

# Cisco Optical Network Controller Configuration Guide, Releases 2.1.x

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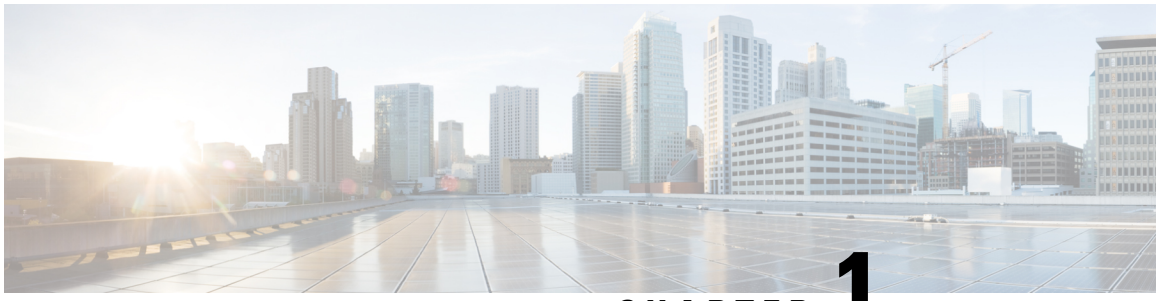
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CHAPTER 1

# Overview of Cisco Optical Network Controller

This section contains the following topics:


- Cisco Optical Network Controller Overview, on page 1


# Cisco Optical Network Controller Overview

Cisco Optical Network Controller (Cisco ONC) is an SDN Domain Controller for Cisco optical networks. Cisco Optical Network Controller behaves as a Provisioning Network Controller (PNC) and performs the following functions:

- collects information about the inventory and topology of the managed network,
- monitors the topology (physical or virtual) of the network,
- notifies of changes topology and service changes, and
- supports optical path creation and deletion.

Cisco Optical Network Controller collects relevant data needed for optical applications. This data is also used to provide abstracted network information to higher layer controllers, thus enabling a centralized control of optical network.

Some of the functions supported by Cisco Optical Network Controller are:

- Optical Domain Controller

  Cisco Optical Network Controller behaves as a domain controller for Cisco optical products. The domain controller feeds data into hierarchical controllers. Optical Network Controller has a North Bound Interface (NBI) based on the TAPI standard which enables it to connect to any hierarchical controller which has a TAPI compliant South Bound Interface and provide its functions to the controller.

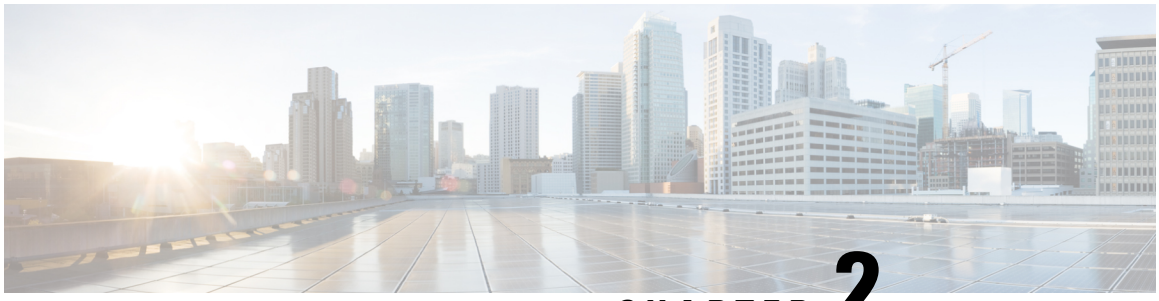
- Path Compute Engine (PCE)

  PCE service provides optical path computation to ensure optically valid paths within supplied constraints are provisioned. PCE uses the up-to-date network status.

- Model Based Network Abstraction

  Cisco Optical Network Controller supports a standardized TAPI model which enables it to abstract the device level details from the hierarchical controller.

See Cisco Optical Network Controller (CONC) Data Sheet for more information on Cisco Optical Network Controller.



CHAPTER 2

# Install Cisco Optical Network Controller

This section contains the following topics:


- Installation Requirements, on page 3
- Install Cisco Optical Network Controller, on page 7
- Log into Cisco Optical Network Controller, on page 8
- Uninstall Cisco Optical Network Controller, on page 8


# Installation Requirements

Before installing Cisco Optical Network Controller, you must install Cisco Crosswork Infrastructure 4.4.

The infrastucture requirements for installing Cisco Crosswork are listed below. For complete installation requirements, see the *Cisco Crosswork Infrastructure 4.4 and Applications Installation Guide*.

## Data Center Requirements

Cisco Crosswork can be deployed in either a vCenter managed data center or onto Cisco CSP. To aid in the deployment, Cisco has developed a cluster installation tool. This tool works in both environments. However, there are limitations to the tool which are detailed later in this section.

**Note**

- The machine where you run the installer must have network connectivity to the data center (vCenter or CSP) where you plan to install the cluster. If this mandatory requirement cannot be met, you must manually install the cluster.
- Cisco Crosswork cluster VMs (Hybrid nodes and Worker nodes) must be hosted on hardware with Hyper Threading disabled.
- Ensure that the host resources are not oversubscribed (in terms of CPU or memory).

### VMware Data Center Requirements

This section explains the data center requirements to install Cisco Crosswork on VMware vCenter.

**Note** The following requirements are mandatory if you are planning to install Cisco Crosswork using the cluster installer. If your vCenter data center does not meet these requirements, then the VMs have to be deployed individually, and connectivity has to be established manually between the VMs.

