as cards and pluggables for NCS 4K-1K-2K and NCS 1K-2K aggregated nodes in an SSON network.</p> <p>This new tab in the <b>Layout</b> page helps to view end-to-end MLC trace for OTN service starting from <b>NCS4K IN</b> until <b>NCS2K Add/Drop</b> for LNI network. Also, it helps to define new traces for the newly added service and maintain the network design and deployment.</p> |

Use this procedure to define the Multilayer Connections (MLC) such as cards and pluggables for 4K-1K-2K and 1K-2K aggregated nodes in an SSON network.

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5](#)

**Step 1** Choose **File > Open**.

The **Select Network To Open** dialog box appears.

**Step 2** Click a network in which you want to define the multilayer connections.

Make sure that the network is in analyzed mode and 4K, 1K, and cards are defined in the network.

The network opens.

**Step 3** Choose **Network > Analyze**.

**Note** Network must be successfully analyzed to proceed further.

**Step 4** Click the **Layout** tab.

**Step 5** In the left pane, click the **MLC** tab.

You can also navigate to the **MLC** page by right-clicking the service name in the network tree and clicking **View in MLC**

You can view a table describing the following properties of the service, in the right pane:

**Table 22: MLC Details**

| Properties        | Description  |
|-------------------|--|
| Name              | Name of the service  |
| Group Name        | Name of the group to which the service belongs to  |
| Type              | Traffic type   |
| Src Site          | Source site  |
| Src NCS4K In      | Details of Rack/Slot/Card/Port in the input side of the NCS 4000 chassis in the source site              |
| Src NCS4K Out     | Details of Rack/Slot/Card/Port in the output side of the NCS 4000 chassis in the source site             |
| Src NCS1K In      | Details of Rack/Slot/Card/Port in the output side of the NCS 1004 chassis in the source site             |
| Src NCS1K Out     | Details of Rack/Slot/Card/Port in the output side of the NCS 1004 chassis in the source site             |
| Src NCS2K AddDrop | Add/Drop multiplexer and demultiplexer connected to the NCS 2000 chassis in the source site              |
| Src NCS2K MPO     | Media channel between the source and destination sites   |
| Dst NCS4K In      | Details of Rack/Slot/Card/Port in the input side of the NCS 4000 chassis in the destination site         |
| Dst NCS4K Out     | Details of Rack/Slot/Card/Port in the output side of the NCS 4000 chassis in the destination site        |
| Dst NCS1K In      | Details of Rack/Slot/Card/Port in the input side of the NCS 1004 chassis in the destination site         |
| Dst NCS1K Out     | Details of Rack/Slot/Card/Port in the output side of the NCS 1004 chassis in the destination site        |
| Dst NCS2K AddDrop | Add/drop multiplexer and demultiplexer that is connected to the NCS 2000 chassis in the destination site |
| Dst NCS2K MPO     | MPO cable connecting the NCS 2000 chassis in the destination site  |
| Media Channel     | Media channel between the source and destination sited   |

| Properties   | Description   |
|--------------|---|
| Notes        | More notes, if any  |
| Trace Origin | Indicates whether the service connections are user-created or imported through LNI. |

**Note** The details of source and destination NCS2K AddDrop and NCS2K MPO are not displayed for the networks that are created in Cisco ONP Release 4.1 and migrated to Cisco ONP Release 4.2.

**Step 6** Click the service name to switch to the layout view.

You will view the layout and the service details in the right pane.

**Step 7** Select the rack, shelf, card, and ports from the drop-down lists for NCS4K In, NCS4K Out, NCS 1K In, and NCS 1K out, for both **Source** and **Destination** sites.

The details of the NCS 2000 chassis are auto-populated.

**Note** For LNI imported network all the details are auto-populated. If you add any new service, you can change the details of the new service as per your requirement.

**Step 8** Click the Tick icon to save the changes you have done.

You can click the refresh icon to delete the changes you made after saving.

The updated details are included in the BOM.

**Step 9** (Optional) To export the MLC details perform the following steps:

- Click the Table icon to switch to the table view.
- Choose **Export > MLC Traces** to export all the details available in the MLC table.
- Choose **Export > LMP/TTI Connections** to export the details of Link Management Protocol (LMP) connections which are the connections between NCS 1004 and NCS 2000 cards, and Trail Trace Identifier (TTI) connections which are the connections between NCS 4000 and NCS 1004 cards.

All these connections get added to the BOM.

**Step 10** (Optional) Click the Filter icon to filter the services displayed in the left pane, based on the following:.

The following filter options are available:

- Source Site
- Destination Site
- Type of the traffic
- Trace Origin
  - LNI—Imported through Import Live Network option
  - User Created—Created through Cisco ONP UI
- Trace Status
  - Completed—User has defined all MLC details.
  - Partial—User has defined only partial MLC details.

- **Empty**—User has not defined any MLC details.

**Step 11** (Optional) Click the three vertical dots and select the following as required:

- **Enable Multi Select**—You can select up to the card level for different OTN.
- **Expand All**—Expands the services tree.
- **Collapse All**—Collapses the expanded services tree.
- **Show Trace Status**—Shows the trace status icon next to the service name.

**Step 12** (Optional) Click the three horizontal dots across the service trace and select the following as required:

- **Delete Trace**—Deletes the respective trace.
- **Locate in Map**—Shows the service in the map view.

**Note** User can enable the same port number on the primary and secondary **NCS4K IN** nodes for Client 1+1 and other protection scheme.

## Regenerate BoM Automatically

You can view the new Chassis or Card added to the existing layout under the **BOM** tab. You can also view the regenerated BoM after manual editing of the layout.

## Add new Pluggables, Alarm Cables and 100G Client Bandwidth Licenses to BoM

You can add new pluggables, alarm cables and 100G bandwidth licenses of NCS 1004 and NCS 4000 platforms to the existing BoM.

The procedure to add new pluggables, alarm cables and 100G client bandwidth licenses to the existing BoM is as follows.

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5.](#)

**Step 1** Choose **File > Open**.

The **Select Network To Open** dialog box appears.

**Step 2** Click the network to open from the list of available networks.

**Step 3** Choose **Network > Analyze**.

**Note** Network must be successfully analyzed to proceed further.

- Step 4** Click the **BOM** tab.
- Step 5** Click **Add**.  
The **New** window opens.
- Step 6** Enter the Cisco part number of the pluggable or alarm cable or 100G bandwidth license in the **Cisco Part Number** field.
- Step 7** Choose the **Quantity** of pluggables or alarm cables or 100G bandwidth licenses to be added.
- Step 8** Click **Add**.  
The new pluggables or alarm cables or 100G bandwidth licenses are added to the BoM list.
- 

## Export IPC Report

You can export the connections of a current site or all sites to an Excel sheet using the following procedure:

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5](#)

---

- Step 1** From the **File** menu, click **Open**.  
The **Select Network To Open** dialog box appears.
- Step 2** Click the network to open from the list of available networks.
- Step 3** Choose **Network > Analyze**.  
**Note** Network must be successfully analyzed to proceed further.
- Step 4** Click the **Layout** tab.
- Step 5** z
- Step 6** Click the **IPC** tab.  
You can view the patches that are listed in the left pane. Click each patch to view the details such as position, card, and port of the source and destination sites.
- Step 7** Hover over the **Export** icon, and click **Current site** or **All Sites** option.  
The **Export IPC** dialog box appears.
- Step 8** Click **Continue** to export the connections of the current site or all sites.  
The cable-type and Cable ID are included in the report only for the NCS 1010 network.
-

# Edit the Layout Manually for NCS 1010 Networks

Table 23: Feature History

| Feature Name                              | Release Information   | Feature Description   |
|---|-----------------------|---|
| Layout Edit Support for NCS 1010 Networks | Cisco ONP Release 5.0 | Cisco has introduced NCS 1010 as a new optical line system to meet the growing optical network needs. Using Cisco ONP you can visualize and edit layouts for NCS 1010 chassis and patch panels. |

The Manual layout edit feature is used to adjust the position of the NCS 1010 chassis and patch panels in the layout.

The procedure to edit the layout manually is as follows:

## Before you begin

[Log in to Cisco ONP Web Interface, on page 5.](#)

**Step 1** Choose **File > Open**.

The **Select Network To Open** dialog box appears.

**Note** You can also create a new NCS 1010 network. For more information, see [Manually Design a Network Using Cisco ONP, on page 20](#).

**Step 2** Click the network to open from the list of available networks.

Choose the NCS 1010 network.

**Step 3** Choose **Network > Analyze**.

**Note** Network must be successfully analyzed to proceed further.

**Step 4** Click the **Layout** tab.

**Step 5** Click **Edit** to enter the Edit mode.

**Step 6** In the left panel, click a site.

**Step 7** Select a unit (NCS 1010 chassis or patch panel) using one of the following methods:

- In the left panel, expand the rack under a site and choose a unit.
- Or, in the Rack view, click a chassis or patch panel.

**Step 8** To adjust the position of the selected units, use one of the following methods:

**Note** If necessary, click the **+New Rack** button to create more racks.

- In the Rack view, drag and drop the selected chassis or panel from a particular rack to the empty slot in the same or different rack.

- Cut and Paste unit in the left panel:
  - Click **Cut** above the Rack view.
  - Right-click on an empty slot in the same or different rack and click **Paste**.  
Cisco ONP disables the Paste option, if you try to paste the unit in the prohibited slots.  
Cisco ONP disables the Cut option, if an existing cut unit is not pasted.
- Cut and Paste unit in the Rack view:
  - Right-click the selected chassis or panel and click **Cut**.
  - Right-click on an empty slot in the same or different rack and click **Paste**.  
Cisco ONP disables the Paste option, if you try to paste the unit in the prohibited slots.  
Cisco ONP disables the Cut option, if an existing cut unit is not pasted.
- Move unit in the left panel:
  - Go to **Move to > Site-X > Rack-X** above the Rack view to move the chassis to the same or different rack.  
Or go to **Move to > Site-X > + New rack** above the Rack view to move the chassis to a new rack.
- Move unit in the Rack view:
  - Right-click the selected chassis or panel and go to **Move to > Site-X > Rack-X** to move the chassis to the same or different rack. Or go to **Move to > Site-X > + New rack** to move the chassis to a new rack.

**Note** The **Move to** option moves the unit automatically to the immediate empty slot. The **Cut** and **Paste** option moves the unit to the selected empty slot.

**Step 9** Click **Done** to save the changes in the Layout.

A warning message appears when empty racks are present in the layout.

**Step 10** Click **OK** to remove the empty racks.

---

# View Internal Node Connections of NCS 1010 Network

Table 24: Feature History

| Feature Name                                       | Release Information   | Feature Description   |
|--|-----------------------|---|
| View Internal Node Connections of NCS 1010 Network | Cisco ONP Release 5.0 | The Node diagram tab displays a functional view that includes precise connections and port labeling of each component such as OLT or ILA, NCS1K-BRK-8/16/24, AAWG-32-O, and AAWG-32-E, for each site in an analyzed NCS 1010 network. |

## Before you begin

[Log in to Cisco ONP Web Interface, on page 5.](#)

**Step 1** Choose **FileOpen**.

The **Select Network To Open** dialog box appears.

**Step 2** Click the analyzed NCS 1010 network.

The network opens.

**Step 3** Choose **Network > Analyze**.

**Note** Network must be successfully analyzed to proceed further.

**Step 4** Click the **Layout > Node Diagram** tabs.

**Step 5** Click each site in the left panel and select a side to view the functional view of the site.

The functional view includes both the combination of physical and logical connections such as:

- Degree interconnections between NCS1010 (OLT or ILA) and NCS1K-BRK-8
- Add/drop connections between NCS1010 and colorless add/drop units (NCS1K-BRK-8, NCS1K-BRK-16, or NCS1K-BRK-24) and colored add/drop units (AAWG-32-O or AAWG-32-E)

**Step 6** Hover over the cable to view the details such as name of the ports that are connected and the cable ID.



# Design Networks with SVO Card

An SVO card along with the application software provides functionality-based licenses for alarm correlation, performance monitoring, connection verification, and Optical Time Domain Reflectometry (OTDR). You can design a network with ROADM and TRAFFIC nodes that are equipped with SVO cards.

## Features

- The SVO card is a two-slot card.
- The SVO card acts as the primary card for all the networks after Release 12.1.0.
- To achieve high availability, you can have two SVO cards equipped in one node.
- You can use two 10G SFP+ pluggables to connect two SVO cards present in a node.
- You cannot have two SVO cards in the same chassis, to achieve high availability in the network.
- When designing the network, you can connect a Cisco ASR 920 Switch to the SVO cards.
- The SVO can be used as a card or as a UCS-based solution.

## SVO Licenses

SVO cards require either Base License or SVO Full License (High Availability, Connection Verification, Flex Spectrum). If you do not select SVO Full License, by default, SVO Base License and High Availability are enabled.

The different types of SVO licenses are

- Cisco NMS: This includes features such as High Availability, Connection Verification, Flex spectrum, and OTDR.
- Third-Party NMS: This includes features such as NBI (North Bound Interface), Alarm Correlation, Performance Monitoring, and Circuit Provisioning.

## Chassis Licensing

- Every chassis added to the network must have license after Release 12.1.0. For the release upgraded network, a new chassis license is added after it is analyzed in Cisco ONP Release 4.0 or higher.
- There are many variants of the chassis license, such as 1-chassis, 5-chassis, 10-chassis, 20-chassis, 50-chassis, and so on. The variants of chassis license are added based on cost optimization.
- A license is required for every chassis that is added to the network after the first chassis.
- Chassis License Flush Out: You can flush out the existing chassis license and purchase a new chassis license. If you hold the existing chassis license, the license remains active even if the site is unlocked.
- Chassis License Flush Out is supported only in the network upgrade mode.
- You can use the existing license with new changes in chassis, if you do not use the Chassis License Flush Out option.

## Associate OLA or DGE Sites with SVO Cards

The following procedure shows how to associate OLA sites with the SVO cards:

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5.](#)

- 
- Step 1** In the network tree panel, right-click any ROADM site.
- Step 2** Click **Edit SVO Associations**.
- Step 3** Select the OLA sites on the map to toggle the SVO connections. Click **Done** at the top-right corner to confirm the selection.
- You can open widgets in the map and select top section to view the association.

**Note** You can also right-click any ROADM site from the Map and click **Edit SVO Associations**. For the sites that are of DGE type, the **Edit SVO Associations** option is not displayed.

The tool associates the OLA and DGE sites that are not associated by you, with the SVO card during the network analysis.

---

## Export NETCONF XML File

You can export the NETCONF (Network Configuration Protocol) XML files for all the individual sites in a network or the complete network. The following procedure, shows how to export NETCONF XML files for the complete network from the Cisco ONP GUI.

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5.](#)

*Table 25: Feature History*

| Feature Name                              | Release Information   | Feature Description  |
|---|-----------------------|--|
| Export NETCONF File from NCS 1010 network | Cisco ONP Release 5.0 | You can export the NETCONF XML files for all the NCS 1010 nodes, and upload them to the NCS 1010 nodes through the Yang suite. This enables automatic bring up of the NCS 1010 nodes using the NETCONF data. |

The network must be in Analyze mode.

---

- Step 1** In the network tree panel, right-click the network.
- Step 2** Click **Generate NetConf XML**.

The message, "Success. Netconf exported successfully" appears.

You can download the zip file that contains NETCONF XML files of individual sites.

**Note** You can choose the destination folder to save the downloaded NETCONF XML files of individual sites. This feature has limited scope in this release.

---

## Export NETCONF XML Files for Individual Sites

The following procedure shows how to export NETCONF XML files for individual sites from the Cisco ONP GUI.

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5.](#)

The network must be in Analyze mode.

---

- Step 1** In the network tree panel, enable the **Stage** button.
  - Step 2** Check the individual site check box.  
You can select only one site at a time and download the NETCONF XML file for that site by enabling the **Stage** button.
  - Step 3** Right-click the site.
  - Step 4** Click **Generate NetConf XML**.  
The message, "Success. Netconf exported successfully" appears.
- 

## Upload NETCONF XML Files on SVO Web Interface

The following procedure shows how to upload the NETCONF XML files on the SVO web interface:

---

- Step 1** In the browser URL field, enter the IP address of the SVO line card.  
The login page appears.
- Step 2** Enter the username and password.
- Step 3** Click **Login**.
- Step 4** Click the hamburger icon at the top-left of the page, and select **Node Configuration**.
- Step 5** Click the **Node Setup** tab.
- Step 6** Click **Select files**.
- Step 7** Browse to the NETCONF XML files exported from the Cisco ONP GUI and upload them.

If the passive unit ID in the NETCONF file exceeds the range 1–126, SVO displays an error message. Validate the XML file and reimport.

**Note** If the value of FEC mode already provisioned in the 200G-CK-C line card does not match with the value available in the NETCONF XML file, SVO displays an error message. We recommend that you remove the provisioned FEC settings for this card and reimport the XML file.

## Upload NETCONF Files to NCS 1010 Device

Use this task to upload the NETCONF files that downloaded from Cisco ONP into the NCS 1010 device using a NETCONF client.

- Step 1** Log in to the NETCONF Yang Suite which has access to the NCS 1010 device.
- Step 2** Connect to the NCS 1010 device.
- Step 3** Copy the NETCONF XML file content that is downloaded from Cisco ONP, and paste it into the Protocol NETCONF Run RPC block.
- Step 4** Append the following commit code at the end of the NETCONF XML file content.

```
<rpc xmlns="urn:ietf:params:xml:ns:netconf:base:1.0" message-id="102">
<commit/>
</rpc>
```

## Export Planning Data for Cisco Optical Network Controller

*Table 26: Feature History*

| Feature Name  | Release Information   | Feature Description  |
|---|-----------------------|--|
| Export Network Planning Data for Cisco Optical Network Controller (Cisco ONC) | Cisco ONP Release 5.0 | You can export the network planning data in the form of a JSON file. This JSON file can be uploaded into Cisco ONC to configure the managed devices in bulk. |

Use this task to export the network planning data which is in the form of JSON file from Cisco ONP. This JSON file is uploaded into Cisco ONC to configure the managed devices.

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5.](#)

The network must be in Analyze mode.

- 
- Step 1** In the network tree panel, right-click the network name.
- Step 2** Click **Generate CONC JSON**.
- Step 3** In the **Export File** dialog box, enter the name of the JSON file.
- Step 4** Click **Export** to download the JSON file into your local system.
- 

## Upload Planning Data into Cisco ONC

Use this task to upload the network planning data (JSON file) downloaded from the Cisco ONP.

- 
- Step 1** Log into Cisco ONC.
- Step 2** Hover over the **Import** icon in the left panel and click **Planning Data Import**.
- Step 3** Click **Import**.
- Step 4** Browse and select the JSON file that is downloaded from Cisco ONP.
- You can use the planning data to configure the devices managed by Cisco ONC.
-





## CHAPTER 4

# Modify Network Properties

---

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- [Modify Fiber Properties , on page 95](#)
- [Modify Fiber Couple Properties, on page 101](#)
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## Modify Network Properties

Use this task to modify the properties of the network.

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5.](#)

- 
- Step 1** In the network tree, click the network name.  
You can view the basic properties of the network at the bottom of the network tree.
- Step 2** Modify the following network properties as required.

| Property         | Platform             | Description  |
|------------------|----------------------|--|
| Name             | NCS 2000<br>NCS 1010 | Modify the network name as required.   |
| Quick Analysis   | NCS 2000             | <p>Check the <b>Quick Analysis</b> check box to quickly analyze the network by using a less accurate algorithm.</p> <p>The quick analysis option does not optimize DCU and amplifier placement algorithm, hence resulting in an approximate BoM.</p> <p>To receive an accurate BoM, uncheck the <b>Quick Analysis</b> check box.</p>   |
| DWDM Interfaces  | NCS 2000             | <p>Cisco ONP supports 100G and 200G transceivers as DWDM interfaces.</p> <p>This option is applicable only for automatically created waves, when OTN services are present.</p> <ul style="list-style-type: none"> <li>• 100G—The entire network chooses the 100G wavelength for transmission.</li> <li>• 200G—The entire network chooses the 200G wavelength for transmission.</li> </ul> <p>If you enable both 100G and 200G options, by default, the entire network chooses 200G wavelength for transmission. If 200G wavelength is not optically feasible, then it selects 100G automatically for transmission.</p> |
| Customer Name    | NCS 2000<br>NCS 1010 | Enter the customer name.   |
| Project          | NCS 2000             | Choose ANSI (North American standard) or ETSI (European Telecommunications Standards Institute) from the drop-down list. ANSI networks do not allow you to define SDH (ETSI) service demands. ETSI networks do not allow you to define SONET (ANSI) service demands.   |
|                  | NCS 1010             | Displays the type of the project, ANSI, or ETSI. You cannot edit it.   |
| Measurement Unit | NCS 2000<br>NCS 1010 | Select the unit of measurement of span length. The available options are Miles and Km.   |
| A2A Mode         | NCS 2000             | <p>Choose the A2A (Any to Any) mode. The available options are:</p> <ul style="list-style-type: none"> <li>• A2A_None</li> <li>• A2A_FAST</li> </ul>   |



| Property                  | Platform | Description   |
|---------------------------|----------|---|
| A2A Power Output          | NCS 2000 | The power output value is based on the chosen A2A mode.   |
| A2A Demand Type           | NCS 2000 | The demand type is based on the chosen A2A mode.  |
| A2A Channel Type          | NCS 2000 | <p>Choose the type of channel. You can choose multiple types. The available options are:</p> <ul style="list-style-type: none"> <li>• Contentionless—This property enables an N-degree ROADM node to accommodate N wavelengths of the same frequency from a single add or drop device.</li> <li>• Colorless—The colorless property enables tuning of channel wavelengths without changing the optical interface of the port.</li> <li>• Colored—The Colored property dedicates a separate port for each wavelength.</li> </ul>                  |
| SSON                      | NCS 2000 | Indicates whether the network is an SSON network.   |
| Use client Payg           | NCS 2000 | <p>Check this check box to enable the Pay As You Grow feature on the client cards.</p> <p>The PAYG feature enables you to implement a cost-effective solution when the wavelength requirements are comparatively less than the maximum capacity of the network. A standard card is configured to work on maximum supported wavelengths, whereas PAYG license comprises license restricted cards and a base license. So, instead of purchasing a standard card, you can purchase a PAYG license.</p>   |
| Naming Convention Enabled | NCS 2000 | <p>(Display only.) By default, the Naming Convention Enabled option is enabled by default for the networks that are created in Cisco ONP, and you cannot edit it. By default, the sides are named from T, S, R, Q, P, O, N, M, L, K, J, I, H, G, F, E, and index, depending upon the used Scalable Upto parameter.</p> <ul style="list-style-type: none"> <li>• You can import a mpz network without naming convention enabled, but the Cascaded SMR option remains disabled.</li> <li>• You cannot edit the label name of the side.</li> </ul> |
| <b>System Release</b>     |          |   |
| NCS 1010                  | NCS 1010 | Displays the system release of the NCS 1010 node in the network.  |
| NCS 4K                    | NCS 4000 | Displays the system release of the NCS 4000 node in the network.  |

| Property   | Platform             | Description  |
|--|----------------------|--|
| NCS 2K   | NCS 2000             | Displays the system release of the NCS 2000 node in the network.   |
| NCS 1K (Available only on the SSON network)                      | NCS 1004             | Displays the system release of the NCS 1004 node in the network.   |
| Previous NCS 2K (Available only on the Release upgraded network) | NCS 2000             | Displays the system release of the NCS 2000 node in the network, before the Release upgrade.   |
| SVO  | NCS 2000             | Choose the type of network management solution. The available options are: <ul style="list-style-type: none"> <li>• SVO—Chooses SVO card.</li> <li>• UCS—Chooses SVO application that is hosted on a server.</li> <li>• Auto—Chooses SVO card as default, for SVO solution.</li> </ul> |
| <b>Network Application Configuration</b>                         |                      |  |
| Use Coordinates Distance   | NCS 2000<br>NCS 1010 | Check this check-box to use the x and y coordinate to calculate the fiber length.  |
| Link-Tuner   | NCS 1010             | Check this check-box to enable the link-tuner  |
| Raman-Tuner  | NCS 1010             | Check this check-box to enable the Raman tuner.  |
| Raman Gain Auto Tuner  | NCS 1010             | Check this check-box to enable the Raman gain auto tuner.  |
| Raman Amplification  | NCS 1010             | Choose whether Raman amplification is Auto or User Forced.   |
| Maximum Auto Ramans  | NCS 1010             | Choose the maximum number of raman enabled links on an end to end circuit path. The available options are 1–3.   |

**Step 3** Click **Update**.

**Step 4** To modify advanced properties of the service, click **Show Advanced Properties** or choose **Network > Entity Editor**.

**Step 5** In the **Entity Editor** window, click the **Site** tab.

**Step 6** Click the network, and modify the properties in the right pane.

**Step 7** Click **Update**.

## Modify Site Properties

Use this task to modify properties of the site.

**Table 27: Feature History**

**Table 27: Feature History**

| Feature Name    | Release Information   | Feature Description  |
|-----------------|-----------------------|--|
| Shared SMR Port | Cisco ONP Release 4.2 | You can enable the <b>Colored Add/Drop</b> property. This feature supports the use of contentionless and colored demands connected to the same port of SMR card. With the <b>Shared SMR Port</b> enabled, you can create and validate the contentionless and colored configuration on a 16-degree SMR-20 node. |

Log in to Cisco ONP Web Interface, on page 5.

In the network tree, expand **Sites**, and click a site.

You can view the basic properties of the site at the bottom of the network tree.

