Cisco Optical Automation Solution for Protected Point-to-Point Managed Optical Fiber Network

Cisco Optical Network Controller
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1 Deploy the Cisco Optical Automation Solution in Seven Steps

Topics:

- Optical Automation Solution

Introduces the Optical Automation Solution deployment workflow, including planning, device bringup, site management, controller operations, service provisioning, live network import, and network analysis.

Optical Automation Solution

This section explains Optical Automation Solution. Use it to understand the purpose, behavior, and dependencies that support the related Optical Automation Solution workflow.

An Optical Automation Solution (OAS) provides a unified approach for planning, deploying, and operating optical networks while keeping design intent consistent across tools and teams. It connects the planning, installation, and controller stages to ensure that data, configurations, and validations remain aligned from day-0 through day-2 operations. OAS also standardizes prerequisites and access controls to reduce deployment variance across sites.

The solution offers several key functions.

- It streamlines deployment and lifecycle management of optical networks through repeatable workflows.
- It enables collaboration among planners, site engineers, and automation administrators with shared artifacts and checkpoints.
- It integrates Cisco Optical Network Planner, Cisco Optical Site Manager, and Cisco Optical Network Controller for end-to-end orchestration.
- It preserves configuration intent from initial design through service provisioning and operational assurance.

Key components and roles in OAS

OAS relies on a structured approach involving specific Cisco platforms and dedicated roles to achieve end-to-end automation:

This table lists the primary solution components for the OAS workflow and describes the function of each.

Table 1: Components

Component	Description
Cisco Optical Network Planner	Design and validate networks for the NCS 1000 series platforms.
NCS 1014, NCS 1004, NCS 1001	Provide hardware platforms for optical transport and connectivity within the solution.
Cisco Optical Site Manager	Serves as the software platform for site configuration import, management, and automation tasks.
Cisco Optical Network Controller	Delivers centralized control and monitoring across the optical network infrastructure.

This table outlines the primary roles and the responsibilities required to maintain alignment from planning through operations.

Table 2: Roles

Role	Responsibilities
Planner	Maintains topology fidelity in Cisco Optical Network Planner, aligns fiber parameters, and generates Cisco Optical Site Manager Netconf XML exports.
Site engineer	Handles the physical installation and powering of Cisco hardware, confirms day-0 configurations, and reports site readiness.
Automation administrator	Operates Cisco Optical Site Manager and Cisco Optical Network Controller, manages authentication, imports configurations, and validates telemetry data.

Interconnected stages

The fundamental principle of OAS is to ensure that the configuration intent defined during the planning phase is accurately translated, applied, and monitored across the entire optical network infrastructure.

The deployment of an Optical Automation Solution typically involves these stages:

Stage	Focus
Model preparation	Validate the network design in Cisco Optical Network Planner by confirming the site inventory, fiber types, connector loss values, and service cards. Resolve any design errors. Capture reports, including the bill of materials, layout, NFV, and cabling details. Generate the site configuration in Netconf XML format for consumption by Cisco Optical Site Manager.
Hardware installation	Deploy optical platforms (NCS 1014, NCS 1004, and NCS 1001), rack equipment, install components, connect power, boot devices, configure root credentials and management addresses, and verify interface status.
Cabling validation	Verify that all fiber and cabling work are completed accurately, according to the planned design standards.
Cisco Optical Site Manager activation	Install and configure Cisco Optical Site Manager, including TACACS, authentication groups, and smart licensing. Import Netconf XML bundles, synchronize devices, and push ANS parameters.
Cisco Optical Network Controller onboarding	Install Cisco Optical Network Controller, set up users, import Cisco Optical Site Manager nodes, and verify topology, alarms, performance monitoring, and circuits.

Figure 1: Optical Automation Solution Workflow

Advantages of OAS

Implementing an Optical Automation Solution offers significant advantages:

- **Repeatable and Consistent Deployments:** Provides a standardized, evidence-backed playbook for deploying optical networks, reducing errors and increasing efficiency.
- **Enhanced Planning and Design:** Facilitates continuous planning by enabling the re-import of live topology data into Cisco Optical Network Planner and supporting proactive upgrade analyses for new network configurations.
- **Operational Assurance:** Ensures reliable service provisioning with comprehensive assurance capabilities and continuous monitoring within Cisco Optical Network Controller.
- **Streamlined Workflow:** Integrates various tools and roles into a cohesive workflow, from initial design to active network management.

Deploy the Optical Automation Solution in seven steps

Use this procedure to deploy the Optical Automation Solution (OAS) from initial design through onboarding and circuit provisioning. It helps you complete the related Optical Automation Solution workflow and verify the expected result.

Use this task to move a planned optical network from design to an operational state with continuous planning enabled.

The OAS deployment workflow coordinates Cisco Optical Network Planner, Cisco Optical Site Manager, and Cisco Optical Network Controller for design, configuration, onboarding, and circuit provisioning.

Before you begin

- Confirm access to Cisco Optical Network Planner and Cisco Optical Network Controller, and ensure devices are installed and cabled at the site.

  Ensure that day-0 parameters are available, including IP address assignments, DCN plans, and access to servers such as NTP, TACACS, and Smart Licensing for software downloads.

Follow these steps to deploy the Optical Automation Solution.

Procedure

1. Plan and design the network in Cisco Optical Network Planner.

   Define topology and circuit requirements, then generate planning reports including the Cisco Optical Site Manager configuration file.

   For details, see Design the topology in Cisco Optical Network Planner and Generate Cisco Optical Site Manager Netconf XML Files.

   Design artifacts are ready for device initialization.

2. Perform device turn-up (Day-0) at the site.

   Power on devices and initialize Day-0 parameters such as IP address assignments, DCN plans, and access to servers such as NTP, TACACS, and Smart Licensing for software downloads.

   For day-0 procedures, see Configure NCS 1000 day-0 settings on page 37.

   Devices are powered on and visible in Cisco Optical Site Manager.

3. Apply Day-1 configuration and validate in Cisco Optical Site Manager.

   Push the Day-1 configuration generated by Cisco Optical Network Planner to devices via Cisco Optical Site Manager and validate the configuration on all devices.

   For details, see Import Cisco Optical Network Planner XML and Synchronize devices in Cisco Optical Site Manager.

Devices are validated and ready for onboarding.

4. Onboard nodes to Cisco Optical Network Controller.

   Add validated nodes to Cisco Optical Network Controller and confirm they appear in inventory.

   For details, see Onboard Cisco Optical Site Manager nodes in Cisco Optical Network Controller.

   Nodes are managed by Cisco Optical Network Controller.

5. Provision circuits in Cisco Optical Network Controller based on the Cisco Optical Network Planner plan.

   Review planned paths in Cisco Optical Network Planner and provision circuits in Cisco Optical Network Controller according to the planned design.

   For details, see Provision CPCE services.

   Circuits are provisioned according to the approved plan.

6. Monitor the live network and synchronize data with Cisco Optical Network Planner.

   Use Cisco Optical Network Controller to monitor network status and import live network details into Cisco Optical Network Planner with one click.

   For details, see Import a live network into Cisco Optical Network Planner on page 91.

   Planning data reflects the live network state.

7. Perform continuous planning and upgrades.

   Use live network information in Cisco Optical Network Planner, generate new ANS parameters after upgrade analysis, and push updates via Cisco Optical Site Manager.

   For details, see Analyze the network.

   The network evolves through continuous planning and upgrades.

OAS deployment is complete, and the network enters a continuous planning loop supported by Cisco Optical Network Planner, Cisco Optical Site Manager, and Cisco Optical Network Controller.

2 Plan Your Network with Cisco Optical Network Planner

Topics:

- Cisco Optical Network Planner prerequisites and user management
- Plan your NCS1001 Network

Describes how to plan an optical network with Cisco Optical Network Planner, including prerequisites, topology design, network analysis, Netconf file generation, and troubleshooting.

Network planning is the stage where Cisco Optical Network Planner is used to model the optical topology, validate design feasibility, and prepare the setup data required for site activation.

Cisco Optical Network Planner enables users to model and test Optical Transport Network (OTN) and Dense Wavelength Division Multiplexing (DWDM) optical networks in a graphical environment.

- Cisco Optical Network Planner is used to design and validate networks for the NCS 1000 and NCS 2000 series platforms.
- The tool generates the Bill of Materials (BoM) based on the modeled network.
- Cisco Optical Network Planner provides detailed network information, including rack views, cabling reports, optical reports, traffic matrices, and optical setup files used for bringing up the Cisco Optical Site Manager network.

Cisco Optical Network Planner prerequisites and user management

This section provides details about Cisco Optical Network Planner prerequisites and user management. Use it to review facts, requirements, values, or operational notes that support the related Cisco Optical Network Planner workflow.

Understand the minimum system requirements and administrative considerations required before deploying Cisco Optical Network Planner.

This table describes the prerequisites and recommended configurations that are essential for Cisco Optical Network Planner installation and operation:

Table 3: Cisco Optical Network Planner prerequisites

Item	Description
Installation	Install Cisco Optical Network Planner in the customer environment. For more details, see: • Cisco Optical Network Planner Installation Guide for detailed installation steps. • To install a Cisco Optical Network Planner SMU package, see Install the SMU. • See Troubleshoot for troubleshooting common Cisco Optical Network Planner issues.
System requirements	• **Operating system:** Ubuntu Server 22.04 or 24.04, or Red Hat Enterprise Linux 8.8 or 8.10 • **CPU:** 8 cores • **Memory:** 96 GB RAM • **Storage:** 500 GB free disk space after installation • **Capacity:** Supports 10 concurrent parallel Cisco Optical Network Planner analyses
Download and licensing	Cisco Optical Network Planner can be downloaded from CCO with a valid license agreement. Contact the account team for download issues.
First-time login	After installing Cisco Optical Network Planner, log in as admin and change the default password during the first-time Cisco Optical Network Planner login.
User access	Users must register in Cisco Optical Network Planner, and an administrator must authorize their accounts before GUI access.
Planning inputs	Have topology details available, including site or device details, fiber parameters, and circuit details.

Users with administrator privileges can:

- Approve new users by assigning a role to a user group.
- Receive email notifications when new users register.
- For more details, see Assign a role to a user group.

Plan your NCS1001 Network

Use these planning inputs when you model a protected point-to-point MOFN network with Cisco NCS 1001 devices in Cisco Optical Network Planner.

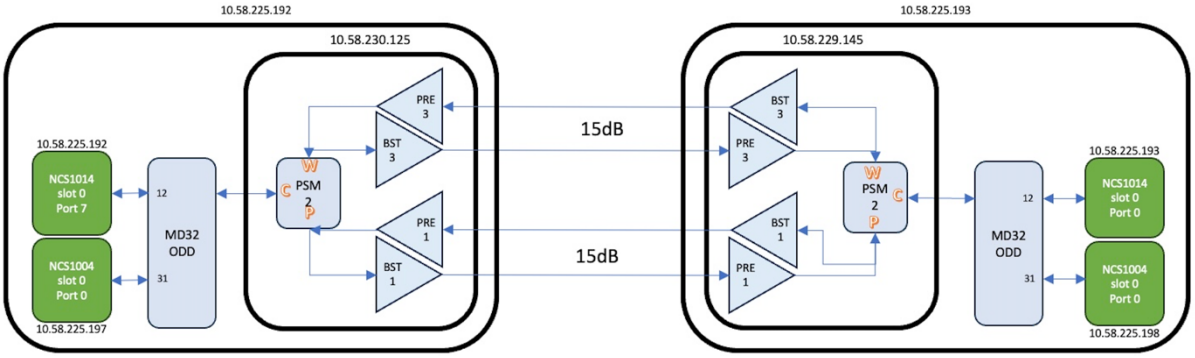
The reference topology is a point-to-point MOFN network with section protection by using the Cisco NCS 1001 PSM card. Use the topology to plan Cisco NCS 1001 bringup, Cisco Optical Site Manager configuration, and Cisco Optical Network Controller provisioning.

Use these software release values when you create the network model:

- **NCS 1001**: 25.4.1
- **NCS 1014**: 26.1.1
- **NCS 1004**: 26.1.1

Before you create the network plan, consider the fiber type, fiber loss values, fiber length calculation method, optical subnet spectral density, circuit and service count, card type, and required add/drop type. Apply these inputs according to your network design requirements.

Figure 2: MOFN topology



Design the topology in Cisco Optical Network Planner

Use this procedure to create and parameterize an optical network model in Cisco Optical Network Planner before running feasibility analysis. It helps you complete the related Cisco Optical Network Planner workflow and verify the expected result.

Use this procedure to create a Cisco Optical Network Planner model that matches the physical design for a new region or pilot network.

The output is a topology file that you can use for Cisco Optical Site Manager exports and downstream bill of materials validation.

The sample node names (Genova and Novara) correspond to the reference network and should be adapted as necessary.

Consider these inputs before you create the network plan. Apply them according to your network design requirements.

- Create the number of circuits based on the channel plan and use the appropriate card type for each circuit.
- Force the add/drop type according to the design requirements. For details about add/drop configuration, see Modify Network Properties.
- Plan two terminal nodes with section protection, two fibers between the terminal sites, NCS 1014 and NCS 1004 service properties, and any forced wavelength or add/drop settings required by the topology.

Before you begin

- Confirm licensing for Cisco Optical Network Planner and verify that your account can create and save projects.
- Gather topology notes: number of ROADM sites, fiber lengths, and circuit/service requirements.
- Confirm the system release values and section-protection topology details. For more information, see NCS 1001 planning inputs in Cisco Optical Network Planner.

- Clarify whether the design needs colored or colorless add/drop behavior per site.

Follow these steps to design the topology.

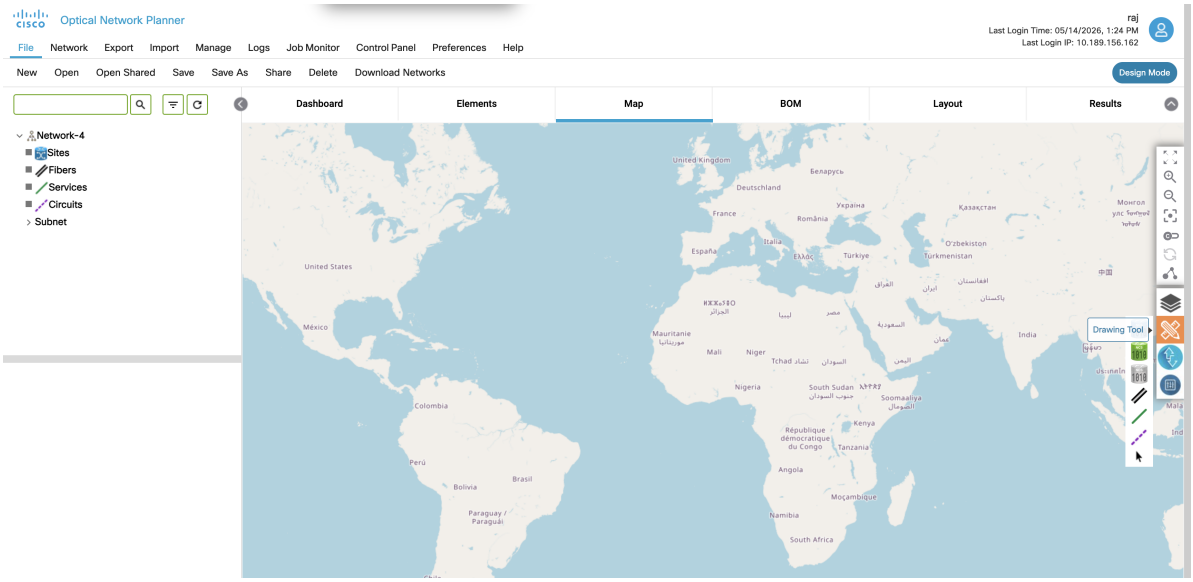
Procedure

1. Create the base network in Cisco Optical Network Planner.
   a) Log in to the Cisco Optical Network Planner home page with a valid user id.
   b) Choose **File**, then click **New**.
   c) In **Create New Network** dialog box, set **L0 Network Platform** to **NCS 1001** and **Band Type** to **C-Band** and use these system release values: NCS 1001 25.4.1, NCS 1014 26.1.1, and NCS 1004 26.1.1.

   Name the network consistently with your deployment tracker (for example, REGION_TOPOLOGY_MMDD).

   A new, empty network canvas opens with the drawing tool enabled.

2. Follow these steps to add sites, fibers, circuits, and services with the drawing tool.
   a) Click the **Drawing Tool** icon (pencil and ruler).



   b) Add two terminal nodes to the map.
   c) For each terminal node, in the C-band section, choose **Site** > **Structure**, and then choose **Terminal-Section** from the drop-down list. By default, **Terminal** is selected.
   d) Use the **Fiber** tool to connect sites following the target topology.

      By default, fibers are 1 km. Enable **Use Coordinates Distance** under **Network Properties** if you want lengths derived from coordinates.

   e) Create two fibers between the terminal nodes to model the working and protect paths.
   f) Click the source site and then the destination site in the map to select **Circuit** (purple) to add demands.

      Both Alien and NCS1000 TXP Trunk to Trunk demands can be created with this option.

   g) Select **Service** (green) to create client services of native NCS1000 TXP.

      The service automatically creates a trunk-to-trunk circuit.

> **Note**
>
> For the specified topology, create a circuit, a service, or both. Define at least one before you run an analysis.

The visual topology reflects the required sites, fibers, circuits, and services.

3. Follow these steps to set site properties using **Entity Editor**.
   a) Choose **Network**, then click **Entity Editor**.
   b) Drill down into **Fibers** to update **Fiber Type**, **Aging Loss**, and **SOL Loss** values.
   c) Update the fiber values in **Properties**.
   d) Click **Show Advance properties** to update advanced parameters.
   e) Expand **Subnet**, then click **OpticalSubnet** and adjust **spectral density** (for example, **Flexgrid-SD-81%**).

   Keep a change log of any forced parameters so installers know which passives to deploy.

   Sites, fibers, and subnet properties match the physical design data.

4. Optional: To select specific colored Add/drop MD-32-E/MD-32-O Mux/Demux patch panels based on the topology, set these properties.

   > **Note**
   >
   > If you do not force this setting and leave it set to **Auto**, Cisco Optical Network Planner automatically selects the default Add/drop.

   a) Choose **Network**, click **Entity Editor**, and then click the **Service** tab.
   b) In the left tree panel, expand the circuit that connects to the site where the patch panel is connected, and then drill down to the trail properties.
   c) Click **Select Similar** to apply the properties in bulk to all the trails.
   d) Under the trail properties, set **Add/Drop Type** to **Colored**.
   e) Click **Update**.
   f) Click the **Site** tab.
   g) Click **Select Similar** to apply the properties in bulk to all the add/drops.
   h) Expand the ROADM site interface, drill down to the Add/Drop properties of the side, or drill down to **C-Band** > **Edge (A)** > **C-Band**, and then under **General**, set **Colored Add/Drop** to **MD-32-Even** or **MD-32-Odd** as per the topology.
   i) Click **Update**.

5. Create a service between **Site-1** and **Site-2**.
   a) Click the **Drawing Tool** icon, and select **Service** (green).
   b) Add the service between the sites on the map by clicking the source site and then the destination site.

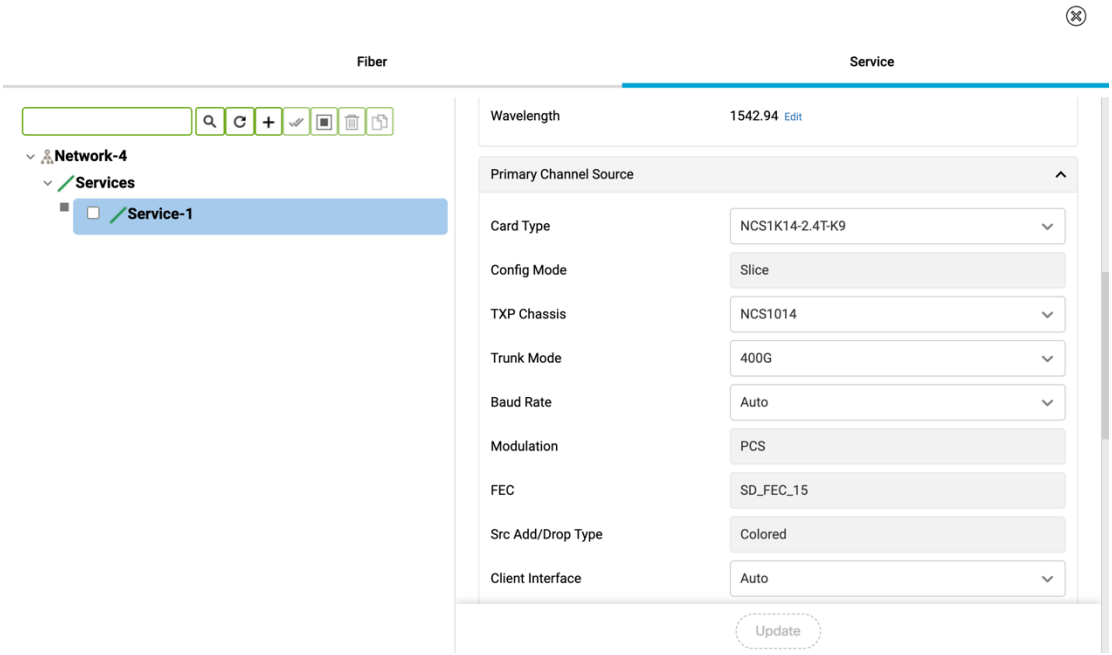
6. To add NCS 1014 (NCS1K14-2.4T-K9=), set these properties in the left tree panel:
   a) Expand the service that connects to the site where NCS 1014 (NCS1K14-2.4T-K9=) is connected in the left tree panel, and then drill down to the service properties.
   b) Under **Service Properties**, in **Primary Channel Source**, set **Card Type** to **NCS1K14-2.4T-X-K9** and **TXP Chassis** to **NC1014**.
   c) Click **Update**.

d) If trunk port 7 of the TXP is connected to port 12 of the MD-32 Odd add/drop module, go to **Entity Editor** > **Service** and set the wavelength to *1542.94 nm* and the client port to *4* for the service.

e) Click **Show Advance Properties**, and set **Src Add/drop Type** and **Dst Add/drop Type** to **Colorless/Colored**.



Figure 3: Cisco Optical Network Planner advanced property forcing



> **Note**
>
> If **Show Advance Properties** is not displayed, check whether a service is selected in the left panel. If a service is selected, clear the selection, and then click the service again.

f) Click **Update**.