- Hypervisor and vCenter supported:
  - VMware vSphere 6.7 or above
  - VMware vCenter Server 7.0 and ESXi 7.0.
  - VMware vCenter Server 6.7 (Update 3g or later) and ESXi 6.7 (Update 1)
- All the physical host machines must be organized within the same VMware Data Center, and while it is possible to deploy all the cluster nodes on a single physical host (provided it meets the requirements), it is recommended that the nodes be distributed across multiple physical hosts.
- The networks required for the Crosswork Management and Data networks need to be built and configured in the data centers, and must allow low latency L2 communication.
- To allow use of VRRP, DVS Port group needs to be set as follows:

| Property | Value |
|---|---|
| Promiscuous mode | Reject |
| MAC address changes | Reject |
| Forged transmits | Accept |

  To edit the settings in vCenter, navigate to the Host > Configure > Networking > Virtual Switches, and select the virtual switch. In the virtual switch, select Edit > Security and confirm the settings as suggested. Repeat the process for each virtual switch used in the cluster.
- Ensure the user account you use for accessing vCenter has the following privileges:
  - VM (Provisioning): Clone VM on the VM you are cloning.
  - VM (Provisioning): Customize on the VM or VM folder if you are customizing the guest operating system.
  - VM (Inventory): Create from the existing VM on the data center or VM folder.
  - VM (Configuration): Add new disk on the data center or VM folder.
  - Resource: Assign VM to resource pool on the destination host, cluster, or resource pool.
  - Datastore: Allocate space on the destination datastore or datastore folder.
  - Network: Assign network to which the VM will be assigned.
  - Profile-driven storage (Query): This permission setting needs to be allowed at the root of the DC tree level.
- We also recommend you to enable vCenter storage control.

## CSP Data Center Requirements

This section explains the data center requirements to install Cisco Crosswork on Cisco Cloud Services Platform (CSP).

- Cisco CSP, Release 2.8.0.276
- Compatible hardware:

| |
|---|
| UCSC-C220-M4S, UCSC-C240-M4SX |
| N1K-1110-X, N1K-1110-S |
| CSP-2100, CSP-2100-UCSD, CSP-2100-X1, CSP-2100-X2 |
| CSP-5200, CSP-5216, CSP-5228 |
| CSP-5400, CSP-5436, CSP-5444, CSP-5456 |

- CSP host or cluster is setup and installed with a minimum of two physical ethernet interfaces - one ethernet connected to the Management network, and the other to the Data network.

# VM Host Requirements

This section explains the VM host requirements.

***Table 1: VM Host Requirements***

| Requirement | Description |
|---|---|
| CPU/Memory/Storage Profiles (per VM) | The data center host platform has to accommodate three VMs of the following minimum configuration:<br>**VMware vCenter:**<br>• Large: 12 vCPUs \| 96 GB RAM Memory \| 1 TB disk space<br>**Cisco CSP:**<br>• Large: 12 CPU cores \| 96 GB RAM Memory \| 1 TB disk space<br>**Note**<br>For assistance in adjusting VM Memory and CPU sizes post installation, contact your Cisco Customer Experience team.<br>Few things to note:<br>• Storage requirements vary based on factors such as the number of devices being supported and the type of deployment selected. However, 1 TB disk space should work for most deployments.<br>• Due to their performance, solid state drives (SSD) are preferred over traditional hard disk drives (HDD).<br>• If you are using HDD, the minimum speed should be over 10,000 RPM.<br>• The VM data store(s) need to have disk access latency of < 10 ms. |

| Requirement | Description |
|---|---|
| Additional Storage | 10 GB (approximately) of storage is required for the Crosswork OVA (in **vCenter**), OR the Crosswork QCOW2 image on each CSP node (in **CSP**). |
| Network Connections | For production deployments, we recommend that you use dual interfaces, one for the Management network and one for the Data network.<br>For optimal performance, the Management and Data networks should use links configured at a minimum of 10 Gbps. |
| IP Addresses | Two IP subnets, one for the Management network and one for Data network, with each allowing a minimum of four assignable IP addresses (IPv4 or IPv6). A Virtual IP (VIP) address is used to access the cluster, and then three IP addresses for each VM in the cluster. If your deployment requires worker nodes, you will need a Management and Data IP address for each worker node.<br>• The IP addresses must be able to reach the gateway address for the network where Cisco Crosswork Data Gateway will be installed, or the installation will fail.<br>• When deploying a IPv6 cluster, the installer needs to run on an IPv6 enabled container/VM.<br>• At this time, your IP allocation is permanent and cannot be changed without re-deployment. For more information, contact your Cisco Customer Experience team. |
| NTP Servers | The IPv4 or IPv6 addresses or host names of the NTP servers you plan to use. If you want to enter multiple NTP servers, separate them with spaces. These should be the same NTP servers you use to synchronize the Crosswork application VM clock, devices, clients, and servers across your network.<br>• Ensure that the NTP servers are reachable on the network before attempting installation. The installation will fail if the servers cannot be reached.<br>• The ESXi hosts that will run the Crosswork application and Crosswork Data Gateway VM must have NTP configured, or the initial handshake may fail with "certificate not valid" errors. |
| DNS Servers | The IPv4 or IPv6 addresses of the DNS servers you plan to use. These should be the same DNS servers you use to resolve host names across your network.<br>• Ensure that the DNS servers are reachable on the network before attempting installation. The installation will fail if the servers cannot be reached. |
| DNS Search Domain | The search domain you want to use with the DNS servers, for example, cisco.com. You can have only one search domain. |

### Important Notes

- Cisco Crosswork Infrastructure and applications are built to run as a distributed collection of containers managed by Kubernetes. The number of containers varies as applications are added or deleted.

- Dual stack configuration is not supported in Crosswork Platform Infrastructure. Therefore, **all** addresses for the environment must be either IPv4 or IPv6.

# Install Cisco Optical Network Controller

Use the following steps to install Cisco Optical Network Controller:

### Before you begin

- Cisco Crosswork Infrastructure 4.4 must be installed. See *Cisco Crosswork Infrastructure 4.4 and Applications Installation Guide* for installation instructions.
- Verify that Crosswork Platform Infrastructure is green (healthy) and all the microservices are up and running.
- Ensure that conc.tar.gz file is downloaded from CCO to an external VM.

### Procedure

**Step 1** Log in to Cisco Crosswork Infrastructure.

**Step 2** Select **Administration** > **Crosswork Manager**.

**Step 3** Navigate to **Application Management** tab and click **Applications** sub-menu.

**Step 4** Click **Add File (.tar.gz)** button.

**Step 5** Enter all the details:

- Server Path/Location: Location of the conc.tar.gz file
- Host Name/IP Address: IP address of the host
- Port: 22
- Username: username to access the external VM to which the `conc.tar.gz` file was downloaded
- Password: password to access the external VM to which the `conc.tar.gz` file was downloaded
- Select **Automatically clean all repository files before adding new one** button.