Modify the following site properties as required.

| Property       | Platform             | Description   |
|----------------|----------------------|---|
| <b>General</b> |                      |   |
| Name           | NCS 2000<br>NCS 1010 | Enter the site name, either alphanumeric or numeric.  |
| Type           | NCS 2000             | Choose the type of site. For example, ROADM, OLA, PASSTHROUGH, or a Traffic site. <ul style="list-style-type: none"> <li>You can add a passthrough site as a place holder. You cannot add services or waves to this site and therefore cannot generate the report. Later, you can convert the passthrough site to a ROADM, OLA, or the Traffic site in the design mode.</li> <li>OLA is an optical line amplifier site that is used only for amplification. You cannot add service or waves on this site.</li> <li>You cannot add a Traffic site of the type 4K-2K into an SSON network.</li> </ul> |
|                | NCS 1010             | Choose the type of site. For example, ROADM, OLA, or PASSTHROUGH.   |
| Node Type      | NCS 2000             | The default value is FLEX NG-DWDM for all nodes. This field is non-editable.  |

| Property                             | Platform             | Description  |
|--------------------------------------|----------------------|--|
| Equipment Configuration              | NCS 2000             | Choose the configuration from the drop-down list. This option is available only for the Traffic site. The available options are: <ul style="list-style-type: none"> <li>• Large CO - NCS 4016</li> <li>• Small Site - NCS 4016</li> <li>• Small Site - NCS 4009</li> </ul>                 |
| Traffic Type (only for Traffic site) | NCS 2000             | Choose the traffic type. The available options are: <ul style="list-style-type: none"> <li>• 4K_1K_2K (for SSON)</li> <li>• 1K_2K (for SSON)</li> <li>• 4K_2K (non- SSON)</li> </ul>   |
| SSON                                 | NCS 2000             | Indicates whether the network is an SSON network.  |
| SVO                                  | NCS 2000             | This property is noneditable at site level. This property enables you to select SVO card as Server or Line card at the network level.  |
| <b>Layout</b>                        |                      |  |
| Chassis Type                         | NCS 2000             | Choose the type of chassis. Chassis type is supported for all the sites except passthrough. <p>The available options are:</p> <ul style="list-style-type: none"> <li>• M6 Chassis</li> <li>• M15 Chassis</li> <li>• Auto</li> </ul> <p>M15 is the default option when you choose Auto.</p> |
| Power Supply                         | NCS 2000<br>NCS 1010 | Choose the type of Power Supply. The available options are Auto, AC Power, and DC Power. <p>The default option is Auto.</p>  |
| <b>C Band</b>                        |                      |  |

| Property              | Platform | Description   |
|-----------------------|----------|---|
| Structure             | NCS 2000 | <p>Choose the type of the site. The available options for ROADM and Traffic sites are:</p> <ul style="list-style-type: none"> <li>• Multi-degree</li> <li>• Line</li> <li>• Terminal</li> </ul> <p>For OLA and PASSTHROUGH, it is Line, and you cannot edit it.</p>   |
|                       | NCS 1010 | <p>Choose the type of the site. The available options for ROADM sites are:</p> <ul style="list-style-type: none"> <li>• Multi-degree</li> <li>• Line</li> <li>• Terminal</li> </ul> <p>For OLA and PASSTHROUGH, it is Line, and you cannot edit it.</p>   |
| Functionality         | NCS 2000 | <p>Displays the site functionality. Following is the functionality available for each type of sites:</p> <ul style="list-style-type: none"> <li>• Optical Cross Connect (OXC) for ROADM and traffic site</li> <li>• Auto or Line Amplifier for OLA site, Cisco ONP downgrades OLA site to passthrough if OLA is not required</li> <li>• Passthrough for passthrough site</li> </ul>     |
|                       | NCS 1010 | <p>Displays the site functionality. ROADM is the default functionality for all site types.</p>  |
| Scalable up to Degree | NCS 2000 | <p>This parameter determines the maximum number of degrees, ducts, or line sides that can be supported by the site.</p> <p>For NCS 2000 site, the available options are 2, 4, 8, 12, and 16. The default option is 4. The network is scalable up to 16 degrees for ROADM and Traffic sites. Choose 2 to have a LINE ROADM site.</p> <p>For OLA, the value is 2 and is noneditable .</p> |
|                       | NCS 1010 | <p>For NCS 1010 site, the available options are 7, 9, 15, 17, 23, 25, and 31.</p>   |

| Property    | Platform             | Description   |
|-------------|----------------------|---|
| Site Type   | NCS 2000             | Choose the type of site. The available options are: <ul style="list-style-type: none"> <li>• Auto</li> </ul> <p>Note When you choose Auto, the default option is SMR-20.</p> <ul style="list-style-type: none"> <li>• SMR-20</li> <li>• SMR-9</li> </ul> <p>The Site type is Line for the OLA site.</p> |
|             | NCS 1010             | For NCS 1010 site, the only option is OLT, and it is not editable.  |
| L0 Platform | NCS 2000<br>NCS 1010 | Displays the platform. For example, NCS 1010 or NCS 2000.   |

**Step 3** Click **Update**.

**Step 4** To modify advanced properties of the site, click **Show Advanced Properties**, or choose **Network > Entity Editor**.

**Step 5** In the **Entity Editor** window, expand **Sites** under the network tree, choose the site, and modify the following properties that are displayed in the right pane. For more information on entity editor, see [Entity Editor, on page 174](#).

| Properties     | Platform                         | Description  |
|----------------|----------------------------------|--|
| <b>General</b> |                                  |  |
| CLLI Code      | NCS 1004<br>NCS 2000<br>NCS 4000 | Enter a string holding the CLI code.   |
| Site Address   | NCS 2000<br>NCS 1010             | Enter the site address.  |
| Evolved Mesh   | NCS 2000                         | By default, this option is unchecked. When you enable this feature on the network, it is automatically enabled on the associated sites of the network. |
| Status         | NCS 2000                         | Displays the status of the network. It shows whether the network is <b>Up</b> or <b>Down</b> .   |
| Weight Lbs     | NCS 1004<br>NCS 2000<br>NCS 4000 | Displays the weight of all the units of the site, in pounds.   |

| Properties              | Platform             | Description  |
|-------------------------|----------------------|--|
| Node Protection         | NCS 2000             | Choose the Node Protection. The available options are: <ul style="list-style-type: none"> <li>• Same shelf</li> <li>• Separated shelves</li> </ul>   |
| Mpo16Lc                 | NCS 2000             | Displays the fan-out module. The default option is MF-MPO-16LC.<br><br>The MPO-16 to 16-LC fan-out module is a double slot module with one MPO-16 connector (COM) and eight LC duplex connectors. The MPO-16 connector is compatible with the SMR20 FS EXP and 16-AD-CCO FS units. |
| Mpo16ToMpo8             | NCS 2000             | Choose the required Mpo16 to Mpo8 converter. The available options are: <ul style="list-style-type: none"> <li>• MPO16ToMPO8Cable</li> <li>• MF-2MPO_AD</li> </ul>   |
| MPO Cable               | NCS 1010             | Choose the required Mpo cable. The available options are: <ul style="list-style-type: none"> <li>• Auto</li> <li>• 16MPO-MPO</li> <li>• 24MPO-MPO</li> </ul>   |
| Cascaded SMR            | NCS 2000             | Enable this option to add Layer-2 contentionless sides.  |
| Flex Spectrum           | NCS 2000             | By default, this check-box remains checked for newly created network. You cannot edit it.  |
| Grooming Site           | NCS 2000<br>NCS 4000 | When you enable this option, it indicates that OTN traffic can be groomed at this site.  |
| MR-MXP BreakOut Cable   | NCS 2000             | Check this check box to use the ONS-MPO-MPOLC-10 breakout cable to interconnect the client ports of the MR-MXP card with the NCS2K-MF-MPO-20LC passive module.   |
| 8X10G-FO                | NCS 2000             | Check this check box to use the NCS2K-MF-8X10G-FO passive module only for 10G on the client-side of the NCS2K-400G-XP card. By default, this passive module is enabled.  |
| <b>Bill of Material</b> |                      |  |
| Enable NCS              | NCS 2000             | This feature enables NCS features on all sites in the network.   |

| Properties              | Platform | Description  |
|-------------------------|----------|--|
| Use PAYG                | NCS 2000 | <p>The Pay As You Grow (PAYG) functionality significantly reduces the initial setup cost and enables the purchase of another wavelength capacity on a need basis.</p> <p>PAYG enables port-based cost or licensing for SMR-9 and SMR-20 cards.</p>   |
| Connection Verification | NCS 2000 | <p>Enable this check box to:</p> <ul style="list-style-type: none"> <li>• Validate the correct optical interconnection between the optical cards inside a Flex ROADM.</li> <li>• Measure the insertion loss of the external passive path.</li> <li>• Validate the quality of the connections to the patch panel.</li> <li>• Check if the insertion loss is within expected value.</li> </ul> <p>The following cards support connection verification:</p> <ul style="list-style-type: none"> <li>• SMR20 FS CV</li> <li>• MF-DEG-5-CV</li> <li>• MF-MPO-16LC-CV</li> <li>• MF-UPG-4-CV</li> </ul> |
| New FS-SMR PID          | NCS 2000 | <p>By default, this check-box remains checked for newly created network. You cannot edit it. This option enables displaying of new SMR-20 PID in the BOM page.</p> <p>You can enable this option when you unlock an mpz network where SMR-20 is selected, during upgrade or release upgrade.</p>   |
| <b>Layout</b>           |          |  |
| Chassis Type            | NCS 2000 | <p>Choose the type of chassis. The available options are:</p> <ul style="list-style-type: none"> <li>• M6, and M15 Chassis for OLA</li> <li>• M6 Chassis for ROADM and Traffic</li> <li>• M15 Chassis for ROADM and Traffic</li> <li>• Auto for all nodes</li> </ul> <p><b>Note</b> Chassis type is not supported for the passthrough site.</p>  |



| Properties                | Platform             | Description  |
|---------------------------|----------------------|--|
| Power Supply              | NCS 2000             | <p>Choose the type of Power Supply.</p> <p>For NCS 2000 site, the available options are based on the chassis type:</p> <ul style="list-style-type: none"> <li>• Auto for all type of chassis</li> <li>• AC Power, DC power for M15 and M2 chassis</li> <li>• AC Power, DC Power, AC2 Power, DC40 Power, and DC20 Power for M6 chassis</li> </ul>   |
|                           | NCS 1010             | The options available for NCS 1010 site are Auto, AC Power, and DC power.  |
| Controller Card           | NCS 2000             | <p>Choose the type of the controller card.</p> <p>For NCS 2000 site, the default controller card is TNCS-2. The available options are based on the chassis type chosen. By default, controller cards that are supported by M15 chassis are listed. The available options are:</p> <ul style="list-style-type: none"> <li>• Auto</li> <li>• TNC/TSC, TNC-E/TSC-E, TNCS, TNCS-0, TNCS-2, and TNCS-20 for M2 chassis</li> <li>• TNC/TSC, TNC-E/TSC-E, TNCS, TNCS-0, TNCS-2, and TNCS-20 for M6 chassis</li> <li>• TNCS, TNCS-0 TNCS-2, TNCS-20 for M15 chassis</li> </ul> |
|                           | NCS 1010             | <p>The following options are available for NCS 1010 site:</p> <ul style="list-style-type: none"> <li>• Auto</li> <li>• NCS1010-CNTRL-K9</li> </ul>   |
| Redundant Controller Card | NCS 2000<br>NCS 1010 | Choose whether to use a redundant controller card.   |

| Properties             | Platform             | Description   |
|------------------------|----------------------|---|
| Layout Template        | NCS 2000             | <p>Choose the required layout template.</p> <p><b>Note</b> After the chosen layout template is applied, all layout properties will be reset and disabled.</p> <p><b>Note</b> After design analysis, if the applied layout template is not considered for card placement in the layout, check for the error message (non- critical) under the <b>Elements &gt; Messages</b> tab. If you see a template-related error which indicates that there is a mismatch between the cards that are defined in template and the cards that are created on the site, perform the following:</p> <ul style="list-style-type: none"> <li>• Export the template from the <b>Layout</b> page, and modify it as required.</li> <li>• Import the modified template using the <b>Manage &gt; Layout Template</b> option.</li> <li>• Switch to Design mode and apply the template to the site using the <b>Entity Editor</b>.</li> <li>• Reanalyze the network to get the correct layout populated.</li> </ul> |
| UTS AC Power Cables    | NCS 2000<br>NCS 1010 | Choose the type of cables to be used for the AC power supply. Cables are listed based on the country type and the Chassis type selected.  |
| Redundant Power Scheme | NCS 2000             | <p>Choose the redundant power scheme from the drop-down list to configure the number of working and protected power units for the chassis.</p> <p>For NCS 2000 site, the options available are based on the chassis type. For M15 chassis, the options available are 1+0, 1+1, 2+0, 2+1, 3+0, 3+1, 2+2, 3+1 is the default redundancy power scheme for M15 DC chassis and 2+2 is the default redundancy power scheme for M15 AC chassis. For example, if you choose 3+1 redundant power scheme, there are 3 working power units and 1 protected power unit.</p> <p>For M6 chassis, the options available are Auto, Yes, and No.</p>   |
|                        | NCS 1010             | For NCS 1010 site, The options available are Auto, 1+0, and 1+1.  |

| Properties             | Platform             | Description  |
|------------------------|----------------------|--|
| Raman Adapter Share    | NCS 2000             | This option is available only for the OLA site. By default, this check box remains checked. This option indicates that MF-2LC-ADP can be shared with EDRA amplifiers and not with RAMAN amplifiers irrespective of the default selection.  |
| ECU Type               | NCS 2000             | <p>Choose the External Connection Unit (ECU) type from the drop-down list. The options available are based on the chassis type. By default, the ECU applicable for M15 is listed.</p> <ul style="list-style-type: none"> <li>• ECU—Has 12 USB 2.0 ports and supports IEEE1588v2 PTP, time-of-day (ToD), and pulse-per-second (PPS) inputs.</li> <li>• ECU-S—Similar to ECU except that it has eight USB 2.0 ports and two USB 3.0 ports.</li> <li>• ECU60-S—Variant of ECU-S introduced for the NCS 2006 when the shelf is powered at –60VDC nominal input voltage.</li> </ul> <p>ECU-S and ECU60-S are supported only for M6 chassis.</p> |
| MF Unit                | NCS 2000             | <p>Choose the mechanical frame for the passive optical modules from the drop-down list. The options available are Auto, MF-6RU/MF-10RU, and MF-1RU.</p> <ul style="list-style-type: none"> <li>• The NCS2K-MF-1RU has four slots for the passive optical modules.</li> <li>• The NCS2K-MF-6RU supports up to 14 single-slot passive optical modules such as any combination of NCS2K-MF-DEG-5, CS2K-MF-UPG-4, or Connection Verification (CV) units.</li> <li>• The NCS2K-MF10-6RU supports up to 10 double-slot passive optical modules such as NCS2K-MF-MPO-16LC=.</li> </ul>  |
|                        | NCS 1010             | For NCS 1010 site, the available options are Auto, MF-4RU, and MF-1RU.   |
| Chassis Disaggregation | NCS 2000             | If you check this check-box, ROADM, and transponder cards are placed in different chassis.   |
| <b>Map</b>             |                      |  |
| X Coordinate           | NCS 2000<br>NCS 1010 | It represents the longitudinal location of the site. Longitude can be positive or negative (-180 to 180). Negative is west of Greenwich, and positive is eastward.   |

| Properties                | Platform             | Description  |
|---------------------------|----------------------|--|
| Y Coordinate              | NCS 2000<br>NCS 1010 | It represents the latitudinal location of the site. Latitude can be positive or negative (- 90–90), north and south of the Equator.  |
| Position Lock             | NCS 2000<br>NCS 1010 | Check this check box to lock the site position on the map.   |
| <b>C Band</b>             |                      |  |
| Shared SMR Port           | NCS 2000             | <p>Check this check box to connect Contentionless unit 16-AD-CCOFS and Colored unit MD-48-ODD/Even to the same MPO port of SMR-20. When Shared SMR port is enabled, MD-48-ODD/EVEN unit connects to the specific side of SMR-20 through MPO-8LC and UPG-4 instead of directly connecting to SMR-20 through MPO-16LC.</p> <p><b>Note</b> Shared SMR port becomes disabled, if</p> <ul style="list-style-type: none"> <li>• <b>Degree Mesh Type</b> property is <i>PPMESH8-5AD</i></li> <li>• Or, <b>Site Type</b> property is <i>SMR-9</i> and <b>Scalable Upto Degree</b> property is 8</li> </ul> |
| Degree Mesh Type          | NCS 2000             | <p>Choose the mesh type for Flex NG-DWDM site. The available options are:</p> <ul style="list-style-type: none"> <li>• DEG-5/UPG-4</li> <li>• PPMESH8-5AD</li> </ul> <p>DEG-5/UPG-4 is the default value.</p>  |
| Degree Type               | NCS 1010             | Displays the type of degree. For example, BRK-8.   |
| Pre Equip Degree          | NCS 2000             | <p>This parameter determines the number of degrees to be considered for the site hardware placement on day 0.</p> <p>For NCS 2000, the values can be None, Auto, 4, 8, 12 or 16. The default option is None. If you choose None, only the sides that are present in the Cisco ONP GUI are shown. The values in the drop-down list are populated based on the value of scalable up to degree parameter.</p>   |
|                           | NCS 1010             | For NCS 1010 site, the options available are Yes and No.   |
| <b>SVO</b>                |                      |  |
| Chassis License Flush Out | NCS 2000             | Allows you to flush out the existing chassis license and purchase new chassis license.   |

| Properties                      | Platform | Description  |
|---------------------------------|----------|--|
| SVO Pluggables                  | NCS 2000 | <p>You can choose one of the following options from the drop-down list. When you choose Auto, ONS_SC+-10G_SR is the default option.</p> <ul style="list-style-type: none"> <li>• Auto</li> <li>• ONS-SC +- 10G-SR</li> <li>• ONS-SC +-10G-LR</li> </ul> <p><b>Note</b> The SVO pluggables are not applicable for UCS-based SVO network design.</p> |
| <b>Cisco NMS</b>                |          |  |
| SVO Full License                | NCS 2000 | Enable this check box to add High Availability (Feature and License), Connection Verification license, Flex Spectrum license, and OTDR license packaged in it.   |
| High Availability               | NCS 2000 | Enable this check box to add the High Availability feature to the license package.   |
| Connection Verification License | NCS 2000 | Enable this check box to add the Connection Verification feature to the license package.   |
| SVO Flex Spectrum License       | NCS 2000 | Enable this check box to add the Flex Spectrum feature to the SVO license package. For SSON networks, Flex Spectrum license is enabled by default.   |
| OTDR License                    | NCS 2000 | Enable this check box to add the OTDR feature to the license package.  |
| <b>3rd party NMS</b>            |          |  |
| 3rd party Full License          | NCS 2000 | Enable this check box to add NBI (North Bound Interface), Alarm Correlation, Performance Monitoring, and Circuit Provisioning features to the license package.   |
| NBI                             | NCS 2000 | Enable this check box to add the NBI feature to the license package.   |
| Alarm Correlation               | NCS 2000 | Enable this check box to add the Alarm Correlation feature to the license package.   |
| Performance Monitoring          | NCS 2000 | Enable this check box to add the Performance Monitoring feature to the license package.  |
| Circuit Provisioning            | NCS 2000 | Enable this check box to add the Circuit Provisioning feature to the license package.  |

**Step 6** Click **Update**.

## Add Contentionless Side to a Site

Contentionless functionality on a site refers to the contentionless add or drop ability of an N-degree ROADM node to accommodate N wavelengths of the same frequency from a single add or drop device. For a ROADM to be contentionless, the number of drop units should be equal to ROADM degrees.

Use the following procedure to add contentionless sides to a ROADM or traffic site:

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5.](#)

**Step 1** Choose **File > Open**.

The **Select Network To Open** dialog box appears.

**Step 2** Click the network in which you want to add contentionless sides to a site.

The network opens.

**Step 3** Choose **Network > Entity Editor**.

**Step 4** Click the site to which you want to add contentionless sides.

**Step 5** Click the **Add Contentionless Side** icon.

**Step 6** Enter the appropriate value in the **Enter number of contentionless sides** field.

The number of contentionless sides that can be added to a site depends on the type of site, the **Scalable Upto Degree** property. The following table explains the same.

**Table 28: Contentionless Sides for Layer-1 SMR**

| Site Type | Scalable Upto Degree | Number of Contentionless Sides |
|-----------|----------------------|--------------------------------|
| SMR-20    | 4                    | 16                             |
| SMR-20    | 8                    | 12                             |
| SMR-20    | 12                   | 8                              |
| SMR-20    | 16                   | 4                              |
| SMR-20    | Line                 | 8                              |
| SMR-20    | Terminal             | 8                              |
| SMR-9     | 4                    | 5                              |
| SMR-9     | 8                    | 1                              |

**Step 7** To add layer-2 SMR-20 contentionless sides, perform the following steps:

- Check the **Evolved Mesh** check box.
- Choose **Site Type** as *SMR-20* or *Auto*.
- Check the **Cascaded SMR** check box.
- Choose **Degree Mesh Type** as *DEG-5/UPG-4*.

e) Click **Update**.

You can add 20 more contentionless sides on each site for layer-2 SMR. The following table explains the same.

*Table 29: Contentionless Sides for Layer-2 SMR*

| Site Type | Scalable Upto Degree | Number of Contentionless Sides for Layer-1 Side | Number of Contentionless Sides for Layer-2 Side |
|-----------|----------------------|---|---|
| SMR-20    | 4                    | 16  | 20  |
| SMR-20    | 8                    | 12  | 20  |
| SMR-20    | 12                   | 8   | 20  |
| SMR-20    | 16                   | 4   | 20  |

**Step 8** Click **OK**.

## Modify Number of Contentionless Side Ports for a Site

Use this task to modify the number of contentionless ports for a side in a ROADM site.

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5.](#)

- 
- Step 1** Choose **File > Open**.  
The **Select Network To Open** dialog box appears.
- Step 2** Click the network in which you want to modify the number of contentionless ports for a side in a ROADM site.  
The network opens.
- Step 3** Choose **Network > Entity Editor**.
- Step 4** Expand a ROADM site and select a contentionless side.  
You can view the properties of the side in the right panel.
- Step 5** From the **Contentionless Ports** drop-down list, choose the required number of ports.  
Click **Update**.
- 

## Modify Fiber Properties

Use this task to modify the properties of fiber.

**Before you begin**

[Log in to Cisco ONP Web Interface, on page 5](#)

**Step 1** In the network tree, expand **Fiber**, and click a fiber.

You can view the basic properties of the fiber at the bottom of the network tree.

**Step 2** Modify the following fiber properties as required.

| Property       | Platform             | Description   |
|----------------|----------------------|---|
| <b>General</b> |                      |   |
| Name           | NCS 2000<br>NCS 1010 | By default, the name of the fiber is based on the number of fibers between the source and destination sites. You can edit the name. |
| Source         | NCS 2000<br>NCS 1010 | Displays the source site name. This field is noneditable.   |
| Destination    | NCS 2000<br>NCS 1010 | Displays the destination site name. This field is noneditable.  |
| Bidirectional  | NCS 2000<br>NCS 1010 | Indicates whether standard single fiber is used to transmit the data in both directions.  |



| Property   | Platform | Description  |
|------------|----------|--|
| Fiber Type | NCS 2000 | <p>Select the fiber type. Cisco ONP supports the following fibers, and the default fiber type is G652-SMF.</p> <ul style="list-style-type: none"> <li>• G652-SMF-28E</li> <li>• TWR</li> <li>• MC</li> <li>• TWPlus</li> <li>• TWMinus</li> <li>• TWClassic</li> <li>• FL</li> <li>• TL</li> <li>• G652-SMF</li> <li>• ELEAF</li> <li>• True wave</li> </ul> |
|            | NCS 1010 | <p>Select the fiber type. Cisco ONP supports the following fibers, and the default fiber type is G652-SMF.</p> <ul style="list-style-type: none"> <li>• G652-SMF-28E</li> <li>• TWR</li> <li>• MC</li> <li>• TWPlus</li> <li>• TWMinus</li> <li>• FL</li> <li>• TL</li> <li>• G652-SMF</li> <li>• ELEAF</li> <li>• True wave</li> </ul>                      |

| Property          | Platform             | Description  |
|-------------------|----------------------|--|
| Length            | NCS 2000<br>NCS 1010 | <p>Displays the span length of the fiber connecting a source and destination site. If necessary, change the span length manually.</p> <ul style="list-style-type: none"> <li>• The Cisco ONP tool automatically updates the fiber length to 1 km or 1 mile. If you change the fiber length, then the tool updates the same in the network tree and the map accordingly.</li> <li>• In the network tree pane, expand <b>Fiber</b> and select the fiber couple, A-Z and Z-A. The properties pane displays the fiber couple name, source side, destination side, its span length, loss, and, Polarization Mode Dispersion (PMD) value.</li> <li>• You can enter the different span length and loss values for the individual fibers in a fiber couple.</li> </ul> |
| Network status    | NCS 2000<br>NCS 1010 | Displays the status of the network, whether the network is being deployed or not. If the network is not deployed, it shows the status as UNDISCOVERED.   |
| Business status   | NCS 2000<br>NCS 1010 | Displays the status of the fiber in a business perspective view. If fiber is not deployed, it shows the status as FUTURE. This field is noneditable.   |
| Measurement Units | NCS 2000<br>NCS 1010 | Choose the measurement unit (Km or Miles) for the fiber span. You can set the measurement unit only for the duct, but not for the fiber pair (couple) or fiber.  |
| Aging Loss [dB]   | NCS 2000<br>NCS 1010 | Enter the aging loss value for the fiber.  |
| DCN Extension     | NCS 2000<br>NCS 1010 | Check this check box to enable the default use of data connection network (DCN) extension on each span in the project. This setting implies that the optical service channel (OSC) channel is not used to connect the two nodes.   |
| OSC FrameType     | NCS 2000             | <p>Choose the OSC frame type. The options available are:</p> <ul style="list-style-type: none"> <li>• Auto</li> <li>• OC3 Frame</li> <li>• GE Frame</li> <li>• FE Frame</li> </ul> <p>The default option is Auto. When set in Auto, Cisco ONP uses FE Frame as the preferred frame type.</p>   |

| Property                    | Platform             | Description  |
|-----------------------------|----------------------|--|
| Aging Factor                | NCS 2000<br>NCS 1010 | Enter the number to fiber aging factor.  |
| <b>Physical</b>             |                      |  |
| Length-Based Loss           | NCS 2000<br>NCS 1010 | The fiber loss value is automatically calculated based on length and loss coefficient, when you check this option.   |
| Tot SOL Loss w/o connectors | NCS 2000<br>NCS 1010 | Enter the start of life fiber loss value for each span, excluding the connector concentrated loss.   |
| <b>Raman Amplification</b>  |                      |  |
| Raman Amplified             | NCS 2000             | Enable Raman Amplification on the ducts.<br><br><b>Note</b> When you enable Raman amplification for NCS 2000 system release 12.2, the side property <i>Enable C+L Band S/C</i> is automatically disabled and vice versa. |

**Step 3** Click **Update**.

**Step 4** To modify advanced properties of the fibers, click **Show Advanced Properties**, or choose **Network > Entity Editor**.

**Step 5** Click the **FIBER** tab in the **Entity Editor** window.

**Step 6** Choose the fiber and modify the following properties in the right pane.

| Property         | Platform             | Description  |
|------------------|----------------------|--|
| <b>General</b>   |                      |  |
| Aging loss       | NCS 2000<br>NCS 1010 | Enter the aging loss value.  |
| DCN Extension    | NCS 2000<br>NCS 1010 | Enable the default use of data connection network (DCN) extension on each span in the network.   |
| OSC Frame Type   | NCS 2000<br>NCS 1010 | Choose the OSC frame type. The options available are Auto, OC3 Frame, Gigabit Ethernet Frame, and Fast Ethernet Frame. The default option is Auto. When set in Auto, Cisco ONP uses Fast Ethernet Frame as the preferred frame type. |
| Aging Factor     | NCS 2000<br>NCS 1010 | Enter the number to factor fiber aging. This factor is multiplied by the SOL total span loss without connectors.   |
| <b>Physical</b>  |                      |  |
| Connector Loss A | NCS 2000<br>NCS 1010 | Connector Loss at Source Site [dB]   |

| Property   | Platform             | Description  |
|--|----------------------|--|
| Connector Loss B   | NCS 2000<br>NCS 1010 | Connector Loss at Destination Site [dB]                                |
| <b>Factors</b>   |                      |  |
| Loss Coefficient [dB/km]                                       | NCS 2000<br>NCS 1010 | Loss is calculated based on the loss coefficient.                      |
| PMD Coefficient  | NCS 2000<br>NCS 1010 | Displays the PMD coefficient.  |
| QD C-Band  | NCS 2000<br>NCS 1010 | Displays the secondary order dispersion for C-band.                    |
| CD C-Band  | NCS 2000<br>NCS 1010 | Displays the secondary order dispersion for L-band.                    |
| RD Factor  | NCS 2000<br>NCS 1010 | Displays the random dispersion value.                                  |
| <b>Extended</b>  |                      |  |
| Effective Mode Area  | NCS 2000<br>NCS 1010 | Displays the effective mode area [ $\mu\text{m}^2$ ]                   |
| SRS tilt coefficient   | NCS 2000<br>NCS 1010 | Displays the Stimulated Raman Scattering tilt coefficient on the band. |
| DRBS coefficient   | NCS 2000<br>NCS 1010 | Displays the Rayleigh Scattering capture coefficient.                  |
| N2   | NCS 2000<br>NCS 1010 | Nonlinear index of refraction [ $1\text{e-}16 \text{ cm}^2/\text{W}$ ] |
| LFBR   | NCS 2000<br>NCS 1010 | Length of individual fibers for sigmaDSP [Km]                          |
| <b>Totals</b><br>(The properties under Totals are noneditable) |                      |  |
| Loss EOL   | NCS 2000<br>NCS 1010 | Displays the total loss EOL calculation.                               |
| Loss SOL   | NCS 2000<br>NCS 1010 | Displays the total loss SOL calculation.                               |

| Property  | Platform             | Description   |
|-----------|----------------------|---|
| CD C-Band | NCS 2000<br>NCS 1010 | Displays the total chromatic dispersion for the C-band. |
| QD C-Band | NCS 2000<br>NCS 1010 | Displays the secondary order dispersion for C-band.     |
| RD        | NCS 2000<br>NCS 1010 | Displays the random dispersion value.                   |
| PMD       | NCS 2000<br>NCS 1010 | Displays the Polarization Mode Dispersion (PMD) value.  |

**Step 7** Click **Update**.

## Modify Fiber Couple Properties

Use this task to modify properties of the fiber couple.