7. To add NCS 1004 (NCS1K4-QXP-K9=), set these properties in the left tree panel:
   a) Expand the service that connects to the site where NCS 1004 (NCS1K4-QXP-K9) is connected in the left tree panel, and then drill down to the service properties.
   b) Under **Service Properties**, in **Primary Channel Source**, set **Card Type** to **NCS1K4-QXP-K9** and **TXP Chassis** to **NCS1004**.
   c) Click **Update**.
   d) Click **Show Advance Properties**, and set **Src Add/drop Type** and **Dst Add/drop Type** to **Colorless/Colored**.
   e) Click **Update**.
8. Choose **File**, then click **Save** to store the project.

   Alternatively, you can click Cisco Optical Network Planner Excel import/export workflow to create a network. For more details, see Import a network using an Excel sheet

   The project file captures the designed topology and is ready for analysis.

You now have a fully defined Cisco Optical Network Planner network that aligns with physical requirements and can proceed to Analyze and Cisco Optical Site Manager export stages. The Cisco Optical Network Planner model includes the protected section design, terminal nodes, fibers, services, and platform-specific service properties.

What to do next

- Analyze the network on page 18
- Share the screenshots and any Excel import artifacts with reviewers.

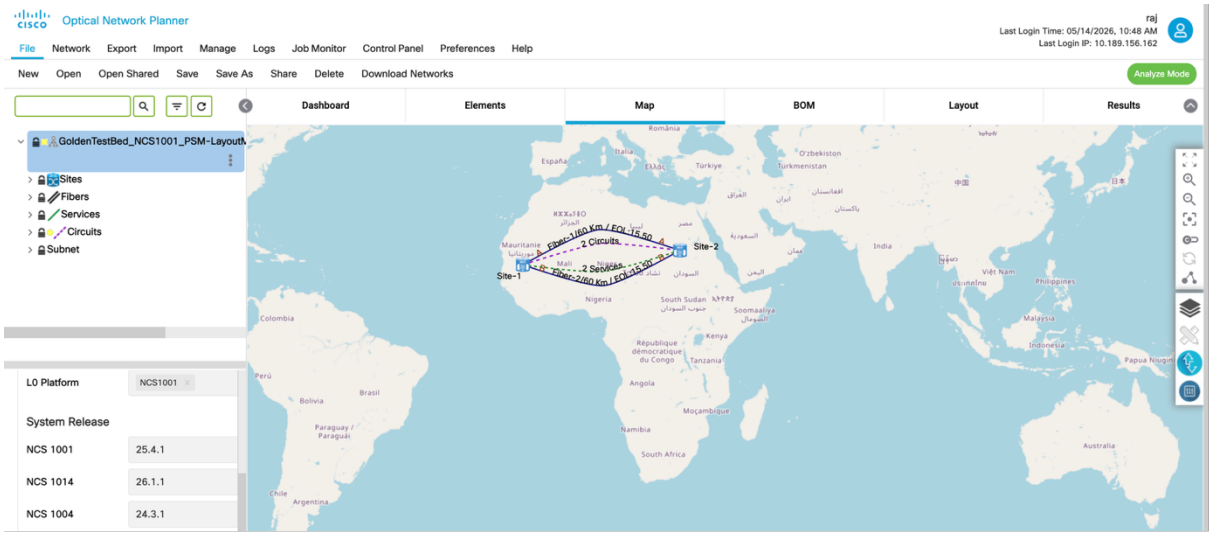
Analyze the network

Use this procedure to analyze a designed sample network in Cisco Optical Network Planner to check its feasibility. It helps you complete the related Cisco Optical Network Planner workflow and verify the expected result.

To analyze the designed sample network and check its feasibility using the Cisco Optical Network Planner Web Interface.

After a successful network analysis, you can validate the design by reviewing various reports available in Cisco Optical Network Planner, including Layout, NFV, BOM, and Optical Reports. These reports provide detailed information about hardware placement, interconnections, inventory, and circuit feasibility.

Figure 4: CONP Analyzed Network



Before you begin

Ensure you have access to the Cisco Optical Network Planner Web Interface and have a sample topology network created.

Follow these steps to analyze the network.

Procedure

1. Log in to Cisco Optical Network Planner Web Interface.
2. Click **File**, then click **Open**.

   The **Select Network To Open** dialog box appears.
3. Click the sample topology network that you have created, from the list of networks.
4. Click **Network**, then click **Analyze**.

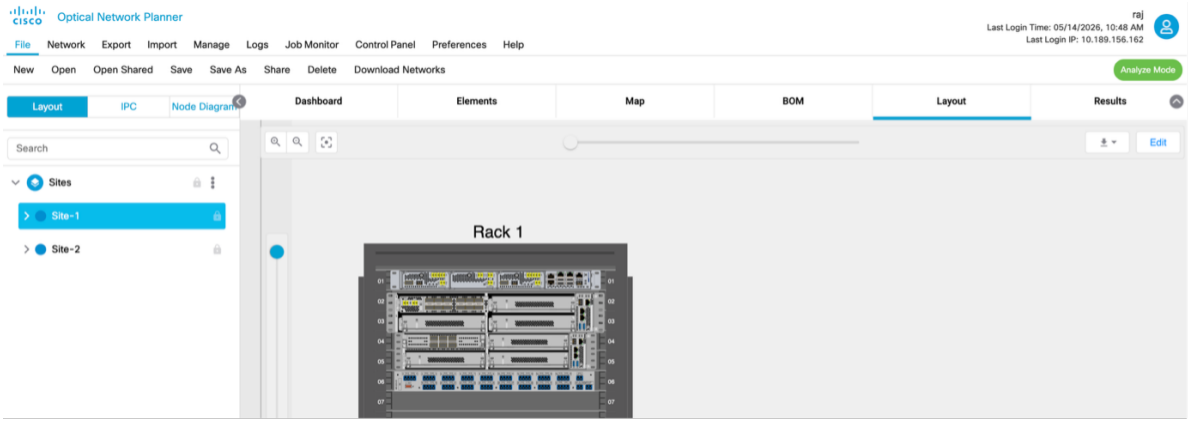
   The Cisco Optical Network Planner analysis progress indicator indicates the analysis status.

   Table 4: Analysis Status

If...	Then...
After successful analysis	The network goes to Analyze Mode.
If there is any failure in the analysis stage	A pop-up window appears with the message, “Analysis Failed.”

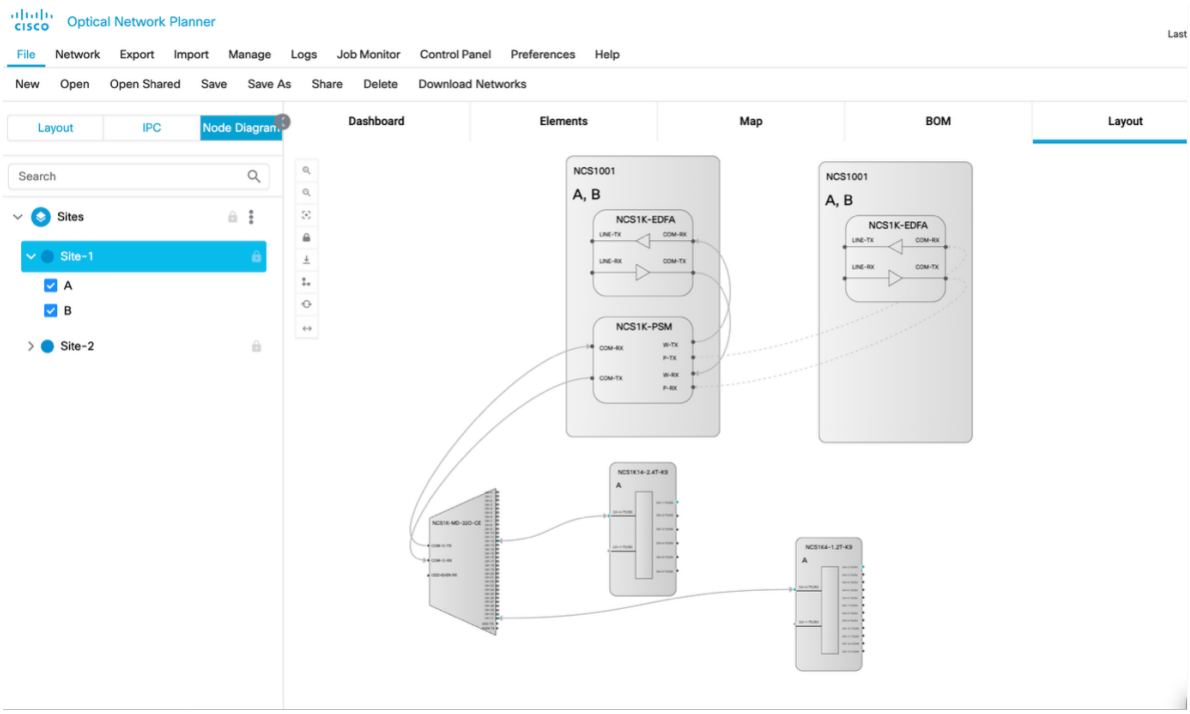
5. Choose the **Elements** > **Messages** tab to see the list of error details in the analyzed network.
   - By default, it shows only the key messages when the **Critical Only** toggle button is enabled.
   - If you want to view the entire network message, disable the **Critical Only** toggle button.
6. 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.
7. Validate the design by navigating to the **Network View** and reviewing these reports:
   a) **Layout Tab**: View hardware placement, rack level details, and site interconnections (via **Node Diagram** in the left panel).

   Figure 5: CONP Layout



b) **Node Diagram**: View the site interconnections.

Figure 6: CONP Node Functional View



c) **BOM Tab**: See the inventory list for each site.

d) **Results** (including **Optical Reports**, **Installation Parameters**, and **Cabling Report**): Validate circuit feasibility and other design parameters.

For more details about the report parameters, see Optical Report.

The network should be in an analyzed state, and you should have validated the design using the CONP reports.

What to do next

Refer to the **Troubleshoot** section in CONP Analysis Troubleshooting for understanding common analysis errors.

Generate Cisco Optical Site Manager Netconf XML Files

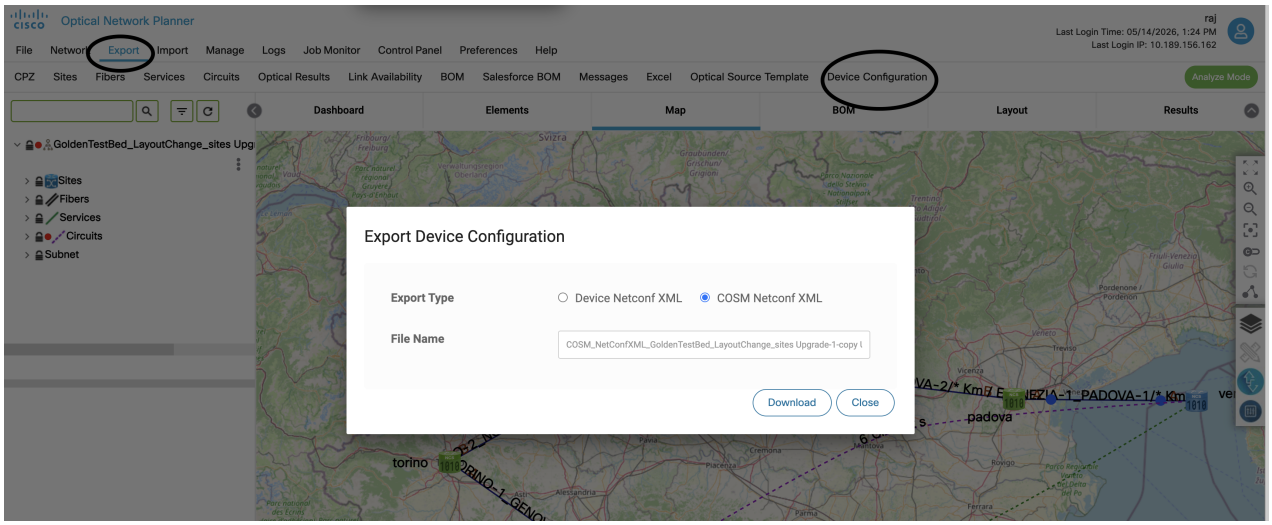
Use this procedure to generating and preparing Cisco Optical Site Manager Netconf XML files for Day1 device configuration. It helps you complete the related Cisco Optical Network Planner workflow and verify the expected result.

Generate and prepare Cisco Optical Site Manager Netconf XML files from Cisco Optical Network Planner.

After the network has undergone analysis and validation, it is necessary to export the configuration data from Cisco Optical Network Planner in a Netconf XML format.

The exported files are packaged into a Zip archive, and each file within this archive corresponds to a specific site, identified by its unique naming convention.

Figure 7: Export device configuration from Cisco Optical Network Planner



Before you begin

Ensure that the network has been thoroughly analyzed and validated.

Follow these steps to generate Cisco Optical Site Manager Netconf XML files.

Procedure

1. Export the Cisco Optical Site Manager Netconf XML file from Cisco Optical Network Planner.

   Refer to Export Cisco Optical Site Manager Netconf XML File for detailed instructions on the export process.

   Figure 5 illustrates the Cisco Optical Network Planner export interface: **Export** → **Device Configuration** → **Cisco Optical Site Manager Netconf XML**.

   A Zip file with a specified name is downloaded.

2. Identify the individual site configuration files within the downloaded Zip file.

   The Zip file contains a list of files, where each file represents a distinct site. The file name helps to identify the individual site using the format:

   ```
   <NetworkName-SiteName>
   ```

   .

3. Upload each individual site file into Cisco Optical Site Manager after it is operational.

For details, see Import Cisco Optical Network Planner XML.

The Cisco Optical Site Manager Netconf XML files are successfully generated, extracted, and prepared for Day1 device configuration in Cisco Optical Site Manager.

What to do next

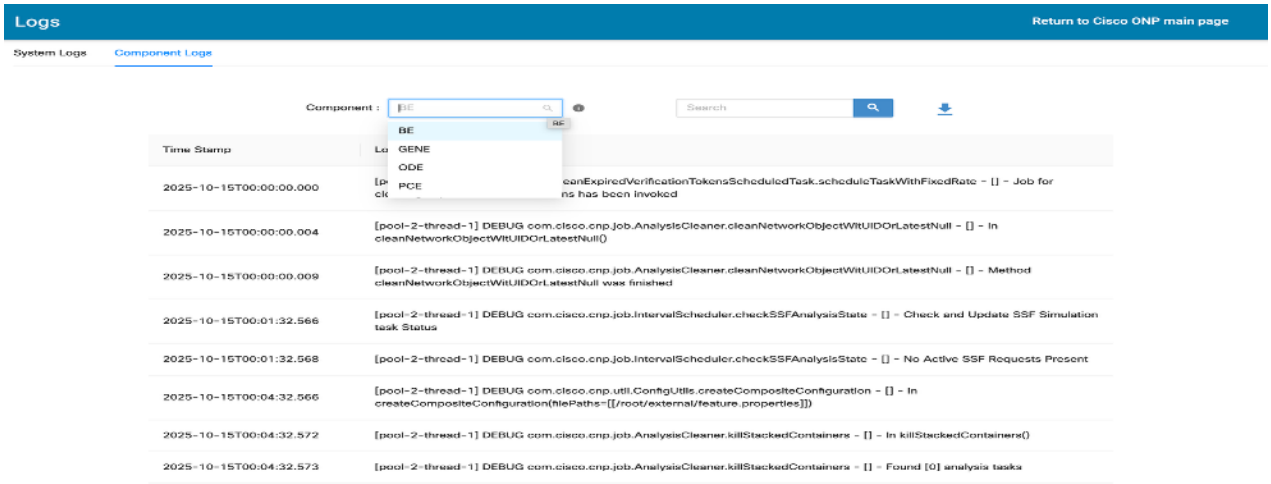
Bring up the platform and Cisco Optical Site Manager, and then configure the Day 1 device settings in Cisco Optical Site Manager by using the uploaded files.

Troubleshooting and log collection

Use this procedure to troubleshooting and log collection. It helps you complete the related Cisco Optical Network Planner workflow and verify the expected result.

Collect the network export and component logs required by engineering support.

Figure 8: Cisco Optical Network Planner logs collection



To resolve any issues encountered during installation, see Troubleshooting Guide.

Before you begin

- Ensure you have administrator access to Cisco Optical Network Planner.
- Verify the target network project is available in the Cisco Optical Network Planner workspace.

Follow these steps to collect troubleshooting logs for engineering support.

Procedure

---

1. Open the network in Cisco Optical Network Planner, select **Export**, then click **CPZ** to export the CPZ file of the network.
2. Export the component logs.
   a) Click **Logs**, then click **Component Logs**.
   b) Collect these logs: BE (CONP Backend log), GENE (NCS1010 and NCS1000 TXP Analysis Engine), ODE (NCS4k Analysis Engine), and PCE (NCS1010 Path Computation & Simulation Engine).

---

3 Reference a sample day-0 network configuration

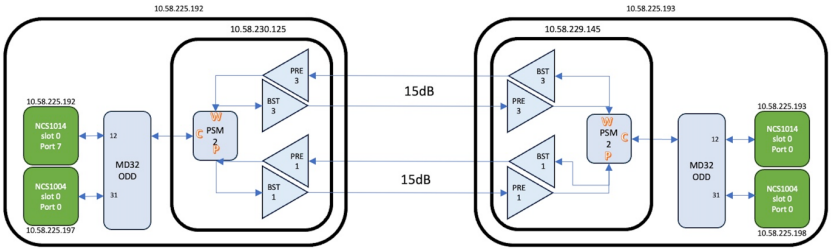
Review the sample topology and Excel workbook used to prepare common and topology-specific values for day-0 configuration.

Use the sample topology and Excel workbook as a reference when preparing the day-0 configuration. Update values that vary by topology or customer before applying the configuration.

Sample day-0 network configuration

This figure shows the sample topology used for the day-0 configuration.

Figure 9: Sample topology for day-0 configuration



In the Excel workbook, values shown in black are common reference values. Replace values shown in purple with values specific to the customer site and network topology before using the workbook.

For the detailed day-0 configuration values, use the Sample day-0 configuration Excel.

4 Bring Up Your NCS 1000 Devices

Topics:

- NCS 1014 overview
- NCS 1004 overview
- NCS 1001 overview
- Install Cisco NCS 1014, NCS 1004, and NCS 1001 hardware
- NCS 1001 setup and initial configuration

Explains NCS 1000 device bringup for the Optical Automation Solution, including hardware installation, initial configuration, validation, troubleshooting, and Cisco IOS XR software maintenance update procedures.

Device bringup is the stage where NCS 1000 platforms are installed, powered, configured, and validated so they are ready for site-level automation.

NCS 1014 overview

This section explains NCS 1014 overview. Use it to understand the purpose, behavior, and dependencies that support the related NCS 1000 platform workflow.

The NCS 1014 chassis delivers a universal transponder solution that supports metro, long-haul, and submarine deployments.

- Supports transponder and line system cards in a 2RU form factor.
- Designed for high-performance optical transport applications.
- Integrates with the OAS end-to-end solution alongside NCS 1001.

Deployment guidance

Use the NCS 1014 where transponder capacity is required.

- Install the chassis in a rack that meets EIA, ANSI, or ETSI requirements.
- Follow the power and grounding requirements for the site.
- Deploy NCS 1014 shelves at aggregation sites that terminate optical channels from the NCS1001 line system.
- If a site only requires line system functions, use NCS1001 without adding transponder shelves.

For more details about NCS 1014 deployment guidance, see Hardware Installation Guide for Cisco NCS 1014.

NCS 1004 overview

This section explains NCS 1004 overview. Use it to understand the purpose, behavior, and dependencies that support the related NCS 1000 platform workflow.

The NCS 1004 provides high-performance transponder capabilities for metro, long-haul, and submarine applications.

- Delivers a 2RU chassis optimized for transport use cases.
- Supports universal transponder functions in the Optical Access System (OAS) architecture.
- · Pairs with NCS 1001 line system nodes in OAS systems.

Deployment guidance

Use the NCS 1004 where a compact transponder shelf is required.

- Install the chassis in an EIA, ANSI, or ETSI rack.
- Follow site power and grounding requirements.
- Use NCS 1004 shelves at sites that require a smaller footprint while maintaining high-capacity transport.
- If a site requires only line system function, use the NCS 1001 without transponder shelves.

For more details about the NCS 1004 deployment guidance, see Hardware Installation Guide for Cisco NCS 1004.

NCS 1001 overview

This section explains the setup, initial configuration, and software upgrade processes for the Cisco NCS 1001 platform used as the Optical Line System (OLS) in this OAS solution.

The Cisco Network Convergence System 1001 (NCS 1001, PID NCS1001-K9) is a 1 RU DWDM Optical Line System optimized for point-to-point data-center DWDM applications. It provides amplification, section and channel protection, and OTDR-based fiber monitoring for C-band DWDM transmission of up to 96 channels over a single fiber pair.

Platform components

Each chassis hosts up to three pluggable optical modules in any combination based on the link design.

- Optical Amplifier (NCS1K-EDFA)
- Protection Switching Module (NCS1K-PSM)
- Optical Time Domain Reflectometer (NCS1K-OTDR)

Platform capabilities

The platform runs Cisco IOS XR and supports these automation and management capabilities:

- Zero Touch Provisioning
- Streaming telemetry
- NETCONF/YANG
- SNMP

Passive optical components

The Cisco NCS 1001 solution includes the chassis and the NCS1K-MD-32E-CE and NCS1K-MD-32O-CE passive mux and demux patch panels. The legacy N1K-MD-32E-C passive mux and demux patch panel is also supported.

For low-channel-count edge sites, the solution can optionally include the Cisco ONS 15216 4-channel Optical Add-Drop Multiplexer (OADM).

NCS 1001 hardware and software support for MOFN deployments

Cisco NCS 1001 provides the line-system functions for the protected point-to-point MOFN deployment.

Use this reference to understand the Cisco NCS 1001 hardware components, slot usage, and software interfaces used in the protected point-to-point Managed Optical Fiber Network (MOFN) topology.

Hardware components

Cisco NCS 1001 includes these hardware components:

- A 1 RU chassis with a removable **NCS1K-CNTLR2** control card and onboard **NCS1K-SSD**.
- Four removable **NCS1K1-FAN** fan modules.
- Two redundant 600 W AC/DC or DC/DC power supply units. Do not mix AC and DC power supply units in the same chassis.
- Three slots for hot-pluggable optical modules, such as **NCS1K-EDFA**, **NCS1K-PSM**, and **NCS1K-OTDR**.
- Two USB 2.0 ports, a copper management port, an optical SFP management port, and an RS-232 console port.