Click **Add**.

**Step 6** The conc.tar.gz file is downloaded to Crosswork cluster.

**Step 7** After the file is downloaded, navigate to **Application Management** tab and click **Applications** sub-menu. Select **Optical Network Controller** card and click the ellipsis (…) button.
The UI displays a new tab which shows you the build number of Optical Network Controller selected for install.

**Step 8** Select **Install**.

**Step 9** You can view the installation progress in the **Job History** sub-menu. **Job Details** section provides a detailed report of installation of Cisco Optical Network Controller.

**Note**

- To upgrade from Cisco Optical Network Controller 2.1 to Cisco Optical Network Controller 2.1.1, see Upgrade Cisco Crosswork.
- Cisco Optical Network Controller 2.1.1 update can be installed only on an existing Cisco Optical Network Controller 2.1 installation.

# Log into Cisco Optical Network Controller

Use the following steps to log into Cisco Optical Network Controller:

### Before you begin

To access Cisco Optical Network Controller, you must have permissions to access Cisco Crosswork Infrastructure. To add new users, see *Cisco Crosswork Infrastructure 4.4 and Applications Installation Guide*.

### Procedure

**Step 1** In the browser URL field, enter **https://<Crosswork server IP Address: Port>/crosswork/onc/** .

Login page is displayed.

**Step 2** Enter the username and password.

**Step 3** Click **Sign In**.

# Uninstall Cisco Optical Network Controller

Use the following steps to uninstall Cisco Optical Network Controller:

### Procedure

**Step 1** Log in to Cisco Crosswork Infrastructure.

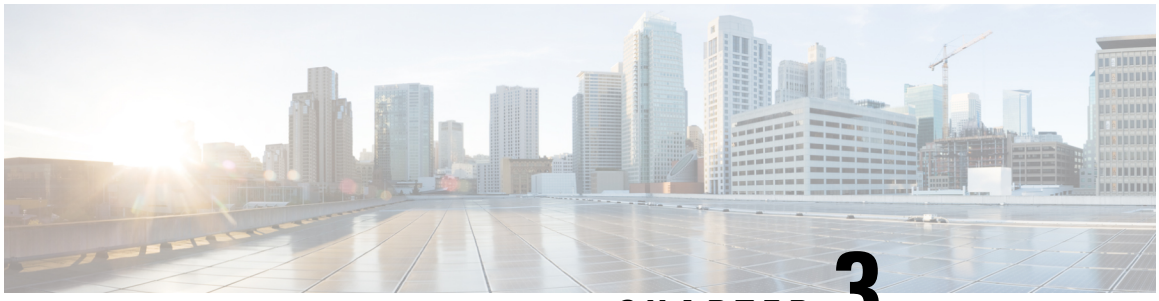
**Step 2** Select **Administration** > **Crosswork Manager**.

**Step 3** Navigate to **Application Management** tab and click **Applications** sub-menu.

**Step 4** Select **Optical Network Controller** card and click the ellipsis (…) button.

**Step 5** Select **Uninstall** from the menu.

**Step 6** You can view the progress in the **Job History** sub-menu.



CHAPTER 3

# Use Cisco Optical Network Controller

*Table 2: Feature History*

| Feature | Release Information | Description |
|---|---|---|
| Network Periodic Full Sync Configuration | Cisco Optical Network Controller Release 1.1 | You can now configure a periodic full sync for all the devices onboarded to Cisco Optical Network Controller. |

This section contains the following topics:


- Onboard Devices and Discover Network, on page 9
- Manage Devices on Cisco Optical Network Controller, on page 10
- Configure Network Periodic Full Sync, on page 13
- Use the Sites Page, on page 14
- Use Planning Data Import, on page 25
- Use Alien Import, on page 26
- Cisco Optical Network Controller TAPI Northbound Interface, on page 26


# Onboard Devices and Discover Network

A device is added after a REST API call is issued to onboard the device. The Device Manager initiates data collection and this data is collected and translated into TAPI model which is eventually published to Hierarchical Controller.

For more information, see *Cisco Optical Network Controller TAPI Northbound Interface API Guide*.

You can onboard a device using Cisco Optical Network Controller GUI.

## Onboard Devices to Cisco Optical Network Controller

Devices must be onboarded to Cisco Optical Network Controller to enable collection of device related information. Cisco Optical Network Controller supports Cisco NCS 2000 Shelf Virtualization Orchestrator (SVO) Series, Release 12.3.1 devices and Cisco NCS 1010, Release 7.9.1 devices.

# Manage Devices on Cisco Optical Network Controller

Use the following tasks to add, import, edit, delete, resync, or reconnect the devices onboarded to Cisco Optical Network Controller.

## Add Devices on Cisco Optical Network Controller

Use this task to add the devices onboarded to Cisco Optical Network Controller.

### Before you begin

Log into Cisco Optical Network Controller, on page 8.

### Procedure

**Step 1** Click **Devices** in the left panel.

**Step 2** Click **New**.

**Step 3** Enter the device details necessary connect to the device.

The following fields are mandatory:

- Name
- IP
- Port
- Type
- GRPC Port (only for NCS1010)
- Username
- Password
- Site Name

**Note**

- Ensure that you enter valid a username and password of the device to enable Cisco Optical Network Controller to connect to the device.
- If the device type is NCS1010, GRPC Port is a mandatory field. For NCS2000 devices, do not fill this field.
- NCS 1010 OLT nodes at a multidegree site can share a common site name. All other devices must have unique site names.

**Step 4** Click **Save**.

The new device is onboarded and added to the **Devices** table. Cisco Optical Network Controller validates the connection with the onboarded device.

The **Name** column includes name, image, device connection status, and an icon indicating the connection status.

- Green—Device is connected.
- Yellow—Device is waiting to be connected.
- Red—Device is disconnected or a resync is needed or device deletion failed.
- Orange—Device deletion in progress.

**Note**
If you hover over the status in the collection status, you can see:

- The reason for the failure if discovery failed
- Last successful time if discovery was completed

# Import Devices on Cisco Optical Network Controller

Use this task to import the devices onboarded to Cisco Optical Network Controller.