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5.](#)

**Step 1** In the network tree, expand **Fiber**, and drill down up to a fiber couple and click the fiber couple.

You can view the basic properties of the fiber couple at the bottom of the network tree.

**Step 2** Modify the following fiber couple properties as required.

| Property         | Platform   | Description  |
|------------------|--|--|
| <b>General</b>   |  |  |
| Name             | <ul style="list-style-type: none"> <li>• NCS 2000</li> <li>• NCS 1010</li> </ul> | By default, fiber couple is named based on the fiber name followed by COUPLE-AZ or COUPLE-ZA. The sides that are connected by the fiber couple are indicated inside brackets. The name is noneditable. |
| Source Side      | <ul style="list-style-type: none"> <li>• NCS 2000</li> <li>• NCS 1010</li> </ul> | Displays the source side name. This field is noneditable.  |
| Destination Side | <ul style="list-style-type: none"> <li>• NCS 2000</li> <li>• NCS 1010</li> </ul> | Displays the destination side name. This field is noneditable.   |

| Property                    | Platform   | Description   |
|-----------------------------|--|---|
| Length                      | <ul style="list-style-type: none"> <li>NCS 2000</li> <li>NCS 1010</li> </ul> | <p>Automatically displays the span length of the fiber connecting a source and destination side. Change the span length manually, if necessary.</p> <p>You can enter the different span length and loss values for the individual fibers in a fiber couple.</p> |
| <b>Factors</b>              |  |   |
| Loss coefficient [dB]       | <ul style="list-style-type: none"> <li>NCS 2000</li> <li>NCS 1010</li> </ul> | Enter the value of the SOL fiber loss per kilometer used to calculate the loss of each span in the network.   |
| <b>Totals</b>               |  |   |
| Loss SOL                    | <ul style="list-style-type: none"> <li>NCS 2000</li> <li>NCS 1010</li> </ul> | Displays the total loss SOL calculation.  |
| Loss EOL                    | <ul style="list-style-type: none"> <li>NCS 2000</li> <li>NCS 1010</li> </ul> | Displays the total loss EOL calculation.  |
| <b>Physical</b>             |  |   |
| Tot SOL Loss w/o connectors | <ul style="list-style-type: none"> <li>NCS 2000</li> <li>NCS 1010</li> </ul> | Enter the start of life fiber loss value for each span, excluding the connector concentrated loss.  |

**Step 3** Click **Update**.

**Step 4** To modify advanced properties of the fiber couple, click **Show Advanced Properties**, or choose **Network > Entity Editor**.

**Step 5** Click the **FIBER** tab in the **Entity Editor** window.

**Step 6** Choose the fiber and drill down to the fiber couple, and modify the following properties in the right pane.

| Property         | Platform   | Description                             |
|------------------|--|---|
| <b>Physical</b>  |  |   |
| Connector Loss A | <ul style="list-style-type: none"> <li>NCS 2000</li> <li>NCS 1010</li> </ul> | Connector Loss at Source Site [dB]      |
| Connector Loss B | <ul style="list-style-type: none"> <li>NCS 2000</li> <li>NCS 1010</li> </ul> | Connector Loss at Destination Site [dB] |
| <b>Factors</b>   |  |   |

| Property   | Platform   | Description   |
|--|--|---|
| PMD coefficient  | <ul style="list-style-type: none"> <li>• NCS 2000</li> <li>• NCS 1010</li> </ul> | Displays the PMD coefficient.                           |
| <b>Totals</b><br>(The properties under Totals are noneditable) |  |   |
| PMD  | <ul style="list-style-type: none"> <li>• NCS 2000</li> <li>• NCS 1010</li> </ul> | Displays the PMD value.                                 |
| Loss EOL   | <ul style="list-style-type: none"> <li>• NCS 2000</li> <li>• NCS 1010</li> </ul> | Displays the total loss EOL calculation.                |
| Loss SOL   | <ul style="list-style-type: none"> <li>• NCS 2000</li> <li>• NCS 1010</li> </ul> | Displays the total loss SOL calculation.                |
| CD C-Band  | <ul style="list-style-type: none"> <li>• NCS 2000</li> <li>• NCS 1010</li> </ul> | Displays the total chromatic dispersion for the C-band. |
| QD C-Band  | <ul style="list-style-type: none"> <li>• NCS 2000</li> <li>• NCS 1010</li> </ul> | Displays the secondary order dispersion for C-band.     |
| RD   | <ul style="list-style-type: none"> <li>• NCS 2000</li> <li>• NCS 1010</li> </ul> | Displays the random dispersion value.                   |

**Step 7** Click **Update**.

## Modify Service Properties

Use this task to modify the properties of the service.

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5.](#)

- Step 1** In the network tree, expand **Services** and click a service.  
 You can view the basic properties of the service at the bottom of the network tree.
- Step 2** Modify the following service properties as required.

| Property       | Platform | Description  |
|----------------|----------|--|
| <b>General</b> |          |  |
| Name           | NCS 2000 | By default, the service name is based on the source and destination sites and the number of services between them. You can edit the name.<br><br>For example, if there are two services between site 1 and site 2, the names of the services are Site-1-Site-2-1 and Site-1-Site-2-2, respectively.  |
| Type           | NCS 2000 | Choose the types of service.   |
| Protection     | NCS 2000 | Choose the protection type from the drop-down list. Options available are: <ul style="list-style-type: none"> <li>• Unprotected</li> <li>• 1+1</li> <li>• Disjoint</li> <li>• S+NS</li> <li>• 1+R</li> <li>• 1+1+R</li> <li>• 1+1+R+R</li> </ul> For more information on protection types, see <a href="#">Supported Protection Schemes</a> , on page 2. |
| Source         | NCS 2000 | Displays the source site name.   |
| Destination    | NCS 2000 | Displays the destination site name.  |

**Step 3** Click **Update**.

**Step 4** To modify advanced properties of the service, click **Show Advanced Properties** or choose **Network > Entity Editor**.

**Step 5** In the **Entity Editor** window, click the **Service** tab.

**Step 6** Choose the service under the network tree, and modify the following properties in the right pane.

| Property        | Platform | Description   |
|-----------------|----------|---|
| <b>General</b>  |          |   |
| Tertiary Source | NCS 2000 | From the drop-down list, select the possible site as a tertiary source. |



| Property                    | Platform | Description   |
|-----------------------------|----------|---|
| Tertiary Destination        | NCS 2000 | <p>From the drop-down list, select the possible site as a tertiary destination.</p> <p>Tertiary source and tertiary destination are enabled only when you select the protection scheme as Unprotected Disjoint.</p> <p>You can select either tertiary destination or both tertiary source and tertiary destination.</p> <ul style="list-style-type: none"> <li>• If you select only the tertiary destination, the demand is created between the source and destination and between the source and tertiary destination. These do not have common fibers in the path, which are disjoint.</li> <li>• If you select both tertiary source and tertiary destination, two unprotected demands are created between the source to destination, and tertiary source to tertiary destination. The demands are disjoint to each other.</li> </ul> |
| <b>Primary Path Forcing</b> |          |   |
| Path                        | NCS 2000 | Cisco ONP automatically selects the shortest path as working path and also allows you to force the path manually.   |
| Fiber                       | NCS 2000 | Primary path fiber is forcing path for working trail.   |
| Regeneration Platform       | NCS 2000 | Displays the platform of the regeneration site  |
| Regen Sites                 | NCS 2000 | Choose the regeneration site.   |
| Wavelength                  | NCS 2000 | Click <b>Edit</b> to choose the wavelength. The default option is Auto.   |
| ODU Timeslot                | NCS 2000 | Enter the ODU timeslot value.   |
| Section Wavelength(s)       | NCS 2000 | Displays the selected <b>Wavelength</b> .   |
| Src Channel Type            | NCS 2000 | <p>Choose the type of source channel. The available options are:</p> <ul style="list-style-type: none"> <li>• Auto—This is the default option. <i>Auto</i> option is the contentionless demand.</li> <li>• Contentionless</li> <li>• Colorless</li> <li>• Colored</li> </ul>  |
| Dst Channel Type            | NCS 2000 | Choose the type of destination channel.   |

| Property  | Platform | Description  |
|---|----------|--|
| <b>Secondary Path Forcing</b> (Available only for 1+1)                |          |  |
| Path  | NCS 2000 | Secondary path is the protected path when the primary path fails. This path is the second best path after the primary path.                                  |
| Fiber   | NCS 2000 | Secondary path fiber is for protected service, forcing path for the protected trail.   |
| Regeneration Platform   | NCS 2000 | Displays the platform of the regeneration site   |
| Regen Sites   | NCS 2000 | Choose the regeneration site.  |
| Wavelength  | NCS 2000 | Click <b>Edit</b> to choose the wavelength. The default option is Auto.  |
| ODU Timeslot  | NCS 2000 | Enter the ODU timeslot value.  |
| Section Wavelength(s)   | NCS 2000 | Displays the selected <b>Wavelength</b> .  |
| Src Channel Type  | NCS 2000 | Choose the type of source channel.   |
| Dst Channel Type  | NCS 2000 | Choose the type of destination channel.  |
| <b>Restoration 1 Path Forcing</b> (Available for 1+R, 1+1+R, 1+1+R+R) |          |  |
| Path  | NCS 2000 | Cisco ONP automatically selects the first restoration path.  |
| Fiber   | NCS 2000 | Choose the first restoration path fibers.  |
| <b>Restoration 2 Path Forcing</b> (Available for 1+1+R+R)             |          |  |
| Path  | NCS 2000 | Cisco ONP automatically selects the second restoration path.   |
| Fiber   | NCS 2000 | Choose the second restoration path fibers.   |
| <b>NCS 1 K Domain</b>   |          |  |
| Client Type   | NCS 2000 | Displays the client type. By default, client type is OTU4.   |
| Interface Type  | NCS 2000 | Displays the interface type. By default, interface type is BH.   |
| Trunk Mode  | NCS 2000 | Choose whether the trunk mode is 200G or 300G. By default, Trunk Mode is 200G.<br><br><b>Note</b> Based on the selected trunk mode, Baud rates are filtered. |
| Baud Rate   | NCS 2000 | Choose whether the Baud rates mode as 60 or 69GBd.   |

**Note**

- Ensure that you force both primary and secondary path fiber or channel for protected service. Also ensure that the wave type is same for both primary and secondary paths. While doing path forcing, make sure that you perform an end-to-end path forcing from the source to the destination. Analysis fails if the partial path is forced.
- Force the wave path for the wave, which is tagged to the service.
- In case of protection type: 1+1+R+R, 1+1+R, and 1+R, you can force a path in restoration path1 or restoration path2 Fiber that is forced in primary or secondary path Fiber.

**Step 7** Click **Update**.

## Services Aggregation

*Table 30: Feature History*

| Feature Name         | Release Information   | Feature Description  |
|----------------------|-----------------------|--|
| Services Aggregation | Cisco ONP Release 4.1 | Services aggregation feature allows two or more services to share the same trunk port or channel. By default, the services are added to the DefaultGroup. You can also export the aggregation reports. |

Services aggregation indicates whether two or more services can share the same trunk port or channel. The aggregation is defined based on the properties of the Service Group. When you add services to the Traffic site (of the type 1K-2K-4K) in an SSON network, a **DefaultGroup** is created under the **Services** in the network tree. The services that you add, are associated to the **DefaultGroup**.

## Create a New Service Group

Use this task to create a new service group:

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5](#)

- Step 1** Choose **File > Open**.  
The **Select Network To Open** dialog box appears.
- Step 2** Click a network, where you want to create a new service group.  
The network opens.
- Step 3** Right-click **Services** under the network tree and choose **Create Service Group**.

A new service group gets created under the Services.

## Modify Service Group Properties

Use this task to modify the properties of service group.

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5.](#)

**Step 1** In the network tree, expand **Services** and click a service group.

You can view the basic properties of the service at the bottom of the network tree.

**Step 2** Modify the following service properties as required.

| Property           | Platform | Description  |
|--------------------|----------|--|
| <b>General</b>     |          |  |
| Name               | NCS 2000 | By default, the service name is based on the source and destination sites and the number of services between them. You can edit the name.<br><br>For example, if there are two services between site 1 and site 2, the name of the services are Site-1-Site-2-1 and Site-1-Site-2-2, respectively. |
| Demand Types       | NCS 2000 | Choose the demand type. For default group all demand types are available, and you cannot edit them.  |
| Default Group      | NCS 2000 | Indicates whether the service group is a default group or a user created group.  |
| <b>NCS 4 K</b>     |          |  |
| Exclusive LC Usage | NCS 4000 | Indicates whether the services belonging to this group must have an exclusive Line Card (LC) or not.<br><br>For example, when you check this check box, neither the Client LC nor the Trunk LC of the services belonging to this group can be shared by services belonging to any other groups.    |

| Property              | Platform | Description  |
|-----------------------|----------|--|
| Symmetric Aggregation | NCS 4000 | <p>Indicates whether this group allows aggregation of only symmetric services. Services are symmetric if they have same protection scheme. Following are the various protection schemes:</p> <ul style="list-style-type: none"> <li>• Unprotected</li> <li>• 1+R</li> <li>• 1+1</li> <li>• 1+1+R</li> <li>• 1+1+R+R</li> </ul> <p>For Example, all “1+1” services are symmetrical.</p> <p>If you check this check box, this service group allows aggregation of only symmetrical services.</p> <p>For example, “Unprotected” can be aggregated only with “Unprotected”, “1+R” only with “1+R”, “1+1” only with “1+1”, and so on.</p> <p>If this check box is unchecked, this service group allows aggregation of symmetrical and unsymmetrical services together.</p> <p>For example, “Unprotected” can be aggregated with either “Unprotected”, “1+R”, “1+1” “1+1+R” or “1+1+R+R”.</p> <p>See <a href="#">Aggregation Rules, on page 109</a>.</p> |
| <b>NCS 1 K</b>        |          |  |
| Exclusive LC Usage    | NCS 1004 | Same as NCS 4 K.   |
| Symmetric Aggregation | NCS 1004 | Same as NCS 4 K.   |

**Step 3** Click **Update**.

## Aggregation Rules

Following are the rules for any two services (symmetrical or nonsymmetrical) to be aggregated:

- The services must have the same Source and Destination.
- The services must have same paths for the same path types.

For example:

- For symmetric aggregation between two “1+1” services, the working path of the first service must match with the working path of the second service and the protection path of the first service must match with the protection path of the second service.

- For non-symmetric aggregation between “1+1” and “1+1+R” services, the working path of the first service must match with the working path of the second service and the protection path of the first service must match with the protection path of the second service. The restoration path of second service can be anything.
- The services must be configured to use same wavelength for same path types.
- If the wavelength is set to “auto”, it is flexible to be aggregated with other “auto” wavelength or a fixed wavelength.
- The services must be configured to use same trunk mode for same path types.
- The services must be configured to use same regeneration sites for same path types.



**Note** Demand Type is not used as a constraint for aggregation (except for trunk capacity availability).

## Associate a Service to the Newly Created Group

By default, the services are associated to the **DefaultGroup**. But you can change the group.

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5.](#)

**Step 1** In the network tree, click the service that you want to associate to a group.

You can view the basic properties of the network at the bottom of the network tree.

**Step 2** Choose the group from the **Service Group** drop-down list.

**Step 3** Click **Update**.

**Note** For an LNI imported network, by default, all the services are present in the Default group. Only when you upgrade the LNI imported network for the first time, you can move the services to other newly created Service Groups without having to unlock them. On subsequent upgrades, you must unlock the services to facilitate the movement between Service Groups. Also, the Service Groups are in locked state in the upgrade mode, unless a complete Network-level unlock has been performed.

### What to do next

## Export Aggregation Reports

Use this task to export the service aggregation reports:

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5.](#)

- 
- Step 1** Choose **File > Open**.  
The **Select Network To Open** dialog box appears.
- Step 2** Click an analyzed network.  
The network opens.
- Step 3** Choose **Export > Service Aggregation**.
- Step 4** Save the aggregation report in the form of an Excel sheet to your local system.
- 

## Modify Wave Properties

Use the following task to modify the properties of the wave.

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5.](#)

- 
- Step 1** In the network tree, expand **Waves**, and click a wave.  
You can view the basic properties of the wave at the bottom of the network tree.
- Step 2** Modify the following wave properties as required.

| Property         | Platform | Description  |
|------------------|----------|--|
| <b>General</b>   |          |  |
| Label            | NCS 2000 | By default, the wave is named based on the source and destination sites and the number of waves between them. You can edit the name.<br><br>For example, if there are two waves defined between site 1 and site 2, the waves are named as Site-1-Site-2-1 and Site-1-Site-2-2, respectively. |
| Source Site      | NCS 2000 | Displays the source site name.   |
| Destination Site | NCS 2000 | Displays the destination site name.  |

| Property        | Platform | Description   |
|-----------------|----------|---|
| Traffic Type    | NCS 2000 | Choose the traffic type from the drop-down list. The available options are: <ul style="list-style-type: none"> <li>• Optical Source</li> <li>• 100GE</li> <li>• 10GE LAN PHY</li> <li>• 40GE LAN PHY</li> <li>• Fiber Channel 10G</li> <li>• Fiber Channel 16G</li> <li>• Fiber Channel 8G</li> <li>• OC-192/STM-64</li> <li>• OTU2</li> <li>• OTU2e</li> <li>• OTU4</li> <li>• Pluggable Card</li> </ul> |
| Protection Type | NCS 2000 | Choose the protection type. <ul style="list-style-type: none"> <li>• <b>Unprotected</b></li> <li>• <b>Client 1+1</b></li> </ul> For more information on protection types, see <a href="#">Supported Protection Schemes</a> , on page 2.   |
| Forecast        | NCS 2000 | Check this check box to change a present wave to a forecast wave.   |
| Encryption      | NCS 2000 | Check this check box to enable encryption.  |

**Step 3** Click **Update**.

## Modify Media Channel Properties

Use the following task to modify properties of the media channel.

### Before you begin

[Log in to Cisco ONP Web Interface](#), on page 5.



**Step 1** In the network tree, expand **Media Channels**, and click a media channel.

You can view the basic properties of the media channel at the bottom of the network tree.

Alternatively, you can choose **Network > Entity Editor > Services**, expand **Media Channels**, and click a media channel to view the properties.

**Step 2** Modify the following properties as required.

| Property         | Platform | Description   |
|------------------|----------|---|
| <b>General</b>   |          |   |
| Label            | NCS 2000 | By default, the media channel is named based on the source and destination sites and the number of media channels between them. You can edit the name.<br><br>For example, if there are two media channels between site 1 and site 2, they are named as Site-1-Site-2-1 and Site-1-Site-2-2, respectively.  |
| Source Site      | NCS 2000 | Displays the source site name.  |
| Destination Site | NCS 2000 | Displays the destination site name.   |
| Traffic Type     | NCS 2000 | Choose the traffic type from the drop-down list. The available options are: <ul style="list-style-type: none"> <li>• Optical Source</li> <li>• 100GE</li> <li>• 10GE LAN PHY</li> <li>• 40GE LAN PHY</li> <li>• Fiber Channel 10G</li> <li>• Fiber Channel 16G</li> <li>• Fiber Channel 8G</li> <li>• OC-192/STM-64</li> <li>• OTU2</li> <li>• OTU2e</li> <li>• OTU4</li> <li>• Pluggable Card</li> </ul> |

| Property        | Platform | Description  |
|-----------------|----------|--|
| Protection Type | NCS 2000 | <p>Choose the protection type.</p> <ul style="list-style-type: none"> <li>• <b>Unprotected</b></li> <li>• <b>Client 1+1</b></li> </ul> <p>For more information on protection types, see <a href="#">Supported Protection Schemes</a> , on page 2.</p> <p>For Client 1+1, ensure that the sites have contentionless sides for the analysis to be successful. By default, Cisco ONP finds both span and node disjoint path for Client1+1 protected waves, but allows you to force span and node disjoint path.</p> |
| Forecast        | NCS 2000 | Check this check box to change a present wave to a forecast wave.  |
| Encryption      | NCS 2000 | Check this check box to enable encryption.   |

**Step 3** Click **Update**.

## Modify Circuit Properties

Use the following task to modify the properties of the circuit in an NCS 1010 network.

### Before you begin

[Log in to Cisco ONP Web Interface](#), on page 5.

**Step 1** In the network tree, expand **Circuits**, and click a circuit.

You can view the basic properties of the circuit at the bottom of the network tree.

**Step 2** Modify the following circuit properties as required.

| Property       | Platform | Description   |
|----------------|----------|---|
| <b>General</b> |          |   |
| Label          | NCS 1010 | <p>By default, the circuit is named based on the source and destination sites and the number of circuits between them. You can edit the name.</p> <p>For example, if there are two circuits defined between site 1 and site 2, the circuits are named as Site-1-Site-2-1 and Site-1-Site-2-2, respectively.</p> |
| Source Site    | NCS 1010 | Displays the source site name.  |

| Property         | Platform | Description   |
|------------------|----------|---|
| Destination Site | NCS 1010 | Displays the destination site name.   |
| Traffic Type     | NCS 1010 | <p>Choose the traffic type from the drop-down list. The available options are:</p> <ul style="list-style-type: none"> <li>• Optical Source</li> <li>• Pluggable Card</li> </ul> <p><b>Note</b> QDD interfaces (both as optical source and pluggable) are not supported with colorless BRK-8, BRK-16, and BRK-24 configurations.</p> |
| Protection Type  | NCS 1010 | Choose the protection type. Currently, we support only Unprotected.   |

**Step 3** Click **Update**.

## Modify Trail Properties

Use this task to modify the properties of the trail.

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5.](#)

**Step 1** In the network tree, expand **Waves**, **Media Channels** or **Circuits**, drill down up to trail and click a trail. The basic properties of the trail are displayed at the bottom of the network tree.

**Step 2** Modify the following trail properties as required.

| Property       | Platform             | Description                             |
|----------------|----------------------|---|
| <b>General</b> |                      |   |
| Label          | NCS 2000<br>NCS 1010 | Displays the name of the trail.         |
| Path of Wave   | NCS 2000<br>NCS 1010 | Select a fiber from the drop-down list. |
| Regen Sites    | NCS 2000<br>NCS 1010 | Select the regeneration site.           |

| Property                | Platform             | Description   |
|-------------------------|----------------------|---|
| Source Site             | NCS 2000<br>NCS 1010 | Displays the source site name.  |
| Destination Site        | NCS 2000<br>NCS 1010 | Displays the destination site name.   |
| Wavelength              | NCS 2000 (Non-SSON)  | Click <b>Edit</b> to choose the wavelength. The default option is Auto.                   |
| Central Wavelength [nm] | NCS 2000<br>NCS 1010 | Click <b>Edit</b> to choose the central wavelength. The default option is Auto.           |
| Multicarrier            | NCS 2000<br>NCS 1010 | Indicates whether the transmission is a multicarrier transmission.                        |
| Trunk Mode              | NCS 2000<br>NCS 1010 | The trunk mode can be edited only when you choose <i>400G-XP-LC</i> as <b>Card Type</b> . |

**Step 3** To modify the advanced properties of the trail, click **Show Advanced Properties** or choose **Network > Entity Editor**.

**Step 4** In the **Entity Editor** window, click the **Service** tab.

**Step 5** Expand **Waves**, **Media Channels** or **Circuits**, under the network tree, drill down to the trail, click the trail, and modify the following properties that are displayed in the right pane.

| Property              | Platform             | Description  |
|-----------------------|----------------------|--|
| <b>General</b>        |                      |  |
| OSNR Forward [dB]     | NCS 2000 (non-SSON)  | Displays the forward optical signal to noise ratio.  |
| OSNR Reverse [dB]     | NCS 2000 (non-SSON)  | Displays the reverse optical signal to noise ratio.  |
| Filtering Penalty     | NCS 2000<br>NCS 1010 | Displays the value of the penalties that are caused by the different filter types (OADM, and ROADM). |
| <b>OTN (non-SSON)</b> |                      |  |
| ODUTimeslot           | NCS 2000 (non-SSON)  | Displays the Optical Data Unit timeslot.   |
| SRLGs                 | NCS 2000 (non-SSON)  | Displays the SRLGs associated with the trail.  |
| OTN Hops              | NCS 2000 (non-SSON)  | Displays the number of OTN hops.   |
| Quantity              | NCS 2000 (non-SSON)  | Displays the number of OTN services on the trail.  |
| <b>Source</b>         |                      |  |

| Property         | Platform             | Description   |
|------------------|----------------------|---|
| Card Type        | NCS 2000<br>NCS 1010 | <p>Choose the card used in the source site. See <a href="#">Supported Cards and Pluggables, on page 177</a> and <a href="#">Supported Optical Sources, on page 189</a> for more information on the list of supported cards.</p> <p><b>Note</b></p> <ul style="list-style-type: none"> <li>• Non-SSON <ul style="list-style-type: none"> <li>• Colored and colorless—Baud rates less than 42 are supported and listed.</li> <li>• Contentionless—Mean power less than -4.4 is supported and listed.</li> </ul> </li> <li>• SSON <ul style="list-style-type: none"> <li>• Colored—Baud rates less than 65 are supported and listed.</li> <li>• Colorless—All interfaces supported and listed.</li> <li>• Contentionless—Mean power less than -4.4 are supported and listed.</li> </ul> </li> </ul> <p>Mean power = (ochData.txRange.max + ochData.txRange.min)/2</p> <p>If contentionless is selected for the <i>source channel type</i>, the QDD interfaces are not supported.</p> |
| Client Interface | NCS 2000<br>NCS 1010 | <p>Choose the pluggable from the drop-down list. The pluggables suitable for the chosen card type are displayed. See <a href="#">Supported Cards and Pluggables, on page 177</a> for more information on the list of supported pluggables.</p> <p>The pluggable FR-1(QSFP-100G-FR-S) is supported on the client ports of the 400G-XP LC starting from NCS 2000 Release 11.1.0.</p>  |

| Property            | Platform             | Description  |
|---------------------|----------------------|--|
| Add/Drop Type       | NCS 2000             | Choose the type of Add/Drop. The available options are: <ul style="list-style-type: none"> <li>• Auto</li> <li>• Contentionless</li> <li>• Colorless</li> <li>• Colored</li> </ul>     |
|                     | NCS 1010             | Choose the type of Add/Drop. The available options are: <ul style="list-style-type: none"> <li>• Auto</li> <li>• Colorless</li> <li>• Colored</li> </ul>                               |
| Trunk Type          | NCS 2000<br>NCS 1010 | Choose the trunk type from the drop-down list.   |
| Contentionless Side | NCS 2000             | Choose the contentionless side from the drop-down list.  |
| <b>Destination</b>  |                      |  |
| Card Type           | NCS 2000<br>NCS 1010 | The destination card type is auto populated based on the source card type chosen.  |
| Client Interface    | NCS 2000<br>NCS 1010 | Choose the pluggable from the drop-down list. The pluggables suitable for the chosen card type are displayed.  |
| Trunk Type          | NCS 2000<br>NCS 1010 | Choose the trunk type from the drop-down list.   |
| Add/Drop Type       | NCS 2000             | Choose the type of the Add/Drop. The available options are: <ul style="list-style-type: none"> <li>• Auto</li> <li>• Contentionless</li> <li>• Colorless</li> <li>• Colored</li> </ul> |
|                     | NCS 1010             | Choose the type of the Add/Drop. The available options are: <ul style="list-style-type: none"> <li>• Auto</li> <li>• Colorless</li> <li>• Colored</li> </ul>                           |

| Property            | Platform | Description   |
|---------------------|----------|---|
| Contentionless Side | NCS 2000 | Choose the contentionless side from the drop-down list. |

**Step 6** Click **Update**.

## Modify Section Properties

Use this task to modify properties of the section.