Software Support

Use these slot and software guidelines for the MOFN deployment:

- In amplified-only configurations, install the EDFA in any supported slot.
- In section-protected configurations, install the protect EDFA in slot 1, the PSM in slot 2, and the working EDFA in slot 3.
- Populate empty optical module slots with filler modules to maintain cooling and laser-safety compliance.
- Cisco NCS 1001 runs Cisco IOS XR. The baseline release for this MOFN deployment is 25.4.1.
- Optical modules appear as controllers in the `Ots 0/<slot>/0/<port>` format. Booster and preamplifier ports use ports 0 and 1, OSC uses port 2, and COM-CHECK uses port 3.
- The platform supports management through CLI over SSH, NETCONF/YANG, gNMI streaming telemetry, and SNMPv2c or SNMPv3.

Install Cisco NCS 1014, NCS 1004, and NCS 1001 hardware

Use this procedure to install NCS 1014, NCS 1004, and NCS 1001 hardware. It helps you complete power, fiber, and passive connections for the Optical Access System workflow.

Prepare the hardware so it is ready for initial configuration.

Use these hardware-installation tasks in sequence. Each linked procedure is kept as a separate task step in the child topics.

Before you begin

Verify that the rack, power, grounding, hardware placement, cabling, and passive-connection details meet the site design and Cisco installation requirements.

Procedure

1. Prepare and install the NCS 1014 chassis and required modules for the site.

   For more details, see Install the NCS 1014 chassis and modules.

2. Install NCS 1014 power components, pluggables, and air-filter hardware.

   For more details, see Complete NCS 1014 power, pluggables, and air-filter installation.

3. Prepare and install the NCS 1004 chassis in the site rack.

   For more details, see Install the NCS 1004 chassis.

4. Install the NCS 1004 controller and line cards required by the bill of materials.

   For more details, see Install NCS 1004 controller and line cards.

5. Install the NCS 1004 FRUs, pluggables, air filter, and fiber-management hardware.

   For more details, see Install NCS 1004 field-replaceable units and fiber management.

6. Connect NCS 1004 power and complete final fiber and passive connections.

   For more details, see Connect NCS 1004 power and complete passive connections.

7. Install the NCS 1001 modules for the site.

For more details, see Install Cisco NCS 1001 modules on page 30.

All hardware is installed and ready for console access and initial configuration.

NCS 1000 platform prerequisites

This section provides details about NCS 1000 platform prerequisites. Use it to review facts, requirements, values, or operational notes that support the related NCS 1000 platform workflow.

Collect the required addressing and host information for each node in the topology.

Required details to gather before installation for each node in the topology.

- Hostname for each node.
- Management and loopback IP addresses.
- Indicate the node role, such as OLT, ILA, OLA, or transponder shelf.
- DCN plans to ensure proper management connectivity.
- Access to servers such as NTP, TACACS, and Smart Licensing for software downloads.

Prepare and install Cisco NCS 1001

Use this task to review the Cisco NCS 1001 hardware, prepare the site, install the chassis, and prepare the 32-channel mux/demux patch panel.

Prepare the installation site and install the Cisco NCS 1001 chassis before installing its modules.

Use the Cisco hardware-installation references that apply to the chassis and passive equipment in the site bill of materials.

Before you begin

Ensure that the required rack space, grounding, power feeds, installation tools, and hardware are available.

Procedure

---

1. Review the Cisco NCS 1001 hardware and supported components.

   For more details, see Cisco NCS 1001 Overview.

2. Prepare the site and hardware for the Cisco NCS 1001 installation.

   For more details, see Prepare to Install Cisco NCS 1001.

3. Install the 1 RU Cisco NCS 1001 chassis in an EIA/ANSI 19-inch rack.

   For more details, see Install Cisco NCS 1001.

4. Prepare the Cisco NCS 1000 32-channel mux/demux patch panel when it is included in the site design.

   For more details, see Prepare to Install Cisco NCS 1000 32-Channel Mux/Demux Patch Panel.

The Cisco NCS 1001 chassis is installed, and the site is ready for module and passive-component installation.

Install Cisco NCS 1001 modules

Use this task to install Cisco NCS 1001 power, controller, optical, fan, and passive modules for the reference topology.

Install the Cisco NCS 1001 hardware according to the site bill of materials and the Cisco Optical Network Planner NFV and connection reports.

Before you begin

- Prepare the site rack, grounding, power feeds, and fiber-management plan.
- Install the Cisco NCS 1001 chassis in an EIA, ANSI, or ETSI 19-inch rack.
- Prepare the Cisco NCS 1000 32-channel mux/demux patch panel.

Follow these steps to install Cisco NCS 1001 modules.

Procedure

1. Install the two power supply units.

   Use either AC power supply units or DC power supply units. Do not mix AC and DC power supply units in the same chassis.

2. Connect AC or DC power to Cisco NCS 1001 according to the site power design.
3. Install the **NCS1K-CNTLR2** control card with the **NCS1K-SSD**.
4. Install the optical modules in slots 1 through 3 according to the site design.

   Supported optical modules include **NCS1K-EDFA**, **NCS1K-PSM**, and **NCS1K-OTDR**. For section-protected deployments, use slot 1 for the protect EDFA, slot 2 for the PSM, and slot 3 for the working EDFA.

5. Install the four **NCS1K1-FAN** modules in fan slots 0 through 3.
6. Install filler optical modules or filler power supply units in empty bays.

   Fillers are required to maintain cooling and laser-safety compliance.

7. Install the OSC SFP pluggables on each EDFA **OSC-RX** and **OSC-TX** port.

   Example pluggables include 1510 nm and 1610 nm CWDM optics, such as **ONS-SC-Z3-1510** and **ONS-SC-Z3-1610**.

8. Optional: Install the **NCS1K-OTDR** module in any free slot and connect **OTDR1** and **OTDR2** to the OSC ports according to the design.
9. Install the required passive modules.
   - Use **NCS1K-MD-32E-CE** Even and **NCS1K-MD-32O-CE** Odd mux/demux patch panels for 32 channels each at 150 GHz spacing. Pair both panels for 64 channels at 75 GHz spacing.
   - Use the legacy **N1K-MD-32E-C** 32-channel Even mux/demux patch panel only for Cisco NCS 1001 deployments that do not use loopback.
   - Use the Cisco ONS 15216 4-channel OADM for low-channel-count edge sites when required by the design.
10. Connect the patch-panel **COM** ports to the EDFA **COM-RX** and **COM-TX** ports.
11. Connect the patch-panel inventory USB cable to a control-card USB port for automatic inventory discovery.
12. Loop the EDFA preamplifier **COM-CHECK** port back to the demux monitor port when **COM-TX** power can exceed 20 dBm.

    This loopback is required for automatic power reduction and laser safety on long spans.

13. Use the Cisco Optical Network Planner NFV and connection report to complete per-site passive and fiber wiring.

The Cisco NCS 1001 hardware and passive modules are installed and ready for software bringup.

Install the NCS 1014 chassis and modules

Use this procedure to use the Cisco NCS 1014 procedures for chassis, fiber management, SSD, fan, controller, and line-card installation. It helps you complete the related NCS 1000 platform workflow and verify the expected result.

Install the NCS 1014 chassis and core modules required for the OAS site.

Complete these procedures before power, pluggable, and air-filter installation.

Before you begin

Verify rack, power, grounding, and fiber-management readiness for NCS 1014.

Procedure

1. Mount the Cisco NCS 1014 chassis in the approved EIA, ANSI, or ETSI rack.

   For more details, see Install the Cisco NCS 1014 chassis on an EIA, ANSI, or ETSI rack.

2. Confirm NCS 1014 power and grounding requirements before installing powered components.

   For more details, see General power and grounding requirements.

3. Attach the fiber management bracket to the slider rail before routing fibers.

   For more details, see Attach the fiber management bracket to the slider rail.

4. Install the SSD in the NCS 1014 chassis.

   For more details, see Install the solid state drive (SSD).

5. Install the fan unit and confirm it is fully seated.

   For more details, see Install the fan unit.

6. Install and secure the NCS 1014 controller.

   For more details, see Install the controller.

7. Attach the fiber management bracket for the installed module layout.

   For more details, see Attach the fiber management bracket.

8. Adjust the fiber management bracket for the planned fiber routing.

   For more details, see Adjust the fiber management bracket.

9. Install and secure the required NCS 1014 line card.

   For more details, see Install the line card.

The NCS 1014 chassis and core modules are installed.

Complete NCS 1014 power, pluggables, and air-filter installation

Use this procedure to use the Cisco NCS 1014 procedures for PSUs, power feeds, pluggables, and air-filter installation. It helps you complete the related NCS 1000 platform workflow and verify the expected result.

Complete the remaining NCS 1014 hardware installation after the chassis and core modules are installed.

Select the AC or DC power procedure that matches the site design.

Before you begin

Install the NCS 1014 chassis, controller, fan unit, and line cards.

Procedure

1. Install the NCS 1014 power supply units in the assigned slots.

   For more details, see Install the power supply units (PSUs).

2. Connect the NCS 1014 chassis to the approved DC power source when the site uses DC feeds.

   For more details, see Connect DC power to the Cisco NCS 1014 chassis.

3. Connect the NCS 1014 chassis to the approved AC power source when the site uses AC feeds.

   For more details, see Connect AC power to the Cisco NCS 1014 chassis.

4. Install the required pluggables in the NCS 1014 ports.

   For more details, see Install the pluggables.

5. Install the NCS 1014 air filter after module installation is complete.

   For more details, see Install the air filter.

NCS 1014 power, pluggables, and air-filter installation is complete.

Install the NCS 1004 chassis

Use this procedure to use the Cisco NCS 1004 chassis installation procedures for rack, stacking, power, and grounding requirements. It helps you complete the related NCS 1000 platform workflow and verify the expected result.

Install the NCS 1004 chassis according to site rack and grounding requirements.

Complete chassis installation before installing controllers, line cards, and field-replaceable units.

Before you begin

Verify rack compatibility, grounding, and power-feed readiness for NCS 1004.

Procedure

1. Confirm that the site rack supports the NCS 1004 chassis before installation.

   For more details, see Rack compatibility.

2. Mount the NCS 1004 chassis in the approved EIA, ANSI, or ETSI rack.

   For more details, see Install NCS 1004 on an EIA, ANSI, or ETSI rack.

3. Apply the NCS 1004 stacking requirements if multiple chassis share the rack space.

   For more details, see Stacking NCS 1004.

4. Confirm NCS 1004 power and grounding requirements before installing powered components.

   For more details, see General power and grounding requirements.

5. Verify the NCS 1004 power supply type against the site power design.

   For more details, see Power supply.

The NCS 1004 chassis is installed and ready for module installation.

Install NCS 1004 controller and line cards

Use this procedure to use the Cisco NCS 1004 controller and line-card references before installing service cards. It helps you complete the related NCS 1000 platform workflow and verify the expected result.

Prepare and install the NCS 1004 controller and supported line-card hardware.

Use the line-card-specific references that match the hardware in the site bill of materials.

Before you begin

Install the NCS 1004 chassis.

Procedure

1. Review the NCS 1004 module installation sequence before inserting cards.

   For more details, see Install Cisco NCS 1004 modules.
2. Confirm that the controller card is supported for the NCS 1004 chassis.

   For more details, see Supported controller cards.
3. Install and secure the NCS 1004 controller card.

   For more details, see Install controller.
4. Identify the NCS 1004 line-card type required by the site bill of materials.

   For more details, see About line cards.
5. Use the 1.2T line-card requirements when the site includes a 1.2T card.

   For more details, see 1.2T line card.
6. Use the 1.2TL line-card requirements when the site includes a 1.2TL card.

   For more details, see 1.2TL line card.
7. Use the 2-QDD-C line-card requirements when the site includes a 2-QDD-C card.

   For more details, see 2-QDD-C line card.
8. Use the OTN-XP line-card requirements when the site includes an OTN-XP card.

   For more details, see OTN-XP line card.
9. Use the QXP-K9 line-card requirements when the site includes a QXP-K9 card.

   For more details, see QXP-K9 line card.

The NCS 1004 controller and line-card references are complete for the installed hardware.

Install NCS 1004 field-replaceable units and fiber management

Use this procedure to use the Cisco NCS 1004 procedures for line-card installation, FRUs, pluggables, air filters, and fiber management. It helps you complete the related NCS 1000 platform workflow and verify the expected result.

Complete NCS 1004 module, field-replaceable unit, pluggable, air-filter, and fiber-management installation.

Use the fiber-management procedure that matches the installed line-card type.

Before you begin

Install the NCS 1004 chassis and identify the installed line-card type.

Procedure

1. Insert and secure the selected NCS 1004 line card in the assigned slot.

   For more details, see Install line card.

2. Install the NCS 1004 power supply in the assigned slot.

   For more details, see Install power supply.

3. Install the fan unit and confirm it is fully seated.

   For more details, see Install fan unit.

4. Attach the fiber management bracket before routing fibers to the line cards.

   For more details, see Attach fiber management bracket.

5. Adjust fiber management for installed 1.2T, 1.2TL, 2-QDD-C, or QXP-K9 line cards.

   For more details, see Adjust fiber management bracket of the 1.2T, 1.2TL, 2-QDD-C, and QXP-K9 line cards.

6. Adjust fiber management for an installed OTN-XP line card.

   For more details, see Adjust fiber management bracket of the OTN-XP line card.

7. Install the required pluggables in the NCS 1004 ports.

   For more details, see Install pluggables.

8. Confirm the NCS 1004 air-filter requirements for the installed chassis.

   For more details, see Air filter.

9. Install the NCS 1004 air filter.

   For more details, see Install air filter.

The NCS 1004 field-replaceable units, pluggables, air filter, and fiber-management hardware are installed.

Connect NCS 1004 power and complete passive connections

Use this procedure to use the Cisco NCS 1004 power procedures and CONP reports to complete final power, fiber, and passive connections. It helps you complete the related NCS 1000 platform workflow and verify the expected result.

Complete NCS 1004 power connections and final OAS fiber and passive connections.

Before you begin

Install the required NCS 1004 modules and review the CONP design output for site passive connections.

Procedure

1. Connect the NCS 1004 chassis to the approved DC power source when the site uses DC feeds.

   For more details, see Connect DC power to NCS 1004.

2. Connect the NCS 1004 chassis to the approved AC power source when the site uses AC feeds.

For more details, see Connect AC power to NCS 1004.

3. Use the CONP NFV and connection reports to complete passive and fiber connections.

   For more details, see Review the CONP NFV and connection reports.

NCS 1004 power and final site passive connections are complete.

What to do next

Proceed to day-0 configuration for each node.

NCS 1001 setup and initial configuration

Prepare Cisco NCS 1001 for operation by completing bootup, Day 0 configuration, and validation.

Cisco NCS 1001 setup includes booting the chassis, configuring management and OSC interfaces, enabling SSH and NETCONF, configuring routes, and validating access before Cisco Optical Site Manager onboarding.

Bringup approaches

Cisco NCS 1001 supports manual bringup and Zero Touch Provisioning (ZTP). Use the manual approach unless your deployment has an approved ZTP process.

Boot Cisco NCS 1001

Use this task to boot Cisco NCS 1001 and verify that the running version matches the boot image.

Boot the Cisco NCS 1001 chassis after hardware installation so that it is ready for Day 0 configuration.

Before you begin

Install the Cisco NCS 1001 hardware and ensure that you can access the XR console port.

Procedure

---

1. Connect to the XR console port and power on the Cisco NCS 1001 system.
2. Allow the system to complete the boot process using the preinstalled operating system image.

   If a preinstalled image is not available, use one of these boot methods:

   - Boot Cisco NCS 1001 using a USB drive
   - Boot using iPXE
   - Boot Cisco NCS 1001 using a Golden ISO

3. After the boot operation completes, reload Cisco NCS 1001.
4. Verify the running software version using the **show version** command.

Example

```
RP/0/RP0/CPU0:ios# show version
Fri Aug 10 10:38:09.569 CEST
Cisco IOS XR Software, Version 7.0.1
Copyright (c) 2013-2019 by Cisco Systems, Inc.
```

```
Build Information:
Built By     : ahoang
Built On     : Wed Jul 31 16:21:34 PDT 2025
Built Host   : iox-ucs-023
Workspace    : /auto/iox-ucs-023-san2/prod/7.0.1.147I.SIT_IMAGE/ncs1001/ws
Version      : 7.0.1.147I
Location     : /opt/cisco/XR/packages/
```

5. Compare the displayed version with the boot image version and verify that the versions match.

Cisco NCS 1001 is booted with the expected software version.

Configure NCS 1000 day-0 settings

Use this procedure for day-0 configuration of NCS 1014, NCS 1004, and NCS 1001 using the sub tasks for manual bring-up and NTP server configuration.

Prepare NCS 1014, NCS 1004, and NCS 1001 for day-1 configuration and network onboarding by completing the day-0 sub tasks.

Repeat each task for every NCS 1014, NCS 1004, and NCS 1001 device that requires day-0 configuration.

Procedure

---

1. Complete the manual bring-up workflow.

   See Manually bring up NCS1000.

2. Configure NTP for time synchronization.

   See NTP server configuration.

Manually bring up Cisco NCS 1001

Use this task to configure Cisco NCS 1001 Day 0 settings for management access, OSC connectivity, SSH, NETCONF, static routes, and host keys.

Manual Day 0 bringup prepares NCS 1014, NCS 1004, and NCS 1001 for Cisco Optical Site Manager management and downstream Cisco Optical Network Controller onboarding.

Repeat this task for every NCS 1014, NCS 1004, and NCS 1001 device that requires manual day 0 bringup.

Before you begin

Follow these steps to manually bring up NCS 1014, NCS 1004, and NCS 1001.

Procedure

---

1. Connect to the node through the console port and set the root-system username and password when prompted.

   Example

```
Enter root-system username: <username>
Enter secret:
Enter secret again:
```

```
User Access Verification
Username: <username>
Password: <password>
```

2. Assign a hostname to the node.

   Example

```
RP/0/RP0/CPU0:ios# config
RP/0/RP0/CPU0:ios(config)# hostname onc-ncs1001-230-125
RP/0/RP0/CPU0:ios(config)# commit
RP/0/RP0/CPU0:ios(config)# end
```

3. View the IPv4 interface status on Cisco NCS 1001.

   Example

```
RP/0/RP0/CPU0:onc-ncs1001-230-125# show ipv4 interface brief
```

   Table 5: IPv4 interface status before configuration

Interface	IP address	Status	Protocol	VRF name
MgmtEth0/RP0/CPU0/0	unassigned	Down	Down	default
MgmtEth0/RP0/CPU0/1	unassigned	Down	Down	default
MgmtEth0/RP0/OSC1/0	unassigned	Down	Down	default
MgmtEth0/RP0/OSC2/0	unassigned	Down	Down	default
MgmtEth0/RP0/OSC3/0	unassigned	Down	Down	default

4. Configure the management interface and the required OSC interfaces.

   Configure **MgmtEth0/RP0/OSC1/0** and **MgmtEth0/RP0/OSC3/0** on Cisco NCS 1001 for inter-node connectivity and remote management connectivity. This configuration is not required for Cisco NCS 1014 or Cisco NCS 1004.

   Table 6: OSC IPv4 address configuration requirements

Node type	OSC interface IPv4 configuration required?	Purpose
Cisco NCS 1001	Yes	DHCP relay and remote management connectivity
Cisco NCS 1014 and Cisco NCS 1004 transponder shelves	No	-

   Example

```
RP/0/RP0/CPU0:onc-ncs1001-230-125# config
RP/0/RP0/CPU0:onc-ncs1001-230-125(config)# interface MgmtEth0/RP0/CPU0/0
RP/0/RP0/CPU0:onc-ncs1001-230-125(config-if)# ipv4 address 10.58.230.125
255.255.252.0
RP/0/RP0/CPU0:onc-ncs1001-230-125(config-if)# commit
```

```
RP/0/RP0/CPU0:onc-ncs1001-230-125(config-if)# exit
RP/0/RP0/CPU0:onc-ncs1001-230-125(config)# interface MgmtEth0/RP0/OSC1/0
RP/0/RP0/CPU0:onc-ncs1001-230-125(config-if)# ipv4 address 10.0.1.125
255.255.255.0
RP/0/RP0/CPU0:onc-ncs1001-230-125(config-if)# interface MgmtEth0/RP0/OSC3/0
RP/0/RP0/CPU0:onc-ncs1001-230-125(config-if)# ipv4 address 10.0.3.125
255.255.255.0
RP/0/RP0/CPU0:onc-ncs1001-230-125(config-if)# commit
RP/0/RP0/CPU0:onc-ncs1001-230-125(config-if)# exit
```

5. Verify that the management and OSC interfaces are up.

   Example

   ```
   RP/0/RP0/CPU0:onc-ncs1001-230-125# show ipv4 interface brief
   ```

   Table 7: IPv4 interface status after configuration

Interface	IP address	Status	Protocol	VRF name
MgmtEth0/RP0/CPU0/0	10.58.230.125	Up	Up	default
MgmtEth0/RP0/CPU0/1	unassigned	Down	Down	default
MgmtEth0/RP0/OSC1/0	10.0.1.125	Up	Up	default
MgmtEth0/RP0/OSC2/0	unassigned	Down	Down	default
MgmtEth0/RP0/OSC3/0	10.0.3.125	Up	Up	default

6. Configure SSH on the node.

   Example

   ```
   RP/0/RP0/CPU0:onc-ncs1001-230-125# config
   RP/0/RP0/CPU0:onc-ncs1001-230-125(config)# ssh server rate-limit 600
   RP/0/RP0/CPU0:onc-ncs1001-230-125(config)# ssh server session-limit 110
   RP/0/RP0/CPU0:onc-ncs1001-230-125(config)# ssh server v2
   RP/0/RP0/CPU0:onc-ncs1001-230-125(config)# ssh server vrf default
   RP/0/RP0/CPU0:onc-ncs1001-230-125(config)# ssh server netconf vrf default
   RP/0/RP0/CPU0:onc-ncs1001-230-125(config)# commit
   ```

7. Configure NETCONF on the node.

   Example

   ```
   RP/0/RP0/CPU0:onc-ncs1001-230-125(config)# netconf agent tty
   RP/0/RP0/CPU0:onc-ncs1001-230-125(config-netconf-tty)# netconf-yang agent
   RP/0/RP0/CPU0:onc-ncs1001-230-125(config-ncy-agent)# ssh
   RP/0/RP0/CPU0:onc-ncs1001-230-125(config)# commit
   ```

8. Configure static routes for management reachability.

   Use the IP addresses and next hops from your site DCN plan. Add platform-specific routes, such as the extra Cisco NCS 1014 route, only when required by the deployment.