**Restriction** When you import devices into Cisco Optical Network Controller using an excel file, do not include more than 200 devices in one excel file.

**Before you begin**

Log into Cisco Optical Network Controller, on page 8

**Procedure**

**Step 1** Click **Devices** in the left panel.

**Step 2** Click **Import Devices**.

**Note**
A template for the Excel file for use in the next step is available in this screen. You can customize this Excel file to suit your network.

**Step 3** Select the spreadsheet which has all the device details and click **Open**.

The new devices are onboarded and added to the **Devices** table.

# Edit Devices on Cisco Optical Network Controller

Use this task to edit the devices onboarded to Cisco Optical Network Controller.

### Before you begin

Log into Cisco Optical Network Controller, on page 8

### Procedure

**Step 1** Click **Devices** in the left panel.

**Step 2** Select the target device and click **Edit** or click the device name under the **Name** column.

**Note**
You can modify only the username and password fields for the device.

# Delete Devices on Cisco Optical Network Controller

Use this task to delete the devices onboarded to Cisco Optical Network Controller.



**Restriction** Do not delete more than 10 devices in a 5 minute interval.

### Before you begin

Log into Cisco Optical Network Controller, on page 8

### Procedure

**Step 1** Click **Devices** in the left panel.

**Step 2** Select the target device and click **Delete**.

**Note**

- You cannot delete a device if collection is in progress.
- You cannot delete devices if they have circuits provisioned. Remove the circuits before deleting the devices.

# Resync Devices on Cisco Optical Network Controller

Use this task to resync the devices onboarded to Cisco Optical Network Controller.

### Before you begin

Log into Cisco Optical Network Controller, on page 8

### Procedure

**Step 1** Click **Devices** in the left panel.

**Step 2** Select the device that you want to resync and click **Resync**.

To resync multiple devices, select the devices and click **Resync**.

To resync all the devices, click **ResyncAll**.

To schedule a periodic resync of all the devices, see Configure Network Periodic Full Sync, on page 13.

**Note**

- If a device is in **Disconnected** status, either **Reconnect** the device or **Resync** the device directly to recover the device connection.
- The Resync All operation is faster than initial onboarding.
- The time the Resync All operation takes depends on the number of devices in the network and amount misaligned data detected in the network.

# Reconnect a Device on Cisco Optical Network Controller

Use this task to reconnect the devices onboarded to Cisco Optical Network Controller.

### Before you begin

Log into Cisco Optical Network Controller, on page 8

### Procedure

**Step 1** Click **Devices** in the left panel.

**Step 2** Click **Reconnect** next to the **Disconnected** status or select the device and click **Reconnect**.

# Configure Network Periodic Full Sync

Use this task to schedule a periodic sync for all the devices that are onboarded to Cisco Optical Network Controller.

### Before you begin

Log into Cisco Optical Network Controller, on page 8

### Procedure

**Step 1** Click **Configurations** in the left panel.

**Step 2** In the **Periodic Network Full Sync** tab, click **Enable**.

**Step 3** In the **Scheduled Start Time** field, enter the start time of full network sync in HH:MM:SS format in UTC.

**Step 4** In the **Repeat Every** field, enter the interval rate in hours at which full network sync must run. Minimum value is 1 and maximum value is 23.

**Step 5** Click **Apply**.

**Note**
To disable the periodic sync for the entire network, click **Disable** and click **Apply**.

# Use the Sites Page

This task and the following tasks describe how to use the Sites page on Cisco Optical Network Controller.

### Before you begin

Log into Cisco Optical Network Controller, on page 8

### Procedure

**Step 1** Click **Sites** in the left panel.
Cisco Optical Network Controller displays the Sites page. This page lists the sites of the devices that Cisco Optical Network Controller manages. The Sites page displays the Site Name, Type, and Operational status of each site.

**Note**
Devices that share a site are grouped in this view.

**Restriction**
The sites page lists only NCS 1010 devices.

**Step 2** Click the site that you want to view the details of.
Cisco Optical Network Controller displays the Site details page. By default, Cisco Optical Network Controller displays the Alarms tab in the tabular view. This tab displays all alarms related to the selected site.

# Use the Functional View

Node functional view is an option available after you open a site from the **Sites** page. The default view is **Tabular** view. To switch to Functional view, click **Functional** on the top right of the screen. To switch back to Tabular view, click **Tabular**.

There are three subviews in the Functional view. They are:

1. Degree view (Only for OLT and multidegree sites)
2. Component view
3. Detailed view

The views are hierarchical and drill down into more detailed views.

All three views have a toggle for the Legend. Click **Show Legends** to show the Legend. When the Legend is visible, click **Hide Legends** to hide the Legend. The Legend shows the different symbols, colors, and styles used in the view.

To get a PDF file with the view that you see, click **Export**.

Autorefresh is disabled by default. But you can set the autorefresh interval by selecting the target interval in the **Auto-refresh** drop-down list.

### Degree View

The degree view visualizes the site and also shows the neighboring sites.

To view details about the nodes or connections, hover over the node or connection. The Cisco Optical Network Controller interface displays a tooltip with information about the node or connection.

To view the neighboring site:

1. Right click the site.
2. Click **Navigate to Site**.

   If the neighboring site is an ILA site, the site opens in Component view.

To select a node, click the node. You can select multiple nodes. To select all nodes, click **Select All**. To clear selections, click **Clear All**.

An alarms floating window is available in Functional view. The alarms floating window is an expandable section. To bring up the floating window, click **x Alarms** on the bottom of the screen. 'x' is the number of active alarms in the current selection in the degree view. The Alarms expander label shows the number of active alarms. The Alarms window shows the alarms for the nodes that you select in the degree view. The expander label shows a blue dot on the top right of the label, if the alarms window is showing a filtered set of alarms. The alarms window is available in all three subviews of **Functional** view. You see the alarms for the selection of nodes in the degree view. The selection in other views does not affect the alarms window.

To go to the component view, select the target nodes and click the **Component View** button.