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5.](#)

**Step 1** In the network tree, expand **Waves**, drill down up to section and click a section.

You can view the basic properties of the section at the bottom of the network tree.

**Step 2** Modify the section properties as required.

Section and trail have the same properties. Refer [Modify Trail Properties, on page 115](#) for the descriptions of the properties.

**Step 3** Click **Update**.

## Modify Side Properties

*Table 31: Feature History*

| Feature Name  | Release Information   | Feature Description   |
|---|-----------------------|---|
| Support for NCS2K-MF-CL-SC (C and L-band combiner and splitter) | Cisco ONP Release 4.2 | Cisco ONP supports the passive module, NCS2K-MF-CL-SC (C and L-band combiner and splitter), starting from the NCS 2000 system release 12.2 for SSON and non-SSON networks. This feature enables combining C and L band wavelengths. |

Table 32: Feature History

| Feature Name              | Release Information   | Feature Description   |
|---------------------------|-----------------------|---|
| NCS2K-RMN-CTP-C+L support | Cisco ONP Release 5.0 | Cisco ONP now supports the passive module, NCS2K-RMN-CTP-C+L (C- and L-band counterpropagating Raman amplifier), starting from the NCS 2000 system release 12.3.1 for SSON and non-SSON networks. |

Use this task to modify the properties of a side in a site.

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5.](#)

**Step 1** In the network tree, Choose **Sites > Site > Site domain > Side**.

**Step 2** To modify the side properties, perform the following steps:

- Click **Show Advanced Properties**.
- In the right pane of **Entity Editor** window, modify the following properties of the side.

**Note** You cannot edit the properties of the Pass through site side.

| Options  | Platform             | Description   |
|--|----------------------|---|
| <b>General</b>   |                      |   |
| Label  | NCS 2000<br>NCS 1010 | Displays the label of the side.   |
| Type   | NCS 2000<br>NCS 1010 | Displays the type of the side. You cannot edit this property.   |
| Node Address   | NCS 1010             | Enter the node address  |
| MPO Cable  | NCS 1010             | Choose the MPO cable. The available options are: <ul style="list-style-type: none"> <li>• Auto</li> <li>• 16MPO-MPO</li> <li>• 24MPO-MPO</li> </ul> |
| Colorless Ports (Displayed for Line side)                | NCS 2000             | Enter the number of colorless ports.  |
| Contentionless Ports (Displayed for Contentionless side) | NCS 2000             | Choose the number of contentionless ports.  |



| Options   | Platform | Description  |
|---|----------|--|
| Enable C+L Band S/C<br>(Displayed for Line side type) | NCS 2000 | <p>Cisco ONP supports the following passive modules:</p> <ul style="list-style-type: none"> <li>NCS2K-MF-CL-SC (C and L-band combiner and splitter), starting from the NCS 2000 system release 12.2 for SSON and non-SSON networks. Check this check box to enable the NCS2K-MF-CL-SC card. This card is supported for ROADM, OLA, and traffic nodes, but not on the passthrough node.</li> </ul> <p><b>Note</b> When you enable this option on a side:</p> <ul style="list-style-type: none"> <li>It is automatically enabled on the side that is connected to the selected side through a fiber.</li> <li>The fiber property <i>Raman Amplified</i> is automatically disabled, and the opposite way.</li> <li>This card introduces a certain amount of attenuation and insertion loss that is reflected in the ANS parameters.</li> </ul> <p>The NCS2K-MF-CL-SC module does not appear in the layout.</p> <ul style="list-style-type: none"> <li>NCS2K-RMN-CTP-C+L (C- and L-band counterpropagating Raman amplifier), starting from the NCS 2000 system release 12.3 for SSON and non-SSON networks. Check this check box to enable the NCS2K-RMN-CTP-C+L card.</li> </ul> <p><b>Note</b> When you enable this option on a side:</p> <ul style="list-style-type: none"> <li>If you enable the fiber property <i>Raman Amplified</i>, then the <i>NCS2K-RMN-CTP-C+L</i> card is automatically forced.</li> <li>If you disable the fiber property <i>Raman Amplified</i>, then the <i>NCS2K-MF-CL-SC</i> card is automatically forced.</li> <li>Fiber property <i>Raman Amplified</i> is automatically disabled for NCS 2000 system release 12.2.</li> </ul> <p>The NCS2K-RMN-CTP-C+L module appears in the layout.</p> |

| Options                   | Platform | Description   |
|---------------------------|----------|---|
| <b>Layout</b>             |          |   |
| Power Supply              | NCS 1010 | Choose the type of Power Supply. The available options are Auto, AC Power, and DC Power.<br><br>The default option is Auto.   |
| Controller Card           | NCS 1010 | Choose the type of the controller card. The available options are: <ul style="list-style-type: none"> <li>• Auto</li> <li>• NCS1010-CNTRL-K9</li> </ul>                               |
| Redundant Controller Card | NCS 1010 | Displays the redundant controller card, if any. Else displays No.   |
| UTS AC Power Cables       | NCS 1010 | Choose the type of cables to be used for the AC power supply. You can choose the cables when the <b>Power Supply</b> is set as <i>AC Power</i> or <i>DC Power</i> .                   |
| Redundant Power Scheme    | NCS 1010 | Choose the redundant power scheme from the drop-down list to configure the number of working and protected power units for the chassis. The available options are Auto, 1+0, and 1+1. |
| MF Unit                   | NCS 1010 | Choose the mechanical frame for the passive optical modules from the drop-down list. The options available are Auto, MF-1RU, and MF-4RU.  |

c) Click **Update**.

## Modify C-Band Amplifier Properties

*Table 33: Feature History*

| Feature Name                       | Release Information   | Feature Description   |
|------------------------------------|-----------------------|---|
| Manual Editing of Raman COP values | Cisco ONP Release 4.1 | This feature allows you to edit the crosstalk values of the Raman COP amplifier in the SSON network, starting from NCS 2000 Release 11.1. |

Table 34: Feature History

| Feature Name     | Release Information   | Feature Description   |
|------------------|-----------------------|---|
| Inline Amplifier | Cisco ONP Release 4.2 | The <b>Inline Amplifier</b> option allows you to enable an inline amplifier in the network. You can simulate the optical feasibility of the network with and without an inline amplifier. Based on the colorless or colored add/drop type selected and the QSFP-DD pluggable status, a default inline amplifier is enabled for the network. |

Use this task to modify the properties of a c-band amplifier in a site.



**Note** Make sure that SMR card is forced on the site before you update the c-band amplifier properties.

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5](#)

**Step 1** In the network tree, choose **Sites > Site > Site domain > Side > C-Band**.

**Step 2** To modify the amplifier properties, perform the following steps:

a) Click **C-Band Amplifier**.

You can view the properties of the C-Band Amplifier at the bottom of the network tree. For more information, see [Supported Amplifiers, on page 193](#).

b) Modify the following properties of the amplifier:

You can also modify the properties by choosing the **C-Band Amplifier** under **Network > Entity Editor**.

| Options        | Platform             | Description                                       |
|----------------|----------------------|---|
| <b>General</b> |                      |   |
| PSD Shape      | NCS 1010             | Enter a Power Spectral Density (PSD) value.       |
| Raman COP Tilt | NCS 2000             | The default value is Auto. You can enter a value. |
| Pre Tilt       | NCS 2000<br>NCS 1010 | The default value is Auto. You can enter a value. |
| Raman Tilt     | NCS 2000<br>NCS 1010 | The default value is Auto. You can enter a value. |
| Booster Tilt   | NCS 2000<br>NCS 1010 | The default value is Auto. You can enter a value. |

| Options          | Platform | Description |
|------------------|----------|-------------|
| Inline Amplifier | NCS 2000 |             |

| Options | Platform | Description  |
|---------|----------|--|
|         |          | <p>Choose whether inline amplifier can be forced. The available options are:</p> <ul style="list-style-type: none"> <li>• Yes—EDFA17 or EDFA35 amplifier is chosen as the default amplifier when you choose colored add/drop module MD-64-C or colorless add/drop MF-6AD-CFS, respectively. See <a href="#">Modify Add/Drop Multiplexer Properties, on page 131</a>.</li> <li>• No—No amplifier can be forced.</li> <li>• Auto <ul style="list-style-type: none"> <li>• EDFA17 amplifier is chosen as the default amplifier when any one of the demands aggregated in MD-64-C has low launch power optical resource or QSFP-DD pluggable is forced.</li> <li>• EDFA35 amplifier is chosen as the default amplifier when any one of the demands aggregated in MF-6AD-CFS has low launch power optical resource or QSFP-DD pluggable is forced.</li> </ul> </li> </ul> <p><b>Note</b> When you configure MF-6AD-CFS+EDFA35 in an SSON or non-SSON network, the optical results show system error for the demands of the same or different types. This error affects the what-if analysis. Hence we recommend choosing the appropriate channel and client attenuators so that the inline amplifier works at the proper gain range.</p> <p>You can view the amplifier added in the <b>IPC</b>, <b>BOM</b>, and <b>Layout</b> tabs, after the successful analysis.</p> <p><b>Note</b></p> <ul style="list-style-type: none"> <li>• When you add a QDD demand while upgrading a network where the Inline Amplifier property is set as <i>no</i>, the inline amplifier can be included in the network only if you unlock the side and set the Inline amplifier property as <i>Auto</i> or <i>Yes</i>.</li> <li>• Default colorless configuration does not require inline amplifier.</li> <li>• When there are no demands passing through the colored or colorless Add/Drop device, the forced Inline</li> </ul> |

| Options           | Platform | Description  |
|-------------------|----------|--|
|                   |          | amplifier is not placed.   |
| <b>From Fiber</b> |          |  |
| Pre Amp           | NCS 2000 | <p>Choose a preamplifier from the drop-down list. The default value is Auto. To enable this field for ROADM and Traffic nodes, you must choose SMR-9 or SMR-20 from the <b>Site Type</b> drop-down list under the Site properties.</p> <p>If you choose SMR-9, the available options are:</p> <ul style="list-style-type: none"> <li>• SMR9-FS-EDFA17-PRE</li> <li>• SMR9-FS-EDFA24-PRE</li> <li>• SMR9-FS-EDFA24-PRE</li> </ul> <p>If you choose SMR-20, the available options are:</p> <ul style="list-style-type: none"> <li>• SMR20-FS-EDFA17-PRE</li> <li>• SMR20-FS-EDFA24-PRE</li> </ul> <p>For the OLA site, the available options are:</p> <ul style="list-style-type: none"> <li>• EDFA35-35-PRE</li> <li>• EDFA35-24-PRE</li> <li>• OPT -EDFA-17</li> <li>• OPT -EDFA-24</li> </ul> |
|                   | NCS 1010 | <p>The options available for NCS 1010 are:</p> <ul style="list-style-type: none"> <li>• Auto</li> <li>• OLT-C-EDFA22-Pre</li> <li>• OLT-C-EDFA35-Pre</li> </ul>  |
| Output Power      | NCS 2000 | The default value is Auto. You can enter a value.  |

| Options         | Platform | Description   |
|-----------------|----------|---|
| Attenuator In   | NCS 2000 | <p>This field is enabled only when you choose a preamplifier. Choose an attenuator from the drop-down list. The available options are:</p> <ul style="list-style-type: none"> <li>• ATT-LC-2</li> <li>• ATT-LC-3</li> <li>• ATT-LC-5</li> <li>• ATT-LC-7</li> <li>• ATT-LC-10</li> <li>• ATT-LC-12</li> <li>• ATT-LC-15</li> <li>• ATT-LC-18</li> </ul> |
| Attenuator Out  | NCS 2000 | <p>This field is enabled only when you choose a preamplifier. Choose an attenuator from the drop-down list. The available options are:</p> <ul style="list-style-type: none"> <li>• ATT-LC-2</li> <li>• ATT-LC-3</li> <li>• ATT-LC-5</li> <li>• ATT-LC-7</li> <li>• ATT-LC-10</li> <li>• ATT-LC-12</li> <li>• ATT-LC-15</li> <li>• ATT-LC-18</li> </ul> |
| <b>To Fiber</b> |          |   |

| Options       | Platform | Description   |
|---------------|----------|---|
| Booster       | NCS 2000 | <p>The default value is Auto. To enable this field for ROADM and Traffic nodes, you must choose SMR-9 or SMR-20 from the <b>Site Type</b> drop-down list under the Site properties.</p> <p>If you choose SMR-20, the default booster is 20SMR-FS-BST.</p> <p>If you choose SMR-9, default booster is SMR9-FS-EDFA-BST.</p> <p>For the OLA node, the available options are:</p> <ul style="list-style-type: none"> <li>• EDFA35-35-BST</li> <li>• EDFA35-24-BST</li> <li>• OPT -EDFA-17</li> <li>• OPT -EDFA-24</li> </ul> |
|               | NCS 1010 | For NCS 1010, it is OLT-C-EDFA-Bst  |
| Output Power  | NCS 2000 | The default value is Auto. You can enter a value.   |
| Attenuator In | NCS 2000 | <p>This field is enabled only when you choose a booster. Choose an attenuator from the drop-down list. The available options are:</p> <ul style="list-style-type: none"> <li>• ATT-LC-2</li> <li>• ATT-LC-3</li> <li>• ATT-LC-5</li> <li>• ATT-LC-7</li> <li>• ATT-LC-10</li> <li>• ATT-LC-12</li> <li>• ATT-LC-15</li> <li>• ATT-LC-18</li> </ul>  |



| Options                    | Platform | Description   |
|----------------------------|----------|---|
| Attenuator Out             | NCS 2000 | <p>This field is enabled only when you choose a booster. Choose an attenuator from the drop-down list. The available options are:</p> <ul style="list-style-type: none"><li>• ATT-LC-2</li><li>• ATT-LC-3</li><li>• ATT-LC-5</li><li>• ATT-LC-7</li><li>• ATT-LC-10</li><li>• ATT-LC-12</li><li>• ATT-LC-15</li><li>• ATT-LC-18</li></ul> |
| <b>Raman Amplification</b> |          |   |

| Options        | Platform | Description   |
|----------------|----------|---|
| Raman Amp      | NCS 2000 | <p>Choose the Raman amplifier from the drop-down list.</p> <p><b>Note</b> To force the RAMAN amplifier on NCS 2000 node, you must enable <b>RAMAN amplified</b> on the fiber, else the <b>Raman Amp</b> is disabled, and network analysis fails.</p> <p><b>Note</b> When you enable the fiber property <b>Raman amplified</b> and the side property <b>Enable C+L Band S/C</b> for NCS 2000 node, <b>Raman Amp</b> is automatically forced as <i>RAMAN-C+L</i>.</p> <p>The available options for NCS 2000 ROADM and Traffic sites are:</p> <ul style="list-style-type: none"> <li>• RAMAN-CTP</li> <li>• RAMAN-COP-CTP</li> </ul> <p>Raman Amp can be forced only between two nodes.</p> <p>The available options for the OLA site are:</p> <ul style="list-style-type: none"> <li>• EDRA1-26</li> <li>• EDRA1-35</li> <li>• EDRA2-26</li> <li>• EDRA2-35</li> <li>• RAMAN-CTP</li> </ul> |
|                | NCS 1010 | <p>The available options for NCS 1010 ROADM site are:</p> <ul style="list-style-type: none"> <li>• Auto</li> <li>• None</li> <li>• Raman</li> </ul>   |
| Raman CTP Gain | NCS 2000 | Enter a value.  |
| Raman COP Gain | NCS 2000 | Enter a value. This field is enabled only when you choose RAMAN-COP-CTP.  |
| Raman Gain     | NCS 1010 | Displays the Raman gain.  |
| Static Data    | NCS 2000 | <p>By default, this option is disabled. Enable it to edit the crosstalk values of the Raman COP amplifier.</p> <p><b>Note</b> Static data is supported from Release 11.1 for SSON network.</p>  |

| Options          | Platform | Description  |
|------------------|----------|--|
| Linear XT Avg    | NCS 2000 | Edit the value of average linear crosstalk.          |
| Linear XT Six    | NCS 2000 | Edit the value average linear crosstalk sigma.       |
| NonLinear XT Avg | NCS 2000 | Edit the value of average nonlinear crosstalk.       |
| NonLinear XT Sig | NCS 2000 | Edit the value of average nonlinear crosstalk sigma. |

**Note** Raman crosstalk values are present in the ANS file under *logoparameters* section.

c) Click **Update**.

## Modify Add/Drop Multiplexer Properties

**Table 35: Feature History**

| Feature Name  | Release Information   | Feature Description  |  |  |
|---|-----------------------|--|--|--|
| Modify Properties of Add/Drop Multiplexer and Demultiplexer | Cisco ONP Release 4.2 | You can create and validate network designs by choosing colored and colorless add/drop multiplexers and demultiplexers, and interleaver under <b>C-Band &gt; Add/Drop</b> . The following options are supported in this release: |  |  |
|   |                       | Type of Add/Drop   | Options  | Network Supported  |
|   |                       | Colorless  | <ul style="list-style-type: none"> <li>• Direct SMR</li> <li>• MF-6AD-CFS</li> </ul>   | <ul style="list-style-type: none"> <li>• SSON</li> <li>• Non-SSON</li> </ul> |
|   |                       | Colored  | <ul style="list-style-type: none"> <li>• MD-64-C</li> <li>• MD-48-ODD</li> <li>• MD-48-EVEN</li> <li>• MD-48-ODD + MD-48-EVEN</li> </ul> | <ul style="list-style-type: none"> <li>• SSON</li> <li>• Non-SSON</li> </ul> |
|   |                       | Interleaver  | <ul style="list-style-type: none"> <li>• MpoCable</li> <li>• MD-48-CM</li> </ul>   | <ul style="list-style-type: none"> <li>• Non-SSON</li> </ul>                 |

Use this task to modify the properties of the add/drop multiplexer in a site.

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5.](#)

**Step 1** In the network tree, Choose **Sites > Site > Site domain > Side > C-Band**.

**Step 2** To modify the Add/Drop multiplexer card properties, perform the following steps:

a) Click **Add/Drop**.

You can view the properties of the add/drop multiplexer at the bottom of the network tree.

b) Modify the following properties of the add/drop multiplexer:

You can also modify the properties by choosing the **Add/Drop** under **Network > Entity Editor**.

| Options          | Platform | Description  |
|------------------|----------|--|
| <b>General</b>   |          |  |
| Colored Add/Drop | NCS 2000 | <p>Choose the colored add/drop multiplexer and demultiplexer: The available options are:</p> <ul style="list-style-type: none"> <li>• MD-64-C—Passive optical multiplexer and demultiplexer module (for SSON network)</li> <li>• None</li> <li>• Auto</li> </ul> <p>To mix 16-AD-CCOFS and MD-48-ODD/EVEN on the same MPO port of SMR-20 and connect MD-48-ODD/EVEN to SMR-20 via MPO-8LC and UPG-4, enable Shared SMR port and force the required colored Add/Drop.</p> <p>The following options are added automatically based on the colored demands created and the wavelengths forced in the non-SSON network.</p> <ul style="list-style-type: none"> <li>• MD-48-ODD</li> <li>• MD-48-EVEN</li> <li>• MD-48-ODD + MD-48-EVEN</li> </ul> |
|                  | NCS 1010 | <p>The options available for NCS 1010 are:</p> <ul style="list-style-type: none"> <li>• Auto</li> <li>• None</li> <li>• MD-32-EVEN</li> <li>• MD-32-ODD</li> <li>• MD-32- ODD+MD-32-EVEN</li> </ul>  |

| Options            | Platform | Description  |
|--------------------|----------|--|
| Colorless Add/Drop | NCS 2000 | <p>Choose the colorless add/drop multiplexer and demultiplexer: The available options for NCS 2000 are:</p> <ul style="list-style-type: none"> <li>• Auto</li> <li>• Direct SMR—SMR-20 card that is directly connected to the colorless channels through MF-MPO-16-LC.</li> </ul> <p><b>Note</b> If the <b>Site Type</b> property is set to <i>SMR-9</i>, the <b>Colorless Ports</b> property under the Side will be disabled.</p> <ul style="list-style-type: none"> <li>• MF-6AD-CFS—6 Port Add/Drop Module (supported only for ROADM starting from NCS 2000 system release 11.0, and traffic site).</li> </ul> <p><b>Note</b> If you choose MF-6AD-CFS for a side, we recommend you to choose the same for other sides of the site.</p> |
|                    | NCS 1010 | <p>The options available for NCS 1010 are:</p> <ul style="list-style-type: none"> <li>• Auto</li> <li>• None</li> <li>• BRK-8</li> <li>• BRK-16</li> <li>• BRK-24</li> </ul> <p><b>Note</b> QDD optical sources are not supported (both as optical source and pluggable) with colorless BRK-8, BRK-16, or BRK-24 configurations.</p>   |
| Colorless Ports    | NCS 1010 | <p>Enter the number of colorless ports. The default values is 0. If you do not change the default value, Cisco ONP automatically calculates the number of colorless ports based on the number of circuits added and colorless add/drop units forced.</p>   |

| Options         | Platform | Description  |
|-----------------|----------|--|
| Interlever Type | NCS 2000 | <p>Choose the interleaver type from the drop-down list. The available options are:</p> <ul style="list-style-type: none"> <li>• Auto</li> <li>• MpoCable</li> <li>• MD-48-CM</li> </ul> <p><b>Note</b>      <b>Interlever Type</b> property is visible and editable only for Line sides of Multi-Degree nodes having <b>Site Type</b> property as <i>SMR-9</i> and <b>Scalable Upto Degree</b> property as 8 under the C-Band tab at the Site level.</p> |

c) Click **Update**.

## Modify Client Properties

Use this task to modify the properties of a client-side attenuator in a site.

### Before you begin

*Table 36: Feature History*

| Feature Name        | Release Information   | Feature Description  |
|---------------------|-----------------------|--|
| Channel Attenuators | Cisco ONP Release 4.2 | You can set up channel attenuators for QSFP-DD demands. You can choose different channel attenuators based on the specific configuration and check for the optical feasibility of the channel. |

[Log in to Cisco ONP Web Interface, on page 5](#)

**Step 1** In the network tree, choose **Sites > Site > Site domain > Side > Clients > Channel-Attenuators**.

**Step 2** In the right pane of the **Entity Editor** window, modify the following properties of the client-side attenuator.

| Properties     | Platform | Description                                   |
|----------------|----------|---|
| <b>General</b> |          |   |
| Wavelength     | NCS 2000 | This column displays the selected wavelength. |

| Properties            | Platform | Description   |
|-----------------------|----------|---|
| RX-Attenuator         | NCS 2000 | Choose an RX-Attenuator from the drop-down list. The default option is Auto.<br><b>Note</b> You must select a wavelength to edit this field.  |
| TX-Attenuator         | NCS 2000 | Choose a TX-Attenuator from the drop-down list. The default option is Auto.<br><b>Note</b> You must select a wavelength to edit this field.   |
| New Wavelength - Auto | NCS 2000 | Click <b>Edit</b> to select a Flex Grid or Fixed Grid wavelength.<br><b>Note</b> Select <b>Fixed Grid (64-Chs)</b> for SSON network with NCS1K-MD-64-C card.<br><b>Note</b> NCS1K-MD-64-C card has First Channel limitation for Colored sites. First Channel (196.1 THz) in Fixed Grid (64-Chs) wavelength supports only Terminal Add/Drop sites and not ROADM sites. |

**Step 3** Click **Update**.

## Sort the Network Elements

You can sort the sites, services, fibers, waves, and SRLG in ascending or descending order. This feature is helpful for huge networks, to find out the required site, fiber, waves, or SRLG names quickly. Right-click the network element, for example **Sites** and choose **Ascending** or **Descending**. You can sort based on alphabets, numbers, or alphanumeric.

## Regeneration Support

In optical networks, as the fiber length increases, a loss in the signal ratio and power could occur due to attenuation and dispersion. You require a regenerator to recreate the weak and distorted optical signals through reamplification, regeneration, and retiming processes. The regenerators remove noise and distortion, convert the optical signal to electrical signal, and then convert the signals back to optical signals (OEO conversion). Cisco ONP supports creation of regeneration sites in the network.



**Note** A regenerator site can only be a ROADM site.

# Create a Regeneration Site

Table 37: Feature History

| Feature Name                            | Release Information   | Feature Description  |
|---|-----------------------|--|
| Wavelength Forcing at the Section Level | Cisco ONP Release 4.1 | This feature allows you to assign different wavelengths for different sections of the Regen sites. |

Use the following procedure to create a regeneration site in the network.

## Before you begin

[Log in to Cisco ONP Web Interface, on page 5.](#)

- 
- Step 1** Choose **File > Open**.  
The **Select Network To Open** dialog box appears.
- Step 2** Select a network from the list of networks. This opens the selected network's map.  
You can also add a regeneration site when you are designing a new network or upgrading a network.
- Step 3** In the network tree, expand **Waves**, select a wave and drill down to its trail.  
**Note** If the network is an SSON network or NCS 1010 network, you see **Media Channels** or **Circuits** respectively instead of waves. Expand **Media Channels** or **Circuits**, and drill down to its trail.
- Step 4** Click the trail.  
You can view the properties of the trail at the bottom of the network tree.
- Step 5** From the **Regen Sites** drop-down list, select a regeneration site.  
**Note** If you select a fiber from the **Path of Wave** drop-down list, you cannot select any regeneration site to force a path. Similarly, if you select a regeneration site, you cannot force a path for the wave. However, if you want to force a fiber, select the fiber from the **Path of Wave** drop-down list available under the section properties.
- Step 6** (Optional) Select the wavelength of each section in the properties for non-SSON network.  
**Note** For the SSON network, you can select the wavelength only at the trial level.
- Step 7** Click **Update**.  
A new section is added along with the existing section under the trail, whenever a regeneration site is created. Regeneration can be performed using any two cards back-to-back or with a dedicated regenerator card.
- Step 8** Click **Analyze** to analyze the network.  
After analysis, if you click trail or section in the network tree, the map highlights the trail in orange color, and the section in green color.