Example

```
RP/0/RP0/CPU0:onc-ncs1001-230-125# config
RP/0/RP0/CPU0:onc-ncs1001-230-125(config)# router static
RP/0/RP0/CPU0:onc-ncs1001-230-125(config-static)# address-family ipv4 unicast
RP/0/RP0/CPU0:onc-ncs1001-230-125(config-static-afi)# 0.0.0.0/0 10.58.228.1
RP/0/RP0/CPU0:onc-ncs1001-230-125(config-static-afi)# 10.58.251.0/24
10.58.253.1
RP/0/RP0/CPU0:onc-ncs1001-230-125(config-static-afi)# commit
```

9. Verify SSH connectivity to the node.

Example

```
$ ssh ncs1001@10.58.230.125
Password: <password>
RP/0/RP0/CPU0:onc-ncs1001-230-125#
```

10. Verify that the node has one of these host keys.

The key list must include one of these key types: ECDSA General Curve Nistp256, ECDSA General Curve Nistp521, ECDSA General Curve Nistp384, or ssh-rsa.

Example
These example show how to configure an ECDSA or RSA host key.

```
RP/0/RP0/CPU0:onc-ncs1001-230-125# show crypto key mypubkey ecdsa
Key label: the_default
Type: ECDSA General Curve Nistp256
Degree: 256

RP/0/RP0/CPU0:onc-ncs1001-230-125# show crypto key mypubkey rsa
Key label: the_default
Type: RSA General purpose
Size: 2048
```

11. If a supported key is not available, generate an ECDSA key.

Example

```
RP/0/RP0/CPU0:onc-ncs1001-230-125# crypto key generate ecdsa nistp256
```

A supported host key is required so that Cisco Optical Site Manager can manage Cisco NCS 1001 for synchronization and file transfer operations.

Cisco NCS 1001 has the required Day 0 configuration for Cisco Optical Site Manager management.

NTP server configuration

Use this procedure to NTP and verify external reference clock status. It helps you complete the related NCS 1000 platform workflow and verify the expected result.

NTP uses the User Datagram Protocol(UDP) as its transport protocol. All NTP communication uses Coordinated Universal Time(UTC). An NTP network usually receives its time from an authoritative time source, such as a radio clock or an atomic clock attached to a time server. NTP distributes this time across the network.

An NTP broadcast client listens for broadcast messages sent by an NTP broadcast server at a designated IPv4 address. The client synchronizes the local clock using the first received broadcast message.

Below are the steps for NTP configuration:

Procedure

1. Synchronize Clock with NTP Server
2. Verify the Status of the External Reference Clock:
   a) Run the **show running-config ntp** command to verify the running NTP configuration.

      Example

      ```
      RP/0/RP0/CPU0:ios#show running-config ntp
      ```

   b) Run the **show ntp associations** command to verify NTP synchronization status.

      Example

      ```
      RP/0/RP0/CPU0:ios#show ntp associations
      Sun Nov 5 15:14:44.128 UTC

      address ref clock st when poll reach delay offset disp
      *~192.0.2.1 198.51.100.1 2 81 128 377 1.84 7.802 2.129
      * sys_peer, # selected, + candidate, - outlayer, x falseticker, ~ configured
      ```

What to do next
Troubleshoot NTP Issues

Configure NCS 1001 protection and amplifier settings

Use this task to manually configure and validate the protection and amplifier setttings in Cisco NCS 1001.

Complete the required Cisco NCS 1001 configuration tasks in the specified order.

Procedure

1. Configure PSM section protection on Cisco NCS 1001.
2. Configure amplifier safety-control mode on Cisco NCS 1001.
3. Configure amplifier remote-node settings on Cisco NCS 1001.
4. (Optional)Validate manual Day 1 configuration on Cisco NCS 1001.

Cisco NCS 1001 is configured and validated for protection and amplifier settings.

Configure PSM section protection on Cisco NCS 1001

Use this task to configure the Cisco NCS 1001 PSM card in section-protection mode.

PSM section protection enables the protected point-to-point design to use working and protect paths.

Before you begin

Follow these steps to configure PSM section protection.

Procedure

1. Configure slot 2 for PSM section protection.

   Example

```
RP/0/RP0/CPU0:onc-ncs1001-230-125# config
RP/0/RP0/CPU0:onc-ncs1001-230-125(config)# hw-module location 0/RP0/CPU0 slot
 2
RP/0/RP0/CPU0:onc-ncs1001-230-125(config-config params)# psm section-protection
RP/0/RP0/CPU0:onc-ncs1001-230-125(config-config params)# commit
```

2. Verify the PSM configuration.

   Example

```
RP/0/RP0/CPU0:onc-ncs1001-230-125# show running-config hw-module location
0/RP0/CPU0 slot 2
hw-module location 0/RP0/CPU0 slot 2
 psm primary-path WORKING
 psm section-protection
```

The PSM card is configured in section-protection mode.

Configure amplifier safety-control mode on Cisco NCS 1001

Use this task to configure amplifier safety-control mode on the OTS controllers required by the protected point-to-point design.

Configure the amplifier safety-control mode manually when the protected point-to-point design requires this setting.

> ⚠ **Caution**
>
> Change amplifier safety-control settings only when required by the approved design and maintenance procedure.

Before you begin

Follow these steps to configure amplifier safety-control mode.

Procedure

Disable safety-control mode on the required OTS controllers.

Example

```
RP/0/RP0/CPU0:onc-ncs1001-230-125# configure
RP/0/RP0/CPU0:onc-ncs1001-230-125(config)# controller ots 0/1/0/0
```

```
safety-control-mode disable
RP/0/RP0/CPU0:onc-ncs1001-230-125(config)# controller ots 0/3/0/0
safety-control-mode disable
RP/0/RP0/CPU0:onc-ncs1001-230-125(config)# commit
```

The OTS controller safety-control mode is configured for the protected point-to-point design.

Configure amplifier remote-node settings on Cisco NCS 1001

Use this task to verify and configure amplifier span-loss and remote-node settings for Cisco NCS 1001 slots.

Amplifier remote-node settings identify the local and remote OSC interfaces used for span-loss and amplifier coordination.

Before you begin

Follow these steps to configure amplifier remote-node settings.

Procedure

1. Verify the existing hardware-module configuration.

   Example

   ```
   RP/0/RP0/CPU0:onc-ncs1001-230-125# show running-config hw-module location
   0/RP0/CPU0 slot
   ```

2. Confirm that **ampli span-loss** and **ampli remote-node** are configured on slot 1 and slot 3.

   Example

   ```
   hw-module location 0/RP0/CPU0 slot 1
    ampli flex-mode
    ampli span-loss
    ampli grid-mode gridless
    ampli node-type TERM
    ampli remote-node local-ipv4 10.0.1.125 remote-ipv4 10.0.1.145 remote-slot-id
    1
   !
   hw-module location 0/RP0/CPU0 slot 3
    ampli flex-mode
    ampli span-loss
    ampli grid-mode gridless
    ampli node-type TERM
    ampli remote-node local-ipv4 10.0.3.125 remote-ipv4 10.0.3.145 remote-slot-id
    3
   ```

Amplifier span-loss and remote-node settings are configured on the required Cisco NCS 1001 slots.

Validate the Cisco NCS 1001 setup

Use this task to validate Cisco NCS 1001 after the initial setup and Day 0 configuration.

Confirm that licensing, software, and hardware are configured and operating as expected.

Perform these validation checks after the initial setup and Day 0 configuration and before starting Day 1 configuration.

Before you begin

Ensure that Cisco NCS 1001 is reachable and that the required management and OSC interfaces are up.

Procedure

1. Verify that Smart Licensing is configured and activated.

   Example

   ```
   RP/0/RP0/CPU0:ios# show license status
   ```

2. Perform the preliminary checks to verify the default setup.

   See Perform Preliminary Checks for detailed procedures.

3. Verify that the software and hardware components are operating as expected.

   Example

   ```
   RP/0/RP0/CPU0:ios# show version
   RP/0/RP0/CPU0:ios# admin
   sysadmin-vm:0_RP0# show platform
   sysadmin-vm:0_RP0# show platform detail
   sysadmin-vm:0_RP0# show inventory
   ```

Cisco NCS 1001 is validated and ready for Day 1 configuration.

Troubleshoot Cisco NCS 1001

Use these resources to troubleshoot Cisco NCS 1001 hardware and alarms.

Identify the appropriate Cisco NCS 1001 troubleshooting information based on the issue.

Use these troubleshooting resources:

- For hardware-related issues, see the Cisco NCS 1001 Troubleshooting Guide.
- For alarm-related issues, see Alarm Troubleshooting.

5 Manage Your Sites with Cisco Optical Site Manager

Topics:

- Cisco Optical Site Manager
- Cisco Optical Site Manager installation workflow
- Onboarding models for Cisco Optical Site Manager
- Outcome

Introduces Cisco Optical Site Manager workflows, including installation, activation, onboarding models, device synchronization, authentication, smart licensing, software maintenance updates, and troubleshooting.

Site management is the stage where Cisco Optical Site Manager is installed, activated, and prepared to manage NCS 1000 devices at an optical site.

Cisco Optical Site Manager

This section explains Cisco Optical Site Manager. Use it to understand the purpose, behavior, and dependencies that support the related Cisco Optical Site Manager workflow.

Cisco Optical Site Manager is a software application that aggregates NCS 1000 optical devices at a site, abstracts the site topology for controller or web UI access, and supports software-defined turn-up, operations, and maintenance.

Cisco Optical Site Manager runs on NCS 1000 controller cards. It can operate as a standalone local craft interface, integrate with Cisco Optical Network Controller, or provide an open NETCONF/YANG northbound interface for third-party controllers.

Cisco Optical Site Manager allows you to:

- Aggregate site-level optical devices under a single management view.
- View site topology, inventory, alarms, performance monitoring data, and mechanical layouts for chassis, cards, and passive devices.
- Use operations, administration, and maintenance functions such as connection verification, loopbacks, PRBS, OTDR, and threshold crossing alerts.
- Configure cards and modules for site-level operations.
- Manage NCS 1000 device topologies for standalone and high availability deployments.

Cisco Optical Network Controller can consume the site-level data streamed by Cisco Optical Site Manager and use it for network-level provisioning, monitoring, troubleshooting, topology views, and analytics.

Supported configurations

Understand how Cisco Optical Site Manager supports standalone and high availability deployments for managing Cisco NCS 1000 devices.

Select a supported Cisco Optical Site Manager deployment based on the host platforms, managed devices, and network topology.

For protected point-to-point configurations, Cisco Optical Site Manager supports these combinations in standalone and high availability configurations:

- Cisco NCS 1014 host managing Cisco NCS 1014, Cisco NCS 1004, and Cisco NCS 1001 devices.
- Cisco NCS 1004 host managing Cisco NCS 1004 and Cisco NCS 1001 devices from Release 25.4.1.
- Cisco NCS 1001 host managing up to two Cisco NCS 1001 devices from Release 25.4.1.

High availability

Cisco Optical Site Manager High Availability (HA) provides continuous management and operational resilience for Cisco optical devices. An HA deployment uses two Cisco Optical Site Manager instances, with one instance operating as Active and the other as Standby. If one instance fails, the other instance maintains uninterrupted device management.

For more details abour HA, see High availability for NCS 1000.

Deployment models for HA in Cisco Optical Site Manager

This section provides details about Deployment models for HA in Cisco Optical Site Manager. Use it to review facts, requirements, values, or operational notes that support the related Cisco Optical Site Manager workflow.

Cisco Optical Site Manager supports several deployment models for implementing high availability (HA), each with distinct configuration requirements, advantages, and dependencies on the Data Communication Network (DCN) architecture and local site availability. Each model:

- analyzes possible deployment scenarios, detailing device connections and configurations,
- covers routing protocols in use and information on any additional devices involved.

Cisco Optical Site Manager supports these deployment models:

- **Dual-homing deployment with devices connected to DCN:** This model involves connecting devices to the DCN using a dual-homing setup.
- **Single-homing deployment with devices connected to DCN:** This model utilizes a single-home connection for devices to the DCN.
- **Deployment with devices interconnected and managed remotely:** In this model, devices are interconnected and managed remotely through the Optical Service Channel (OSC).
- **Deployment with devices interconnected with redundancy and managed remotely:** This model extends the previous one by incorporating redundancy for devices interconnected and remotely managed via OSC.

For more information about HA deployment models, see Deployment models for HA in Cisco Optical Site Manager.

Cisco Optical Site Manager installation workflow

Learn how to install and configure Cisco Optical Site Manager on NCS 1000 platforms.

This workflow helps you install and configure Cisco Optical Site Manager. You will set up Cisco Optical Site Manager, configure it for standalone or high availability (HA) operation, manage interfaces, and activate the application as needed.

Before you begin

Verify that the installation requirements are met before proceeding. For details, see Prerequisites for devices managed by Cisco Optical Site Manager.

Perform these tasks to install and configure Cisco Optical Site Manager on NCS 1000 platforms.

Procedure

1. Install Cisco Optical Site Manager. For more details, see Install Cisco Optical Site Manager on NCS 1014 on page 48.
2. Configure Cisco Optical Site Manager in standalone or high availability mode. For more details, see Supported configurations.
3. Activate Cisco Optical Site Manager. For more details, see Activate Cisco Optical Site Manager on page 52.

Install Cisco Optical Site Manager on NCS 1014

Learn how to install Cisco Optical Site Manager on NCS 1014 platforms using IOS XR optional RPM packages. Use this procedure to add, activate, commit, and verify the software in synchronous mode before configuring standalone or high availability deployment.

Cisco Optical Site Manager can be installed on NCS 1014 platforms in these two ways:

1. As part of a Golden ISO (GISO) image where the Cisco Optical Site Manager package is already bundled with Cisco IOS XR image.

2. On NCS 1014 platforms where Cisco IOS XR is already installed, you can install Cisco Optical Site Manager as an optional software component.

In the second scenario, you must manually install the Cisco Optical Site Manager software using the provided *.rpm* files. You can download the Cisco Optical Site Manager software image from the Software Download page.

Table 8: Supported software packages and device management capacities for NCS 1014

Cisco Optical Site Manager hosting platform	Deployment guidance	Device management capacity
NCS 1014	At a site with NCS 1014 and NCS 1001 devices, use NCS 1014 as the Cisco Optical Site Manager host and NCS 1001 as the managed device.	Can manage NCS 1014, NCS 1004, and NCS 1001 devices.

Before you begin

- Before installing the Cisco Optical Site Manager RPM, verify whether the `xr-cosm` package is already active on the host device using comand `show install active | include xr-cosm`.

  If the command displays an active `xr-cosm` package, the Cisco Optical Site Manager RPM is already included in the installed GISO. Skip the RPM installation steps and proceed with Cisco Optical Site Manager configuration and activation. If the command does not display the package, install the Cisco Optical Site Manager RPM.

- Download and install the *NCS1010/NCS1020 and NCS1014 IOS XR Software optional-rpms* optional package from Software Download page.

Follow these steps to install Cisco Optical Site Manager:

Procedure

1. Copy all the *.rpm* files in the **cosm** folder of the downloaded package to the device storage.

```
RP/0/RP0/CPU0:vmxCisco_T1#mkdir /misc/disk1/cosm
RP/0/RP0/CPU0:vmxCisco_T1# scp user@[RPM_SERVER]:/nobackup/ncs1010_image/*.rpm
    /misc/disk1/cosm
Password: ********
```

2. Add the Cisco Optical Site Manager package source folder to the Cisco IOS XR software management system in synchronous mode using the **install package add source file:** *rpm-folder* **synchronous** command.

   Example

```
RP/0/RP0/CPU0:ios#install package add source file:/harddisk:/cosm/ synchronous
Install add operation 2.1.1 has started
```

   Installation in synchronous mode is optional and runs in the foreground and waits for the operation to complete before returning control to the user.

3. Install the Cisco Optical Site Manager RPM in synchronous mode using the **install package add** *package-name* **synchronous** command.

   Example

```
RP/0/RSP0/CPU0:ios#install package add xr-cosm synchronous
```

4. Apply the latest changes in synchronous mode on the NCS 1000 device using the **install apply restart synchronous** command.

   Example

   ```
   RP/0/RP0/CPU0:ios#install apply restart synchronous
   ```

5. Commit the changes using the **install commit synchronous** command.

   Example

   ```
   RP/0/RP0/CPU0:ios#install commit synchronous
   ```

6. Verify that Cisco Optical Site Manager rpm is installed using the **show install active | include xr-cosm** command.

   Example

   ```
   RP/0/RP0/CPU0:ios#show install active | include xr-cosm
   Fri Nov 14 11:07:17.877 UTC
   xr-cosm
   26.1.1v1.0.1-1
   ```

Cisco Optical Site Manager is installed on the device.

This example describe the commands to install Cisco Optical Site Manager:

```
RP/0/RP0/CPU0:ios#install package add source file:/harddisk:/cosm/ synchronous
RP/0/RSP0/CPU0:ios#install package add xr-cosm synchronous
RP/0/RP0/CPU0:ios#install apply restart synchronous
RP/0/RP0/CPU0:ios#install commit synchronous
RP/0/RP0/CPU0:ios#sh install active | include xr-cosm
Fri Nov 14 11:07:17.877 UTC
xr-cosm                                                    26.1.1v1.0.1-1
```

What to do next

Configure Cisco Optical Site Manager in Configure Cisco Optical Site Manager in standalone mode for NCS 1014 on page 50 or Cisco Optical Site Manager High Availability mode.

Configure Cisco Optical Site Manager in standalone mode for NCS 1014

Learn how to configure Cisco Optical Site Manager in standalone mode on NCS 1014. This procedure covers setting management interfaces, defining user credentials, enabling optional auto-onboarding, committing changes, and verifying the configuration.

Cisco Optical Site Manager can be configured in standalone mode on a single NCS 1014 device.

The configuration involves setting up Cisco Optical Site Manager interfaces, defining management interface parameters, and establishing user credentials for access.

Before you begin

- Except for the mandatory parameters described in this procedure, retain the default values for all other configuration parameters unless your deployment requires different values.

Follow these steps to configure Cisco Optical Site Manager in standalone mode:

Procedure

1. Enter into the IOS XR and COSM configuration mode using the **configure terminal** and **cosm** commands.

   Example

   ```
   RP/0/RP0/CPU0:ios#configure terminal
   RP/0/RSP0/CPU0:ios(config)# cosm
   ```

2. Configure the device interface through which Cisco Optical Site Manager can be accessed by using the **mgmt-interface-name MgmtEth** *R/S/I/P* command.

   Example

   ```
   RP/0/RP0/CPU0:ios(config-cosm)# mgmt-interface-name Loopback1
   ```

   This is the interface used to reach Cisco Optical Site Manager. This interface can be a physical interface or a loopback interface.

3. Configure the username using the **user-name** *user name* command.

   Example

   ```
   RP/0/RP0/CPU0:ios(config-cosm)# user-name cisco
   ```

4. Configure the password using the **user-password** *password* command.

   Example

   ```
   RP/0/RP0/CPU0:ios(config-cosm)# user-password ***
   ```

   Note

   The Cisco Optical Site Manager username and password can be the same as, or different from, the XR host device credentials. These credentials are saved in the Cisco Optical Site Manager application database and are not displayed in the XR show running-config output.

5. Commit the changes and exit the configuration modes using the **commit** and **end** commands.

   Example

   ```
   RP/0/RP0/CPU0:ios(config-cosm) commit
   RP/0/RP0/CPU0:ios(config-cosm) end
   ```

6. Verify the configuration using the **show running-config cosm** command.

Example
This example shows the standalone Cisco Optical Site Manager configuration.

```
RP/0/RP0/CPU0:ios#show running-config cosm
Fri Oct 18 12:53:47.056 UTC
cosm
 mgmt-interface-name Loopback1
!
```

The configured *user-name* and *user-password* are not displayed in the output of the **show running-config cosm** command.

Cisco Optical Site Manager is configured in the standalone mode.

Activate Cisco Optical Site Manager

Learn how to activate Cisco Optical Site Manager after completing configuration in standalone or high availability mode, verify activation status, and confirm required parameter consistency before enabling the application and accessing the GUI.

After configuration is complete, activate Cisco Optical Site Manager to enable the application.

After configuring Cisco Optical Site Manager in standalone or high availability mode, including setting management interfaces, and user credentials, the application remains inactive until explicitly activated.

Important

The configuration of interfaces used by Cisco Optical Site Manager should not be changed after activation.

Procedure

---

1. Activate Cisco Optical Site Manager using the **cosm activate** command.

   Example

   ```
   RP/0/RP0/CPU0:ios# cosm activate
   ```

2. Verify the status of the application using the **show cosm status** command.
   It may take a few minutes to activate Cisco Optical Site Manager.

- After activating, wait for few minutes before logging in to the Cisco Optical Site Manager GUI.
- Upon successful activation, the application transitions to an active state. Status commands display APP_ACTIVATED and ACTIVATED states.

This example shows the status of Cisco Optical Site Manager configured in standalone mode.

```
RP/0/RP0/CPU0:OLT-2#show cosm status
Fri Oct 18 13:06:09.862 UTCCOSM state: APP_ACTIVATED
AppMgr app state: ACTIVATED
AppMgr container state: RUNNING
Container status: Up 1 hours
```

```
Last error: No error
COSM version: 26.1.1.D0362
```

What to do next

- Login to Cisco Optical Site Manager
- Import a Cisco Optical Network Planner configuration file.

Onboarding models for Cisco Optical Site Manager

This section explains Onboarding models for Cisco Optical Site Manager. Use it to understand the purpose, behavior, and dependencies that support the related Cisco Optical Site Manager workflow.

Cisco Optical Site Manager supports two onboarding models that determine where device configuration originates.

- Configure the complete data path, including circuits, in Cisco IOS XR, and then onboard the device to Cisco Optical Site Manager.
- Perform day-0 configuration and prerequisites on NCS1001, and then push data path configuration from Cisco Optical Site Manager using Cisco Optical Network Planner initial installation parameters.

Import a Cisco Optical Network Planner configuration file

Use this procedure to import a Cisco Optical Network Planner configuration file. This task helps you complete the required configuration, verification, or management action in Cisco Optical Site Manager.