**Restriction** When there are three or more degrees, Degree IPCs overlap and degree view hides IPC links.

### Component View

The component view shows the internal components of the selected nodes from the degree view. This view does not show the connections between nodes in a multidegree site. The component view displays each node with active (OLT and ILA) and passive components and the IPCs between the nodes. The component view shows the PID of each component on the component. You can view up to 8 nodes in the component view.

The components show the port numbers. You can see both the hardware port numbers and software port numbers in the Rack/Slot/Interface/Port format.

Component view does not show the neighboring sites.

Zoom in and out in the component view using the + and – buttons, the scroll wheel, or the pinching gesture on the trackpad or touchscreen. You can pan around the screen by clicking and dragging the mouse.

Use the overlays drop-down to toggle alarms and CV status overlays. Both overlays are enabled by default.

If you enable either overlay, the Overlays button displays a blue badge on the top right of the button.

Hover over a component to see the rack placement of the component in a tooltip.

If you enable the alarms overlay, the component view displays alarm indicators on the components as per the respective origins of the alarm. The alarm indicators are color-coded according to the severity. If multiple alarms have the same origin, you see the highest severity indicator. Hover on the indicator to see a tooltip that displays alarm information. The tooltip displays information about the highest severity alarm and shows the count for all alarm severities that are active. This view shows the component level alarms indicators on the top-right corner of the component.

If you enable CV status overlay, the component view displays IPC CV status indicators on the IPC. Some IPCs pass behind other components in the component view. To view the IPC hover on the IPC.

To view details of an IPC, click the IPC. The component view centers on the IPC and highlights the components that the IPC is connecting. The other components are dimmed. The component view also displays a table containing the IPC details. Each row in the table corresponds to one direction. To close the IPC details, click the close button.

To go back to degree view, click the **degree view** button. To go to detailed view, click the **detailed view** button after selecting the target active component.

### Detailed View

Detailed view shows a detailed internal schematic diagram of the NCS 1010 equipment. Detailed view shows the neighboring sites.

To view a neighboring site, right click the site and click **Navigate to Site**. **Navigate to Site** takes you to the highest level view available. For ILA nodes, the highest level view is the Component view. For OLT nodes, the highest level view is Degree View.

If you enable Alarms Overlay, you can see color-coded alarm indicators on the originating components of the equipment. Detailed view shows only the NCS 1010 data path alarms. For more information on these alarms, see Troubleshooting of Data Path Alarms.

# Use Rack View

Rack View is available in the Alarms and Inventory tabs of a Site page. The position of equipment in Rack view is the Physical location in the inventory table. The rack view supports up to 8 racks, it shows all the equipment at a site.

On the right of the page, you can see the rack view.

**Note** Rack view supports only NCS 1010 devices.

### Before you begin

### Procedure

**Step 1** (Optional) To see the rack view in full screen, click the full screen button.

If you use a filter in the Inventory or Alarm tabs, the equipment that does not match the filter is dimmed. The filtered view is available even after you make the rack view full screen.

**Note**
Rack view shows each degree at a site as a rack. You cannot create, delete, or hide racks.

**Step 2** (Optional) To see the PID and Site name, hover over the equipment. You get a tooltip with the PID and Site name.

For NCS1K-BRK-SA, you can see the PID for each passive module in the BRK-SA chassis also.

**Step 3** (Optional) To relocate equipment in a rack or across racks:

a) Click Edit.
b) Right click the device.
c) Click relocate.
d) Click the target location Invalid locations are highlighted in red.

You cannot place the devices in locations that are highlighted in red. Some locations are locations invalid because you cannot accommodate the height of the equipment or the location already has a device present. You can move equipment across racks and within a rack.

e) click Apply changes

**Step 4** (Optional) To see the rack view in Optical Configurations tab and Optical XC tab, click Show Rack on the right of the screen.

**Step 5** (Optional) To export the rack view as a PDF file, click Export on the top left of the screen.

# View and Export Alarms

This task describes how to view and export alarms information from the Sites page on Cisco Optical Network Controller.

### Before you begin

Log into Cisco Optical Network Controller, on page 8

### Procedure

**Step 1** Click **Sites** in the left panel.

**Step 2** Click the site that you want to view the details of.
Cisco Optical Network Controller displays the Site details page. By default, Cisco Optical Network Controller displays the Alarms tab. This tab displays all alarms for the site.

**Step 3** To export the alarm information into an Excel file, click Export.

# View and Export Inventory

This task describes how to view inventory details from the Sites page on Cisco Optical Network Controller.

### Before you begin

Log into Cisco Optical Network Controller, on page 8

### Procedure

**Step 1** Click **Sites** in the left panel.

**Step 2** Click the site that you want to view the details of.

**Step 3** Click **Inventory**.
Cisco Optical Network Controller displays the Inventory tab. This tab displays all the inventory at the selected site.

**Step 4** (Optional) To export inventory data into an excel file, click **Export**.

# View Optical Configurations

This task describes how to use the **Optical Configurations** tab of the Sites page. You can view information about Internal Patch Cords (IPC) and Pre-provisioned Passives.

### Before you begin

Log into Cisco Optical Network Controller, on page 8

### Procedure

**Step 1** Click **Sites** in the left panel.

**Step 2** Click the site that you want to view the details of.

**Step 3** Click **Optical Configurations**.
Cisco Optical Network Controller displays the Optical Configurations tab. The Optical Configurations tab displays information about Internal Patch Cords (IPC) and Pre-provisioned Passives.

## Add IPC

This task describes how to add an IPC from the Optical Configurations tab of the Sites page.

### Before you begin

Log into Cisco Optical Network Controller, on page 8

### Procedure

**Step 1** Click **Sites** in the left panel.

**Step 2** Click the site that you want to view the details of.

**Step 3** Click **Optical Configurations**.

**Step 4** Under Internal Patch Cords, click **Add**.

**Step 5** Select the source and destination devices and ports from the respective drop-down lists.

**Step 6** Enter a ToneID.

ToneID is a user-defined hexadecimal string of 8–64 characters <0-9a-f> (lowercase). Cisco Optical Network Controller supports ToneID for NCS1K-MD-32O-C, NCS1K-MD-32E-C, and NCS1K-BRK-8 modules. ToneID for NCS1K-BRK-8 modules must be 8 comma-separated strings.