**Note** You can assign different wavelengths for different sections. The **Central Wavelength** is denoted as a \*, when different wavelengths are assigned for different sections.

---

## Multidegree ROADM

In multidegree ROADM, sites have two or more sides and face two or more fibers spans. You can select the degree of a node from the Cisco ONP GUI. The values are 2, 4, 8, 12, and 16 for Evolved Mesh (EV) ON and OFF scenarios. The default value is 4. Degrees 5, 9, and 13 are not supported. EV flag is editable.

### Prerequisites for Cascaded SMR

- The **Structure** field under **C Band** in the **Entity Editor** must be Multidegree.
- The **Site Type** field under **C Band** in the **Entity Editor** must be SMR-20.
- The **Evolved Mesh** check box under **General** in the **Entity Editor** must be checked.
- The **Degree Mesh Type** field under **C Band** in the **Entity Editor** must be Auto or DEG-5/UPG-4.
- The **Mpo16TOMpo8** field under **General** in the **Entity Editor** must be MPO16To2MPO8 cable.
- By default, the **Cascaded SMR** check box is unchecked, but you can edit in the design mode as a site property. Check the **Cascaded SMR** check box for contentionless side creation. L2 SMR is supported for both SSON and Non-SSON networks.
- You can edit the **Cascaded SMR** check box when **Evolved Mesh** is ON and the SMR-20 card is selected. You can create Layer 2 SMR sides only after you check the **Cascaded SMR** check box.
- You can create contentionless sides manually and force the contentionless ports. The default value is 16 for the contentionless ports. The range of values is 0–16.

### Limitations

- Supports only contentionless add/drop demands.
- Supports Layer-2 SMR for SMR-20 card only.





## CHAPTER 5

# Configure a Network

This chapter describes the various ways of configuring the network designed through Cisco ONP.

- [Configure a NCS 2000 Network for Contentionless Functionality, on page 139](#)
- [Configure an NCS 2000 Network for Colorless Functionality, on page 140](#)
- [Configure an NCS 2000 Network for Colored Functionality, on page 141](#)
- [Configure a Network with Mixed Add/Drop Multiplexers and Demultiplexers, on page 141](#)
- [Configure an NCS 1010 Network for Colorless Functionality, on page 145](#)
- [Configure an NCS 1010 Network for Colored Functionality, on page 146](#)
- [Configure an NCS 1010 Network with Mixed Add/Drop Multiplexers and Demultiplexers, on page 147](#)

## Configure a NCS 2000 Network for Contentionless Functionality

Use the following procedure to configure the contentionless functionality in a network:

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5](#)

- 
- Step 1** Create a network design. See [Design a Network Using Cisco ONP, on page 19](#).
- Step 2** Add contentionless sides to the required sites. See [Add Contentionless Side to a Site, on page 94](#).
- Step 3** Set the channel type for the demands:
- a) In the **Entity Editor** window, click the **Services** tab.
  - b) Click the service connecting the site and set the **Src Channel Type** property as *Auto* or *Contentionless*. Similarly, click the trail under the wave (for non-SSON) or Media Channel (for SSON) and set the **Src Channel Type** property as *Auto* or *Contentionless*.
- Note** Contentionless is the default option when you select *Auto*.
- c) Click **Update**.
- Step 4** Analyze the network by choosing **Network > Analyze**.
-

# Configure an NCS 2000 Network for Colorless Functionality

Use the following procedure to configure the colorless functionality in a network:

## Before you begin

[Log in to Cisco ONP Web Interface, on page 5.](#)

**Step 1** Create a network design. See [Design a Network Using Cisco ONP, on page 19](#).

**Step 2** Set the channel type for the demands:

- In the **Entity Editor** window, click the **Services** tab.
- Click the service connecting the site and set the **Src Channel Type** property as *Colorless*. Similarly, click the trail under the wave (for non-SSON) or Media Channel (for SSON) and set the **Src Channel Type** property as *Colorless*.
- Under the **Site > Side** properties, choose the Line type side from which you want to create the colorless demand, and enter the number of **Colorless Ports**.

The number of colorless ports for *MF-6AD-CFS* depends on the **Scalable Upto Degree** property. The following table explains the same.

**Table 38: Colorless Ports for SSON and Non-SSON Networks**

| Site Type | Scalable Upto Degree | Maximum Number of Colorless Ports for SSON | Maximum Number of Colorless Ports for Non-SSON |
|-----------|----------------------|--|--|
| SMR-20    | 4                    | 72   | 72   |
| SMR-20    | 8                    | 72   | 72   |
| SMR-20    | 12                   | 24   | 24   |
| SMR-20    | 16                   | 24   | 24   |
| SMR-20    | Line                 | 96   | 96   |
| SMR-20    | Terminal             | 120  | 96   |
| SMR-9     | 4                    | 5  | 5  |

- Click **Update**.

**Step 3** Under the **C-Band** properties, choose *MF-6AD-CFS* or *Direct SMR* as the **Colorless Add/Drop**.

**Step 4** Click **Update**.

**Step 5** Analyze the network by choosing **Network > Analyze**.

You can see the colorless Add/Drop unit getting added in the layout and BOM.

# Configure an NCS 2000 Network for Colored Functionality

Use the following procedure to configure the colored functionality in a network:

## Before you begin

[Log in to Cisco ONP Web Interface, on page 5.](#)

- 
- Step 1** Create a network design. See [Design a Network Using Cisco ONP, on page 19](#).
- Step 2** Set the channel type for the demands:
- In the **Entity Editor** window, click the **Services** tab.
  - Click the service connecting the site and set the **Src Channel Type** property as *Colored*. Similarly, click the trail under the wave (for non-SSON) or media channel (for SSON) and set the **Src Channel Type** property as *Colored*.
  - Click **Update**.
- Step 3** For SSON network, perform the following:
- Under the **C-Band** properties, choose *MD-64-C* as the **Colored Add/Drop**.
- Note** MD-64-C is supported from NCS 2000 Release 12.x.
- Click **Update**.
- For non-SSON network, by default, *MD-48-ODD* or *MD-48-EVEN* is added as the **Colored Add/Drop** when **Share SMR Port** is not enabled.
- Note** If you choose *MD-48-EVEN* or *MD-48-ODD*, make sure to select an even wavelength for the **Wavelength** property under **Trail**.
- Step 4** When **Share SMR Port** port is enabled, you can select the **Colored Add/Drop** by using the following steps:
- Under the **C-Band** properties, choose *MD-48-ODD*, *MD-48-EVEN*, or *MD-48-ODD+MD-48-EVEN* as the **Colored Add/Drop**.
- Note** The above mentioned Add/Drop units are supported from NCS 2000 Release 11.x.
- Click **Update**.
- Step 5** Analyze the network by choosing **Network > Analyze**.
- You can see the colored Add/Drop unit getting added in the layout and BOM.
- 

# Configure a Network with Mixed Add/Drop Multiplexers and Demultiplexers

Use the following procedure to configure mixed wavelengths in a network:

Table 39: Feature History

| Feature Name                             | Release Information   | Feature Description   |
|--|-----------------------|---|
| Support for Mixed Add/Drop Configuration | Cisco ONP Release 4.2 | <p>You can configure different functionalities in the network created in Cisco ONP. Mixed wavelengths such as colorless and contentionless, colored and contentionless, can be added/dropped on the same side or direction. The following mixed configurations are supported:</p> <ul style="list-style-type: none"> <li>• Colored (MD-48-ODD/MD-48-EVEN) and Contentionless (16-AD-CCOFS) without shared SMR port</li> <li>• Colored and Contentionless (MD-64-C and 16-AD-CCOFS)</li> <li>• Colored (MD-64-C) and Colorless (Direct SMR)</li> <li>• Colored (MD-48) and Contentionless (16-AD-CCOFS) with Shared SMR Port</li> <li>• Colorless and MD-48-ODD/MD-48-EVEN</li> <li>• Colorless and 16-AD-CCOFS</li> </ul> |

**Before you begin**

[Log in to Cisco ONP Web Interface, on page 5.](#)

- 
- Step 1** Create a network design. See [Design a Network Using Cisco ONP, on page 19](#) .
- Step 2** Set the properties of the network under the **Entity Editor** for different combinations of the functionalities, as described in the following table:

Table 40: Supported Mixed Configurations

| Supported Network Type | Possible Mixed Configurations   | Properties to be Set  |
|------------------------|---|---|
| Non-SSON               | Colored (MD-48-ODD/MD-48-EVEN) and Contentionless (16-AD-CCOFS) without shared SMR port | <ul style="list-style-type: none"> <li>Add required number of contentionless sides.</li> <li><b>Channel Type</b>—Set the <b>Src Channel Type</b> and <b>Dst Channel Type</b> to be <i>Colored</i> for one wave. Set the <b>Src Channel Type</b> and <b>Dst Channel Type</b> to be <i>Contentionless</i> for the second wave created on the same site. Both wavelengths must add/drop in the same side or direction.</li> <li>By default, MD-48-ODD or MD_48-EVEN is added as the Colored Add/Drop in the BOM and layout, when you set the <b>Channel Type</b> as <i>Colored</i> and when <b>Shared SMR Port</b> is disabled.</li> <li>By default, 16-AD-CCOFS is added in the BOM and layout, when you set the <b>Channel Type</b> as <i>Contentionless</i>.</li> </ul> |
| SSON                   | Colored and Contentionless (MD-64-C and 16-AD-CCOFS)                                    | <ul style="list-style-type: none"> <li>Add required number of contentionless sides.</li> <li><b>Channel Type</b>—Set the <b>Src Channel Type</b> and <b>Dst Channel Type</b> to be <i>Colored</i> for one media channel. Set the <b>Src Channel Type</b> and <b>Dst Channel Type</b> to be <i>Contentionless</i> for the second media channel created on the same site. Both channels must add/drop in the same side or direction.</li> <li><b>Colored Add/Drop</b>—MD-64-C under the side.</li> </ul>  |
| SSON                   | Colored (MD-64-C) and Colorless (Direct SMR)  | <ul style="list-style-type: none"> <li><b>Channel Type</b>—Set the <b>Src Channel Type</b> and <b>Dst Channel Type</b> to be <i>Colored</i> for one media channel. Set the <b>Src Channel Type</b> and <b>Dst Channel Type</b> to be <i>Colorless</i> for the second media channel created on the same site. Both channels must add/drop in the same side or direction.</li> <li>Enter the number of <b>Colorless Ports</b> under the <b>Line Side</b> properties.</li> <li><b>Colored Add/Drop</b>—MD-64-C</li> <li><b>Colorless Add/Drop</b>—Direct SMR</li> </ul>  |

| Supported Network Type | Possible Mixed Configurations   | Properties to be Set  |
|------------------------|---|---|
| Non-SSON               | Colored (MD-48) and Contentionless (16-AD-CCOFS) with Shared SMR Port | <ul style="list-style-type: none"> <li>• Add required number of contentionless sides.</li> <li>• <b>Channel Type</b>—Set the <b>Src Channel Type</b> and <b>Dst Channel Type</b> to be <i>Colored</i> for one wave. Set the <b>Src Channel Type</b> and <b>Dst Channel Type</b> to be <i>Contentionless</i> for the second wave created on the same site. Both wavelengths must add/drop in the same side or direction.</li> <li>• Check the <b>Shared SMR Port</b> check box, under the <b>Site</b> properties.</li> <li>• <b>Colored Add/Drop</b>—MD-48-ODD, MD-48-EVEN, or MD-48-ODD and MD-48-EVEN<br/><br/>If you choose <i>MD-48-EVEN</i>, make sure to select an even wavelength for the <b>Wavelength</b> property under <b>Trail</b>.</li> </ul> |
| Non-SSON               | Colorless and MD-48-ODD/MD-48-EVEN                                    | <ul style="list-style-type: none"> <li>• <b>Channel Type</b>—Set the <b>Src Channel Type</b> and <b>Dst Channel Type</b> to be <i>Colorless</i> for the wave.</li> <li>• Enter the number of <b>Colorless Ports</b> under the <b>Line Side</b> properties.</li> <li>• By default, MD-48-ODD/MD-48-EVEN is added as colored Add/Drop in the BOM and layout, when any colored demand is added in the non-SSON network.</li> </ul>   |
| SSON                   | Colorless and Contentionless (16-AD-CCOFS)                            | <ul style="list-style-type: none"> <li>• Add required number of contentionless sides.</li> <li>• <b>Channel Type</b>—Set the <b>Src Channel Type</b> and <b>Dst Channel Type</b> to be <i>Colorless</i> for the wave or media channel.</li> <li>• <b>Channel Type</b>—<i>Colorless</i> for one wave and <i>Contentionless</i> for another wave created on the same site. Both wavelengths must add/drop in the same side or direction.</li> </ul>   |

**Note** MF-6AD-CFS colorless configuration cannot be mixed with any other configurations.

The following is the list of mixed configurations that are not supported by Cisco ONP.



Table 41: Unsupported Mixed Configurations

| Network Type | Mixed Configurations  |
|--------------|---|
| SSON         | Colored (MD-64-C) and Colorless (MF-6AD-CFS)                  |
| SSON         | Contentionless and Colorless (MF-6AD-CFS)                     |
| SSON         | Colored (MD-64-C), Contentionless, and Colorless (MF-6AD-CFS) |
| SSON         | Colored (MD-64-C) and Layer-2 Contentionless                  |
| Non-SSON     | Contentionless and Colorless (MF-6AD-CFS)                     |
| Non-SSON     | Colored (MD-48) and Colorless (MF-6AD-CFS)                    |
| Non-SSON     | Colorless (Direct SMR) and Colorless (MF-6AD-CFS)             |
| Non-SSON     | Colored, Contentionless, and Colorless (MF-6AD-CFS)           |

## Configure an NCS 1010 Network for Colorless Functionality

Use the following procedure to configure the colorless functionality in an NCS 1010 network:

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5.](#)

**Step 1** Create a network design. See [Design a Network Using Cisco ONP, on page 19](#).

**Step 2** Set the channel type for the demands:

- In the **Entity Editor** window, click the **Services** tab.
- Click the trail under the circuit set the **Src Channel Type** property as *Colorless*.
- Click **Update**.

**Step 3** Under the **C-Band** properties, choose *BRK-8*, *BRK-16* or *BRK-24* as the **Colorless Add/Drop**.

The Maximum number of colorless ports depends on the scalable up to degree. The following table explains the same.

Table 42: Colorless Ports for NCS 1010 Networks

| Scalable Upto Degree | MPO Port Used for Degree Interconnect | Maximum Number of Colorless Ports Supported |        |       |
|----------------------|---------------------------------------|---|--------|-------|
|                      |                                       | BRK-24                                      | BRK-16 | BRK-8 |
| 7                    | 4                                     | 72  | 48     | 24    |
| 9                    | 1                                     | 66  | 44     | 22    |
| 15                   | 3, 4                                  | 48  | 32     | 16    |

| Scalable Upto Degree | MPO Port Used for Degree Interconnect | Maximum Number of Colorless Ports Supported |        |       |
|----------------------|---------------------------------------|---|--------|-------|
|                      |                                       | BRK-24                                      | BRK-16 | BRK-8 |
| 17                   | 1, 2                                  | 42  | 28     | 14    |
| 23                   | 2, 3, 4                               | 24  | 16     | 8     |
| 25                   | 1, 2, 3                               | 18  | 12     | 6     |
| 31                   | 1, 2, 3, 4                            | 0   | 0      | 0     |
| Terminal             | NA                                    | 90  | 60     | 30    |
| Line                 | 4                                     | 72  | 48     | 24    |

**Note** Colorless configuration is not supported for scalable upto degree 31.

**Step 4** Click **Update**.

**Step 5** Analyze the network by choosing **Network > Analyze**.

You can see the colorless Add/Drop unit getting added in the layout and BOM.

## Configure an NCS 1010 Network for Colored Functionality

Use the following procedure to configure the colored functionality in an NCS 1010 network:

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5.](#)

**Step 1** Create a network design. See [Design a Network Using Cisco ONP, on page 19](#).

**Step 2** Set the channel type for the demands:

- In the **Entity Editor** window, click the **Services** tab.
- Click the trail under the circuit and set the **Src Channel Type** property as *Colored*.
- Click **Update**.

**Step 3** Under the **C-Band** properties, choose *MD-32-EVEN*, *MD-32-ODD*, or *MD-32- ODD+MD-32-EVEN* as the **Colored Add/Drop**.

**Step 4** Click **Update**.

**Step 5** Analyze the network by choosing **Network > Analyze**.

You can see the colored Add/Drop unit getting added in the layout and BOM.

# Configure an NCS 1010 Network with Mixed Add/Drop Multiplexers and Demultiplexers

Use the following procedure to configure mixed wavelengths in an NCS 1010 network:

## Before you begin

[Log in to Cisco ONP Web Interface, on page 5.](#)

---

**Step 1** Create a network design. See [Design a Network Using Cisco ONP, on page 19](#).

**Step 2** Set the properties under the **Entity Editor** for different combinations of the functionalities:

For example, set the **Src Channel Type** and **Dst Channel Type** to *Colored* for one circuit. Set the **Src Channel Type** and **Dst Channel Type** to *Colorless* for the second circuit created on the same site. Both channels must add/drop in the same side or direction.

You can choose any combination of the colored or colorless add/drop.

**Note** When the **Scalable Upto Degree** is 31, the colorless configuration is not supported, and hence mixed configuration is also not supported for **Scalable Upto Degree** 31.

---





## CHAPTER 6

# View Network Reports

---

- [Network Reports, on page 149](#)

## Network Reports

Cisco ONP provides network reports, which are listed under the report availability tabs. Reports are available depending on whether a network is analyzed, or not. Reports are also available in site properties after analyzing the network.

Cisco ONP provides the following reports:

- Dashboard
- Elements
- Map
- BOM
- Layout
- Results

The Cisco ONP home page has multiple tabs to access the reports of the analyzed network. You can also view the reports for specific site, fiber, or wave properties by clicking the respective report in the Network Tree pane.

## View Reports in the Dashboard Tab

The **Dashboard** tab provides the total count of sites, fibers, SRLGs, services, waves/media channels/circuits, and messages that exist in the network.



### Note

The Dashboard report shows incorrect count of 100G and 200G waves for transponder cards. You can view the details in the Optical report and Traffic report.

## View Reports in the Elements Tab

The **Elements** tab provides detailed reports of the network elements and messages.

| Report   | Description   |
|----------|---|
| Sites    | Shows the site information, which consists of the name of the sites, type and their X and Y coordinate values.  |
| Fibers   | Shows the information about the fiber length between the source and the destination for corresponding sites.  |
| Services | Shows the service type, source and destination sites for particular service, quantity, protection type, and status.<br><br>For each service, the report shows the primary path, secondary path, and their status.   |
| Waves    | The Waves report shows the number of waves available in the network and the wave utilization. Click each wave to view the following details: <ul style="list-style-type: none"> <li>• Wave—Consists of a wave UID and its source and destination sites.</li> <li>• Wave Details—Provides details of wave OSNR, channel path, OTN services associated to wave and excluded channels.</li> <li>• Channels—Port details of the source and destination cards, wavelength that is used, and its utilization demands.</li> <li>• Optical Results—Provides details of optical parameters such as OSNR, SOL, EOL, Power margin, CD, and PMD.</li> </ul> |
| SRLGs    | Lists the names of created SRLGs and their fiber details. Click <b>Export</b> at the bottom to export the report in .xlsx format.   |
| Messages | Shows messages that are related to errors occurred while analyzing the network. By default, only critical messages for the analyzed network are listed here. You can disable the <b>Critical Only</b> toggle button to view all messages.   |



**Note** Click the Pop-up icon to view the reports in a larger, resizable window.

## View Details of the BOM Report

**Table 43: Feature History**

| Feature Name                         | Release Information   | Feature Description  |
|--------------------------------------|-----------------------|--|
| Support for New PIDs for SMR-20 Card | Cisco ONP Release 4.2 | <p>The following new licensed PIDs for the SMR-20 card are displayed on the BOM page so that you can view the price details and consider ordering.</p> <ul style="list-style-type: none"> <li>• NCS2K-FSSMR-2LIC=</li> <li>• E-NCS2K-1P-LIC=</li> <li>• E-NCS2K-5P-LIC=</li> <li>• E-NCS2K-10P-LIC=</li> </ul> |

**Table 44: Feature History**

| Feature Name                 | Release Information   | Feature Description   |
|------------------------------|-----------------------|---|
| MLP Brownfield with Diff BOM | Cisco ONP Release 4.1 | <p>This feature allows you to perform the following:</p> <ul style="list-style-type: none"> <li>• Compare the BOMs of two or more LNI imported networks.</li> <li>• Upgrade brownfield network.</li> <li>• Upgrade Cisco ONP network with traffic sites.</li> </ul> |

The BOM report consists of individual site price lists and the total BOM of the network. Click each site to view BOM of OTN and DWDM separately.

You can compare the BOM of the existing network with other networks using the **Compare with: Other Networks** option.

You can export the BOM details in the form of a spreadsheet, by clicking **Export** and saving it to your local system.

We recommend that you export the BOM report only in the analyze mode. Exporting the reports in the upgrade and release upgrade modes may be inaccurate.



**Note** You can also compare the BOM of LNI imported networks.



**Note** From Release 4.2, Cisco ONP supports listing of new licensed PIDs for the SMR-20 card. The PIDs are chosen based on the demand. This is applicable only for the newly designed and upgraded networks.

- NCS2K-FSSMR-2-LIC=—20-port FS-SMR licensed to enable two ports
- E-NCS2K-1P-LIC=—Software license to enable one port on licensed 20-port FS-SMR
- E-NCS2K-5P-LIC=—Software license to enable five ports on licensed 20-port FS-SMR
- E-NCS2K-10P-LIC=—Software license to enable ten ports on licensed 20-port FS-SMR

## View Details of Layout and Internal Connections

To get the details of layout and internal connections, perform the following steps:

### Before you begin

[Log in to Cisco ONP Web Interface, on page 5.](#)

**Step 1** Click the **Layout** tab on the Cisco ONP home page.

**Step 2** Type the site name in the search box, or select a site from the **Sites** drop-down list.

The site layout is displayed with its racks and cards. Hover the mouse pointer over the transponder card to view the details of slot, PID of the card, and ports. Expand the Ports to view details, such as wavelength and trunk mode. Similarly, hover the mouse pointer over chassis to know the total power consumption.

SVO supports up to 50 UUIDs, beyond which, the site layout displays incorrect UUID for the chassis.

**Step 3** Click the **IPC** tab to view the selected site's internal patch connections.

## Export Internal Connections

Cisco ONP allows you to export internal fiber connection in two ways, either at Site-level or Network-level. To export the details, right-click the internal fiber connection or site, and click **Export**.

## Compare the Installation Parameters of Two Networks

*Table 45: Feature History*

| Feature Name                 | Release Information   | Feature Description  |
|------------------------------|-----------------------|--|
| UI Revamp of Optical Reports | Cisco ONP Release 4.1 | This feature improves the user experience while comparing the installation parameters and optical reports of two networks. |

Use this task to compare the installation parameters of two networks.



**Before you begin**

[Log in to Cisco ONP Web Interface, on page 5.](#)

- 
- Step 1** Click the **Results** tab on the Cisco ONP home page.
- Step 2** Click **Installation Parameters**.
- Step 3** Click **Other Networks**.
- Step 4** From the list of networks, choose the network to compare with.

You can find a new parameter called **diffBy**.

**Note** You can click **Clear** to stop the comparison of two networks.

## Compare the Optical Report of Two Networks

Use this task to compare the optical report of two networks.

**Before you begin**

[Log in to Cisco ONP Web Interface, on page 5.](#)

- 
- Step 1** Click the **Results** tab on the Cisco ONP home page.
- Step 2** Click **Optical Report**.
- Step 3** Click **Other Networks**.
- Step 4** From the list of networks, choose the network to compare with.

You can find two values in the optical parameters such as Protection, SOL, EOL, SE, P/F, Source, Src Colorless, Src Contentionless, Destination, Dst Colorless, Dst Contentionless, Wavelength, Src Tx Type, Dst Tx type, Span, Suggested Regen Locations, BER Target, SOL OSNR, EOL OSNR, SOL OSNR margin, EOL OSNR margin, SOL RX, EOL RX, SOL Power Margin, EOL Power Margin, SOL Overload, EOL Overload, Residual CD, CD robustness, Single-Channel NLE Status, Multi-Channel NLE Status, Min GB, Filtering Penalty, PMD, RX Atten, TX Atten, Encryption, SNLE Components, MNLE Components, OSNR Penalties and POWER Penalties.

**Note** You can click **Clear** to stop the comparison of two networks.

## View Optical Results

Use this task to view the details of optical reports, installation parameters, traffic report, and cabling reports.