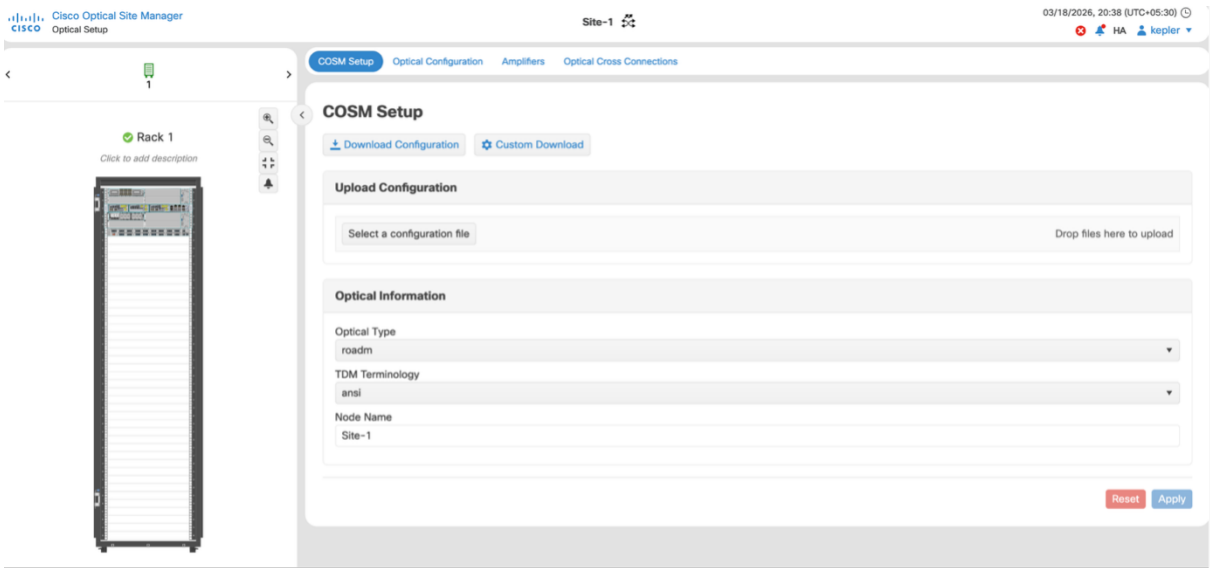
Use this task to import a Cisco Optical Network Planner NETCONF file (.xml) into Cisco Optical Site Manager to configure device parameters automatically.

If you have a NETCONF file (.xml) exported from Cisco Optical Network Planner (Cisco ONP), you can import it to Cisco Optical Site Manager. This file includes:

- Node, shelf, card type, and port information, including wavelength
- Pluggable Port Module (PPM), OTN, and FEC parameters
- Degree, IPC, and link-related information
- Fiber attributes and other network parameters

> **Note**
>
> While you will typically upload a Cisco ONP-generated file, there are cases where you must upload the 'golden XML' file provided to you.

Figure 10: Upload Configuration



Before you begin

Ensure that:

- The NETCONF file (.xml) contains these parameters available on Cisco Optical Site Manager:
  - device name
  - uid
  - rack id
  - chassis/passive unit id
- Ensure the Cisco Optical Site Manager site name (in the CONP XML file or any other location) does not contain the string *IP*. If this string appears in the site name, network discovery in Cisco Optical Network Controller does not work correctly.
- Cisco Optical Site Manager is newly activated with no devices added to it.
- The Cisco Optical Network Planner configuration file does not include any Optical Cross-Connects.
- Log into Cisco Optical Site Manager.

Procedure

1. Click **Optical Setup** in the left panel.
2. Click the **Node Setup** tab.
3. In the **Upload Configuration** section, click **Select a configuration file**.
   a) Navigate to the location where the NETCONF file (.xml) is present and select it.
   b) Click **Yes**.
   c) Click **Upload**.
   A confirmation message appears after the upload is complete.
4. Verify these configuration before adding a device:
   a) Click **Optical Setup**.
   b) In the **Optical Configuration** and **ANS Parameters** tabs, verify the successful configuration of CONP XML data onto the device.
      - The device node types must match TXP, OLT or ILA.

- Confirm that the physical cabling on the device matches the Cisco Optical Site Manager Node Functional View.
- Verify that the rack positioning, degree, IPC and NFV views are aligned with the designed network of Cisco Optical Network Planner.

What to do next

1. Verify that the file uploads without errors. If an error occurs, correct the file and upload it again.

   Note

   Partial uploads are not supported. Cisco Optical Site Manager uploads the complete configuration in a single operation. If the file contains an error, the entire configuration is rolled back.

2. Verify that the rack positioning, degree, IPC, and Node Functional View match the network designed in Cisco Optical Network Planner.

Prerequisites for devices managed by Cisco Optical Site Manager

This section provides details about Prerequisites for devices managed by Cisco Optical Site Manager.

Ensure that the devices meet the connectivity, SSH, NETCONF, cabling, and topology requirements before you manage them using Cisco Optical Site Manager.

Verify these prerequisites are met:

- Device reachability from the Cisco Optical Site Manager host device Cisco IOS XR Linux shell.
- SSH server is configured. Example settings include `ssh server rate-limit 600`, `ssh server session-limit 110`, `ssh server v2`, `ssh server vrf default`, and `ssh server netconf vrf default`.
- NETCONF YANG agent is configured with SSH enabled. For more details, see Enable NETCONF over SSH for secure host device communication on page 55.
- Confirm that the physical cabling on the device matches the Cisco Optical Site Manager Node Functional View.
- Verify that the rack positioning, degree, IPC and NFV views are aligned with the designed network of Cisco Optical Network Planner.

Enable NETCONF over SSH for secure host device communication

Learn how to enable NETCONF over SSH on host devices so that Cisco Optical Site Manager can securely connect for configuration and monitoring. Use this procedure to configure the required SSH settings and activate the NETCONF protocol.

Enable NETCONF over SSH so that Cisco Optical Site Manager can connect to host devices for configuration and monitoring. Enable NETCONF on each Cisco Optical Site Manager host device.

Before you begin

Follow these steps to enable NETCONF:

Procedure

1. Enter the configuration mode using the **configure terminal** command.

   Example

   ```
   RP/0/RP0/CPU0:ios#configure terminal
   ```

2. Enable NETCONF-YANG agent over SSH connection using the **netconf-yang agent ssh** command.

   Example

   ```
   RP/0/RSP0/CPU0:ios(config)# netconf-yang agent ssh
   ```

3. Configure the device to use SSH protocol v2 using the **ssh server v2** command.

   > **Note**
   >
   > Only SSH version 2 is supported.

   Example

   ```
   RP/0/RP0/CPU0:ios(config)# ssh server v2
   ```

4. Set the rate limit for incoming SSH connection requests to 600 per minute using the **ssh server rate-limit** *rate-limit* command.

   Example

   ```
   RP/0/RP0/CPU0:ios(config)# ssh server rate-limit 600
   ```

5. Set the SSH session limit to 110 using the **ssh server session-limit** *session-limit* command.

   Example

   ```
   RP/0/RP0/CPU0:ios(config)# ssh server session-limit 110
   ```

6. Enable SSH server access in the default VRF using the **ssh server vrf** *vrf-name* command.

   Example

   ```
   RP/0/RP0/CPU0:ios(config)# ssh server vrf default
   ```

7. Enable NETCONF over SSH in the default VRF using the **ssh server netconf vrf** *vrf-name* command.

   Example

   ```
   RP/0/RP0/CPU0:ios(config)# ssh server netconf vrf default
   ```

8. Enable NETCONF protocol over SSH connection using the **ssh server netconf** command.

Example

```
RP/0/RP0/CPU0:ios(config)# ssh server netconf
```

9. Commit the changes using the **commit** command.

After you enable NETCONF, Cisco Optical Site Manager can establish a secure communication with the device using the NETCONF protocol over SSH.

This example describes the commands to enable NETCONF over SSH on the host devices:

```
RP/0/RP0/CPU0:ios# configure terminal
                RP/0/RSP0/CPU0:ios(config)# netconf-yang agent ssh
                RP/0/RP0/CPU0:ios(config)# ssh server v2
                RP/0/RP0/CPU0:ios(config)# ssh server rate-limit 600
                RP/0/RP0/CPU0:ios(config)# ssh server session-limit 110
                RP/0/RP0/CPU0:ios(config)# ssh server vrf default
                RP/0/RP0/CPU0:ios(config)# ssh server netconf vrf default
                RP/0/RP0/CPU0:ios(config)# ssh server netconf
```

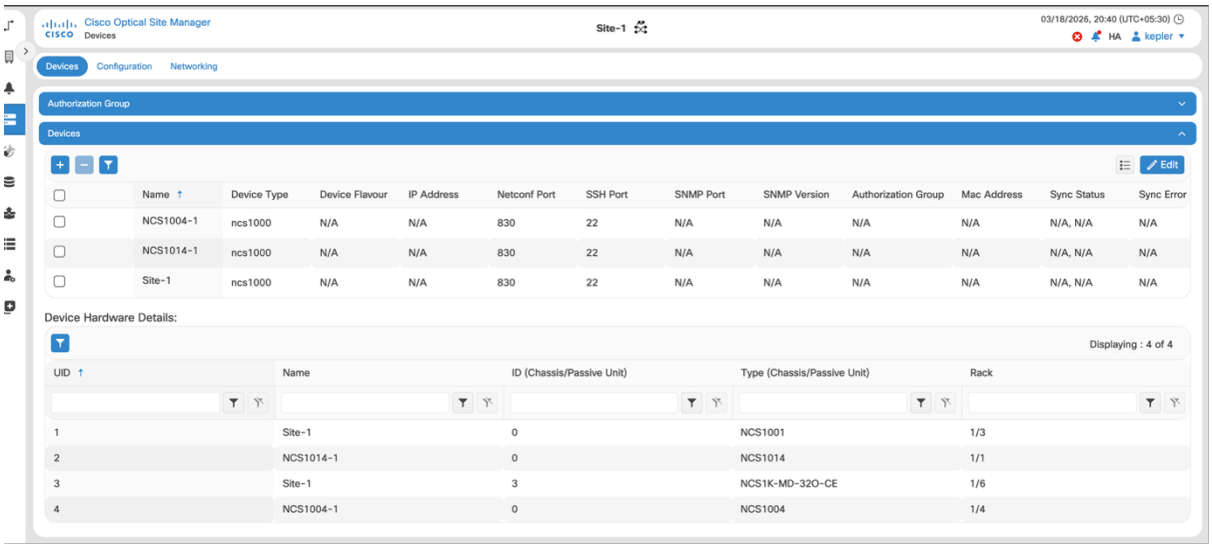
Synchronize devices in Cisco Optical Site Manager

Use this procedure to synchronize onboarded devices after XML import. It helps you complete the related Cisco Optical Site Manager workflow and verify the expected result.

Synchronization is essential for the effective management of devices by Cisco Optical Site Manager, ensuring accurate status, timely alarms, and proper operational visibility.

Complete this task after importing the Cisco Optical Network Planner XML.

Figure 11: Synchronize devices



Before you begin

- Edit one device at a time and wait for synchronization to complete before updating the next device.
- Devices are onboarded and reachable from the Cisco Optical Site Manager host.

Follow these steps to synchronize devices.

Procedure

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

   The **Device Configuration** page appears.

2. In the **Devices** area, click **Authorization Group** to expand it.

   The table lists all available authorization groups.

3. Click **Add Auth Group**.
4. Enter a name in **Authorization Group Name** and the device credentials in the **Remote Name** and **Remote Password** fields.
5. Click **Add**.

   The new authorization group is added to the table.

   > **Note**
   >
   > If the devices to be managed do not share same credentials, you must create additional authorization groups to match each unique credential set. This ensures that Cisco Optical Site Manager can authenticate and manage each device securely according to its configuration.

6. Expand the **Devices** section, then click **Edit**.
7. Update these fields of the device to be managed by Cisco Optical Site Manager.
   - **IP Address**
   - **Authorization Group**
   - **Device (XR) Netconf Port** (default 830)
   - **Device (XR) SSH Port** (default 22)

   > **Note**
   >
   > - Keep the Cisco Optical Site Manager NETCONF port and the device XR NETCONF port at their default values. If either port is required to be changed, ensure that the Cisco Optical Site Manager NETCONF port and the device XR NETCONF port use different values.

   Wait for sync status to complete for all the devices
8. Wait until the **Sync Status** of all the devices is *sync-completed, alarm-synchronized state*.
9. Verify physical connectivity to confirm that all cabling is correct and to prevent installation errors.

Devices are synchronized and ready for operational monitoring.

TACACS+ authentication

This section provides details about TACACS+ authentication. Use it to review facts, requirements, values, or operational notes that support the related Cisco Optical Site Manager workflow.

Use the Cisco Optical Site Manager configuration guide to configure TACACS authentication.

For details about TACACS authentication, see TACACS+ authentication.

Smart Licensing

This section provides details about Cisco Optical Site Manager smart licensing. Use it to review facts, requirements, values, or operational notes that support the related Cisco Optical Site Manager workflow.

Smart Licensing is a cloud-based, software license management solution that enables you to automate time-consuming, manual licensing tasks. The solution allows you to easily track the status of your license and software usage trends.

Cisco Optical Site Manager Smart Licensing is honor based, and license utilization is based on the number of active line cards managed by Cisco Optical Site Manager.

Supported Smart Licensing modes include:

- **Smart Transport:** Enables Cisco devices to send license usage information directly to Cisco Smart Software Manager (CSSM) over the internet.
- **CSLU:** Enables Cisco devices to send license usage information through Cisco Smart Licensing Utility (CSLU) without direct connectivity to CSSM.
- **Offline:** Enables Cisco devices to manage license usage locally without connectivity to CSSM.

For details about Smart Licensing, see Smart licensing for Cisco Optical Site Manager.

Troubleshooting

This section provides details about Cisco Optical Site Manager troubleshooting. Use it to review facts, requirements, values, or operational notes that support the related Cisco Optical Site Manager workflow.

Cisco Optical Site Manager diagnostics offer robust tools for troubleshooting issues by collecting and organizing operational data from your managed devices.

You can choose the applicable log types and devices and download the collected data as a ZIP file. Key features and capabilities include:

- **Customizable Log Selection:** You can choose specific log types and devices to tailor the diagnostic data to your troubleshooting needs.
- **Download Option:** All selected logs can be downloaded as a ZIP archive, simplifying data sharing.
- **Collected Data Types:**
  - Alarms
  - Audit logs
  - Operational conditions
  - Device inventory
  - Device diagnostics
- **Device Diagnostics:** When required, collect device diagnostics, including the `show tech` output and any additional device details, together with the Cisco Optical Site Manager diagnostics.

For more details about Cisco Optical Site Manager diagnostics, see Diagnostics.

Outcome

This section provides details about Cisco Optical Site Manager outcome. Use it to review facts, requirements, values, or operational notes that support the related Cisco Optical Site Manager workflow.

After completing this chapter, the node or Cisco Optical Site Manager is ready for Cisco Optical Network Controller onboarding. The Cisco Optical Site Manager instance IP addresses and credentials are available for Cisco Optical Network Controller onboarding and management.

6 Operate Your Network with Cisco Optical Network Controller

Topics:

- Cisco Optical Network Controller
- Install Cisco Optical Network Controller
- Operating Cisco Optical Network Controller
- Outcome

Describes Cisco Optical Network Controller operations, including installation, upgrades, node onboarding, user management, circuit provisioning, alarms, workspaces, PM history, logs, and troubleshooting.

Network operation is the stage where Cisco Optical Network Controller centralizes onboarding, service provisioning, monitoring, and troubleshooting after Cisco Optical Site Manager prepares the sites.

Cisco Optical Network Controller

This section explains Cisco Optical Network Controller. Use it to understand the purpose, behavior, and dependencies that support the related Cisco Optical Network Controller workflow.

Core capabilities

Cisco Optical Network Controller operates as a provisioning network controller for Cisco optical networks. The controller delivers these operational outcomes.

- Centralizes onboarding of Cisco Optical Site Manager nodes.
- Collects inventory and topology data from managed Cisco Optical Site Manager nodes.
- Creates and deletes optical circuits through the Service Manager application.
- Monitors topology changes and service updates.
- Unifies topology, alarm, and performance monitoring views.

Install Cisco Optical Network Controller

Use this procedure to download Cisco Optical Network Controller installation files, install the controller, and plan a geo-redundant deployment. It helps you complete the related Cisco Optical Network Controller workflow and verify the expected result.

The installation establishes the controller platform for user management, node onboarding, and circuit provisioning and monitoring.

Before you begin

- Verify that you have a Cisco account and a valid license agreement to download images.
- Identify whether this is a new deployment or a geo-redundant deployment.

Follow these steps to install Cisco Optical Network Controller.

Procedure

1. Download these installation files from Software Download.
   - Download the `.ova` image for a new installation.
   - Download the `.tar` system pack image for upgrading Cisco Optical Network Controller to a newer version.
   - Download the `.tar` service pack image for updating an existing Cisco Optical Network Controller installation with bug fixes and enhancements.

   For details about installation requirements, see Installation Requirements.
2. Install Cisco Optical Network Controller using the OVA workflow.
   a) Review the deployment prerequisites in the installation guide.
   b) Deploy the OVA in VMware vSphere and complete the installation wizard.

   For details about the OVA workflow, see Install Cisco Optical Network Controller in a standalone mode .
3. Plan for the installation and deployment of geo-redundant Cisco Optical Network Controller.
   a) Review Install and deploy geo-redundant Cisco Optical Network Controller.
   b) Review Upgrade a standalone deployment to a geo-redundant deployment.

For details about switching active and standby roles, see Perform a switchover in a geo-redundant Cisco Optical Network Controller deployment.

Cisco Optical Network Controller is installed and ready for the required deployment model.

Operating Cisco Optical Network Controller

This section describes operating Cisco Optical Network Controller. Use it to understand the sequence, dependencies, and expected outcome before you perform the related Cisco Optical Network Controller procedures.

The workflow assumes Cisco Optical Network Controller is installed and reachable in the management network.

Summary

The process outlines the steps for administrators and operators to create users, onboard Cisco Optical Site Manager nodes, validate the discovery process, and provision circuits.

Workflow

The stages outline the complete workflow for operating the Cisco Optical Network Controller. Each stage must be completed before the next one begins to prevent circuit provisioning errors.

1. Stage 1 – Log in with the administrator credentials created during installation and create users.
   - For details about login, see Log in to Cisco Optical Network Controller.
   - For details about creating users, see Create users in Cisco Optical Network Controller.
2. Stage 2 – Onboard Cisco Optical Site Manager by Adding nodes using the interface or bulk import with Excel.

   For details about onboarding, see Onboard Cisco Optical Site Manager nodes in Cisco Optical Network Controller.
3. Stage 3 – Validate topology and inventory.
   - Confirm Discovery Completed and Connected status for each node.
   - Review topology maps and site inventory views.

   For details about validation, see Validate Cisco Optical Site Manager inventory discovery and network topology.
4. Stage 4 – Create and monitor circuits.
   - Use Service Manager to provision optical channel circuits.
   - Monitor circuit status and alarms using the monitoring workspace.

   For details about provisioning, see Provision CPCE services.

Log in to Cisco Optical Network Controller

Use this procedure to log in to Cisco Optical Network Controller. The task helps you access the web UI before you perform configuration and monitoring tasks.

Use this procedure to log in to Cisco Optical Network Controller in Cisco Optical Network Controller. Complete this task when you need to configure, verify, or manage the related network operation.

> **Note**
>
> Cisco Optical Network Controller supports a maximum of 25 users to log in concurrently.

Follow these steps to log into Cisco Optical Network Controller:

Procedure

1. In the browser URL field, enter `https://<virtual-ip>:8443/`

   > **Note**
   >
   > **<virtual-ip>** refers to the IP address or hostname of your Cisco Optical Network Controller deployment.

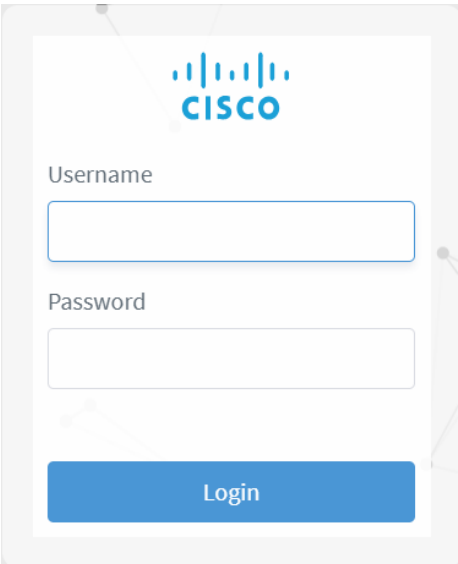
   The browser displays the login page.

2. Enter the username and password.

   Username and password are provided by your system administrator.

3. Click **Login**.

   Figure 12: Log into Cisco Optical Network Controller



The log in to Cisco Optical Network Controller task is complete.

Create users in Cisco Optical Network Controller

Use this procedure to add local users and assign roles after Cisco Optical Network Controller installation. It helps you complete the related Cisco Optical Network Controller workflow and verify the expected result.

Create a local user account in Cisco Optical Network Controller and define the user's credentials, permissions, and status.

After the initial installation, use the administrator credentials established during setup to complete this task. Cisco Optical Network Controller provides these role levels.

Table 9: User access permissions levels

Role	Permissions
Admin	No restrictions.
Supervisor	Similar to admin, but a supervisor user cannot perform user management and check logs.
Readonly	Can check data, but cannot provision resources.
Internal	Use this role during triage or troubleshooting to collect debug logs. We recommend using it only under the supervision of the Cisco Technical Assistance Center (TAC).

Before you begin

Before you begin:

- Confirm the virtual IP used by Cisco Optical Network Controller.
- Have the administrator username and password available.

Follow these steps to create users.

Procedure

1. From the Cisco Optical Network Controller home page click **Settings** .
2. From the panel list, select **Local Users** and click **Add** .
3. In the **Add User** screen, enter **Username**.
4. Enter and confirm the password.
5. Select the check box in the **Access Permissions** section to choose the access level for the user.
   For more details about permissions levels, see the Table 9: User access permissions levels on page 66 table.