**Step 7** Click **Add**.

## Delete IPC

This task describes how to delete an IPC from the Optical Configurations tab of the Sites page.

### Before you begin

Log into Cisco Optical Network Controller, on page 8

**Note** Cisco Optical Network Controller does not allow you to delete an IPC if services are running on it.

### Procedure

**Step 1** Click **Sites** in the left panel.

**Step 2** Click the site that you want to view the details of.

**Step 3** Click **Optical Configurations**.

**Step 4** Under Internal Patch Cords, select the target IPC.

You can select multiple IPCs.

**Step 5** Click **Delete**.

# Verify Connections

This task describes how to perform Connection Verification from the Optical Configurations tab of the Sites page.

### Before you begin

- Log into Cisco Optical Network Controller, on page 8
- IPC must be added in Cisco Optical Network Controller.
- You must have provided a unique 8 or more digit tone pattern while adding an IPC.

**Restriction** Cisco Optical Network Controller supports connection verification only for NCS 1010 BRK-8 and MD-32 modules.

### Procedure

**Step 1** Click **Sites** in the left panel.

**Step 2** Click the site that you want to view the details of.

**Step 3** Click **Optical Configurations**.

**Step 4** Select the target IPC.

You can select multiple IPCs.

**Step 5** Click **Verify Connection**. Accept the warning prompt.

The CV status columns in the IPC table changes to IN PROGRESS. When the Connection Verification process is complete, the status changes to SUCCESS or FAILURE.

**Note** If you trigger connection verification for multiple IPCs, the connection verification requests are queued, and the requests in the queue show the status as **Started**.

You can see the reason for a failure by hovering over the failure status. Connection verification may fail for the following reasons:

- Tone ID not configured
- Empty Tone ID
- Empty Expected Tone ID
- Empty Tone Rate
- Empty Tone Info
- Tone ID not matching

- Reverse CV failed
- Forward CV failed
- Empty response received
- Could not Start Tone Generation or Detection
- Could not Stop Tone Generation or Detection
- Couldn't configure tone on given port
- Could not get interface names
- Could not apply src tone config
- Could not apply dst tone config
- Exception while sleeping
- Internal Error
- Could not Start Tone Generation
- Could not Start Tone Detection
- Could not Stop Tone Generation
- Could not Stop Tone Detection

## Add Passive

This task describes how to add a Passive to be Pre-provisioned from the Optical Configurations tab of the Sites page.

**Note**

- BRK-8 and BRK-24 are added as 1 RU modules in Cisco Optical Network Controller 2.1.
- Cisco Optical Network Controller 2.1 does not support the BRK-SA module.
- Cisco Optical Network Controller supports the following passive modules:
  - NCS1K-MD-32O-C
  - NCS1K-MD-32E-C
  - NCS1K-BRK-24
  - NCS1K-BRK-8

### Before you begin

Log into Cisco Optical Network Controller, on page 8

### Procedure

**Step 1** Click **Sites** in the left panel.
**Step 2** Click the site that you want to view the details of.
**Step 3** Click **Optical Configurations**.
**Step 4** Under Passive Pre-provisioning, click **Add**.
**Step 5** Select the device the passive is connected to, the type of passive module and the USB port on the device the passive module is connected to from the drop-down lists.
**Step 6** Click **Add**.

## Delete Passive Module

This task describes how to delete a passive module from the Optical Configurations tab of the Sites page.



**Note** Cisco Optical Network Controller 2.1 does not support deleting multiple passives.

Cisco Optical Network Controller 2.1 does not support deleting BRK-8 and BRK-24 modules. If you try to delete a BRK-8 or BRK-24 module, the delete operation fails.

### Before you begin

Log into Cisco Optical Network Controller, on page 8

### Procedure

**Step 1** Click **Sites** in the left panel.
**Step 2** Click the site that you want to view the details of.
**Step 3** Click **Optical Configurations**.
**Step 4** Under Passive Pre-provisioning, select the target passive module.
**Step 5** Click **Delete** and confirm the delete operation.

## Export Optical Configuration

This task describes how to export information to an Excel file from the Optical Configurations tab of the Sites page.

### Before you begin

Log into Cisco Optical Network Controller, on page 8

### Procedure

**Step 1** Click **Sites** in the left panel.

**Step 2** Click the site that you want to view the details of.

**Step 3** Click **Optical Configurations**.

**Step 4** (Optional) To export the IPC information into an Excel file, click **Export** under **Internal Patch Cords**.

To export information about specific IPCs, select the IPCs before clicking **Export**.

**Step 5** (Optional) To export the passives information into an Excel file, click **Export** under **Passive Pre-provisioning**.

To export information about specific passives, select the passives before clicking **Export**.

# View Optical Cross-Connects

This task describes how to use the **Optical XC** tab of the Sites page.

### Before you begin

Log into Cisco Optical Network Controller, on page 8

### Procedure

**Step 1** Click **Sites** in the left panel.

**Step 2** Click the site that you want to view the details of.

**Step 3** Click **Optical XC**.
Cisco Optical Network Controller displays the Optical XC tab. The Optical XC tab displays information about Optical Cross-connects.

**Step 4** Click + for the target cross-connect to view additional information.

## Allocate Fan-Outs for Optical Cross-Connects

This task describes how to perform fan-out allocation for optical cross-connects from the Optical XC tab of the Sites page. After successful fan-out allocation, the cross-connect status becomes discovered.

### Before you begin

Log into Cisco Optical Network Controller, on page 8

You must create the IPCs necessary for the cross-connect. To create an IPC, perform the steps at Add IPC, on page 18.

### Procedure

**Step 1** Click **Sites** in the left panel.
**Step 2** Click the site that you want to view the details of.
**Step 3** Click **Optical XC**.
**Step 4** Select the target cross-connect.
**Step 5** Click **Fan-Out Allocation**.
**Step 6** Choose the **Add-Drop** port from the drop-down list and click **Apply**.
The cross-connect status changes to Discovered after successful Fan-Out Allocation.

## Delete Optical Cross-Connect

This task describes how to delete optical cross-connects from the Optical XC tab of the Sites page.

