



## Design and Analyze Networks

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## 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 1: 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

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

## Before you begin

[Log in to Cisco ONP Web Interface.](#)

## Procedure

- 
- Step 1** Choose **File > New**.
- The **Create New Network** dialog box appears.
- Step 2** If you want to create an SSON network, check the **SSON Network** check box, else leave the **SSON Network** check box unchecked.
- Step 3** Choose the **System Release** for NCS 2K from the drop-down list.
- You cannot change the system releases that are available for NCS 4K and NCS 1K.
- Step 4** Click **Create**.
- You can view a map and the design palette. For more information, see [Design Palette](#).
- Step 5** Click the **Drawing Tool** icon (pencil and ruler crossed).
- Step 6** 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

**Note** Cisco ONP automatically calculates the distance based on the x and y coordinates on the map. Before you create the design, zoom in the map to the maximum for an accurate distance, because the distance is used to calculate signal degradation.

- b) Click the **Fiber** icon and drag it to connect from one site to another site. Continue this for all sites.

**Step 7** Create services between the sites.

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 8** Create media channels (for SSON), or waves (for non-SSON) between the sites.

- a) Click the **Drawing Tool** icon, and select **Media channel** (purple in color), or **Waves** (red in color).
- b) Add the 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 9** Choose **File > Save As**.

**Step 10** Enter a network name in the **Give a Network Name** dialog box.

**Step 11** Click **Save**.

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## 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:



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

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### Before you begin

[Log in to Cisco ONP Web Interface.](#)

### Procedure

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- 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.



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

### Before you begin

[Log in to Cisco ONP Web Interface.](#)

### Procedure

**Step 1** Choose **File > Download Import Template** to download the Excel sheet 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 (NCS2000)
Sites	Site Label, Type, X coordinates, Y coordinates, Pre Equip Degree, Grooming Site, CLLI code, and Site Address
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.
Demands	Demand Label, A (Source), Z (Destination), Y (Tertiary Source), B (Tertiary Destination), Type of Demand, Quantity, and Protection.  Note: Y and B can be used with Unprotected Disjoint Service.
Channels	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

- Aliens and transponders
- See [Supported Aliens](#), and [Supported Cards and Pluggables](#).
- Contentionless 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](#) as a user with network creation permission.

Import the required aliens and layout template using **Manage > Alien** and **Manage > Layout Template** 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.

## Procedure

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**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.

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## 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 alien 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](#)

## Procedure

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**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.



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

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### Before you begin

[Log in to Cisco ONP Web Interface.](#)

### Procedure

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- 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 alien 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 alien files and layout template that you want to replace.  
If you do not choose the alien 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 2: 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](#)

## Procedure

**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 13](#).

**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
8088	API Gateway	Receives all the incoming requests, and then delegates the requests to internal microservices like LNI Broker
8086	Collector Service	Collects metrics and operation data from the devices
8082	Device Manager	Responsible for device onboarding process
8083	Inventory Service	Provides inventory data
9975	TL1 plug-in Service	South bound interface plug-ins for TL1 protocol-based NCS 2000 devices
8898	NCS 2K Inventory Adapter Service	Adapter module to transform NCS 2000 device response from collector to Cisco ONP NCMS schema-based POJO
8899	NCS 4K Inventory Adapter Service	Adapter module to transform NCS 4000 device response from collector to Cisco ONP NCMS schema-based POJO
8900	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
8102	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
8091	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  <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.

Port	Service	Usage
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
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 3:**

Property	Values
<b>Network</b>	
Network Type	SSON
Platform	ETSI
System Release	NCS 2000: R11.1, and R11.1.1.2 NCS 1004: XR 7.0.1 NCS 4000: XR 6.5.2.8
<b>Site/Node</b>	
Site Type	4K-1K-2K: ADD/DROP, 1K-2K;Regen, 2K:ROADM/OLA
ROADM	SMR-20, SMR-9-17FS, SMR-9-34FS, SMR-9-24FS
Amplifier	RAMAN-CTP, RAMAN-COP, EDFA35-24, 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

<b>Property</b>	<b>Values</b>
Evolved Mesh	ON and OFF
Node Protection	2K: Separated shelves, 4K: Single shelf
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
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

Property	Values
Protection	Unprotected, and 1+R
Path	Actual Path
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=, 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.




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**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.

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

### Before you begin

[Log in to Cisco ONP Web Interface.](#)



## Procedure

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- 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.

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# 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.](#)

## Procedure

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- 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 **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](#).

### Procedure

**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 NCS 1004alien 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 alien 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 NCS 1004 alien.
- 

## 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](#).

### Procedure

---

- 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.](#)

### Procedure

---

**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.](#)

### Procedure

---

**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.](#)

### Procedure

---

- 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.

## 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

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 both SSON and non-SSON networks.

Use these steps to upgrade your network:

### Before you begin

[Log in to Cisco ONP Web Interface.](#)

### Procedure

- 
- 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), and media channel (for SSON) 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.

**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** 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 4: 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.](#)

## Procedure

**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:

- Edit the properties of network elements.
- Delete the network elements from the network.
- 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 26](#).
  - 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 26](#).

**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 5:**

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.	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.  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.)
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.	Cisco ONP allows you to unlock the channel and automatically clears auto-assigned properties. After unlocking you can perform the following: <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 6: 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.