   Figure 13: Local Users

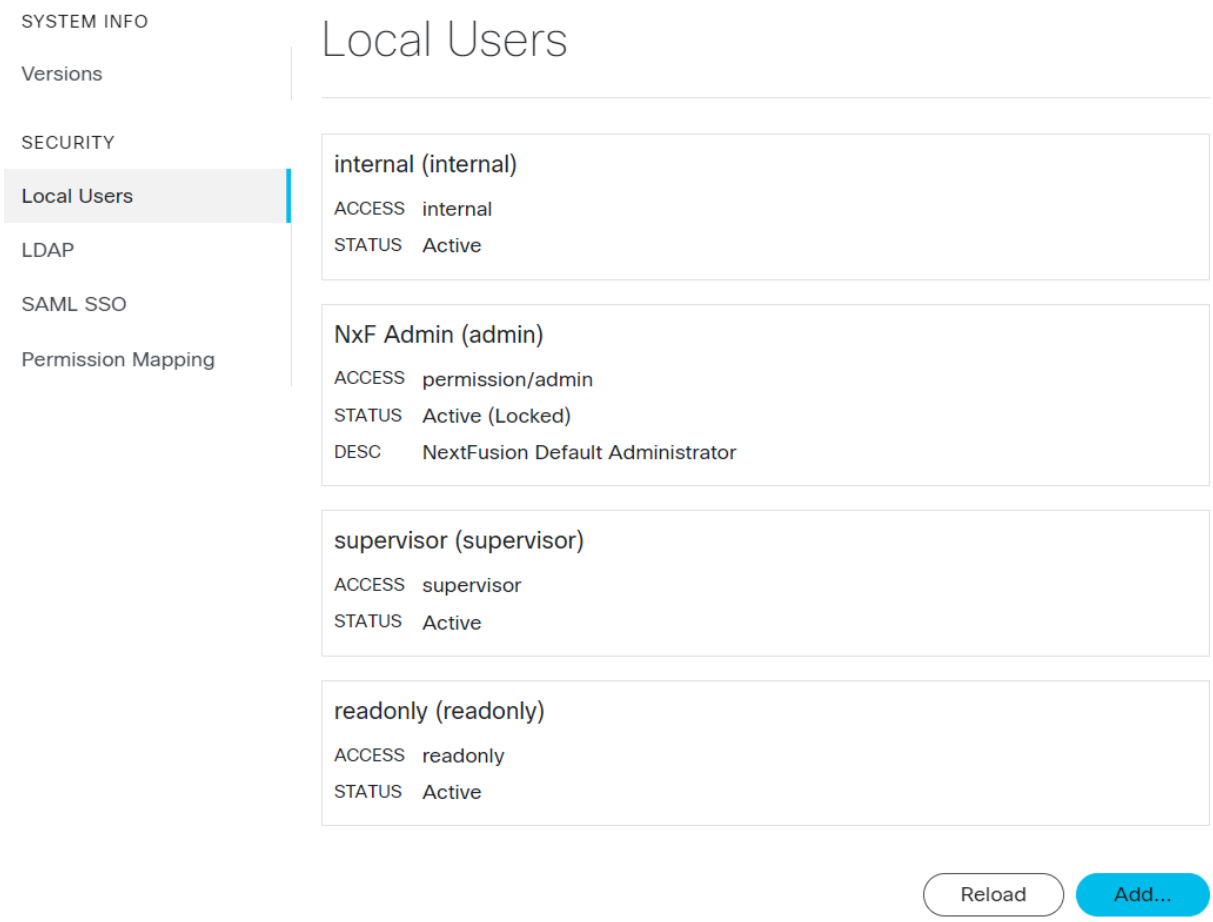
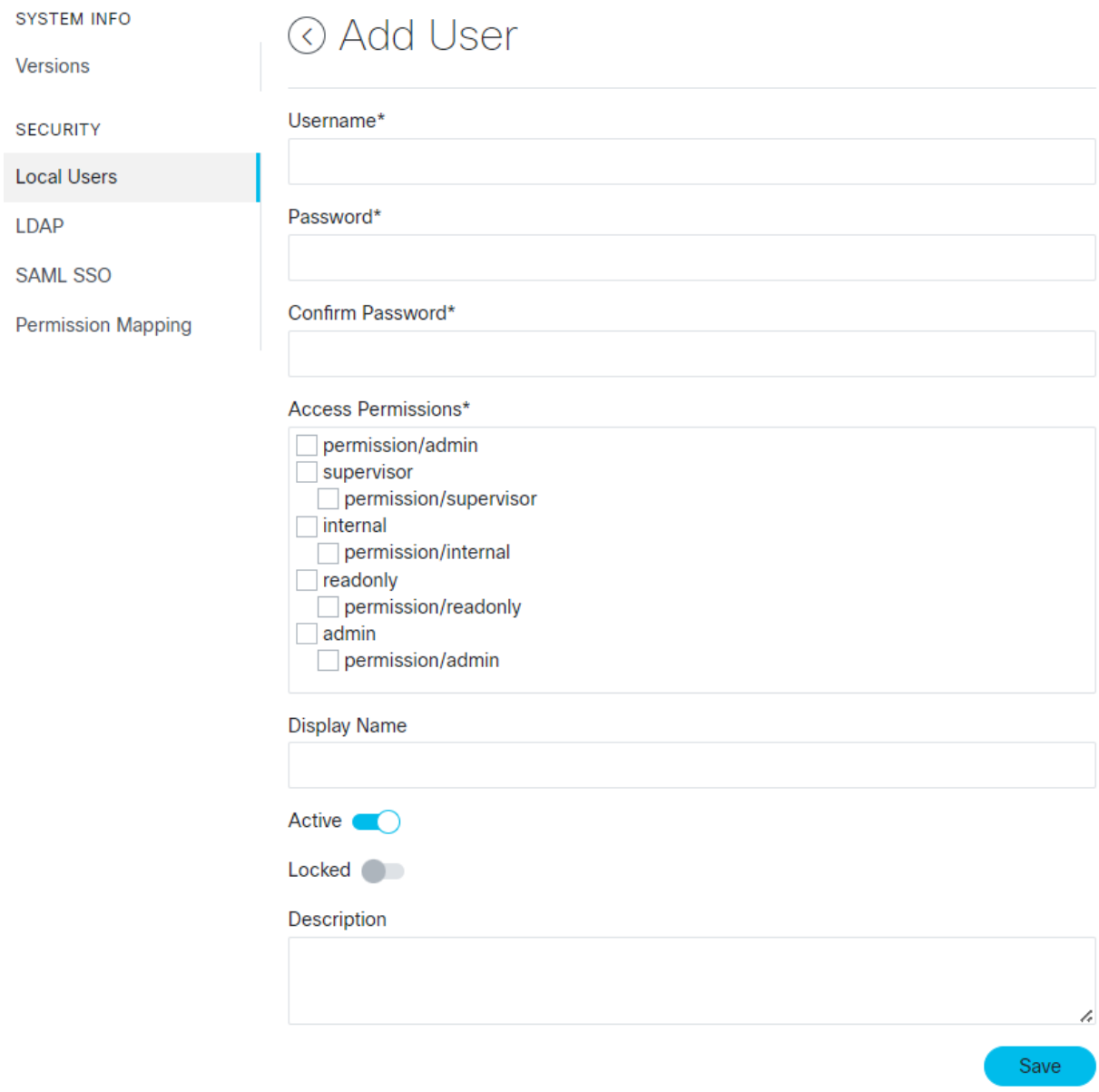


Figure 14: Add User



6. (Optional) Specify the **Description** and **Display Name**.
7. Configure the user status by selecting the radio buttons. These radio buttons function independently, allowing both to be either enabled or disabled simultaneously.

Button	Action
Active	Enable or disable user login to Cisco Optical Network Controller.
Locked	Enable or disable user deletion. When the lock is enabled, the user cannot be deleted. Disabling the lock allows the user to be deleted.

8. Click **Save**.

Local users are created for ongoing Cisco Optical Network Controller operations.

Onboard Cisco Optical Site Manager nodes in Cisco Optical Network Controller

Use this procedure to onboard Cisco Optical Site Manager nodes to Cisco Optical Network Controller. It helps you add nodes through the user interface or an Excel import workflow.

Onboarding Cisco Optical Site Manager nodes connects them to Cisco Optical Network Controller for discovery and provisioning. Only users with administrator or supervisor permissions can onboard nodes.

Before you begin

Log in to Cisco Optical Network Controller as an admin/supervisor user.

Follow any of these tasks to onboard Cisco Optical Site Manager nodes.

Procedure

1. Onboard a single node using the Cisco Optical Network Controller interface.

   For more details, see Onboard Cisco Optical Site Manager nodes using the Cisco Optical Network Controller.

2. Onboard multiple nodes using an Excel import.

   For more details, see Onboard Cisco Optical Site Manager nodes using Excel import.

Cisco Optical Site Manager nodes are onboarded and ready for discovery.

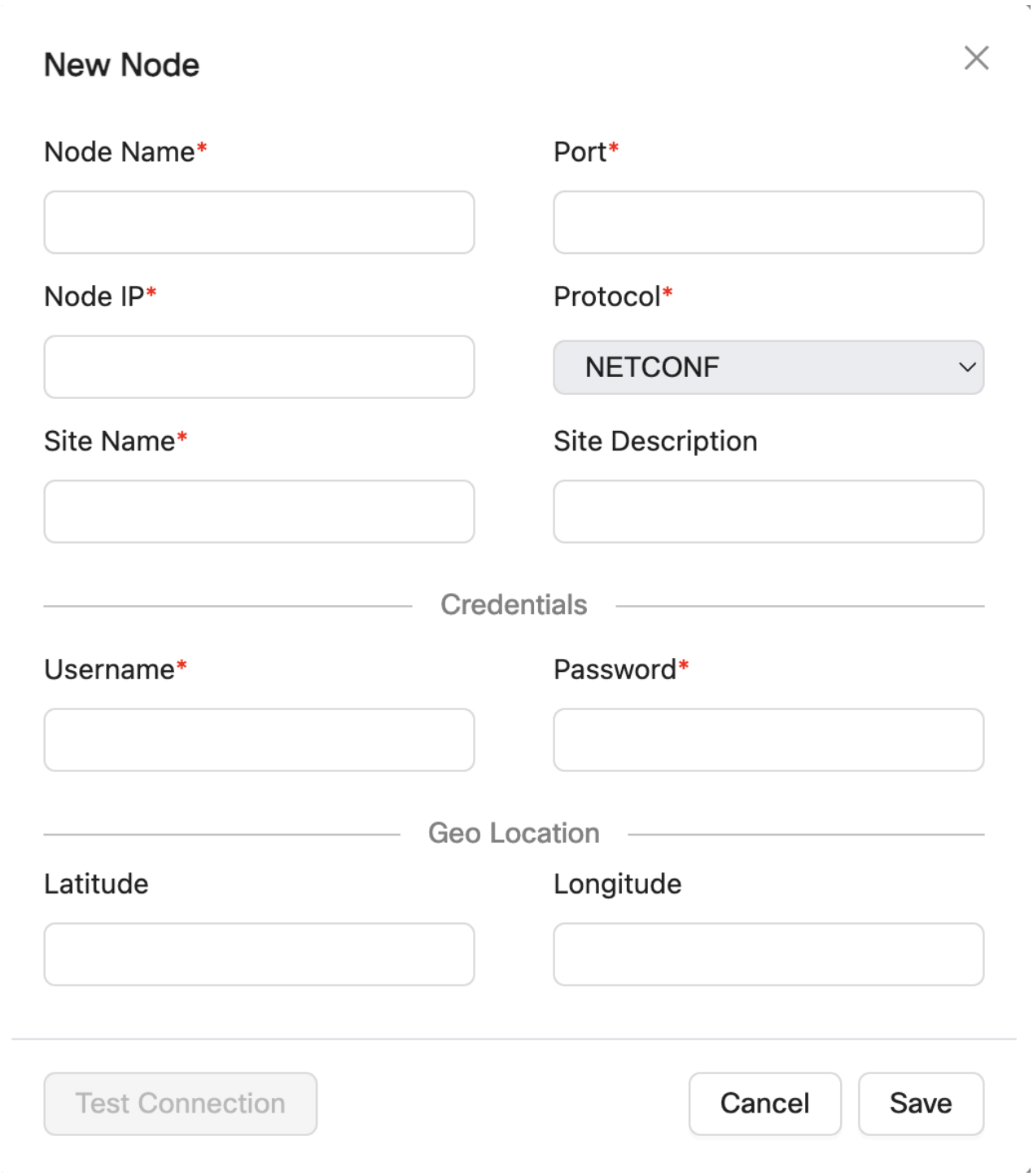
Add nodes on Cisco Optical Network Controller

Use this procedure to add nodes on Cisco Optical Network Controller. The task helps you onboard a single Cisco Optical Site Manager node with the required connection details.

Use this procedure to add nodes on Cisco Optical Network Controller in Cisco Optical Network Controller. Complete this task when you need to configure, verify, or manage the related network operation.

Use this task to add a single Cisco Optical Site Manager node.

Figure 15: Add New Node



Before you begin

Verify these before addding to Cisco Optical Network Controller:

- Verify the Cisco Optical Site Manager is reachable from Cisco Optical Network Controller server via DCN.
- NETCONF port is enabled on the Cisco Optical Site Manager. For more details, see Enable NETCONF over SSH.
- The COSM1K (NCS 1000 series) nodes must be added using port number 2022.
- You must add only fully configured nodes. All passives and patchcords must already be created before you add a node.

Follow these steps to add nodes on Cisco Optical Network Controller:

Procedure

1. Click **Nodes** in the left panel.
2. Click **New**.
3. In the **New Node** dialog box, enter the details necessary connect to the node.

   Ensure that you enter valid a username and password of the node to enable Cisco Optical Network Controller to connect to the node. For details about field descriptions, see the Table 10: Add new node field descriptions on page 72 table.

   > **Note**
   >
   > Use a Cisco Optical Site Manager administrator account to add and manage a Cisco Optical Site Manager node in Cisco Optical Network Controller. This account is required for onboarding and ongoing node operations, including performance monitoring collection, service provisioning and deletion, database backup and restore, and software download and activation. Other Cisco Optical Site Manager user roles are not supported for these operations.

4. To test connectivity from Cisco Optical Network Controller to a Cisco Optical Site Manager node, perform these steps:
   a) (Optional) Click **Test Connection** to test the connectivity to the node.

      > **Note**
      >
      > The **Test Connection** button is enabled only if the **Node Name**, **Port** and **Node IP** fields are filled.

      The **Test Connection** dialog opens for the selected node and shows the node name, node IP address, node port, connection status, and test duration..
   b) Click **Try Again** if you want to rerun the connection test.
   c) Click **Ping** if you want to verify node reachability from Cisco Optical Network Controller.

      The ping result shows the reachability status and test duration for the selected Cisco Optical Site Manager node.

5. Click **Save**.
   The new node is onboarded successfully and added to the **Nodes** table.

Cisco Optical Network Controller onboards the Cisco Optical Site Manager nodes.

Table 10: Add new node field descriptions

Field	Description	Mandatory
Node Name	Name of the new node you are adding. **Note** This name replaces the already configured Cisco Optical Site Manager node name.	Yes
Node IP	IP address of the new node which you are adding. **Note** Ensure that this IP does not overlap the Reserved internal IP addresses and subnets.	Yes
Port	The port number of the new node which you are adding.	Yes
Protocol	The protocol used for the new node which you are adding.	Yes
Site Name	The name of the site to which the new node belongs.	Yes

Field	Description	Mandatory
Username	The username for accessing the new node.	Yes **Note** Use an administrator account to add and manage a Cisco Optical Site Manager node in Cisco Optical Network Controller. This account is required for onboarding and ongoing node operations, including performance monitoring collection, service provisioning and deletion, database backup and restore, and software download and activation. Other Cisco Optical Site Manager user roles are not supported for these operations.
Password	The password for accessing the new node.	Yes
Site Description	The description of the site to which the new node belongs.	No
Latitude	The Latitude co-ordinate value that you want to assign for the new node to set its location on the map.	No
Longitude	The Longitude co-ordinate value that you want to assign for the new node to set its location on the map.	No

Import multiple nodes into Cisco Optical Network Controller

Use this procedure to import multiple nodes into Cisco Optical Network Controller. Cisco Optical Network Controller onboards nodes in batches.

Use this procedure to import multiple nodes into Cisco Optical Network Controller in Cisco Optical Network Controller. Complete this task when you need to configure, verify, or manage the related network operation.

Cisco Optical Network Controller onboards nodes in batches:

- XS profile: 2 nodes at a time
- S and M profiles: 3 nodes at a time

Follow these steps to import multiple nodes from any spreadsheet into Cisco Optical Network Controller.

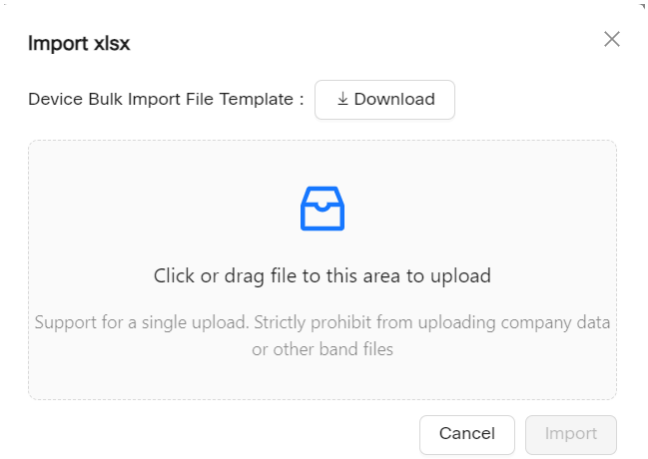
Before you begin

Follow these steps to import multiple nodes into Cisco Optical Network Controller:

Procedure

1. Click **Nodes** in the left panel.
2. Click **Import nodes** to import the nodes in bulk.
3. Click **Download** to download the node bulk import file template.
4. For each node you want to import, enter its information in the appropriate columns in the downloaded Excel sheet.
5. In the **Import xlsx** dialog box, select the Excel sheet.

Figure 16: Import nodes



	A	B	C	D	E	F	G	H	I	J	K
1	Node Name	Node IP	User Name	Password	Connectivity Type	Connectivity Port	Site Name	Site Description	Product Type	Latitude	Longitude
2	sampleDevice_1	10.00.00.99			NETCONF	2022	sampleSite_1	sample site description test	Cisco Optical Node		
3											
4											
5											
6											
7											
8											
9											

The sample bulk import template file includes these fields that you must fill out before importing the Excel sheet:

Table 11: Bulk Import File Template

Name	Description
Node Name	Name of the node Cisco Optical Site Manager node. **Note** This name replaces the already configured Cisco Optical Site Manager node name.
Node IP	The IP address of the node you are adding. **Note** Ensure that this IP does not overlap the Reserved internal IP addresses and subnets.
User Name	The username for accessing the new node. **Note** Use an administrator account to add and manage a Cisco Optical Site Manager node in Cisco Optical Network Controller. This account is required for onboarding and ongoing node operations, including performance monitoring collection, service provisioning and deletion, database backup and restore, and software download and activation. Other Cisco Optical Site Manager user roles are not supported for these operations.
Password	The password for accessing the new node.
Connectivity Type	The type of the protocol used for connecting the node. Default: NETCONF
Connectivity Port	The port number of the node. Port number 2022 for NCS 1000 series nodes.
Site Name	The name of the site to which the new node belongs.
Site Description	The description of the site to which the new node belongs.
Product Type	Set it as *Cisco Optical Node*.

Name	Description
Latitude	Specify the latitude co-ordinate value you want to assign to the new node to set its location on the map.
Longitude	Specify the longitude co-ordinate value you want to assign for the new node to set its location on the map.

After you upload the file, Cisco Optical Network Controller validates the entries and displays the message *Import in progress* while the nodes are being onboarded.

The new nodes are onboarded and added to the Nodes table. Wait until all nodes have completed onboarding.

Cisco Optical Network Controller nodes

Use this reference to understand how Cisco Optical Network Controller represents and manages devices as nodes.

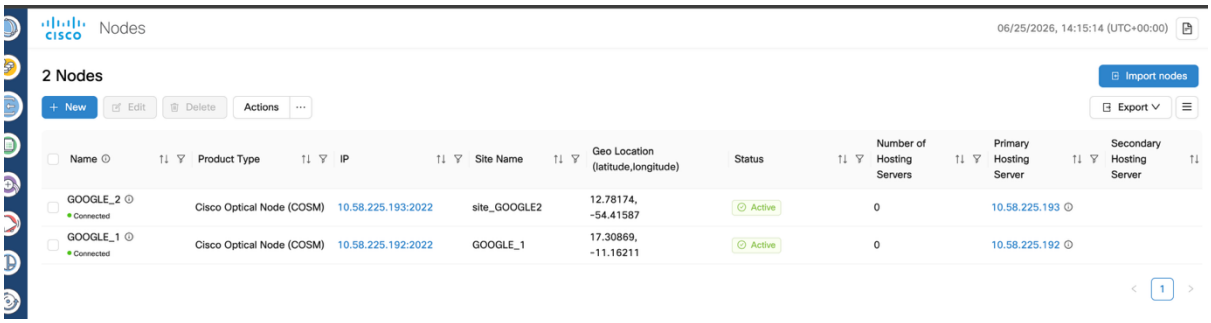
Cisco Optical Network Controller uses nodes to represent managed Cisco Optical Site Manager nodes in the network. Node information helps operators verify reachability, monitor synchronization state, validate onboarding, and troubleshoot connection issues.

Cisco Optical Network Controller nodes details

A node refers to a Cisco Optical Site Manager node in the network. You can add a single node or a set of nodes in the form of a batch at any given point in time.

Use the **Nodes** screen to view the details of each node.

Figure 17: Cisco Optical Network Controller nodes



Operators can use node actions to resynchronize nodes, reconnect nodes, test connectivity, and update network synchronization. These actions help keep Cisco Optical Network Controller aligned with the managed devices and Cisco Optical Site Manager instances.

For detailed information about nodes, see Cisco Optical Network Controller nodes.

Validate node discovery and network topology in Cisco Optical Network Controller

Use this procedure to confirm node discovery, topology visualization, and inventory visibility after onboarding. It helps you complete the related Cisco Optical Network Controller workflow and verify the expected result.

Validation confirms that Cisco Optical Network Controller is ready for service provisioning on all the onboarded Cisco Optical Site Manager nodes.

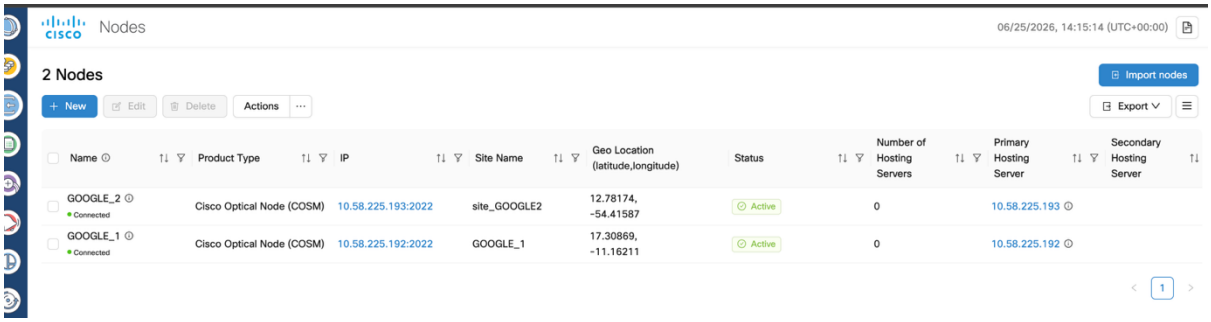
Run this task after Cisco Optical Site Manager node onboarding is complete.

Follow these steps to validate Cisco Optical Site Manager node discovery and network topology.

Procedure

1. Verify that the status of each onboarded Cisco Optical Site Manager node is active.

   Figure 18: Cisco Optical Network Controller node view



2. Verify that the **Status** column shows *Active* for the node listed in the **Name** column.

   Wait at least 60 seconds after discovery completes before sending TAPI requests.