**Note** Cisco Optical Network Controller 2.1 does not support deleting multiple cross-connects.

### Before you begin

Log into Cisco Optical Network Controller, on page 8

### Procedure

**Step 1** Click **Sites** in the left panel.
**Step 2** Click the site that you want to view the details of.
**Step 3** Click **Optical XC**.
**Step 4** Select the target cross-connect.
**Step 5** Click **Delete** and confirm the delete operation.

## Export Optical Cross-Connects

This task describes how to export information to an Excel file from the Optical XC tab of the Sites page.

### Before you begin

Log into Cisco Optical Network Controller, on page 8

### Procedure

**Step 1** Click **Sites** in the left panel.

**Step 2** Click the site that you want to view the details of.

**Step 3** Click **Optical XC**.

**Step 4** To export the cross-connect information into an Excel file, click **Export**.

To export information about specific cross-connects, select the cross-connects before clicking **Export**.

# Use Planning Data Import

This task describes how to use Cisco Optical Network Controller to:

- Import the planning data from Cisco Optical Network Planner.
- Push the configurations on to the devices.

  You can push the following configurations:

  - Equipment: For preprovisioning and checking if there is any mismatch in the actual equipment
  - Internal Patch Cords: You can create IPCs with ToneIDs for connection verification for BRK-8 and MD-32 modules.
  - Optical Attributes

    The supported attributes are:

    - `DROP PSD`, `PSD MIN`, and `Connector Loss` for the OLT
    - `Spectral Density`, `AmpliGainRange`, `WkgMode`, `Total Power`, `Gain`, and `Tilt` for different amplifiers in ILAs and OLTs
    - `PSDShape`, `PSD`, and `Attenuation` for the different VOAs in the ILAs and OLTs
    - `Fiber length` and `Fiber type` for each span

### Before you begin

Log into Cisco Optical Network Controller, on page 8

### Procedure

**Step 1** Hover over the **Import** icon in the left panel and click **Planning Data Import**.

**Step 2** Click **Import**.

**Step 3** Upload the JSON file from Cisco Optical Network Planner.

The Planning Data Import page displays the details of the imported devices. Map the planning data to actual data in the next step. Cisco Optical Network Controller autocorrelates and preassociates the devices with the same device name and site name.

**Step 4** Click **Edit**.

a) Select the Actual Site Name and Actual Device Name for each device from the respective drop-down lists.

b) Click **Apply changes**.

**Step 5** Select the target devices and click **Bulk Push** to push the configurations from Cisco ONP on to the target devices.

**Note**
You can push equipment, internal patchcords (IPC), and optical attributes configurations individually or in combination. IPC push must always include equipment configuration.

**Restriction**
ToneID configuration for NCS 1010 BRK-24 modules are not pushed to the devices as connection verification only supports BRK-8 and MD-32 modules.

The results of a bulk push are available in the log page that is in the **Last Push** column.

# Use Alien Import

This task describes how to use Cisco Optical Network Controller to:

- Import the alien device data.

**Before you begin**

Log into Cisco Optical Network Controller, on page 8

**Procedure**

**Step 1** Hover over the **Import** icon in the left panel and click **Alien Import**.

**Step 2** Click **Import**.
Cisco Optical Network Controller imports and displays the information of all the alien devices from the XML file. After successful import, the alien device information is available for applications that use the Cisco Optical Network Controller TAPI and REST API.

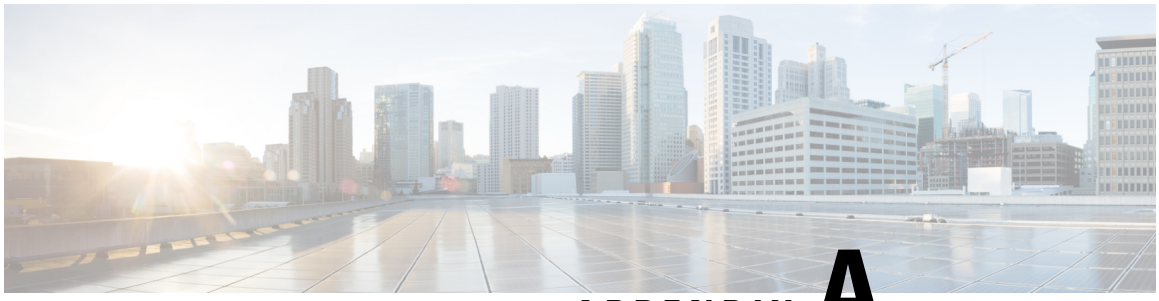
**Step 3** To export the alien device information in JSON or XML formats, click **Export** and choose the target format from the drop-down list.

# Cisco Optical Network Controller TAPI Northbound Interface

Cisco Optical Network Controller exposes a standard T-API Northbound Interface (NBI) towards northbound clients. The TAPI NBI supports RESTCONF and NETCONF protocols. An SDN-C client such as Hierarchical

Controller can communicate with Cisco Optical Network Controller TAPI NBI Server (SDN-C) using one these protocols and exchange TAPI model information.

For more information, see *Cisco Optical Network Controller TAPI Northbound Interface API Guide*.



APPENDIX A

# Supported Components

Following is the list of supported components for Cisco Optical Network Controller:

| Product ID | Description |
|---|---|
| ***NCS 2000 Devices*** | |
| **Transponder/Muxponder** | |
| NCS2K-400G-XP= | 400G CFP2 MR xponder |
| **Passives** | |
| NCS2K-MF-6RU= | Mechanical frame for passive units - 14 slots with USB Hub - 6RU |
| NCS2K-MF10-6RU= | Mechanical frame for passive units - 10 slots with USB Hub - 6RU |
| NCS2K-MF-DEG-5= | Mesh interconnection MF unit - upto 5 degrees |
| NCS2K-MF-UPG-4= | Mesh interconnection MF unit - upgrade - 4 degrees |
| NCS2K-MF-DEG-5-CV= | 5 degrees mesh interconnect - with Connection Verification |
| NCS2K-MF-UPG-4-CV= | 4 degrees upgrade mesh interconnect - with Connection Verification |
| NCS2K-MF-MPO-16LC= | MPO-16 to 16xLC fan out MF unit - with integrated monitoring |
| NCS2K-MF-M16LC-CV= | MPO-16 to 16xLC fan out - with Connection Verification |
| NCS2K-MF-MPO-8LC= | MPO to 8x LC fan out MF unit - with integrated monitoring |
| NCS2K-MF-6AD-CFS= | 6-port add/drop MF unit - Colorless Flex Spectrum |
| NCS2K-MF-10AD-CFS= | 10-port add/drop MF unit - Colorless Flex Spectrum |