Error Message	Workarounds
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.
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 7: 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, 12.0.1, and 12.1.0</li> <li>• From 11.1.0 to 12.0.1, and 12.1.0</li> </ul>
Cisco ONP network	<ul style="list-style-type: none"> <li>• From 11.0.0 to 11.1.0, 12.0.1, and 12.1.0</li> <li>• From 11.1.0 to 12.0.1, and 12.1.0</li> <li>• From 12.0.1 to 12.1.0</li> </ul>
Excel imported network	From 11.0.0 to 11.1.0, 12.0.1, and 12.1.0 From 11.0.0 to 11.1.0, 12.1.0, and 12.2.0

Network	Upgrade Release
LNI network	11.1.0 to 12.0.1 and 12.1.0 11.1.0 to 12.1.0 and 12.2.0 <b>Note</b> You cannot directly release upgrade an LNI network. Perform the following: <ul style="list-style-type: none"> <li>• Upgrade the LNI network. see <a href="#">Upgrade LNI Network, on page 24</a>)</li> <li>• Analyze the network. (see <a href="#">Analyze the Network, on page 21</a>)</li> <li>• Release upgrade the analyzed LNI network.</li> </ul>

**Before you begin**

[Log in to Cisco ONP Web Interface.](#)

**Procedure**

- 
- 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 8: 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](#) as a user with admin or planner role.

### Procedure

- 
- 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](#) as a user with admin or planner role.

**Procedure**

- 
- 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](#).

**Procedure**

- 
- 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](#).

### Procedure

---

- 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.](#)

### Procedure

---

- 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.](#)

**Procedure**

- 
- 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.](#)

**Procedure**

- 
- 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.

Report	Description
<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.](#)

### Procedure

---

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.](#)

### Procedure

---

- 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.](#)

### Procedure

---

- 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.

---

## Import Alien

Alien 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 alien or aliens:

### Before you begin

[Log in to Cisco ONP Web Interface.](#)

### Procedure

---

- Step 1** Choose **Manage > Aliens**.
- The **Manage Alien** dialog box appears. The default aliens available in the server are:

- Aliens\_titano5\_Sauron
- NCS1004\_Aliens\_V3

Interfaces under Aliens\_titano5\_Sauron are:

- T5\_100G\_25%\_DE
- T5\_200G\_15%\_DE
- T5\_100G\_25%
- T5\_100G\_15%\_DE
- T5\_200G\_25%
- T5\_100G\_15%
- T5\_200G\_15%
- T5\_200G\_25%\_DE

**Step 2** Click **Add**.

The **Import Alien (.mxd)** dialog box appears.

**Step 3** Click **Choose File** and browse to the .mxd file stored in your local system, and click **Import**.

After the alien 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 Alien

Use this procedure to download an alien or aliens:

### Procedure

**Step 1** Choose **Manage > Aliens**.

The **Manage Alien** dialog box appears.

**Step 2** Choose an alien or multiple aliens to download.

## Delete Alien

Use this procedure to delete an alien or aliens:

**Before you begin**

[Log in to Cisco ONP Web Interface.](#)

**Procedure**

- 
- Step 1** Choose **Manage > Aliens**.  
The **Manage Alien** dialog box appears.
- Step 2** Choose an alien or multiple aliens to delete.
- Step 3** Click **Delete** to delete the selected aliens.
- 

## Layout Template

Layout templates are reusable templates that are used to design layout configurations for a network. When you have a 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.

## Export Layout Template

*Table 9: 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.](#)

**Procedure**

- 
- 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 **Hierarchy** tab.
- Step 6** Click the name of a site for which you want to download the layout template.
- Step 7** 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 8** Click **Export**.
- Note**
- 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 under the **Hierarchy** tab, 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 into the Cisco ONP database:

### Before you begin

[Log in to Cisco ONP Web Interface.](#)

### Procedure

- 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.](#)

### Procedure

---

- 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.](#)

### Procedure

---

- 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.](#)

### Procedure

---

- 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.](#)

### Procedure

---

- 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 42](#)
- Step 5** Click the **Hierarchy** tab.
- Step 6** Click **Edit** to enter the edit mode.
- Step 7** Right click the name of a site on which you want to import the layout template, and click **Import**.
- Step 8** Choose the layout template that you want to import into the site and click **OK**



The layout template gets applied to the site.

## Layout Visualization

*Table 10: 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 **Hierarchy** 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.](#)

### Procedure

- 
- 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 **Hierarchy** 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.

**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 **Hierarchy** 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.](#)

### Procedure

---

**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** 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.

## 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.

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.](#)

### Procedure

---

**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 11: 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.](#)

### Procedure

- 
- 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 **Hierarchy** tab.
- Step 6** Click the name of a site for which you want to download the port usage.
- Step 7** Mouse hover the **Export** icon and click **Port Usage** for **Current site** or **All Sites**.  
The **Export Port** dialog box appears.

**Step 8** 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.

---

## 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.](#)

**Procedure**

---

**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](#)

### Procedure

---

**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.

---

## 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.](#)

### Procedure

---

- 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 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](#).

The network must be in Analyze mode.

### Procedure

---

- 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:



## Procedure

---

- 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.

---