3. Select **Topology** in the left panel to display nodes and links on the map.

   For details about topology review, see Topology in Cisco Optical Network Controller Configuration Guide.

4. Verify that all the expected nodes and connections appear in the **Topology** page.

   The topology view reflects the onboarded network.

5. Click **Inventory** in the left panel to verify the detailed inventory for the site.

   For details about inventory review, see Network Inventory in Cisco Optical Network Controller Configuration Guide.

   Cisco Optical Network Controller displays all inventory items for the selected site. Click a node to view its details.

Node discovery, network topology, and network inventory views are validated and ready for circuit provisioning.

Circuits

This section explains Circuits. Use it to understand the purpose, behavior, and dependencies that support the related Cisco Optical Network Controller workflow.

The Service Manager application in Cisco Optical Network Controller provides centralized management of network services, particularly circuits. Use **Service Manager** to visualize, provision, monitor, edit, and delete circuits.

Supported circuit types

Cisco Optical Network Controller supports these DWDM circuit types in both GMPLS and CPCE control planes:

- **OCH-NC**: Establishes connectivity between two optical nodes on a specified wavelength. The connection uses ports on multiplexer/demultiplexer and add/drop cards.
- **OCH-CC**: Extends the OCH-NC to create an optical connection from the source client port to the destination client port of the TXP/MXP cards. An OCH-CC circuit represents the end-to-end client service through the DWDM system.
- **OCH-Trail**: Transports OCH-CC circuits over the common trunk-to-trunk connection between transponder (TXP) or muxponder (MXP) line cards. When you create an OCH-CC between two TXP or MXP cards, Cisco Optical Network Controller automatically creates the corresponding OCH-Trail.

Provisioning behavior

A circuit represents an end-to-end connection and consists of an alternating series of cross-connections and link connections. The provisioning scope depends on the control plane:

- For CPCE circuits, Cisco Optical Network Controller makes configuration changes across multiple participating nodes.

The Provisioning Wizard collects the required circuit information in a step-by-step workflow and generates the required configuration for the participating nodes. On the final page, review the inputs, update service parameters if required, and deploy the configuration.

Deployment and validation

Cisco Optical Network Controller deploys configuration changes as an atomic transaction. It makes a best effort to complete all operations together or none of them. If configuration fails on any device during a multi-node operation, rollback restores the participating nodes to their state before provisioning was attempted.

After provisioning is complete, the circuit appears in the Service List table. The lifecycle state initially appears as **PLANNED** and changes to **INSTALLED** after the circuit is installed. Monitor provisioned circuits by using the Circuit Monitoring Workspace. For details, see Create CPCE services.

Review the circuit detailed path in Cisco Optical Network Controller

Use this task to review the detailed circuit path after provisioning an OCH-Trail or OCH-CC circuit.

The detailed path view helps you verify the provisioned circuit path before completing service validation.

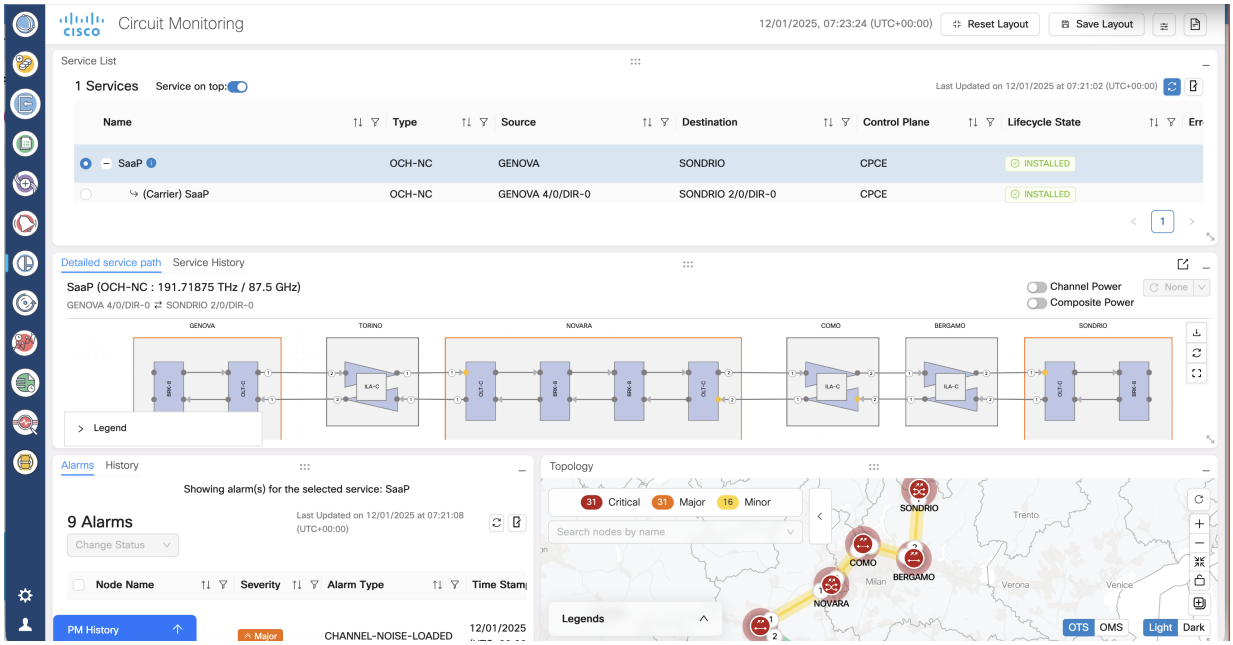
Before you begin

Follow these steps after the circuit is provisioned successfully.

Procedure

1. Click **Workspaces**, then click **Launch** in the **Circuit Monitoring** section.
2. Select the provisioned circuit.
3. Review the detailed path and verify that it matches the planned service path.

   Figure 19: Circuit detailed path



The provisioned circuit path is validated in Cisco Optical Network Controller.

Measure span loss in Cisco Optical Network Controller

Use this task to review span-loss measurement after Trail or CC circuit provisioning succeeds.

Span-loss measurement helps verify optical span behavior after the Trail or CC circuit is provisioned.

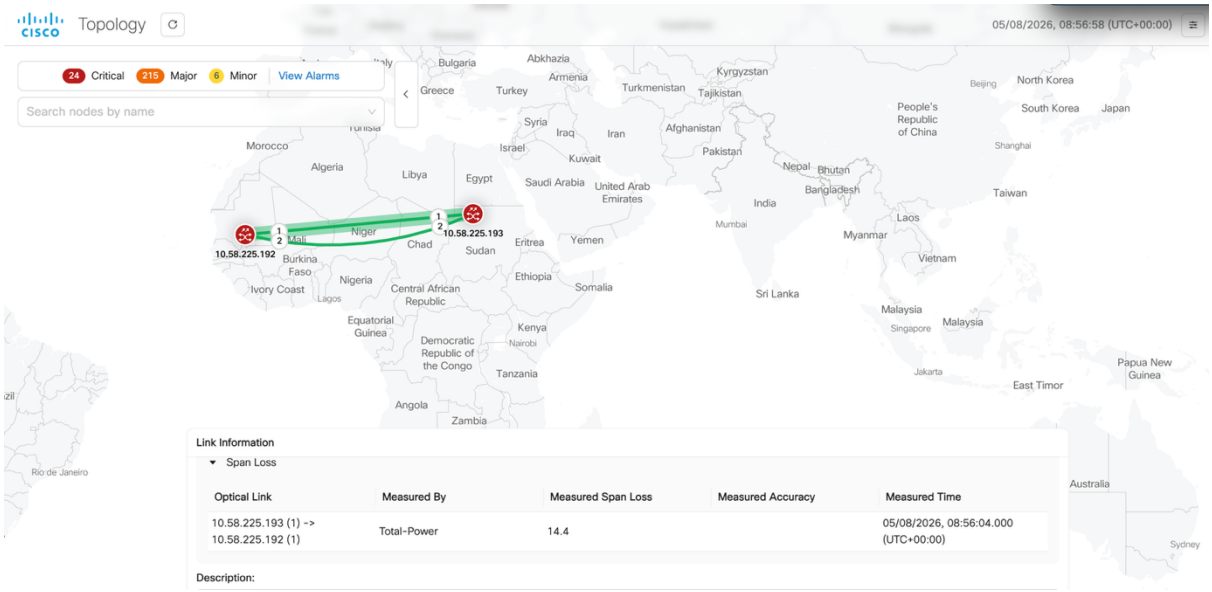
Before you begin

Provision the Trail or CC circuit successfully before reviewing span-loss measurement.

Procedure

1. Open Cisco Optical Network Controller and go to the circuit monitoring view for the provisioned Trail or CC circuit.
2. Review the span-loss measurement for the selected circuit.

Figure 20: Span loss



3. Verify that the span-loss value aligns with the expected optical design.

The span-loss measurement is available and validated for the provisioned circuit.

Cisco Optical Network Controller alarms

This section provides details about Cisco Optical Network Controller alarms. Use it to review facts, requirements, values, or operational notes that support the related Cisco Optical Network Controller workflow.

Cisco Optical Network Controller alarms help monitor network conditions and support troubleshooting across managed nodes, circuits, and network resources. The Alarms application provides active and historical alarm information, including severity, affected object, service impact, acknowledgement status, user notes, and correlation details. You can use alarm information to:

You can use alarm information to:

- Review current and previous faults.
- Identify root-cause conditions through network-level alarm correlation.
- Forward selected alarms or events to external SNMP managers.

For more information, see Alarms and Alarms troubleshooting.

Cisco Optical Network Controller workspaces

This section provides details about Cisco Optical Network Controller workspaces. Use it to review facts, requirements, values, or operational notes that support the related Cisco Optical Network Controller workflow.

Workspaces combine information from multiple Cisco Optical Network Controller applications into a single view. They help users review related topology, alarm, service, link, and performance information without switching between separate applications.

The available workspaces support these monitoring and management views:

Workspace	Focus
Network Monitoring Workspace	Provides a network-level view of node status, alarms, links, and performance metrics. Alarm details are displayed based on the node or link selected in the topology.

Workspace	Focus
Circuit Monitoring Workspace	Provides a circuit-level view of the service path, associated alarms, restoration events, and performance history.
Link Monitoring Workspace	Provides a link-level view that integrates the links table, topology, alarms, PM history, and associated circuits. Selecting a link in the links list highlights it in topology, and selecting nodes or links in topology filters the links list.

Workspace panels are interactive and can include Alarms, Service List, Topology, Detailed Service Path, Links, and PM History views. Layout changes can be saved or reset, and contextual actions can cross-launch to related node, equipment, port, circuit, or link information.

For more information, see Workspaces.

Cisco Optical Network Controller PM history

This section provides details about Cisco Optical Network Controller PM history. Use it to review facts, requirements, values, or operational notes that support the related Cisco Optical Network Controller workflow.

The PM History application helps you view and generate performance monitoring reports for interfaces that are part of onboarded nodes. It is available in the **Network Monitoring** workspace for links and in the **Service Monitoring** workspace for circuits through the detailed service path.

PM History provides these capabilities:

- Collects PM data from onboarded Cisco Optical Site Manager nodes at 15-minute and 24-hour intervals.
- Displays PM data in tabular and graphical formats based on the selected node, interval, date and time range, interface type, port, and location.
- Generates historical PM reports for Cisco Optical Network Controller entities such as circuits or services, links, and ports.
- Retrieves older PM data from archived storage when the selected data is outside the active retention period.

For more information, see PM History.

Common failures and troubleshooting procedures for Cisco Optical Network Controller

This section provides details about Common failures and troubleshooting procedures for Cisco Optical Network Controller. Use it to review facts, requirements, values, or operational notes that support the related Cisco Optical Network Controller workflow.

This section lists common errors and their troubleshooting or workaround steps. If the issues persist after trying the suggested workarounds, contact Cisco TAC and collect a tech dump as described.

This section covers these Cisco Optical Network Controller troubleshooting areas:

- Installation failures
- Node addition, deletion, and resync operation failures
- Topology failures
- Circuit creation and deletion failures
- Alien import and PM failures

If the issues are still not resolved by the suggested workarounds contact Cisco TAC after collecting tech dump.

Figure 21:

Installation failure

This table lists common installation failures and provides troubleshooting steps for each issue.

Table 12: Installation Failure

Reason	Description/Details	Troubleshooting	Workaround/Remarks
CONC UI Login Failures	Unable to log in to CONC UI after installation	Check whether the admin password was created as part of the installation and entered correctly.	If no admin password was created during installation, create one and try logging in again.
VM Login Failures	Unable to SSH to VM – It will continue to ask for password	This can happen when keys are not matched or ed25519 is not used for key generation	For accessing SSH, ed25519 key is required. The ed25519 key is different from the RSA key. So, follow the steps in installation documents for SSH Key Generation. Ensure the public key specified during installation is matching with the private key used for login.
	SSH connection time out	This can happen if both northbound and eastbound are in same network	Keep northbound and eastbound in separate network
ONC pods not coming up as ready	Some ONC pods are in Init:ContainerStatusUnknown and few others in ImagePullBackOff status when running **kubectl get pods –A** command	Data Volume Size (GB) not mentioned correctly as per the VM Profile(XS, S, M) during installation [OR] No Disk Space (/data) available when running “df -h” command	Reinstall ONC – Configure data volume according to the VM profile during installation
	VM time is not in sync with NTP time	Verify that the VM’s time is synchronized with NTP after startup. 1. Run the **timedatectl status** command. 2. Verify these parameters in the command output: • System clock synchronized: yes • NTP service: active	Check if NTP is configured correctly and VM time is in sync with it Make sure the hardware clock (ESXi Host) is not far off the system time on all the nodes.
	DNS not configured properly or DNS server not reachable	Check if DNS server was mentioned correctly during installation and the mentions DNS servers are reachable	Configure DNS server properly during installation.

Node addition failure

The table outlines node addition failures and the steps to resolve them.

Table 13: Node Addition Failure

Reason	Description/Details	Troubleshooting	Workarounds/Remarks
Connection Failure	UI status – Disconnected	Check connectivity to the Node by – Check if the user provided details like Connectivity type, IP, Port, and node credentials are correctly mentioned in Cisco Optical Network Controller UI.	Correct the details provided in the Cisco Optical Network Controller UI.
		Check if Ping to the node is working	Check if the node is properly configured and has proper network configuration.
		Check if the Netconf connectivity to the node on the Netconf port is working.	Check if the Netconf and XR configuration is proper on the node
Collection Failure	UI status – Failed/Errored	Check the release on the NCS1010/COSM node.	COSM / NCS1010 should be running Supported Release versions. If the issue occurs even when the required software versions are present call TAC.

Node deletion failure

Use this table to identify node deletion failures and find troubleshooting guidance.

Table 14: Node Deletion Failure

Reason	Description/Details	Troubleshooting	Workarounds/Remarks
Node is part of a Circuit	UI status – Circuit/Service spanning over the node	This is expected Cisco Optical Network Controller behavior.	Delete the Circuit/Connectivity-service (via NBI) and then try Node deletion.
Collection In Progress	UI Status – Node cannot be deleted because Collection is in Progress	This is expected Cisco Optical Network Controller behavior.	Wait for the collection to be completed and then try node deletion.
Resync in Progress	UI status – Node cannot be deleted because Collection is in Progress	This is expected Cisco Optical Network Controller behavior.	Wait for the Resync to be completed and then try node deletion.

Reason	Description/Details	Troubleshooting	Workarounds/Remarks
Connectivity Check in Progress	UI status – Node cannot be deleted because Waiting for Connection	This is expected Cisco Optical Network Controller behavior.	Wait for the Resync/Recollection to be completed and then try node deletion.

Resync operation failure

This table lists common resync operation failures and provides troubleshooting steps for each issue.

Table 15: Resync Operation failure

Reason	Description/Details	Troubleshooting	Workaround/Remarks
Node not reachable	UI status – Node – Disconnected Status – Blank/Resync pending/Resync Failed	This is expected Cisco Optical Network Controller behavior.	Check if the node is properly configured and has proper network configuration. Check if the Netconf and XR configuration is proper on the COSM/NCS1010 node. Try Resync again Check the release on the SVO/NCS1010 node for compatibility with Cisco Optical Network Controller release.
Node credentials changed on the node	UI status – Node – Disconnected Status –Blank/Resync pending/Resync Failed	This is expected Cisco Optical Network Controller behavior.	Edit the node credentials via Optical Network Controller UI and click OK. Resync will happen automatically.

Topology failure

The table outlines topology failures and the steps to resolve them.

Table 16: Topology Failure

Reason	Description/Details	Troubleshooting	Workaround/Remarks
Lat and Long not mentioned for nodes in Import Excel/Add Node UI Dialog	Some of the nodes in Node table are not displayed in Topology	This is expected Cisco Optical Network Controller behavior.	When user enters topology, ONC will display “There are a few nodes without geographical coordinates. Please click on the pen icon to assign them manually.” User need to click Pen icon and drag the nodes to required location. Alternately the latitude and longitude can be edited in Nodes Page. Click Nodes in the left panel. Click EDIT after selecting the node from the table.
Links do not show up in ONC	Some of the links which are up in network might not show up in ONC topology view	Check if neighbours are shown correctly in COSM Web UI – Node Functional View and Neighbors are shown correctly in Optical Setup -> Optical Configuration	Correct COSM errors if any.

Circuit creation failure

Use this table to identify circuit creation failures and find troubleshooting guidance.

Table 17: Circuit Creation Failure

Reason	Description/Details	Troubleshooting	Workaround/Remarks
No Route Available	Cisco Optical Network Controller UI status – NA	No route can be found by the Path Computation Engine. Could be expected behavior.	Check the topology and the route for the currently created services.
Wrong SIP Selection	Cisco Optical Network Controller status – NA	SIP UUIDs are not proper	Check the list of available SIPs and supply only SIPs returned from the T-API topology-context fetched by the Hierarchical Controller from Optical Network Controller as part of the get call.
Node(s) not reachable	Cisco Optical Network Controller status – NA	Circuit will move to Pending-Removal lifecycle state.	Check the node reachability and fix it Delete the connectivity-service Recreate the connectivity-service.

Reason	Description/Details	Troubleshooting	Workaround/Remarks
Routing constraint is Invalid	Cisco Optical Network Controller status – NA	Could be due to invalid UUIDs provided in the connectivity-service request constraints.	Check the list of available constraints and supply only valid constraints.
Routing Constraint Not Feasible	Cisco Optical Network Controller status – NA	Could be expected behavior since a route may not be available meeting the Constraint provided.	Check the topology and the constraint provided.

Circuit deletion failure

This table lists common circuit deletion failures and provides troubleshooting steps for each issue.

Table 18: Circuit Deletion Failure

Reason	Description/Details	Troubleshooting	Workaround/Remarks
Circuit Deletion attempted before circuit creation is completed	Connectivity-service lifecycle-state is Planned and same service deletion is attempted.	This is expected behavior.	Wait till the circuit lifecycle-state is either Installed or Pending-removal.
Invalid Circuit ID	Invalid connectivity-service UUID is provided	This is expected behavior.	Connectivity-service should be of an existing connectivity-service in the T-API connectivity-context.

Alien import failure

The table outlines alien import failures and the steps to resolve them.

Table 19: Alien import failure

Reason	Description/Details	Troubleshooting	Workaround/Remarks
Alien file format is not proper	UI status – Request Failed	This is expected Cisco Optical Network Controller behavior.	Please check the file format. Cisco Optical Network Controller supports XML file format from Cisco Optical Network Planner only.

PM failure

Use this table to identify PM failures and find troubleshooting guidance.

Table 20: PM failure

Reason	Description/Details	Troubleshooting	Workaround/Remarks
Node Reachability	Cisco Optical Network Controller UI status – Node Status – Disconnected	This is expected Cisco Optical Network Controller behavior if the node is not reachable or the interface is not UP/Working on the node.	Check the node connectivity to the COSM node using Ping.
Node is onboarded recently	PM data is not shown for the node	This is expected Cisco Optical Network Controller behaviour – After the node is onboarded, it could take more than 15 min to show up 15 min PM data and 24 hours to show up 24 Hr PM data	Wait for the minimum duration (15 min or 24 Hr) for PM collection to start from ONC and show up in GUI

Cisco Optical Network Controller logs

This section provides details about Cisco Optical Network Controller logs. Use it to review facts, requirements, values, or operational notes that support the related Cisco Optical Network Controller workflow.

Logs help you track user and system activity, export audit information, review developer logs, schedule archived log collection, and collect diagnostic data for support.

The Logs application organizes log data into tabs so that operators can find, filter, export, and archive log information from a single location. The log enhancements provide organized log management, filtering, pagination, export options, retention and archiving, and access control for different user roles.

- **Audit**: Displays audit log entries with fields such as time, category, identifier, username, client IP, and message. Audit categories include system, node, inventory, topology, service, alarm, alien import, and site audit events.
- **Debug**: Displays developer logs with filter options such as namespace, microservice, container, log level, time range, and search.
- **Archives**: Provides access to archived audit logs and debug logs. Archived logs can be scheduled, downloaded, deleted, suspended, resumed, or modified based on operational requirements.
- **Tech Dump**: Collects diagnostic data bundles that include system information, logs, configuration files, and operational data for troubleshooting.

For more information, see Logs.

Generate and download tech dump logs

Use this procedure to generate and download tech dump logs. When you generate a tech dump, Cisco Optical Network Controller compiles logs, configuration files, and operational data into a single archive file.

Use this procedure to generate and download tech dump logs in Cisco Optical Network Controller. Complete this task when you need to configure, verify, or manage the related network operation.

When you generate a tech dump, Cisco Optical Network Controller compiles logs, configuration files, and operational data into a single archive file.

Before you begin

Ensure that there is sufficient space on the VM hosting the Cisco Optical Network Controller.

Follow these steps to generate and download the tech dump logs:

Procedure

1. Click **Logs**.
2. Click **Tech Dump** tab.

   For details about the field descriptions on this tab, see Table 21: Tech dump tab field descriptions on page 88.
3. Click the **Collect** button to initiate the log collection.
   A confirmation message appears, stating that starting a new log collection will delete the existing log file.
4. Click the **Collect the DB dump** check box if you also want to collect information about CONC databases.

   Note

   Selecting this check box does not collect any sensitive information, including device credentials.
5. Click **Collect** on the dialog box.

   Collected log files remain local to the current active VM. If a switchover occurs, these files are not available on the new active VM.

   Wait for the log collection to finish.
6. Click **Download** to download the logs or **Delete** to remove them.

   Warning

   Do not log out during the download, as it can cause the file download to fail.

A file named in the *tech_dump_<timestamp>.tar.gz* format is downloaded.