| Product ID | Description |
|---|---|
| NCS2K-MF-16AD-CFS= | 16-port add/drop MF unit - Colorless Flex Spectrum |
| NCS1K-MD-64-C= | Optical module is based on Athermal Wave Guide (AWG) providing 64 channels at 75-GHz space covering the extended C-band of optical spectrum. |
| **Optical Cables** | |
| NCS2K-MF-2MPO-ADP= | Double MPO-16 to 2xMPO-8 Adapter MF unit - monitoring |
| **Optical Amplifiers** | |
| NCS2K-EDRA1-26C= | 21 dBm Erbium Doped Raman Amplifier 26dB Span - C-Band, includes one 2m LC/LC fiber optic cables and one 2m E2000/PC high power fiber optical cable |
| NCS2K-EDRA1-35C= | 21 dBm Erbium Doped Raman Amplifier 35dB Span - C-Band, includes one 2m LC/LC fiber optic cable and one 2m E2000/PC high power fiber optical cable |
| NCS2K-EDRA2-26C= | 21 dBm Erbium Doped Raman Amplifier + Bst 26dB Span - C-Band, includes two 2m LC/LC fiber optic cables and one 2m E2000/PC high power fiber optical cable |
| NCS2K-EDRA2-35C= | 21 dBm Erbium Doped Raman Amplifier + Bst 35dB Span - C-Band, includes two 2m LC/LC fiber optic cables and one 2m E2000/PC high power fiber optical cable |
| NCS2K-OPT-EDFA-35= | NCS2000 - Optical Amplifier, C Band, switchable gain |
| 15454-OPT-AMP-C= | Enhanced optical amplifier, 20 dBm output power, can be configured as preamplifier or booster, C-band, 80 channel, 50-GHz compatible, LC connectors, midstage access, includes one 4-dB LC/LC attenuated loopback (to be used if DCU is not required) and two 2-meter LC/LC fiber-optic cables. |
| **Line Cards** | |
| NCS2K-9-SMR17FS= | 9-port Single Module ROADM - 0-17dB Gain - Flex Spectrum |
| NCS2K-9-SMR24FS= | 9-port Single Module ROADM - 12-24dB Gain - Flex Spectrum |
| NCS2K-9-SMR34FS= | 9-port Single Module ROADM - 20-34dB Gain - Flex Spectrum |

| Product ID | Description |
|---|---|
| NCS2K-20-SMRFS-CV= | 20-port SMR - Switch. Gain Flex Spectrum - Connection Verification |
| NCS2K-20-SMRFS-L= | 20-port Single Module ROADM - Switchable Gain - Flex Spectrum |
| **Contentionless Add/Drop Line Cards** | |
| NCS2K-12-AD-CCOFS= | 12-port - 4-degree - Contentionless add/drop unit (typical 20W, maximum 30W) |
| NCS2K-16-AD-CCOFS= | 12-port - 4-degree - Contentionless add/drop unit (typical 40W, maximum 50W) |
| **Patch Panels** | |
| 15216-MD-48-EVEN= | Cisco ONS 15216 exposed faceplate multiplexer/demultiplexer patch panels of 48-channels spaced at 100 GHz on the even ITU grid. |
| 15216-MD-48-ODDE= | Cisco ONS 15216 exposed faceplate multiplexer/demultiplexer patch panels of 48-channels spaced at 100 GHz on the odd ITU grid. |
| **Interleaver and Deinterleaver Pluggable** | |
| 15216-MD-48-CM= | 50 GHz/100 GHz C-band interleaver and deinterleaver pluggable that provides signal interleaving and deinterleaving in 50-GHz channel spacing DWDM systems. |
| **EDFA Amplifier Cards** | |
| 15454-OPT-EDFA-17= | Cisco True Variable Gain Booster Amplifier with maximum 17-dB gain |
| 15454-OPT-EDFA-24= | Cisco True Variable Gain Booster Amplifier with maximum 24-dB gain |
| **Raman Amplifier Cards** | |
| 15454-M-RAMAN-COP= | High-Power Co-Propagating, 1W optical pump output power, C-band, 96-channel 50-GHz Raman unit with 1 ES 2000 PS PC 2m cable |
| 15454-M-RAMAN-CTP= | High-Power Counter-Propagating, 1W optical pump output power, C-band, 96-channel 50-GHz Raman unit with 2 ES 2000 PS PC – LC 2m cables |
| ***NCS 1000 Devices*** | |
| **NCS 1010** | |

| Product ID | Description |
|---|---|
| NCS1K-OLT-C= | NCS 1010 Optical Line Terminal - C-band |
| NCS1K-OLT-R-C= | NCS 1010 Optical Line Terminal with Raman - C-band |
| NCS1K-ILA-C= | NCS 1010 In-Line Amplifier - C-band |
| NCS1K-ILA-R-C= | NCS 1010 In-Line Amplifier with 1x Raman - C-band |
| NCS1K-ILA-2R-C= | NCS 1010 In-Line Amplifier with 2x Raman - C-band |
| **NCS 1K MD32 Filters** | |
| NCS1K-MD-32O-C= | NCS 1000 32 chs Odd Mux/Demux Patch Panel - 150GHz - C-band |
| NCS1K-MD-32E-C= | NCS 1000 32 chs Even Mux/Demux Patch Panel - 150GHz - C-band |
| **NCS 1K Breakout Modules** | |
| NCS1K-BRK-24= | NCS 1000 MTP/MPO to 16 colorless chs passive breakout module |
| NCS1K-BRK-8= | NCS 1000 shelf for 4 passive modules |

**Note** NCS 2000 series SVO devices do not support PM history in Cisco Optical Network Controller 2.0 release.