**Before you begin**

[Log in to Cisco ONP Web Interface, on page 5.](#)

- 
- Step 1** Click the **Results** tab on the Cisco ONP home page.
- By default, the **Optical Report** tab appears. Each row in the tab shows the performance of one optical path:

| Optical Parameter         |  |
|---------------------------|--|
| Name                      | Displays the ID number of the wave and aggregated waves. ID is automatically generated based on the site name.   |
| Protection                | Displays the protection type of the wave.  |
| SOL                       | Displays an icon indicating the results summary of the analysis that is run with Start of Life (SOL) fiber loss values: <ul style="list-style-type: none"> <li>• Green indicates success.</li> <li>• Yellow indicates success with a marginal failure risk.</li> <li>• Orange indicates that the channel has a higher risk of failure.</li> <li>• Red indicates failure.</li> </ul>  |
| EOL                       | Displays an icon indicating the results summary of the analysis that is run with End of Life (EOL) fiber loss values. The indicator shows the optical performance for the path at the end of the fiber life: <ul style="list-style-type: none"> <li>• Green indicates success.</li> <li>• Yellow indicates success with a marginal failure risk.</li> <li>• Orange indicates that the channel has a higher risk of failure.</li> <li>• Red indicates failure.</li> </ul> |
| SE                        | Indicates a system-related error that may impact the analysis of the design. If the indicator is red, review the messages that are reported at the end of the analysis or determine which units or sites have a problem.   |
| P/F                       | Displays the present or forecast services indication.  |
| Source                    | Displays the name of the source site and side; for example, Site 1-E.  |
| Src Colorless             | Displays whether the colorless functionality is enabled on source ports.   |
| Src Contentionless        | Displays whether the contentionless functionality is enabled on source ports.  |
| Destination               | Displays the name of the destination site and side; for example, Site 1-E.   |
| Dst Colorless             | Displays whether the colorless functionality is enabled on destination ports.  |
| Dst Contentionless        | Displays whether the contentionless functionality is enabled on destination ports.   |
| Wavelength                | Displays the wavelength of the optical channel.  |
| Src Tx Type               | Displays the type of DWDM unit or pluggable port module that is used at the source of the specific Optical Channel (OCH) trail. The class of the DWDM unit is also displayed.  |
| Dst Tx type               | Displays the type of DWDM unit or pluggable port module that is used at the destination of the specific OCH Trail. The class of the DWDM unit is also displayed.   |
| Span                      | Displays the total span length (source to destination) for this path in kilometers.  |
| Suggested Regen Locations | Displays the regeneration locations.   |

| Optical Parameter         |   |
|---------------------------|---|
| BER Target                | Displays the bit error rate (BER) target for this channel, based on the capability of the channel's optical interface. It is 1.0E-15 for the interfaces using forward error correction (FEC) and 1.0E-12 for interfaces without FEC.  |
| SOL OSNR                  | Displays the start of life average Optical Signal to Noise Ratio (OSNR) value at the receiver.  |
| EOL OSNR                  | Displays the end of life average OSNR value at the receiver.  |
| SOL OSNR margin           | Displays the SOL OSNR margin calculation. It is the difference between the OSNR value at certain power of the working point of the receiver client and the working area boundary.   |
| EOL OSNR margin           | Displays the EOL OSNR margin calculation, which is the difference between the OSNR value at a certain power of the working point of the receiver client and the working area boundary.  |
| SOL RX                    | Displays the SOL average power that is received at the destination site in dBm.   |
| EOL RX                    | Displays the EOL average power that is received at the destination site in dBm.   |
| SOL Power Margin          | Displays the SOL power budget margin at the receiver in decibels. It is defined as the offset between the receiver working point and the BER curve with margin. A positive value indicates that there are no power problems.  |
| EOL Power Margin          | Displays the EOL power budget margin at the receiver in decibels. It is defined as the offset between the receiver working point and the BER curve with margin. A positive value indicates that there are no power problems.  |
| SOL Overload              | Displays the SOL overload margin at the receiver in decibels. A positive value indicates that there are no overload problems.   |
| EOL Overload              | Displays the EOL overload margin at the receiver in decibels. A positive value indicates that there are no overload problems.   |
| Residual CD               | Displays the chromatic dispersion (CD) margin of the demand.  |
| CD robustness             | Displays the robustness to chromatic dispersion of the receiver.  |
| Single-Channel NLE Status | Displays the status of alarms if any nonlinear effect (NLE) is present in the demand.   |
| Multi-Channel NLE Status  | Provides the status of the nonlinear effect (NLE) on a particular channel or demand due to other channels or demands.   |
| Min GB                    | Displays the minimum Guard Band (GB) requirement between channels on the 40G CP-DQPSK MXP and 40G CP-DQPSK ME MXP cards, and other transponders in a mixed any-to-any connectivity.   |
| Filtering Penalty         | Displays the value of the penalties that are caused by different filter types (OADM, ROADM, and arrayed waveguide grating (AWG)).   |
| PMD                       | Displays the calculated total Polarization Mode dispersion (PMD) for each circuit. If the overall PMD for the link overcomes the maximum that is allowed, the PMD value is displayed in red colored font. The maximum allowed value depends on the client interface. For these special cases, the network must be manually resolved by contacting a Cisco TAC team. |
| RX Atten                  | Displays the attenuation at the input of the receiver.  |
| TX Atten                  | Displays the attenuation at the output of the receiver.   |

| Optical Parameter |  |
|-------------------|--|
| Encryption        | Displays the encryption type of the channel. Possible values are N/A, Yes, No. |

**Step 2** Click **Export Report** to export the optical reports details in an Excel sheet.

We recommend that you export the optical report only in the analyze mode. Exporting the reports in the upgrade and release upgrade modes may be inaccurate.

**Step 3** Click the **Installation Parameters** tab.

The Installation Parameters report shows the values to be set (provisioned) at the installation time on each site in the network.

You can view the installation parameters for **ANS** (automatic node setup), and **ANP** (automatic node provisioning), for each side of the Network Element (NE) in all the sites:

**Step 4** Click the **ANS** tab to view the following parameters:

**Table 46: ANS Parameters**

| Parameter        | Description  |
|------------------|--|
| Name             | Displays the name of the site  |
| Side             | Displays the line side   |
| Position         | Displays the rack, shelf number, and slot position of the card where the patch cord originates.                        |
| Unit             | Displays the name of the card.   |
| Port             | Displays the port number where the patch cord originates.  |
| Port ID          | Displays the port ID.  |
| Port Label       | Displays the name of the port.   |
| Parameter        | Displays the name of the parameter to be set, such as RX Power Low.  |
| Value            | Displays the name of the value to be set for the parameter.  |
| Measurement Unit | Displays the measurement unit for the related installation parameter value, such as dBm.                               |
| Manual Set       | Indicates with a Yes or No which parameters must be manually set using the Cisco Transport Controller (CTC) interface. |

**Step 5** Click the **ANP** tab to view the following parameters:

**Table 47: ANP Parameters**

| Parameter | Description  |
|-----------|--|
| Name      | Displays the name of the site.                                     |
| Unit ID   | Displays the unit (slot number) of the passive units in the shelf. |

| Parameter      | Description   |
|----------------|---|
| Shelf ID       | Displays the shelf identifier.                          |
| Rack Number    | Displays the rack number.                               |
| Rack Position  | Identifies the rack position in the shelf.              |
| Slot Position  | Identifies the slot position in the shelf for the card. |
| Equipment Type | Displays the card type.                                 |
| Description    | Displays the details of the card type.                  |

**Step 6** Click the **Traffic Report** tab.

You can view the aggregated demand channel data in the form of the following traffic reports:

**Table 48: Traffic Reports**

| Traffic Report      | Description  |
|---------------------|--|
| Demand              | Categorizes each demand type. Each demand is further categorized into service, trails, and sections.   |
| Section             | Displays the sections under every service.   |
| Src Site            | Displays the site name for the optical channel source.   |
| Src Position        | Displays the rack, shelf ID, and slot identifiers for the source of the optical channel.   |
| Src Card            | Displays the unit name for the optical channel source.   |
| Dst Site            | Displays the site name for the optical channel destination.  |
| Dst Position        | Displays the rack, shelf ID, and slot identifiers for the destination of the optical channel.  |
| Dst Card            | Displays the unit name for the optical channel destination.  |
| Client Service Type | Displays the client service type of the demand; for example, OC-48.  |
| Protection Type     | Displays the protection type of the demand   |
| Encryption          | Displays whether the demand is encrypted or not, values are NA, Yes, No.   |
| Wavelength          | Displays the wavelength value of the optical channel, and the serial number of the wavelength in the wavelength band.  |
| Max Latency         | Displays the latency time for the current circuit. This value includes all the latency components for the circuit, including fiber and DWDM units on the path. |

**Step 7** Click the **Cabling Report** tab.

You can view the patch cord connections related to multi-shelf management. This report is available for the networks starting from NCS 2000 system Release 12.1.0.

**Table 49: Cabling**

| <b>Cabling Report</b> | <b>Description</b>  |
|-----------------------|---|
| Name                  | Displays the name of the site.  |
| Src Unit Type         | Displays the source unit.   |
| Src Position          | Displays the rack, shelf, and slot position of the card from which the patch cord originates. |
| Src ID                | Displays the source unit ID.  |
| Src Port Label        | Displays the name of the port.  |
| Cable Type            | Displays the type of cable.   |
| Dst Unit Type         | Displays the source unit.   |
| Dst Position          | Displays the rack, shelf, and slot position of the card from which the patch cord terminated. |
| Dst ID                | Displays the destination unit ID.   |
| Dst Port Label        | Displays the name of the port.  |
| W/P                   | Displays whether the connection relates to a present or forecast circuit.                     |

## Confidential Banner

**Table 50: Feature History**

| <b>Feature Name</b> | <b>Release Information</b> | <b>Feature Description</b>  |
|---------------------|----------------------------|---|
| Confidential Banner | Cisco ONP Release 4.1      | This feature indicates the confidentiality of the reports or results generated by Cisco ONP for a network. The CONFIDENTIAL banner is placed in all the exported reports. It is placed in the first row and first cell of the Excel sheet, followed by a blank row and the contents of the exported report. |

Table 51: Feature History

| Feature Name                     | Release Information   | Feature Description   |
|----------------------------------|-----------------------|---|
| Customizable Confidential Banner | Cisco ONP Release 4.2 | The Confidential Banner string can be customized as required. An admin user can modify the banner string when the <i>confidentialBanner.enabled</i> field is set to true in the <i>feature.properties</i> file. |

The **CONFIDENTIAL** banner is to be present in all the exported reports. It is placed in the first row, first cell of the Excel sheet (.xlsx), followed by a blank row and the contents of the exported report.

The exported reports include:

- Sites
- Fibers
- Services
- Waves
- Traffic
- Failure (Plan and Restore)
- BOM
- Media Channel
- SRLG
- Messages
- Optical Result
- Failure Group
- Cabling Report
- Service Aggregation
- IPC (Individual and All sites)



#### Note

- The **CONFIDENTIAL** banner is present in all the sheets, if multiple sheets are present in the xlsx file.
- The **CONFIDENTIAL** banner is updated, only when you export the reports in .xlsx format.
- The server admin can customize the banner string **CONFIDENTIAL** in the *confidentialBanner.content* field as required. The admin must set the *confidentialBanner.enabled* field to *true* in the *feature.properties* file to enable banner change. By default, the *confidentialBanner.enabled* value is set to *false*.







## CHAPTER 7

# Backup and Restore Cisco ONP Database

- [Backup Database, on page 161](#)
- [Restore Database Using Script, on page 164](#)

## Backup Database

Based on the database backup configuration on the server, as set by the system admins, you can take the backup of the complete database on a daily, weekly, or monthly basis. Only system admins can access the backup folders and restore them. Backup archive is stored on highly durable NFS share. The following backup archives are available:

- Archives for the last 7 days
- Weekly archives for the last 4 weeks
- Monthly archives for the last 6 months



**Note** You can change the duration for monthly archives.

## Setup Backup

### Before you begin

- Ensure that highly durable 2 TB NFS storage is available to store database archives.
- Ensure that the storage is accessible from the Cisco ONP environment. Set up rules that are defined by the Cisco ONP network and appropriate ACL (Access Control List) to permit or deny access to the storage.

- 
- Step 1** Log into the Cisco ONP server, where you have installed Cisco ONP by using the tar archive.
  - Step 2** Create a folder for backup. Ideally it should be mounted on a reliable object storage (like NFS).
  - Step 3** Copy backup, rotation, and setup backup scripts from `ONP/images` folder to the new folder created in step 2.

Example:

```
$ cd
$ mkdir cnp_backups
$ tree ~/cnp_backups/
/home/ciscocnp/cnp_backups/
├── rotation.sh
└── setup_backup.sh
```

Ensure that all scripts have necessary permissions:

```
$ chmod +x rotation.sh
$ chmod +x setup_backup.sh
$ ls -l | grep .sh
-rwxrwxr-x 1 ciscocnp ciscocnp 518 Jan 16 05:23 backup_mongo.sh
-rwxrwxr-x 1 ciscocnp ciscocnp 1412 Feb 1 05:50 rotation.sh
```

**Step 4** Copy `restore_mongo.sh` from `/ONP/images/`.

---

## Perform Manual Backup

Perform the following steps for the backup operation:

---

**Step 1** Browse to the location, where the `backup_mongo.sh` script is stored.

**Step 2** Execute the `backup_mongo.sh` script using the following command:

Example:

```
user@server:~/cnp_backups$ bash backup_mongo.sh
```

The backup file gets stored in the daily backup folder (`backup.daily`) with the current time stamp.

---

## Schedule a Backup

### Schedule a Backup Using Script

Use this task to schedule the backup operation using script:

---

**Step 1** Log in to the Cisco ONP server.

**Step 2** Execute the `rotation.sh` script using the following command:

```
user@server:~/cnp_backups$ bash rotation.sh
```

This command creates necessary folder structure.

**Step 3** Execute the `setup_backup.sh` script using the following command:

Example:

The backup file gets stored in the daily backup folder (backup.daily) with the current time stamp.

- Step 4** Enter the path in the user prompt to store the file.  
Backup files are stored in your required file path as following:  
`/user-defined path/backups/backup.daily`

---

## Schedule a Backup

Use this task to schedule the backup operation using Crontab:

- Step 1** Log in to the Cisco ONP server.  
**Step 2** Configure the Crontab job using the following command.  
`user@server~/cnp_backups$ sudo crontab -e`  
**Step 3** Modify the Crontab.sh script to schedule the backup.

Example:

The following example shows the scheduling of the backup operation, at 3 a.m daily.

```
0 3 * * * /home/ciscocnp/cnp_backups/backup_mongo.sh
```

---

## Syntax to Schedule the Backup Using Crontab

Use the following syntax to schedule backup in Crontab:

```
m h dom mon dow
```

Where:

- m—Minutes (0–59)
- h—Hours (1–23)
- dom—Day of the month
- mon—Month of the year
- dow—Day of the week

To define the time, you can provide concrete values for minute (m), hour (h), day of the month (dom), month (mon), and day of the week (dow), or use the wildcard, '\*' in these fields (for 'any').



---

**Note** The backup jobs start based on the cron's system daemon's notion of time and time zones.

---

## Restore Database Using Script

You can restore the database using script, which is available at the following location:

```
/ONP/Images/restore_mongo.sh
```

Execute the following command:

```
$ sudo bash restore_mongo.sh DB backup archive file path.
```

For example:

```
$ sudo bash restore_mongo.sh /backups/backup.daily/2019-05-05-23-58.archive
```

The database backup is created and a confirmation prompt appears asking to delete the database (y/n).

Enter **y** to delete the database.

Enter **n** to not delete the database.

Enter **No** to not delete the database and apply only missing data(s) from backup file.



## APPENDIX **A**

# Cisco ONP UI Reference

- [Menu Bar, on page 165](#)
- [Network Tree, on page 171](#)
- [Design Palette, on page 172](#)
- [Entity Editor, on page 174](#)

## Menu Bar

The following table describes the options available in the Cisco ONP GUI menu bar.

| Options       | Description   |
|---------------|---|
| File          | Includes the common file options such as New, Open, Open Shared, Save, Save As, Share, and Delete   |
| Network       | Includes Entity Editor, Analyze, and SSON Convert   |
| Export        | Includes options to export reports of CPZ, sites, fibers, SRLGs, services, waves, media channels, optical results, service aggregation, BOM, and messages. Export enables you to download excel and LNI templates |
| Import        | Imports different types of files (CPZ, Excel, LNI, and MPZ) and designs a network in CONP   |
| Manage        | Manages Layout Templates and Optical Sources  |
| Logs          | Displays logs events that are initiated during a specific period, such as user login, user logout, password change, and LNI - start, failed, and completed  |
| Job Monitor   | Checks and manages tasks running in the background  |
| Control Panel | Manages users, user groups, user roles, permissions, system configuration, and dictionary   |
| Help          | Displays the Cisco ONP version  |
| Last Login    | Shows last date and time when the user logged in to Cisco ONP, and last login with IP details   |
| Username      | Shows name of the user who has currently logged in to Cisco ONP   |

## File

The **File** menu includes common file options such as New, Open, and Delete.

| Options     | Description  |
|-------------|--|
| New         | Creates a new network. By default, NCS 1010 is created. To create NCS 2000 networks, change <b>L0 Network Platform</b> to <i>NCS2000</i> . You can check the <b>SSON Network</b> check box and select <b>System Release</b> for NCS 2K to create an SSON network.  |
| Open        | Opens a saved network. The network name in blue-colored font indicates that the network is in the Design mode, and the network name in green-colored font indicates that the network is in the Analyze mode.<br><br><b>Note</b> If you view a blank screen when you open a network, refresh the browser, or log in to Cisco ONP again. |
| Open Shared | Opens a shared network.  |
| Save        | Saves a network.   |
| Save As     | Saves the network with a new name.   |
| Share       | Shares a network or networks.  |
| Delete      | Deletes a network or networks.   |

## Network

The **Network** menu includes options such as Entity Editor, Analyze, and SSON Convert in the design mode. It includes options such as Entity Editor, Design, Upgrade, and Enter Plan Mode in the Analyze mode.

| Options             | Description   |
|---------------------|---|
| Entity Editor       | Use this option to edit various properties of an element in the network                 |
| Analyze             | Analyzes the network after completing the design  |
| SSON Convert        | Converts a Non-SSON network to an SSON network  |
| Design              | Switches from Analyze mode to Design, Upgrade, or Release Upgrade mode                  |
| Upgrade             | Upgrades an existing network that is in the Analyze mode                                |
| Release Upgrade     | Upgrades the NCS 2K System Release of a network   |
| Enter Plan Mode     | Switches to the Plan mode   |
| Exit Plan Mode      | Exits the plan mode   |
| Restore             | Restores failed fibers and nodes  |
| Open Failure Report | Expands the Failure Report from the bottom of the Map. Data is populated after Restore. |

| Options                 | Description   |
|-------------------------|---|
| Open Feasibility Report | Expands the Feasibility Report from the bottom of the Map. The report displays the data regarding Auto Regen Suggestions for channel feasibility. |

## Export

The **Export** menu includes options to export reports of Sites, Fibers, Services, SRLG, Waves, Messages, and BOM.

| Options                                     | Description   |
|---|---|
| CPZ   | Export the .cpz design file of a network into your local system.  |
| Sites                                       | Exports site details such as x and y coordinates, grooming site flag, CLI code, site address, site type, and site name.   |
| Fibers                                      | Exports fiber details such as length, loss to fiber, source and destination site, source and destination edge.  |
| Services                                    | Exports service details such as name, type, path, quantity, and protection.   |
| SRLGs                                       | Exports details about created SRLGs.  |
| Waves (Available for non-SSON network)      | Exports wave details such as Label, Source and Destination sites, Card Type, Wavelength, Utilization, Source port, Destination port, Demands, OTN Hops, OSNR, OSNRMarginEOL, StatusEOL, Excluded Channels, and Path of Wave.  |
| Media Channels (Available for SSON network) | Exports media channel details such as Media Channel Label, Media Carrier Label, Source and Destination sites, Card Type, Wavelength, Utilization, Source port, Destination port, Demands, OTN Hops, OSNR, OSNRMarginEOL, StatusEOL, Excluded Channels, and Path of Media channel. |
| Circuits (Available for NCS1010 network)    | Exports circuits details such as Circuit Label, Carrier Label, Source and Destination sites, Card Type, Traffic Type, Wavelength, Utilization, Source port, Destination port, Demands, OTN Hops, OSNR, OSNRMarginEOL, StatusEOL, Excluded Circuits, and Path of Circuit.          |
| Messages                                    | Shows the complete log of the analysis, including critical errors.  |
| Download Excel Template                     | Download sample Excel file that can be used as a reference for creating networks using the Import Excel feature.  |
| Download LNI Template                       | Download sample LNI file that can be used as a reference for creating networks using the Import feature.  |
| Optical Source Template                     | Download sample Optical Source Excel file that can be used as a reference for creating User Defined/custom Optical Source using the <b>Manage &gt; Optical Sources</b> feature.   |
| BOMs  | Exports details about pricing and quantity of the network equipment   |

| Options        | Description   |
|----------------|---|
| Failure Groups | This option is available only in the plan mode. You can add failed fibers to a failure group.   |
| Failure Report | This option is available only in the plan mode. It shows the failed fibers, total channels, failed channels, restored channels, and fiber hotzones. |
| Optical Result | Exports details such as protection type, SOL, EOL, source, and destination  |

## Import

The Import menu imports an Excel file, a CPZ file, or an MPZ file.

| Options | Description   |
|---------|---|
| CPZ     | Imports the .cpz network design files that are exported from another Cisco ONP instance                                       |
| Excel   | Imports an Excel file containing all the design parameters  |
| Live    | Imports a live deployed network by retrieving configurations of the nodes, provided in the LNI input Excel sheet              |
| MPZ     | Imports the .mpz network design files from CTP to Cisco ONP, to avoid recreating the networks that are already created in CTP |

## Manage

You can manage layout templates and optical sources.

| Options          | Description  |
|------------------|--|
| Layout Templates | Imports reusable templates to design layout configurations for a network |
| Optical Sources  | Imports an optical source from your local system                         |

## Logs

The System Logs option allows an admin user, or user with USER MANAGEMENT, and NETWORK MANAGEMENT permissions to view at logs the events that are initiated during a specific time interval. Examples of events are user login, user logout, password change, Live Network Import (LNI)-start, failed, completed and analysis-start, and failed.

The **SYSTEM LOGS** page includes the following fields:

| Field      | Description   |
|------------|---|
| Time Stamp | Provides the date and time of the specific event  |
| Event Type | Shows the type of event, which includes user login, user logout, password change, and so on |



| Field        | Description  |
|--------------|--|
| Description  | Describes the event, which includes user login success, user logout success, and so on |
| Username     | Shows the user who has initiated specific events                                       |
| Event Source | Shows the IP address of the device from where the event is initiated                   |

Events that are captured in the System Logs are:

| Event                    | Description  |
|--------------------------|--|
| SIGNUP                   | New user sign-up for Cisco ONP   |
| LOGIN                    | User log in to Cisco ONP   |
| USER STATE CHANGE        | User state change from Active to Inactive and the converse             |
| USER ROLE CHANGE         | User role change, such as admin to planner, and so on                  |
| LOGOUT                   | User log out from Cisco ONP  |
| USER DELETION            | Deletion of a particular user  |
| UNAUTHORIZED             | User enters invalid login credentials                                  |
| LNI_START                | Successful initiation of Live Network Import                           |
| LNI_COMPLETE             | Successful completion of live import of a network                      |
| LNI_CANCEL               | Cancellation of Live Network Import                                    |
| LNI_PURGE                | Imported Live network data is successfully purged                      |
| ANALYZE_LNI_START        | Analysis of LNI network started successfully                           |
| ANALYZE_LNI_END          | Analysis of LNI network completed successfully                         |
| LNI_POPULATE_DESIGN_DATA | Populating of L0 DesignData initiated                                  |
| ANALYZE START            | Starting of the network analysis                                       |
| ANALYZE END              | Completion of the network analysis                                     |
| ANALYZE CANCEL           | Cancellation of the network analysis                                   |
| UPGRADE NETWORK          | Entering the Upgrade mode  |
| PLAN_INIT                | Entering the Plan mode   |
| PLAN_END                 | Exiting the Plan mode  |
| PLAN_REROUTE             | Checking for alternate paths to restore failed media channels or waves |
| PLAN_PROGRESS            | Restoration of failed media channels or waves in progress              |
| RELEASE_UPGRADE_NETWORK  | Upgrading the system release of the network is in progress.            |

## Job Monitor

The **Job Monitor** menu checks and manages tasks running in the background.

You can access this menu if you have ADMIN, NETWORK\_MANAGEMENT, or NETWORK\_PLANNING role.

The **JOB MONITOR** page has the following options:

| Options        | Description   |
|----------------|---|
| Refresh        | Refreshes the display information.  |
| Filter         | Applies one or more of the following filter options:<br>Task Type: Filters the display information based on the task type.<br>Select Start Date: Filters the display information based on the start date of the task.<br>Select End Date: Filters the display information based on the end date of the task.<br>Username: Filters the display information based on the username.  |
| Created Date   | Displays the date on which the task is started by the user.   |
| Network Name   | Displays the name of the network on which the task is running.  |
| Task Type      | Displays the type of background task: Valid values are ANALYZE and EPNM_IMPORT.   |
| Messages       | Displays the current state of the task.   |
| Cancel         | Enables you to cancel or stop an ongoing background task: <ul style="list-style-type: none"> <li>The Admin can cancel any of the running background tasks. Other valid users can cancel only their own tasks.</li> <li>If you want to cancel your ongoing network analysis, you can open Cisco ONP at the browser in incognito mode, or contact the Admin.</li> <li>After a task is cancelled, it gets removed from the job monitor. You can check the status of a cancelled task from <b>System logs</b> page. Click <b>Logs</b> to open the <b>System logs</b> page.</li> </ul> |
| Check Progress | Enables you to view the status of the LNI operation.  |

## Control Panel

Apart from designing, analyzing, and creating BOM for a network, a user with admin rights can activate, manage, and delete users and their roles.

To navigate to the control panel page, click **Control Panel**.

The admin or any user with USER\_MANAGEMENT role can lock, unlock an individual user account, and manually expire the individual user password. For more information, see [Manage Users and Roles, on page 9](#).

## Help

This menu provides information about the Cisco ONP version.

| Field | Description                     |
|-------|---------------------------------|
| About | Provides the Cisco ONP version. |

## Network Tree

The left pane of the Cisco ONP home page comprises a network tree. The network tree includes various network elements. When you click each element, the respective property is displayed under the network tree. You can edit the properties. For more information on editing the network properties, see [Modify Network Properties, on page 79](#).

**Table 52: Network Tree Elements**

| Network Tree Elements               | Description  |
|-------------------------------------|--|
| Network name                        | Displays the name of the network.  |
| Sites                               | Customer premise equipment that is located in a rack within a building.  |
| Fiber                               | Optical fiber connecting two sites.  |
| Fiber Couple                        | A fiber couple consists of two different fibers (clockwise and counterclockwise), one for transmission and another for reception.  |
| Services                            | <p>Service is the circuit through which traffic flows between nodes.</p> <p>When you add services to the Traffic site (of the type 1K-2K-4K) in an SSON network, a DefaultGroup is created under the Services in the network tree. You can also create new service group.</p>  |
| Waves or Medial Channel or Circuits | The wave or Media channel represents a DWDM channel. In a wave hierarchy, for each wave, there is a trail. When you expand a trail, there is a section under each trail. The trail is an optical path or a network section joining two traffic nodes. It can have more than one section depending on whether the trail has a regenerator site. For more information on regeneration, see <a href="#">Regeneration Support, on page 135</a> . |

| Network Tree Elements | Description  |
|-----------------------|--|
| SRLG                  | Shared Risk Link Group (SRLG) is useful for routing the protected services. If there are Fiber1 and Fiber 2 in the network, they are assumed to be diverse and are used as alternates for protection purposes. If Fiber 1 and Fiber 2 are in an SRLG, they are not true alternates, and they share the same risk of failure. Therefore, if Fiber1 fails, Fiber 2 also fails, and Fiber 2 cannot be used as a protected path. |
| Optical subnet        | An optical subnet is a collection of spans with certain associated properties. When you create a new network, Cisco ONP automatically creates an optical subnet that is associated to the network. At least one optical subnet must exist for each network.  |
| Stage button          | Visible only in the Analyze mode.  |

Use the Search box on top of the network tree to search for any specific site, fiber, or wave in the network tree panel. Click the Refresh icon to refresh your search.

## Design Palette

At the right of the Cisco ONP home page, there is the design palette. You can use this design palette to create a network design. It consists of the following six icons:

| Icons             | Description  |
|-------------------|--|
| <b>Zoom In</b>    | Click this icon to magnify the map.                    |
| <b>Zoom Out</b>   | Click this icon to minimize the map.                   |
| <b>Reset Zoom</b> | Click this icon to reset the map to its original size. |

| Icons                | Description   |
|----------------------|---|
| <b>Drawing Tool</b>  | <p>The Drawing Tool consists of the following icons:</p> <ul style="list-style-type: none"> <li>• <b>Traffic Site:</b> Select this icon, and click the working area to create traffic sites in the network.</li> <li>• <b>ROADM Site:</b> Select this icon, and click the working area to create ROADM sites.</li> <li>• <b>OLA Site:</b> Select this icon, and click the working area to create OLA sites.</li> <li>• <b>Passthrough Site:</b> Select this icon, and click the working area to create passthrough sites.</li> <li>• <b>Link:</b> Click this icon, and drag and drop between sites to create a fiber link.</li> <li>• <b>OTN Service:</b> Click this icon to create OTN service between sites.</li> <li>• <b>DWDM channel:</b> Click this icon to add a wave or medial channel between sites.</li> <li>• <b>Select:</b> The <b>Select</b> icon looks similar to the cursor tool. Click this icon to select a node, link service, and so on.</li> </ul>  |
| <b>Layers Window</b> | <p>Use this icon to view or hide layers such as fiber link, service, text, and channel. The following are the four toggle icons:</p> <ul style="list-style-type: none"> <li>• <b>Toggle Fiber:</b> Click this icon to view or hide fiber link details from the network.</li> <li>• <b>Toggle Service:</b> Click this icon to view or hide service details from the network.</li> <li>• <b>Toggle Wave:</b> Click this icon to view or hide the channel or wave details from the network.</li> <li>• <b>Toggle Text:</b> Click this icon to view or hide the text from the network.</li> <li>• <b>Toggle SVO associations:</b> Click this icon to remove or add SVO associations.</li> <li>• <b>Expand/Collapse All Demands:</b> Click this icon to expand the waves or media channels so that you can view them clearly. Click this icon again to collapse the waves and media channels to their original shape and position.</li> </ul> <p>The eye symbol in the icon indicates that you are currently viewing the respective details.</p> |
| <b>Zoom Tool</b>     | <p>The icon below the <b>Drawing Tool</b> is the <b>Zoom Tool</b>. You can change the display of the working area by using this function. Click the arrow to view two sliders.</p> <ul style="list-style-type: none"> <li>• <b>Map Fade:</b> Move the <b>Map Fade</b> slider from right to left to fade the map from the background.</li> <li>• <b>Zoom In/Out:</b> To magnify the map, move the Zoom in or out slider from left to right.</li> </ul>   |

| Icons   | Description  |
|---|--|
| <b>Zoom Elements</b>                                    | Click the <b>Zoom Elements</b> icon to view four sliders. <ul style="list-style-type: none"> <li>• <b>Media Channel Width:</b> Move this slider from left to right to increase the channel width.</li> <li>• <b>Path Spread:</b> Move this slider from left to right to increase the space between the paths.</li> <li>• <b>Fiber Width:</b> Move this slider from left to right to increase the fiber width.</li> <li>• <b>Service Width:</b> Move this slider from left to right to increase the service width.</li> </ul> |
| <b>Show Failed</b><br>(available only in plan mode)     | This icon shows the failed media channels in the map. Failed ones are marked with a red cross mark.  |
| <b>Traffic Monitor</b><br>(available only in plan mode) | This icon shows the total number of impacted media channels, demands, or services, that are working or failed in the entire network.   |

## Entity Editor

The **Entity Editor** allows you to edit various properties of an element in the network. Choose **Network > Entity Editor** to open the **Entity Editor** window. The following table explains the operations that you can perform in the **Entity Editor** window.

| Options               | Description   |
|-----------------------|---|
| Left pane filter      | Includes check boxes to filter the network elements displayed under each tab: <ul style="list-style-type: none"> <li>• For the <b>SITE</b> tab, you can choose whether to display OTN (only traffic node), DWDM (ROADM, OLA, or pass-through) node, or both.</li> <li>• For the <b>FIBER</b> tab, you can choose the fiber connecting a particular source and destination sites.</li> <li>• For the <b>SERVICE</b> tab, you can choose to display either services, waves, or both.</li> </ul> |
| Right pane properties | Displays all properties of the selected network element. You can modify the properties as required.   |
| <b>Search</b>         | Searches for a particular network element.  |
| <b>Refresh</b>        | Refreshes the network elements that are listed under each tab.  |

| Options  | Description  |
|--|--|
| <b>Expand/Collapse</b>   | Expands or collapses the network elements available in the network tree under each tab.  |
| <b>Select Similar</b>  | <p>Use this option to make a similar selection. For example, select a ROADM site, and click the <b>Select Similar</b> icon. All ROADM sites get selected.</p> <p>You can change a property in all the selected sites at one time.</p> <p>Allows you to identify and compare the property difference. For example, if a property is different among the selected sites, that property is dimmed. You can select an option that is applied to all the selections.</p>  |
| <b>Un-Select All</b>   | Deselects all selections that you make under the network tree.   |
| <b>Delete</b>  | Deletes the selected network elements.   |
| <b>Add Contentionless Sides</b> (available only under the <b>SITE</b> tab) | <p>Contentionless functionality on a site refers to the contentionless add/drop ability of an N-degree ROADM node to accommodate N wavelengths of the same frequency from a single add/drop device. For a ROADM to be contentionless, the number of drop units have to be equal to ROADM degrees.</p> <ul style="list-style-type: none"> <li>Click the ROADM site to which you want to add contentionless sides.</li> <li>Click the <b>Add Contentionless Side</b> icon.</li> <li>Enter the appropriate value in the <b>Enter number of contentionless sides</b> field.</li> <li>Click <b>OK</b>.</li> </ul> <p>After adding the contentionless side, you can edit the contentionless port property of the side at the right pane. You can select any of the values ranging from 1 to 16. The default value is 16.</p> |

| Options   | Description   |
|---|---|
| <b>Copy</b> (available only under the <b>SERVICE</b> tab) | <p>Use this option to clone a service or wave that is connected between two sites.</p> <ul style="list-style-type: none"><li>• Select a wave and click <b>Copy</b>.</li><li>• Enter the quantity in the <b>Clone Service/DWDM Channel</b> dialog box, and click <b>OK</b>.</li></ul> <p>The label of the new wave has –1 appended to the label of the cloned wave. For example, Site-2-Site3-1-1 is the label of the new wave that is created by cloning the wave Site-2-Site3-1. You can rename the label.</p> <p>You can also clone a service in a similar way.</p> |





## APPENDIX **B**

# Supported Cards and Pluggables

- [Supported Transponder Cards and Pluggables, on page 177](#)

## Supported Transponder Cards and Pluggables

*Table 53: Feature History*

| Feature Name      | Release Information   | Feature Description   |
|-------------------|-----------------------|---|
| Pluggable Support | Cisco ONP Release 4.1 | QSFP-100G-FR-S= pluggable is supported on the QSFP ports of the 400G-XP LC transponder card with 100GE data rate. |

Cisco ONP supports the following transponders and pluggable:

| Transponder/<br>Muxponder                    | Traffic Type  | FEC mode  | Pluggables Supported  | Encryption<br>SSON         | Encryption<br>Non-SSON | Trunk<br>Mode     |
|--|---|-----------|---|----------------------------|------------------------|-------------------|
| 200G-CK-LC<br>+ MR-MXP<br>(200G MXP<br>mode) | <ul style="list-style-type: none"> <li>• 100GE</li> <li>• OTU4</li> </ul> | SD-FEC_20 | <ul style="list-style-type: none"> <li>• SR-1(CPAK-100G-SR10)</li> <li>• SR-1(CPAK-100G-SR4)</li> <li>• LR-1(CPAK-100G-LR4)</li> <li>• SR-1(CPAK-100G-SR10)</li> <li>• LR-1(CPAK-100G-LR4)</li> </ul> | Yes (only<br>for<br>100GE) | No                     | Auto,<br>TRK_200G |
| 200G-CK-LC<br>+ MR-MXP<br>(100G TXP<br>mode) | 100GE   | SD-FEC_20 | <ul style="list-style-type: none"> <li>• SR-1(CPAK-100G-SR10)</li> <li>• SR-1(CPAK-100G-SR4)</li> <li>• LR-1(CPAK-100G-LR4)</li> </ul>  | Yes                        | Yes                    | Auto,<br>TRK_100G |
| 200G-CK-LC<br>+ MR-MXP<br>(100G TXP<br>mode) | 100GE   | SD-EFEC   | <ul style="list-style-type: none"> <li>• SR-1(CPAK-100G-SR10)</li> <li>• SR-1(CPAK-100G-SR4)</li> <li>• LR-1(CPAK-100G-LR4)</li> </ul>  | Yes                        | Yes                    | Auto,<br>TRK_100G |

| Transponder/<br>Muxponder                    | Traffic Type  | FEC mode  | Pluggables Supported  | Encryption<br>SSON | Encryption<br>Non-SSON | Trunk<br>Mode     |
|--|---|-----------|---|--------------------|------------------------|-------------------|
| 200G-CK-LC<br>+ MR-MXP<br>(100G TXP<br>mode) | 100GE   | SD-FEC    | <ul style="list-style-type: none"> <li>• SR-1(CPAK-100G-SR10)</li> <li>• SR-1(CPAK-100G-SR4)</li> <li>• LR-1(CPAK-100G-LR4)</li> </ul>  | Yes                | Yes                    | Auto,<br>TRK_100G |
| 200G-CK-LC<br>+ MR-MXP<br>(100G MXP<br>mode) | <ul style="list-style-type: none"> <li>• 10GE</li> <li>• 10GE<br/>LAN<br/>PHY</li> <li>• OC192</li> <li>• OTU2</li> </ul> | SD-FEC_20 | <ul style="list-style-type: none"> <li>• LR-1(ONS-QSFP-4*10G-MLR)</li> <li>• LR-1(QSFP-4*10G-MLR)</li> <li>• SR-1(QSFP-40G-SR4)</li> <li>• SR-1(ONS-SC+10G-SR)</li> <li>• LR-1(ONS-SC+10G-LR)</li> <li>• DWDM(ONS-SC+-10G-C)</li> <li>• DWDM(ONS-SC+-10GEPxxx)</li> </ul> | Yes                | Yes                    | Auto,<br>TRK_100G |
| 200G-CK-LC<br>+ MR-MXP<br>(100G MXP<br>mode) | <ul style="list-style-type: none"> <li>• 10GE</li> <li>• 10GE<br/>LAN<br/>PHY</li> <li>• OC192</li> <li>• OTU2</li> </ul> | SD-EFEC   | <ul style="list-style-type: none"> <li>• LR-1(ONS-QSFP-4*10G-MLR)</li> <li>• LR-1(QSFP-4*10G-MLR)</li> <li>• SR-1(QSFP-40G-SR4)</li> <li>• SR-1(ONS-SC+10G-SR)</li> <li>• LR-1(ONS-SC+10G-LR)</li> <li>• DWDM(ONS-SC+-10G-C)</li> <li>• DWDM(ONS-SC+-10GEPxxx)</li> </ul> | Yes                | Yes                    | Auto,<br>TRK_100G |
| 200G-CK-LC<br>+ MR-MXP<br>(100G MXP<br>mode) | <ul style="list-style-type: none"> <li>• 10GE<br/>LAN<br/>PHY</li> <li>• 10GE</li> <li>• OC192</li> <li>• OTU2</li> </ul> | SD-FEC    | <ul style="list-style-type: none"> <li>• LR-1(ONS-QSFP-4*10G-MLR)</li> <li>• LR-1(QSFP-4*10G-MLR)</li> <li>• SR-1(QSFP-40G-SR4)</li> <li>• SR-1(ONS-SC+10G-SR)</li> <li>• LR-1(ONS-SC+10G-LR)</li> <li>• DWDM(ONS-SC+-10G-C)</li> <li>• DWDM(ONS-SC+-10GEPxxx)</li> </ul> | Yes                | Yes                    | Auto,<br>TRK_100G |

| Transponder/<br>Muxponder  | Traffic Type   | FEC mode      | Pluggables Supported   | Encryption<br>SSON | Encryption<br>Non-SSON | Trunk<br>Mode     |
|--|--|---------------|--|--------------------|------------------------|-------------------|
| 200G-CK-LC<br>+ MR-MXP<br>(100G MXP<br>mode 2*10G<br>2*40G<br>MODE)        | <ul style="list-style-type: none"> <li>• 10GE</li> <li>• 10GE<br/>LAN<br/>PHY</li> <li>• 40GE</li> </ul>   | SD-FEC_20     | <ul style="list-style-type: none"> <li>• SR-1(ONS-SC+10G-SR)</li> <li>• LR-1(ONS-SC+10G-LR)</li> <li>• DWDM(ONS-SC+-10G-C)</li> <li>• LR-1(QSFP-40G-LR4)</li> <li>• DWDM(ONS-SC+-10GEPxxx)</li> <li>• SR-1(QSFP-40G-SR4)</li> <li>• SR-1(QSFP-40G-SR-BD)</li> </ul>      | Yes                | Yes                    | Auto,<br>TRK_100G |
| 200G -<br>CK-LC +<br>MR - MXP<br>(100G MXP<br>mode 2*10G<br>2*40G<br>MODE) | <ul style="list-style-type: none"> <li>• 10GE</li> <li>• 40GE</li> </ul>                                   | SD-EFEC       | <ul style="list-style-type: none"> <li>• SR-1(ONS-SC+10G-SR)</li> <li>• LR-1(ONS-SC+10G-LR)</li> <li>• DWDM(ONS-SC+-10G-C)</li> <li>• DWDM(ONS-SC+-10GEPxxx)</li> <li>• SR-1(QSFP-40G-SR4)</li> <li>• LR-1(QSFP-40G-LR4)</li> <li>• SR-1(QSFP-40G-SR-BD)</li> </ul>      | Yes                | Yes                    | Auto,<br>TRK_100G |
| 200G -<br>CK-LC +<br>MR -MXP<br>(100G MXP<br>mode 2*10G<br>2*40G<br>MODE)  | <ul style="list-style-type: none"> <li>• 10GE</li> <li>• 40GE</li> </ul>                                   | SD-FEC        | <ul style="list-style-type: none"> <li>• SR-1(ONS-SC+10G-SR)</li> <li>• LR-1(ONS-SC+10G-LR)</li> <li>• DWDM(ONS-SC+-10G-C)</li> <li>• DWDM(ONS-SC+-10GEPxxx)</li> <li>• SR-1(QSFP-40G-SR4)</li> <li>• LR-1(QSFP-40G-LR4)</li> <li>• SR-1(QSFP-40G-SR-BD)</li> </ul>      | Yes                | Yes                    | Auto,<br>TRK_100G |
| 200G -<br>CK-LC<br>+10x10G<br>-LC  | <ul style="list-style-type: none"> <li>• 10GE</li> <li>• OC192</li> <li>• OTU2</li> <li>• OTU2e</li> </ul> | SD-<br>FEC_20 | <ul style="list-style-type: none"> <li>• SR-1(ONS-SC+-10G-SR)</li> <li>• LR-1(ONS-SC+-10G-LR)</li> <li>• DWDM(ONS-SC+-10G-C)</li> <li>• DWDM(ONS-SC+-10GEPxxx)</li> <li>• ER(ONS-SC+-10G-ER)</li> <li>• ZR (ONS-SC+-10G-ZR)</li> <li>• DWDM(ONS-SC+-10G-xx.x)</li> </ul> | Yes for<br>OTU2e   | No                     | Auto,<br>TRK_100G |

| Transponder/<br>Muxponder  | Traffic Type   | FEC mode      | Pluggables Supported   | Encryption<br>SSON              | Encryption<br>Non-SSON | Trunk<br>Mode     |
|--|--|---------------|--|---------------------------------|------------------------|-------------------|
| 200G -<br>CK-LC<br>+10x10G<br>-LC                                | <ul style="list-style-type: none"> <li>• 10GE</li> <li>• OC192</li> <li>• OTU2</li> <li>• OTU2e</li> </ul> | SD-EFEC       | <ul style="list-style-type: none"> <li>• SR-1(ONS-SC+-10G-SR)</li> <li>• LR-1(ONS-SC+-10G-LR)</li> <li>• DWDM(ONS-SC+-10G-C)</li> <li>• DWDM(ONS-SC+-10GEP<sub>xxx</sub>)</li> <li>• ER (ONS-SC+-10G-ER)</li> <li>• ZR (ONS-SC+-10G-ZR)</li> <li>• DWDM(ONS-SC+-10G-<sub>xxx</sub>)</li> </ul>   | Yes for<br>OTU2e                | No                     | Auto,<br>TRK_100G |
| 200G-CK-LC<br>+ 10x10G<br>-LC                                    | <ul style="list-style-type: none"> <li>• 10GE</li> <li>• OC192</li> <li>• OTU2</li> <li>• OTU2e</li> </ul> | SD-FEC        | <ul style="list-style-type: none"> <li>• SR-1(ONS-SC+-10G-SR)</li> <li>• LR-1(ONS-SC+-10G-LR)</li> <li>• DWDM(ONS-SC+-10G-C)</li> <li>• DWDM(ONS-SC+-10GEP<sub>xxx</sub>)</li> <li>• ER(ONS-SC+-10G-ER)</li> <li>• ZR(ONS-SC+-10G-ZR)</li> <li>• DWDM(ONS-SC+-10G-<sub>xxx</sub>)</li> </ul>   | Yes for<br>OTU2e                | No                     | Auto,<br>TRK_100G |
| 200G -<br>CK-LC +<br>MR-MXP<br>(200G Mxp<br>100G+10*10G<br>Mode) | <ul style="list-style-type: none"> <li>• 100GE</li> <li>• 10GE</li> <li>• OC192</li> <li>• OTU2</li> </ul> | SD-<br>FEC_20 | <ul style="list-style-type: none"> <li>• SR-1(CPAK-100G-SR10)</li> <li>• SR-1(CPAK-100G-SR4)</li> <li>• LR-1(CPAK-100G-LR4)</li> <li>• SR-1(ONS-SC+-10G-SR)</li> <li>• LR-1(ONS-SC+-10G-LR)</li> <li>• DWDM(ONS-SC+-10G-C)</li> <li>• DWDM(ONS-SC+-10GEP<sub>xxx</sub>)</li> <li>• ER(ONS-SC+-10G-ER)</li> <li>• ZR(ONS-SC+-10G-ZR)</li> <li>• DWDM(ONS-SC+-10G-<sub>xxx</sub>)</li> </ul> | Yes for<br>100GE<br>and<br>OTU2 | No                     | Auto,<br>TRK_200G |

| Transponder/<br>Muxponder  | Traffic Type   | FEC mode  | Pluggables Supported  | Encryption<br>SSON | Encryption<br>Non-SSON | Trunk<br>Mode     |
|--|--|-----------|---|--------------------|------------------------|-------------------|
| 200G-CK-LC<br>+ MR-MXP<br>+ MR-MXP<br>(200G Mxp<br>4*40G +<br>4*10G<br>Mode) | <ul style="list-style-type: none"> <li>• 10GE</li> <li>• 10GE LAN PHY</li> <li>• 40GE</li> </ul> | SD-FEC_20 | <ul style="list-style-type: none"> <li>• SR-1(ONS-SC+-10G-SR)</li> <li>• LR-1(ONS-SC+-10G-LR)</li> <li>• DWDM(ONS-SC+-10G-C)</li> <li>• DWDM(ONS-SC+-10GEPxxx)</li> <li>• SR-1(QSFP-40G-SR4)</li> <li>• LR-1(QSFP-40G-LR4)</li> <li>• SR-1(QSFP-40G-SR-BD)</li> </ul>   | Yes                | Yes                    | Auto,<br>TRK_200G |
| 200G-CK-LC<br>+ 10x10G<br>-LC +<br>MR-MXP                                    | <ul style="list-style-type: none"> <li>• 10GE</li> <li>• OC192</li> <li>• OTU2</li> </ul>        | SD-FEC_20 | <ul style="list-style-type: none"> <li>• SR-1(ONS-SC+-10G-SR)</li> <li>• LR-1(ONS-SC+-10G-LR)</li> <li>• DWDM(ONS-SC+-10G-C)</li> <li>• DWDM(ONS-SC+-10GEPxxx)</li> <li>• ER(ONS-SC+-10G-ER)</li> <li>• ZR(ONS-SC+-10G-ZR)</li> <li>• DWDM(ONS-SC+-10G-xx.x)</li> <li>• LR-1(ONS-QSFP-4*10G-MLR)</li> <li>• ZR(ONS-SC+-10G-ZR)</li> </ul> | Yes                | Yes                    | Auto,<br>TRK_200G |
| 200G-CK-LC<br>+ MR-MXP<br>+ MR-MXP   | <ul style="list-style-type: none"> <li>• 10GE</li> <li>• OC192</li> <li>• OTU2</li> </ul>        | SD-FEC_20 | <ul style="list-style-type: none"> <li>• SR-1(ONS-SC+-10G-SR)</li> <li>• LR-1(ONS-SC+-10G-LR)</li> <li>• DWDM(ONS-SC+-10G-C)</li> <li>• DWDM(ONS-SC+-10GEPxxx)</li> <li>• ER(ONS-SC+-10G-ER)</li> <li>• ZR(ONS-SC+-10G-ZR)</li> <li>• DWDM(ONS-SC+-10G-xx.x)</li> <li>• LR-1(ONS-QSFP-4*10G-MLR)</li> <li>• ZR(ONS-SC+-10G-ZR)</li> </ul> | Yes                | Yes                    | Auto,<br>TRK_200G |

| Transponder/<br>Muxponder       | Traffic Type  | FEC mode           | Pluggables Supported  | Encryption<br>SSON | Encryption<br>Non-SSON | Trunk<br>Mode     |
|---------------------------------|---|--------------------|---|--------------------|------------------------|-------------------|
| 100GS -<br>CK-LC +<br>10x10G-LC | <ul style="list-style-type: none"> <li>• 10GE</li> <li>• OC192</li> </ul>   | EFEC,<br>SD-FEC_20 | <ul style="list-style-type: none"> <li>• SR-1(ONS-SC+-10G-SR)</li> <li>• LR-1(ONS-SC+-10G-LR)</li> <li>• DWDM(ONS-SC+-10G-C)</li> <li>• DWDM(ONS-SC+-10GEPxxx)</li> <li>• ER(ONS-SC+-10G-ER)</li> <li>• ZR(ONS-SC+-10G-ZR)</li> <li>• DWDM(ONS-SC+-10G-xxx)</li> </ul>  | No                 | No                     | Auto,<br>TRK_100G |
| 100G - LC-C<br>+<br>10x10G-LC   | <ul style="list-style-type: none"> <li>• 10GE</li> <li>• OC192</li> <li>• Fiber<br/>Channel<br/>10G</li> <li>• Fiber<br/>Channel<br/>8G</li> <li>• OTU2</li> <li>• OTU2e</li> </ul> | FEC                | <ul style="list-style-type: none"> <li>• SR-1(ONS-SC+-10G-SR)</li> <li>• LR-1(ONS-SC+-10G-LR)</li> <li>• DWDM(ONS-SC+-10G-C)</li> <li>• DWDM(ONS-SC+-10GEPxxx)</li> <li>• ER(ONS-SC+-10G-ER)</li> <li>• ZR(ONS-SC+-10G-ZR)</li> <li>• DWDM(ONS-SC+-10G-xxx)</li> </ul>  | No                 | No                     | Auto              |
| 100G - LC-C<br>+<br>10x10G-LC   | <ul style="list-style-type: none"> <li>• 10GE</li> <li>• OC192</li> <li>• Fiber<br/>Channel<br/>10G</li> <li>• Fiber<br/>Channel<br/>8G</li> <li>• OTU2</li> <li>• OTU2e</li> </ul> | EFEC               | <ul style="list-style-type: none"> <li>• SR-1(ONS-SC+-10G-SR)</li> <li>• LR-1(ONS-SC+-10G-LR)</li> <li>• DWDM(ONS-SC+-10G-C)</li> <li>• DWDM(ONS-SC+-10GEPxxx)</li> <li>• ER (ONS-SC+-10G-ER)</li> <li>• ZR(ONS-SC+-10G-ZR)</li> <li>• DWDM(ONS-SC+-10G-xxx)</li> </ul> | No                 | No                     | Auto              |

| Transponder/<br>Muxponder     | Traffic Type  | FEC mode | Pluggables Supported  | Encryption<br>SSON | Encryption<br>Non-SSON | Trunk<br>Mode |
|-------------------------------|---|----------|---|--------------------|------------------------|---------------|
| 100G - LC-C<br>+<br>10x10G-LC | <ul style="list-style-type: none"> <li>• 10GE</li> <li>• OC192</li> <li>• Fiber Channel 10G</li> <li>• Fiber Channel 8G</li> <li>• OTU2</li> <li>• OTU2e</li> </ul>                         | HG-FEC   | <ul style="list-style-type: none"> <li>• SR-1(ONS-SC+-10G-SR)</li> <li>• LR-1(ONS-SC+-10G-LR)</li> <li>• DWDM(ONS-SC+-10G-C)</li> <li>• DWDM(ONS-SC+-10GEPxxx)</li> <li>• ER (ONS-SC+-10G-ER)</li> <li>• ZR (ONS-SC+-10G-ZR)</li> <li>• DWDM(ONS-SC+-10G-xx.x)</li> </ul> | No                 | No                     | Auto          |
| 100G - CK-LC-C +<br>10x10G-LC | <ul style="list-style-type: none"> <li>• 10GE</li> <li>• 10GE LAN PHY</li> <li>• OC192</li> <li>• Fiber Channel 10G</li> <li>• Fiber Channel 8G</li> <li>• OTU2</li> <li>• OTU2e</li> </ul> | FEC      | <ul style="list-style-type: none"> <li>• SR-1(ONS-SC+-10G-SR)</li> <li>• LR-1(ONS-SC+-10G-LR)</li> <li>• DWDM(ONS-SC+-10G-C)</li> <li>• DWDM(ONS-SC+-10GEPxxx)</li> <li>• ER(ONS-SC+-10G-ER)</li> <li>• ZR(ONS-SC+-10G-ZR)</li> <li>• DWDM(ONS-SC+-10G-xx.x)</li> </ul>   | No                 | No                     | Auto          |

| Transponder/<br>Muxponder        | Traffic Type  | FEC mode | Pluggables Supported   | Encryption<br>SSON | Encryption<br>Non-SSON | Trunk<br>Mode |
|----------------------------------|---|----------|--|--------------------|------------------------|---------------|
| 100G<br>-CK-LC-C +<br>10x10G-LC  | <ul style="list-style-type: none"> <li>• 10GE</li> <li>• 10GE LAN PHY</li> <li>• OC192</li> <li>• Fiber Channel 10G</li> <li>• Fiber Channel 8G</li> <li>• OTU2</li> <li>• OTU2e</li> </ul> | EFEC     | <ul style="list-style-type: none"> <li>• SR-1(ONS-SC+-10G-SR)</li> <li>• LR-1(ONS-SC+-10G-LR)</li> <li>• DWDM(ONS-SC+-10G-C)</li> <li>• DWDM(ONS-SC+-10GEP<sub>xxx</sub>)</li> <li>• ER(ONS-SC+-10G-ER)</li> <li>• ZR(ONS-SC+-10G-ZR)</li> <li>• DWDM(ONS-SC+-10G-<sub>xxx</sub>)</li> </ul> | No                 | No                     | Auto          |
| 100G -<br>CK-LC-C +<br>10x10G-LC | <ul style="list-style-type: none"> <li>• 10GE</li> <li>• 10GE LAN PHY</li> <li>• OC192</li> <li>• Fiber Channel 10G</li> <li>• Fiber Channel 8G</li> <li>• OTU2</li> <li>• OTU2e</li> </ul> | HG-FEC   | <ul style="list-style-type: none"> <li>• SR-1(ONS-SC+-10G-SR)</li> <li>• LR-1(ONS-SC+-10G-LR)</li> <li>• DWDM(ONS-SC+-10G-C)</li> <li>• DWDM(ONS-SC+-10GEP<sub>xxx</sub>)</li> <li>• ER(ONS-SC+-10G-ER)</li> <li>• ZR(ONS-SC+-10G-ZR)</li> <li>• DWDM(ONS-SC+-10G-<sub>xxx</sub>)</li> </ul> | No                 | No                     | Auto          |



| Transponder/<br>Muxponder | Traffic Type   | FEC mode            | Pluggables Supported   | Encryption<br>SSON | Encryption<br>Non-SSON | Trunk<br>Mode         |
|---------------------------|--|---------------------|--|--------------------|------------------------|-----------------------|
| 400G-XP-LC                | <ul style="list-style-type: none"> <li>• 100GE</li> <li>• 10GE LAN PHY</li> <li>• 10GE</li> <li>• 40GE</li> <li>• Fiber Channel 10G</li> <li>• Fiber Channel 16G</li> <li>• Fiber Channel 8G</li> <li>• OC192 /STM64</li> <li>• OTU2</li> <li>• OTU2e</li> <li>• OTU4</li> </ul> | SD-FEC_25-<br>NO_DE | <ul style="list-style-type: none"> <li>• SR-1(QSFP-100G-SR4-S)</li> <li>• LR-1(QSFP-100G-LR4-S)</li> <li>• LR-1(QSFP-28-LR4)</li> <li>• SR-1(QSFP-100G-SM-SR)</li> <li>• SR-1(QSFP-40/100G-SRBD)</li> <li>• LR-1(ONS-QSFP-4*10G-MLR)</li> <li>• LR-1(QSFP-4*10G-LR)</li> <li>• SR-1(QSFP-40G-SR4)</li> <li>• ER(ONS-QSFP-4*10G-MER)</li> <li>• LR-1(QSFP-40G-LR4)</li> <li>• SR-1(QSFP-40G-SR-BD)</li> <li>• LR-1(ONS-QC16GFC-LW)</li> <li>• LR-1(ONS-QC16GFC-SW)</li> <li>• LR-1(ONS-QSFP28-LR4)</li> <li>• FR-1 (QSFP-100G-FR-S)<br/>(only for 100GE)</li> </ul> | Yes                | Yes                    | TRK_100G,<br>TRK_200G |

| Transponder/<br>Muxponder | Traffic Type  | FEC mode        | Pluggables Supported   | Encryption<br>SSON | Encryption<br>Non-SSON | Trunk<br>Mode      |
|---------------------------|---|-----------------|--|--------------------|------------------------|--------------------|
| 400G-XP-LC                | <ul style="list-style-type: none"> <li>• 100GE</li> <li>• 10GE LAN PHY</li> <li>• 10GE</li> <li>• 40GE</li> <li>• Fiber Channel 10G</li> <li>• Fiber Channel 16G</li> <li>• Fiber Channel 8G</li> <li>• OC192/STM64</li> <li>• OTU2</li> <li>• OTU2e</li> <li>• OTU4</li> </ul> | SD-FEC_15-NO_DE | <ul style="list-style-type: none"> <li>• SR-1(QSFP-100G-SR4-S)</li> <li>• LR-1(QSFP-100G-LR4-S)</li> <li>• LR-1(QSFP-28-LR4)</li> <li>• SR-1(QSFP-100G-SM-SR)</li> <li>• SR-1(QSFP-40/100G-SRBD)</li> <li>• LR-1(ONS-QSFP-4*10G-MLR)</li> <li>• LR-1(QSFP-4*10G-LR)</li> <li>• SR-1(QSFP-40G-SR4)</li> <li>• ER(ONS-QSFP-4*10G-MER)</li> <li>• LR-1(QSFP-40G-LR4)</li> <li>• SR-1(QSFP-40G-SR-BD)</li> <li>• LR-1(ONS-QC16GFC-LW)</li> <li>• LR-1(ONS-QC16GFC-SW)</li> <li>• LR-1(ONS-QSFP28-LR4)</li> <li>• FR-1 (QSFP-100G-FR-S) (only for 100GE)</li> </ul> | Yes                | Yes                    | TRK_100G, TRK_200G |
| 100G-LC-C                 | <ul style="list-style-type: none"> <li>• 100GE</li> <li>• OTU4</li> </ul>   | FEC             | SR-1(CPAK-100G-SR10)   | No                 | No                     | Auto               |
| 100G-LC-C                 | <ul style="list-style-type: none"> <li>• 100GE</li> <li>• OTU4</li> </ul>   | EFEC            | SR-1(CPAK-100G-SR10)   | No                 | No                     | Auto               |
| 100G-LC-C                 | <ul style="list-style-type: none"> <li>• 100GE</li> <li>• OTU4</li> </ul>   | HGFEC           | SR-1(CPAK-100G-SR10)   | No                 | No                     | Auto               |
| 100G - CK-LC-C            | <ul style="list-style-type: none"> <li>• 100GE</li> <li>• 40GE</li> <li>• OTU4</li> </ul>   | FEC             | <ul style="list-style-type: none"> <li>• SR-1(CPAK-100G-SR4)</li> <li>• SR-1(CPAK-100G-SR10)</li> <li>• LR-1(CPAK-100G-LR4)</li> </ul>   | No                 | No                     | Auto               |

| Transponder/<br>Muxponder              | Traffic Type  | FEC mode  | Pluggables Supported   | Encryption<br>SSON | Encryption<br>Non-SSON | Trunk<br>Mode     |
|--|---|-----------|--|--------------------|------------------------|-------------------|
| 100G -<br>CK-LC-C                      | <ul style="list-style-type: none"> <li>• 100GE</li> <li>• 40GE</li> <li>• OTU4</li> </ul> | EFEC      | <ul style="list-style-type: none"> <li>• SR-1(CPAK-100G-SR4)</li> <li>• SR-1(CPAK-100G-SR10)</li> <li>• LR-1(CPAK-100G-LR4)</li> </ul> | No                 | No                     | Auto              |
| 100G -<br>CK-LC-C                      | <ul style="list-style-type: none"> <li>• 100GE</li> <li>• 40GE</li> <li>• OTU4</li> </ul> | HGFEC     | <ul style="list-style-type: none"> <li>• SR-1(CPAK-100G-SR4)</li> <li>• SR-1(CPAK-100G-SR10)</li> <li>• LR-1(CPAK-100G-LR4)</li> </ul> | No                 | No                     | Auto              |
| 100GS -<br>CK-LC                       | 100GE   | FEC       | SR-1(CPAK-100G-SR10)   | Yes                | No                     | Auto,<br>TRK_100G |
| 100GS -<br>CK-LC                       | 100GE   | EFEC      | LR-1(CPAK-100G-LR4)  | Yes                | No                     | Auto,<br>TRK_100G |
| 100GS -<br>CK-LC                       | 100GE   | SD-FEC_20 | SR-1(CPAK-100G-SR10)   | Yes                | No                     | Auto,<br>TRK_100G |
| 200G -<br>CK-LC<br>(100G Mode<br>only) | <ul style="list-style-type: none"> <li>• 100GE</li> <li>• OTU4</li> </ul>                 | FEC       | <ul style="list-style-type: none"> <li>• SR-1(CPAK-100G-SR4)</li> <li>• SR-1(CPAK-100G-SR10)</li> <li>• LR-1(CPAK-100G-LR4)</li> </ul> | Yes (for<br>100GE) | No                     | Auto,<br>TRK_100G |
| 200G -<br>CK-LC<br>(100G Mode<br>only) | <ul style="list-style-type: none"> <li>• 100GE</li> <li>• OTU4</li> </ul>                 | EFEC      | <ul style="list-style-type: none"> <li>• SR-1(CPAK-100G-SR4)</li> <li>• SR-1(CPAK-100G-SR10)</li> <li>• LR-1(CPAK-100G-LR4)</li> </ul> | Yes (for<br>100GE) | No                     | Auto,<br>TRK_100G |
| 200G-CK-LC<br>(100G Mode<br>only)      | <ul style="list-style-type: none"> <li>• 100GE</li> <li>• OTU4</li> </ul>                 | SD-FEC_20 | <ul style="list-style-type: none"> <li>• SR-1(CPAK-100G-SR4)</li> <li>• SR-1(CPAK-100G-SR10)</li> <li>• LR-1(CPAK-100G-LR4)</li> </ul> | Yes (for<br>100GE) | No                     | Auto,<br>TRK_100G |





## APPENDIX C

# Supported Optical Sources

- [Supported Optical Sources](#), on page 189

## Supported Optical Sources

**Table 54: Feature History**

| Feature Name                             | Release Information   | Feature Description  |
|--|-----------------------|--|
| New Optical Source and Pluggable Support | Cisco ONP Release 4.2 | Optical Sources enable you to simulate the optical feasibility of the network with the 400G and other interfaces that are not natively modeled in Cisco ONP. The following Optical Sources are introduced in this release: <ul style="list-style-type: none"> <li>• ONS-CFP2D-400G-C-OpticalSources-V 2.mxd</li> <li>• QDD-400G-ZRP-S-OpticalSources-V2.mxd</li> </ul> |

Cisco ONP supports the following optical sources:

- OpticalSources\_NCS2K\_400GXP-LC\_NCS4K-4H-OPW-QC2 DWDM Line Card
  - 400GXP\_100G\_25%\_DE
  - 400GXP\_200G\_15%\_DE
  - 100G-SD-FEC
  - 400GXP\_100G\_15%\_DE
  - 200G-SD-FEC
  - 400GXP\_100G\_15%
  - 400GXP\_200G\_15%
  - 400GXP\_200G\_25%DE
- NCS1004\_OpticalSources\_V3
  - NCS1004\_QPSK\_SP\_16QAM\_200G\_27%SDFEC\_60GBd

- NCS1004\_SP\_16QAM\_300G\_27%SDFEC\_69GBd
- NCS1004\_QPSK\_200G\_27%SDFEC\_69GBd
- NCS1004\_16QAM\_32QAM\_400G\_27%SDFEC\_62GBd
- NCS1004\_16QAM\_400G\_27%SDFEC\_69GBd
- NCS1004\_SP\_16QAM\_16QAM\_300G\_27%SDFEC\_60GBd
- NCS1004\_32QAM\_500G\_27%SDFEC\_69GBd
- QDD and CFP2-DCO variants
  - **ONS-CFP2D-400G-C-OpticalSources-V2.mxd**<sup>1</sup>
    - CFP2\_200OR\_TXP\_FOIC2\_OFEC\_15\_DE\_ON\_4Q\_1S\_BR63\_1
    - CFP2\_300OR\_TXP\_FOIC3\_OFEC\_15\_DE\_ON\_8Q\_1S\_BR63\_1
    - CFP2\_400OR\_TXP\_FOIC4\_OFEC\_15\_DE\_ON\_16Q\_1S\_BR63\_1
  - **ONS-CFP2D-400G-C-OpticalSources-V2.mxd**<sup>2</sup>
    - CFP2\_300ZR+\_MXP\_GAUI8\_OFEC\_15\_DE\_ON\_8Q\_0S\_BR60\_1
    - CFP2\_200ZR+\_MXP\_GAUI2\_OFEC\_15\_DE\_ON\_8Q\_1E\_BR40\_1
    - CFP2\_200ZR+\_MXP\_GAUI2\_OFEC\_15\_DE\_ON\_16Q\_1E\_BR30\_1
    - CFP2\_400ZR\_TXP\_GAUI8\_CFEC\_15\_DE\_ON\_16Q\_0S\_BR59\_8
    - CFP2\_200ZR+\_MXP\_GAUI2\_OFEC\_15\_DE\_ON\_4Q\_0S\_BR60\_1
    - CFP2\_100ZR+\_TXP\_GAUI2\_OFEC\_15\_DE\_ON\_4Q\_1S\_BR30\_1
    - CFP2\_200ZR+\_MXP\_GAUI2\_OFEC\_15\_DE\_ON\_4Q\_1S\_BR60\_1
    - CFP2\_400ZR+\_TXP\_GAUI8\_OFEC\_15\_DE\_ON\_16Q\_1E\_BR60\_1
    - CFP2\_300ZR+\_MXP\_GAUI8\_OFEC\_15\_DE\_ON\_8Q\_1E\_BR60\_1
    - CFP2\_400ZR+\_TXP\_GAUI8\_OFEC\_15\_DE\_ON\_16Q\_0S\_BR60\_1
    - CFP2\_100OR\_TXP\_FOIC1\_OFEC\_15\_DE\_ON\_4Q\_1S\_BR31\_6
    - CFP2\_200OR\_TXP\_FOIC2\_OFEC\_15\_DE\_ON\_8Q\_1S\_BR42\_1
    - CFP2\_200OR\_TXP\_FOIC2\_OFEC\_15\_DE\_ON\_16Q\_1E\_BR31\_6
  - **QDD-400G-ZRP-S-OpticalSources-V2.mxd**<sup>2</sup>
    - QDD\_200ZR+\_MXP\_GAUI2\_OFEC\_15\_DE\_ON\_4Q\_1S\_BR60\_1
    - QDD\_400ZR\_TXP\_GAUI8\_CFEC\_15\_DE\_ON\_16Q\_0S\_BR59\_8
    - QDD\_200ZR+\_MXP\_GAUI2\_OFEC\_15\_DE\_ON\_4Q\_0S\_BR60\_1
    - QDD\_400ZR+\_TXP\_GAUI8\_OFEC\_15\_DE\_ON\_16Q\_1E\_BR60\_1

<sup>1</sup> The optical source interfaces are supported for SSON networks.

<sup>2</sup> The optical source interfaces are supported for SSON and non-SSON networks.

- QDD\_400ZR+\_TXP\_GAUI8\_OFEC\_15\_DE\_ON\_16Q\_0S\_BR60\_1
- QDD\_300ZR+\_MXP\_GAUI8\_OFEC\_15\_DE\_ON\_8Q\_1E\_BR60\_1
- QDD\_400ZR+\_TXP\_GAUI8\_OFEC\_15\_DE\_ON\_16Q\_0E\_BR60\_1
- QDD\_300ZR+\_MXP\_GAUI8\_OFEC\_15\_DE\_ON\_8Q\_0E\_BR60\_1
- QDD\_100ZR+\_TXP\_GAUI2\_OFEC\_15\_DE\_ON\_4Q\_1S\_BR30\_1
- QDD\_200ZR+\_MXP\_GAUI2\_OFEC\_15\_DE\_ON\_16Q\_1E\_BR30\_1
- QDD\_300ZR+\_MXP\_GAUI8\_OFEC\_15\_DE\_ON\_8Q\_0S\_BR60\_1
- QDD\_200ZR+\_MXP\_GAUI2\_OFEC\_15\_DE\_ON\_8Q\_1E\_BR40\_1



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**Note** NCS 1004 is supported as an optical source.

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**Note** The following optical source files are not supported in NCS 2000 Release 11.0:

- NCS1004\_16QAM\_32QAM\_400G\_27%SDFEC\_62GBd
- NCS1004\_QPSK\_SP\_16QAM\_200G\_27%SDFEC\_60GB

Hence, we recommend you to upgrade the system release of the network to Release 11.1, or force the optical source files that are supported for the Release 11.0.

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## APPENDIX D

# Supported Amplifiers

- [Supported Amplifiers, on page 193](#)

## Supported Amplifiers

Cisco ONP supports the following amplifiers:

**Table 55: Cisco ONP Supported NCS 2000 Amplifiers**

| Amplifier            | Description   |
|----------------------|---|
| 15454-M-RAMAN-CTP    | Raman Amp C-Band  |
| 15454-M-RAMAN-COP    | Raman Amp C-Band  |
| EDFA 35 for OLA node | Erbium Doped Fiber Amplifier (EDFA) that can function in dual gain with maximum gain of 35 dB |
| NCS2K-EDRA2-26C      | 21dBm EDFA + Bst 26dB Span - C-Band   |
| NCS2K-EDRA1-26C      | 21dBm EDFA 26dB Span - C-Band   |
| NCS2K-EDRA2-35C      | 21dBm EDFA + Bst 35dB Span - C-Band   |
| NCS2K-EDRA1-35C      | 21dBm EDFA35dB Span - C-Band  |

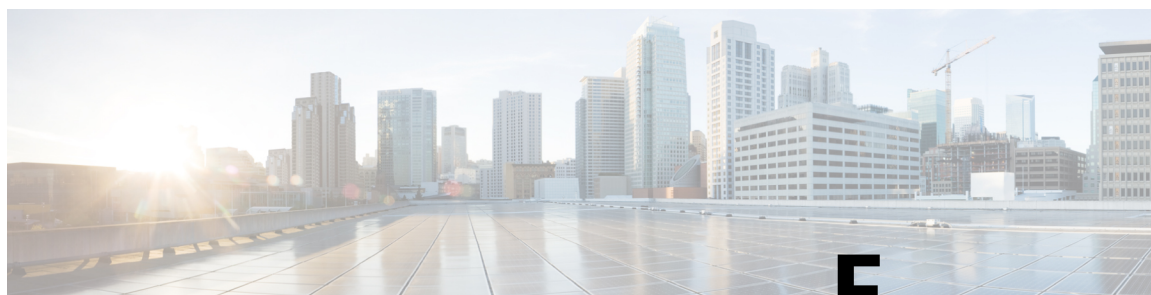


### Note

- RAMAN-CTP is supported on all nodes.
- EDRA's are supported on the OLA node.
- For ROADM and Traffic nodes, the booster amplifier and preamplifier are in-built. The booster is 20SMR-FS-BST.

*Table 56: Cisco ONP Supported NCS 1010 Amplifiers*

| Amplifier        | Description   |
|------------------|---|
| OLT-C-EDFA22-Pre | 25 dBm EDFA preamplifier available in OLT card      |
| OLT-C-EDFA35-Pre | 35 dBm EDFA preamplifier available in OLT card      |
| ILA-C-EDFA17-Bst | 17 dBm EDFA booster amplifier available in ILA card |
| ILA-C-EDFA30-Bst | 30 dBm EDFA booster amplifier available in ILA card |



# APPENDIX E

## Troubleshoot

- [Troubleshooting Tasks, on page 195](#)

## Troubleshooting Tasks

The following table describes the common error messages that are related to Cisco ONP configuration and the workarounds:

**Table 57: Troubleshooting Tasks for Cisco ONP Configuration**

| Warning Message or Error  | Probable Reason for the Error  | Workaround   |
|---|--|--|
| Cannot Route demand. Did not find any valid omnidirectional side.             | Required contentionless sides are not created on add/drop sites. For protected service or wave, minimum two contentionless sides are required on the add/drop sites.   | Check and add the required number of contentionless sides on the target service or wave source and destination sites.  |
| Error: No valid path from <i>&lt;source&gt;</i> to <i>&lt;destination&gt;</i> | Disjoint path is not available for protected demand.<br>Or<br>Forced wavelength may be already used for other demand in the same path.<br>Or<br>The number of colorless demands created is more than the colorless ports forced on the interfaces. | For linear topology, change the demand protection to unprotected.<br><br>For ring topology, ensure that at least two nodes and fiber-disjoint paths are available and the forced wavelength is unconfined in the end-to-end path.<br><br>Force the required number of colorless ports. |
| Error: Traffic subnet constraints prevent routing of section.                 | Disjoint path is not available for protected demand.<br>Or<br>Forced wavelength may be already used for other demands in the same path.  | For linear topology, change the demand protection to unprotected.<br><br>For ring topology, ensure that at least two nodes and fiber-disjoint paths are available and the forced wavelength is unconfined in the end-to-end path.  |

| Warning Message or Error   | Probable Reason for the Error   | Workaround   |
|--|---|--|
| Error: The sum of CoDem and Non-CoDem colorless ports and ports that are used for Omnidirectional and Contentional sides cannot exceed 20 when the TYPE is SMR-20. | The number of contentionless sides, colorless ports that are forced, and colored demand exceed SMR-20 port capacity.<br><br>Or<br><br>The Cascaded SMR flag is enabled, and colored or colorless demand is created. | If the Cascaded SMR flag is enabled, create only contentionless demands on those nodes. Else, reduce the number of contentionless sides, colorless ports, or colored demands that are created, to get successful network analysis. |
| Couple between <source>.<side> and <destination>.<side> is of invalid type.  | The fiber connecting these sides is not supported by Cisco ONP.   | Change the fiber type to the one that is supported by Cisco ONP.   |
| Unconnected nodes or sites are present in the network.   | Any of the sites are connected to the fiber in the Ring/Linear network.   | Connect the fiber to the nodes in the ring network.  |
| Unfeasible forcing   | Wrong path has been forced on the wave or media channel.  | Force the correct path on the Wave/Media Channel.  |
| E11000 duplicate key error collection: CnpDB.dbchangelog index: _id_dup key: { : ObjectId("") }  | Restore database script attempts to write data in the mongo database, but the data with the same index is already present.  | Clear the contents of mongodb_cnp folder before running the restore command: <b>rm -rf /var/lib/mongodb_cnp/*</b> cannot   |
| Cannot complete mesh connection.   | There is an issue with setting up connection in the lock mode.  | Unlock the mentioned entity or unlock the complete site.   |
| Path constraints prevent routing.  | Invalid path has been forced.   | Check the path and choose the correct primary path and secondary path fibers.<br><br>Or<br><br>Remove all the fibers that are forced to set the <b>Path of Wave</b> property as <i>Auto</i> .                                      |
| Traffic subnet constraints prevent routing.  | Forced Wavelength is not part of the Optical subnet rule.   | Force the wavelength as per optical subnet rule or change the optical subnet rule.   |
| MF Unit value MF1-RU is not supported in RPT, so resetting the value to default for <site name>.   | Template is applied when properties such as <b>ECU</b> , <b>MF Unit</b> are forced.   | Set the property <b>MF Unit</b> to <i>Auto</i> and then force the template.  |

| Warning Message or Error  | Probable Reason for the Error   | Workaround  |
|---|---|---|
| Please force MD-48-CM as Interlever Type for {0}.   | In non-SSON traffic, the ROADM site with the properties (DEG-8, SMR-9, number of contentionless sites is equal to 1) has 96 colored waves.<br><br>The <b>Interlever Type</b> is property set to <i>Auto</i> or <i>MpoCable</i> .  | Modify the Interlever forcing on the line side to MD-48-CM.                                 |
| The sum of forced CoDem and Non-CoDem colorless ports and colored demands can't be greater than 9 for type SMR-9. | During upgrade or Release upgrade, colorless port is forced on SMR-9, and more than one contentionless side is added in the imported MPZ network.   | Delete the extra contentionless sides.  |
| No Route Found.   | Plan mode restoration fails because the presence of dark fiber in the restoration path makes it difficult to find it.   | Check the restoration path. It must not have any dark fiber.                                |
| Wavelength Forced {0} in this {1} is already in use / not as per current optical subnet channel rule.             | Two fibers are occupied by a wave with the same wavelength.<br><br>The fiber belongs to a subnet where the wavelength is not supported. For example, a wave with an even wavelength is forced through a fiber belonging to the C40 channel or C48 channel subnet rules. | Correct the wave such that the wavelength is supported by the optical subnet C-band rule.   |
| tm.unsupported_client_pluggable.msg =Incompatible Client Interface forcing.                                       | ROADM sites having waves with optical source other than 100, 200SDFEC are converted to traffic sites.   | Before you convert the site type to traffic, modify the optical source wave to be feasible. |
| Error Message   | Slow internet connectivity, or idle session.  | Refresh the browser and try again.  |
| Please provide a valid .mpz network file.   | The MPZ file that you are trying to upload does not have a valid file extension.  | Upload proper .MPZ file.  |
| Failed to import mpz file, please make sure the MPZ file is not in use and retry.                                 | MPZ file remains open in the CTP tool.  | Close MPZ file in the CTP tool before uploading it to Cisco ONP .                           |
| Cannot connect to Server;(Password).  | Failed to connect to Mongo DB on opening <b>Control Panel</b> tab.  | Restart the Mongo database container or reinstall the Build.                                |

| Warning Message or Error   | Probable Reason for the Error   | Workaround  |
|--|---|---|
| Null pointer exception   | The applied layout template file has syntax error such as extra SPACE, TAB, missing symbols such as <, >.   | Fix the syntax and reapply the template.  |
| Object not found in cache.   | Intermediate network disconnection.   | Refresh the browser or log in again to Cisco ONP.   |
| Session does not exist.  | Idle time-out   | Log in again to Cisco ONP.  |
| Forced/Locked wavelength is not feasible for spectrum to be allocated for the demand/MCH <Site-1-Site-3-1>. Insufficient spectrum around the forced central wavelength.                          | Forced wavelength is not a feasible central wavelength based on the configuration.  | Force another wavelength that is next to the currently forced one.  |
| Route could not be found/Alternate path not found/<Optically not feasible>.  | Insufficient spectral width due to the following reasons: <ul style="list-style-type: none"> <li>• The alternate path has no waves (dark fiber).</li> <li>• Optical parameters are not feasible.</li> <li>• Wavelength does not have sufficient bandwidth.</li> </ul> | Make sure that the alternate path has waves associated with the fiber and has sufficient bandwidth available.   |
| Error: Could not find any valid flex configuration for the traffic matrix defined at <Site-1.A> This could be because of configuration limitations, invalid forcings, or equipment restrictions. | Check if it is 8 degrees, SMR-9 node with Evolved Mesh ON and contentionless and colorless/colored mixed add/drop configuration.  | Change Evolved Mesh to Off, reduce Scalable upto degree to 8, change Site Type to SMR-20, or Remove contentionless or colorless forcing.  |
| Single hop path Site-1~Site-3 needs regeneration but has no regenerator hosting sites.   | Check if <b>Quick analysis</b> under Network property is disabled.  | <ul style="list-style-type: none"> <li>• Enable <b>Quick analysis</b>.</li> <li>• After successful analysis, check the optical report and look for the waves that require regeneration.</li> <li>• Split the long haul demand between the intermediate short distance nodes that are equivalent to regen site.</li> <li>• Disable <b>Quick analysis</b> and analyze.</li> </ul> |

| Warning Message or Error   | Probable Reason for the Error                                    | Workaround   |
|--|--|--|
| Missing SOURCE TermPoint for PceServiceRequest   | Required Add/Drop card cannot be placed on the source node.      | Check the source node configuration (such as scalable upto degree, number of colored and colorless circuits or port forcing, and colored add/drop card forcing).   |
| Missing DESTINATION TermPoint for PceServiceRequest  | Required Add/Drop card cannot be placed on the destination node. | Check the destination node configuration (such as scalable upto degree, number of colored and colorless circuits or port forcing, and colored add/drop card forcing).  |
| Service allocation failed: No resource available   | Spectrum allocation failed for the mentioned service             | <ul style="list-style-type: none"> <li>• Check the colored add/drop forcing and the number of colored demands routing on the path.</li> <li>• Check the number of colorless demands, ports, and add/drop cards forced on the path.</li> <li>• Check the optical subnet defined on the path and the type of service used.</li> </ul>  |
| Service allocation failed: [PCE-WAL00028] - No free spectrum available to allocate circuit: [PCE-WAL00028] | Spectrum allocation failed for the mentioned service             | Check the card type forced for the colored circuit. Circuits with a maximum spectrum of 75GHz can be used with colored add/drop MD-32-ODD/EVEN. For example, a circuit that has an interface with rate greater than 60-bit rate or 60GBd cannot work with 75GHz fixed grid add/drop with 82% spectral density. Change to colorless add/drop BRK-24 or change to interface type having less spectral occupancy. |