The **Tech Dump** tab displays these fields:

Table 21: Tech dump tab field descriptions

Field	Description
File Name	Displays the name of the generated tech-dump file, including timestamp and timezone.
Status	Shows the current state of the tech-dump file generation. A green check mark indicates successful completion.
File Size	Indicates the size of the generated tech-dump archive in MB.
Triggered By	Shows the user ID that triggered the tech-dump collection.
Triggered On	Shows the exact timestamp (date and time with timezone) when the tech-dump creation started.

Field	Description
Action	Provides available operations for the generated file: • Download: Download the collected logs. • Delete: Delete the collected logs. **Note** These options are not displayed when the log collection is in progress.

Cisco Optical Network Controller references

This section provides details about Cisco Optical Network Controller references. Use it to review facts, requirements, values, or operational notes that support the related Cisco Optical Network Controller workflow.

These references help operations teams monitor health and automate workflows.

Consult the following sources for operational workflows.

- For details about API usage, see Cisco Optical Network Controller APIs.
- For details about general configuration workflows, see Cisco Optical Network Controller Configuration guide.

Outcome

This section provides details about Cisco Optical Network Controller outcome. Use it to review facts, requirements, values, or operational notes that support the related Cisco Optical Network Controller workflow.

After completing this chapter, Cisco Optical Network Controller is installed, configured, and ready for network operations.

Cisco Optical Site Manager nodes are onboarded, optical circuits are provisioned, and operational workflows such as monitoring, alarms, PM history, and troubleshooting are available for ongoing management.

7 Import Your Live Network and Plan Future Expansion with Cisco Optical Network Planner

Topics:

- Import a live network into Cisco Optical Network Planner
- Collect troubleshooting data for live network import

Describes live network import into Cisco Optical Network Planner by using Cisco Optical Network Controller, including import preparation, live network data transfer, and troubleshooting data collection.

Live Network Import (LNI) is the final step after a network is created, where the deployed devices and their current configuration are imported into Cisco Optical Network Planner to reflect the actual state of the live network.

LNI is a network import capability that:

- Imports deployed optical networks into Cisco Optical Network Planner in real time
- Supports networks with NCS 1004, NCS 1014, and NCS 2000 nodes
- Provides a complete view of the deployed network after import

Import a live network into Cisco Optical Network Planner

Use this procedure to import a live network into Cisco Optical Network Planner. It helps you complete the related live network import workflow and verify the expected result.

Use this task to bring the live network topology into Cisco Optical Network Planner.

Importing the live network is the final step in the integration workflow.

Before you begin

Before you begin, gather the Cisco Optical Network Controller IP address and user credentials.

Follow these steps to import a live network into Cisco Optical Network Planner.

Procedure

1. In Cisco Optical Network Planner, choose **Import** > **Live**.
2. Enter the Cisco Optical Network Controller IP address and user credentials.
3. Complete the import wizard to start the live network import.

The imported network appears in Cisco Optical Network Planner and mirrors the Cisco Optical Network Controller topology.

Collect troubleshooting data for live network import

Use this procedure to collect troubleshooting data for live network import. It helps you complete the related live network import workflow and verify the expected result.

Use this task when you need to share live network import data with the engineering team.

Before you begin

Ensure that the live network import has completed or failed with an error.

Follow these steps to collect troubleshooting data for live network import.

Procedure

1. From Cisco Optical Network Planner, export and share the Cisco Optical Network Planner CPZ file for the network.

   For detailed steps about exporting, see Export the CPZ file.

2. Collect and share Cisco Optical Network Controller response data.
   a) Open this URL in any browser.

   ```
   https://<conc_server_IP>:8443/onc-osapi-gw-service/v1/network
   ```

   b) Save the raw data response to text file in JSON format.

8 Update Your Cisco Optical Automation Solution with Software Maintenance Updates

Topics:

- Cisco Optical Network Planner software maintenance update
- Cisco IOS XR and Cisco Optical Site Manager software maintenance update
- Install a Cisco Optical Network Controller service pack

Describes software maintenance update (SMU) procedures for Cisco NCS 1000 devices, Cisco Optical Network Controller, Cisco Optical Site Manager, and Cisco Optical Network Planner.

Cisco Optical Network Planner software maintenance update

This section provides details about Cisco Optical Network Planner software maintenance update. Use it to review facts, requirements, values, or operational notes that support the related Cisco Optical Network Planner workflow.

Use a Cisco Optical Network Planner software maintenance update (SMU) to keep the Cisco Optical Network Planner system current with fixes and enhancements for the installed release.

Before you install a Cisco Optical Network Planner SMU, review these points:

- The Cisco Optical Network Planner base release must already be installed on the Ubuntu server.
- The SMU package is installed by using the provided tar archive and installer script.
- After the installation completes, verify that the Cisco Optical Network Planner services are running.

For the installation procedure, see Install the SMU for Cisco Optical Network Planner.

Cisco IOS XR and Cisco Optical Site Manager software maintenance update

Use this reference to choose the software maintenance update installation method for Cisco IOS XR devices and Cisco Optical Site Manager hosts.

Select the installation method that matches the required fixes and the reload control needed for the maintenance window.

Software maintenance update overview

A software maintenance update (SMU) is a software patch that is installed on a Cisco IOS XR device. An SMU is built for a specific release, component, and platform, and is provided for urgent issues.

The Cisco Optical Site Manager image is bundled as a Cisco IOS XR RPM. Therefore, a Cisco Optical Site Manager SMU is delivered as a Cisco IOS XR SMU. A Cisco Optical Site Manager SMU is always a reload SMU.

In a Cisco Optical Site Manager high availability deployment, install the SMU on the standby device before installing it on the active device. For more details, see Install a Cisco Optical Site Manager SMU.

Installation method selection

Confirm the required SMU and installation method with the Cisco account team. This table helps you choose the workflow before you install the SMU.

Table 22: SMU installation method selection

If	Then
You need to install a Cisco IOS XR software image and selected SMUs in one operation.	Build a Golden ISO and use the **install replace** command from the Cisco IOS XR CLI. See Install software maintenance updates by using a Golden ISO.
You do not need control over reload timing.	Use the **install source** command. This method automatically applies the changes, including reload or restart actions as required, and reduces the number of commands needed for SMU installation without changing the entire image. See Install a software maintenance update by using the install source command.
You need to install multiple SMUs together and control reload timing.	Use the **install package add source** command. This method requires explicit apply and commit actions. See Install software maintenance updates by using the install package add source command.

Install software maintenance updates by using a Golden ISO

Use this procedure to install a Golden ISO that includes Cisco IOS XR software and selected software maintenance updates.

Install the Cisco IOS XR software image and selected SMUs in one operation by using a Golden ISO.

A Golden ISO (GISO) is a customized ISO that includes the standard base image with basic functional components, additional RPMs, SMUs, and configuration files. A Golden ISO upgrades the device to a version that has a predefined list of SMUs in a single operation.

Follow these steps to install SMUs by using a Golden ISO.

Procedure

1. Check the **md5sum** value of the downloaded Golden ISO.

   Example

   ```
   [syedsaah@vxr-sirius-04 Image]$ md5sum
   ncs1010-golden-x86_64-25.1.1-Feb27Drop2.iso
   44dcd5214add0314116d109918bb926f  ncs1010-golden-x86_64-25.1.1-Feb27Drop2.iso
   ```

2. Copy the image from the workspace or local directory to the node.

   Example

   ```
   [syedsaah@vxr-sirius-04 Image]$ scp ncs1010-golden-x86_64-25.1.1-Feb27Drop2.iso
    cisco@4.33.7.61:/harddisk:/
   Password:
   ncs1010-golden-x86_64-25.1.1-Feb27Drop2.iso
                                 100% 2497MB  85.5MB/s   00:29
   ```

3. Access the device shell and verify that the copied image is available in `/harddisk:/`.

   Example

   ```
   RP/0/RP0/CPU0:P2A_DT_07#run
   Mon Feb 23 13:29:40.542 IST
   [node0_RP0_CPU0:~]$ cd /harddisk\:
   [node0_RP0_CPU0:/harddisk:]$ ls -ltra | grep -i
   ncs1010-golden-x86_64-25.1.1-Feb27Drop2.iso
   -rwxrwxrwx.  1 root  root          2618347520 Feb 23 13:27
   ncs1010-golden-x86_64-25.1.1-Feb27Drop2.iso
   ```

4. Verify that the **md5sum** value of the copied image matches the value calculated before the copy.

   Example

   ```
   [node0_RP0_CPU0:/harddisk:]$ md5sum ncs1010-golden-x86_64-25.1.1-Feb27Drop2.iso
   44dcd5214add0314116d109918bb926f  ncs1010-golden-x86_64-25.1.1-Feb27Drop2.iso
   ```

5. Install the software image from `/harddisk:/`.

Example

```
RP/0/RP0/CPU0:P2A_DT_07#install replace
harddisk:/ncs1010-golden-x86_64-25.1.1-Feb27Drop2.iso commit noprompt
Mon Feb 23 13:31:48.714 IST
Install replace operation 204 has started
Install operation will continue in the background
```

6. After the node is up, check the software version and the status of the install process.

Example

```
RP/0/RP0/CPU0:P2A_DT_07#show version
Mon Feb 23 13:50:15.241 IST
Cisco IOS XR Software, Version 25.1.1 LNT
Copyright (c) 2013-2025 by Cisco Systems, Inc.

Build Information:
 Built By     : swtools
 Built On     : Fri Feb 20 08:58:11 UTC 2026
 Build Host   : iox-ucs-037
 Workspace    : /auto/srcarchive12/prod/25.1.1/ncs1010/ws
 Version      : 25.1.1
 Label        : 25.1.1-Feb27Drop2

cisco NCS1010 (C3758 @ 2.20GHz)
cisco NCS1010-SA (C3758 @ 2.20GHz) processor with 32GB of memory
P2A_DT_07 uptime is 7 minutes
NCS 1010 - Chassis

RP/0/RP0/CPU0:P2A_DT_07#show install request
Mon Feb 23 13:50:29.368 IST

User request: install replace
/harddisk:/ncs1010-golden-x86_64-25.1.1-Feb27Drop2.iso commit
Operation ID: 204
State:        Success since 2026-02-23 13:46:53 UTC+05:30

Current activity:    No install operation in progress
```

7. Verify the active package summary.

Example

```
RP/0/RP0/CPU0:P2A_DT_07#show install active summary
Mon Feb 23 13:51:05.379 IST
Active Packages:    XR: 156    All: 1400
Label:              25.1.1-Feb27Drop2
XR Software Hash:
3b41e8017f18853a6a9c1a9d5b3463a4c91b07e2cace3b746ef5a755138c3210

Optional Packages
Version
--------------------------------------------------
---------------------------
xr-bgp
25.1.1v1.0.0-1
xr-cosm
25.1.1v1.0.3-1
xr-healthcheck
```

```
25.1.1v1.0.0-1
xr-ipsla
25.1.1v1.0.0-1
xr-is-is
25.1.1v1.0.0-1
xr-lldp
25.1.1v1.0.0-1
xr-mpls-oam
25.1.1v1.0.0-1
xr-netflow-stubs
25.1.1v1.0.0-1
xr-netsim
25.1.1v1.0.0-1
xr-olc
25.1.1v1.0.0-1
xr-ospf
25.1.1v1.0.0-1
xr-perfmgmt
25.1.1v1.0.0-1
xr-track
25.1.1v1.0.0-1

Mandatory Packages With Active Bugfixes
Version
--------------------------------------------------
--------------------------
xr-diskboot
25.1.1v1.0.1-1
xr-ncs1010-core
25.1.1v1.0.1-1
xr-ncs1010-dri
25.1.1v1.0.1-1
xr-ncs1010-forwarder
25.1.1v1.0.1-1
xr-ncs1010-fpd
25.1.1v1.0.2-1
xr-ncs1010-os-oe
25.1.1v1.0.1-1

Active Fixes (count: 7):
  CSCwn69606: xr-diskboot, xr-ncs1010-dri, xr-ncs1010-os-oe
  CSCwq77633: xr-ncs1010-core
  CSCwr31650: xr-ncs1010-forwarder
  CSCwr67302: xr-cosm
  CSCws04319: xr-cosm
  CSCws41649: xr-ncs1010-fpd
  CSCws74922: xr-ncs1010-fpd
```

8. Verify the committed package summary.

Example

```
RP/0/RP0/CPU0:P2A_DT_07#show install committed summary
Mon Feb 23 13:51:31.334 IST
Committed Packages: XR: 156    All: 1400
Label:              25.1.1-Feb27Drop2
XR Software Hash:
3b41e8017f18853a6a9c1a9d5b3463a4c91b07e2cace3b746ef5a755138c3210

Optional Packages
Version
```

```
--------------------------------------------------
--------------------------
xr-bgp
25.1.1v1.0.0-1
xr-cosm
25.1.1v1.0.3-1
xr-healthcheck
25.1.1v1.0.0-1
xr-ipsla
25.1.1v1.0.0-1
xr-is-is
25.1.1v1.0.0-1
xr-lldp
25.1.1v1.0.0-1
xr-mpls-oam
25.1.1v1.0.0-1
xr-netflow-stubs
25.1.1v1.0.0-1
xr-netsim
25.1.1v1.0.0-1
xr-olc
25.1.1v1.0.0-1
xr-ospf
25.1.1v1.0.0-1
xr-perfmgmt
25.1.1v1.0.0-1
xr-track
25.1.1v1.0.0-1

Mandatory Packages With Committed Bugfixes
Version
--------------------------------------------------
--------------------------
xr-diskboot
25.1.1v1.0.1-1
xr-ncs1010-core
25.1.1v1.0.1-1
xr-ncs1010-dri
25.1.1v1.0.1-1
xr-ncs1010-forwarder
25.1.1v1.0.1-1
xr-ncs1010-fpd
25.1.1v1.0.2-1
xr-ncs1010-os-oe
25.1.1v1.0.1-1

Committed Fixes (count: 7):
  CSCwn69606: xr-diskboot, xr-ncs1010-dri, xr-ncs1010-os-oe
  CSCwq77633: xr-ncs1010-core
  CSCwr31650: xr-ncs1010-forwarder
  CSCwr67302: xr-cosm
  CSCws04319: xr-cosm
  CSCws41649: xr-ncs1010-fpd
  CSCws74922: xr-ncs1010-fpd
```

The Golden ISO software changes are installed and committed on the device.

Install a software maintenance update by using the install source command

Use this procedure to install a Cisco IOS XR software maintenance update when you do not need control over reload timing.

Install and commit a Cisco IOS XR or Cisco Optical Site Manager SMU by using the **install source** command.

The **install source** command automatically applies the changes, including reload or restart actions as required. Use this method to reduce the number of commands needed for SMU installation without changing the entire image.

Follow these steps to install an SMU by using the **install source** command.

Procedure

1. Copy the SMU from the server to the device and confirm the **md5sum** value.

   Example

   ```
   [root@NCS1k-ZTP smu]# scp
   /nobackup/cosm/smu/ncs1010-x86_64-25.1.1-CSCwp05477-swtools-2025-10-08-2334.tgz
    cixxx@10.xx.xx.xx:/harddisk:/

   [node0_RP0_CPU0:/harddisk:]$ md5sum
   ncs1010-x86_64-25.1.1-CSCwp05477-swtools-2025-10-08-2334.tgz
   4e156140f4481452599c44afbdadd13d
   ncs1010-x86_64-25.1.1-CSCwp05477-swtools-2025-10-08-2334.tgz
   ```

2. Install the SMU.

   Example

   ```
   RP/0/RP0/CPU0:router#install source
   /harddisk:/ncs1010-x86_64-25.1.1-CSCwp05477-swtools-2025-10-08-2334.tgz
   ```

3. Wait until the install request state changes to **Success**.

   Example

   ```
   RP/0/RP0/CPU0:COSM_OLT-3_214#show install request
   Mon Oct 13 07:40:19.516 UTC

   User request: install source
   /harddisk:/ncs1010-x86_64-25.1.1-CSCwp05477-swtools-2025-10-08-2334.tgz
   Operation ID: 26.1
   State:        Success since 2025-10-13 07:38:28 UTC
   Current activity:    Await user input
   Time started:        2025-10-13 07:38:28 UTC
   ```

4. Commit the install operation.

   Example

   ```
   RP/0/RP0/CPU0:COSM_OLT-3_214#install commit
   ```

5. Repeat this procedure for each SMU that you install individually.

Each SMU is treated as a separate transaction.

The SMU is installed and committed on the device.

Install software maintenance updates by using the install package add source command

Use this procedure to install multiple Cisco IOS XR software maintenance updates together when you need control over reload timing.

Install multiple SMUs together by using the **install package add source** command, and explicitly apply and commit the changes during the maintenance window.

Use this method when you need control over reload timing. The workflow requires explicit apply and commit actions.

Follow these steps to install SMUs by using the **install package add source** command.

Procedure

---

1. Review the Cisco IOS XR package installation procedure for the target platform and release.

   For detailed steps, see Install additional RPMs and bug fixes.
2. Add the required SMU packages by using the **install package add source** command.
3. Apply the SMU package changes during the approved maintenance window.
4. Commit the SMU package changes after validation is complete.

The selected SMUs are installed and committed on the device.

Install a Cisco Optical Network Controller service pack

Use this procedure to install a Cisco Optical Network Controller service pack for bug fixes and enhancements. It helps you complete the related Cisco Optical Network Controller workflow and verify the expected result.

Install a service pack to update an existing Cisco Optical Network Controller deployment with bug fixes and enhancements.

Before you begin

- Verify that the service pack is compatible with the installed Cisco Optical Network Controller version.
- Download the required service pack image from Cisco Software Download.

Follow this step to install a service pack.

Procedure

Install a service pack to update your Cisco Optical Network Controller with bug fixes and enhancements.

To install a service pack, see Install a Cisco Optical Network Controller service pack.

The Cisco Optical Network Controller service pack is installed.

9 Upgrade Your Optical Network with Cisco Optical Network Controller

Topics:

- Prepare for Cisco Optical Network Controller rollback scenarios
- Upgrade a standalone Cisco Optical Network Controller deployment
- Upgrade a mixed-device optical network
- Recover from an incomplete optical network upgrade

Describes the SWIMU workflows and preparation requirements for upgrading Cisco Optical Site Manager hosts and managed optical devices.

Upgrade Cisco Optical Site Manager hosts and their managed devices using the **SWIMU → Upgrade Orchestrator** application in Cisco Optical Network Controller. An upgrade domain is a group of connected devices that should remain release-aligned during the upgrade.

Table 23: Upgrade workflow selection

Workflow title	When to use
Upgrade a mixed-device optical network	Use when the upgrade domain contains a mixture of Cisco NCS 1010, Cisco NCS 1014, Cisco NCS 1004, or Cisco NCS 1001 devices.

Complete these preparation items before upgrading the optical network:

- Upgrade Cisco Optical Network Controller to the required target release.
- Verify that the target software release supports all host and managed-device combinations in the upgrade domain. For more details about the supported upgrade matrix, see Supported platform and software combinations.
- Upload the required software images to the external SFTP server.
- Verify that the remote path folder has write permissions that allow the external user to upload files.
- Verify that the SFTP server uses SSH version 7.x or 8.x.
- Verify connectivity between Cisco Optical Network Controller, Cisco Optical Site Manager, and the external SFTP server.
- Configure static routes from devices that host Cisco Optical Site Manager to the external SFTP server.
- Configure the SFTP server in the SWIMU application in Cisco Optical Network Controller.
- Confirm that sufficient storage is available on the Cisco Optical Site Manager hosts and managed devices.
- Resolve upgrade-impacting active alarms, licensing-compliance conditions on IOS XR, and incomplete IOS XR install operations before starting the upgrade.
- Back up the current Cisco Optical Site Manager and managed-device configurations.
- Plan the activation window so that directly connected devices do not remain on different software releases longer than necessary.

- Verify that the Cisco Optical Network Controller VM time is synchronized with the device backend time.
- Ensure that the target GISO contains the Cisco Optical Site Manager RPM.
- For upgrades from 24.3.1 or 25.1.1 to 26.1.1, ensure that the GISO includes the required bridge SMU.

Note

Use an external SFTP server to distribute software images.

Prepare for Cisco Optical Network Controller rollback scenarios

Use this procedure to prepare rollback requirements before upgrading Cisco Optical Network Controller. It helps you complete the related Cisco Optical Network Controller workflow and verify the expected result.

Rollback preparation helps you restore Cisco Optical Network Controller to a previous version when a valid database backup is available.

Before you begin

Follow this step to prepare for rollback scenarios.

Procedure

Prepare for rollback scenarios.

- Back up the database before upgrades.
- Install the older release using the matching OVA file when rollback is required.
- Restore the database backup after the installation completes.

> **Note**
>
> Direct downgrades to older releases are not supported by Cisco Optical Network Controller. You can revert to a previous version only if a backup of the target Cisco Optical Network Controller database was created before the upgrade. For more details, see Backup and Restore Database.

For detailed instructions, see Backup and Restore Database.

The rollback prerequisites are identified before the Cisco Optical Network Controller upgrade.

Upgrade a standalone Cisco Optical Network Controller deployment

Use this procedure to upgrade a standalone Cisco Optical Network Controller deployment to a new version. It helps you complete the related Cisco Optical Network Controller workflow and verify the expected result.

Upgrade the standalone deployment so that Cisco Optical Network Controller runs the required software version.

Before you begin

- Confirm that the target release is supported for the deployment.
- Download the required upgrade image from Cisco Software Download.

Follow this step to upgrade the standalone deployment.

Procedure

Upgrade the standalone deployment to the new Cisco Optical Network Controller version.

For details about upgrades, see Upgrade a Standalone Deployment of Cisco Optical Network Controller to a new version.

The standalone Cisco Optical Network Controller deployment is upgraded to the target version.

Upgrade a mixed-device optical network

Use this workflow when the upgrade domain contains a mixture of Cisco NCS 1010, Cisco NCS 1014, Cisco NCS 1004, or Cisco NCS 1001 platforms.

Upgrade mixed-device networks in phases so that Cisco Optical Site Manager hosts and managed devices can use the correct platform images.

Upgrade the network in two phases:

- Upgrade the Cisco Optical Site Manager hosts.
- Upgrade the devices managed by those hosts.

Keeping host and managed-device activation separate provides better control over image selection and platform-specific recovery.

For Cisco NCS 1010 and Cisco NCS 1014, use the same Golden ISO (GISO), including the Cisco Optical Site Manager RPM, for both host and managed devices when possible. A common image simplifies distribution and activation and prevents one image from replacing another on the Cisco Optical Site Manager host.

Before you begin

Complete the optical network upgrade preparation items before you start this workflow.

Procedure

1. Create host distribution groups.

   In the SWIMU application, create a separate image distribution group for each Cisco Optical Site Manager host platform.

   For example, place Cisco NCS 1010 hosts and Cisco NCS 1014 hosts in separate groups.

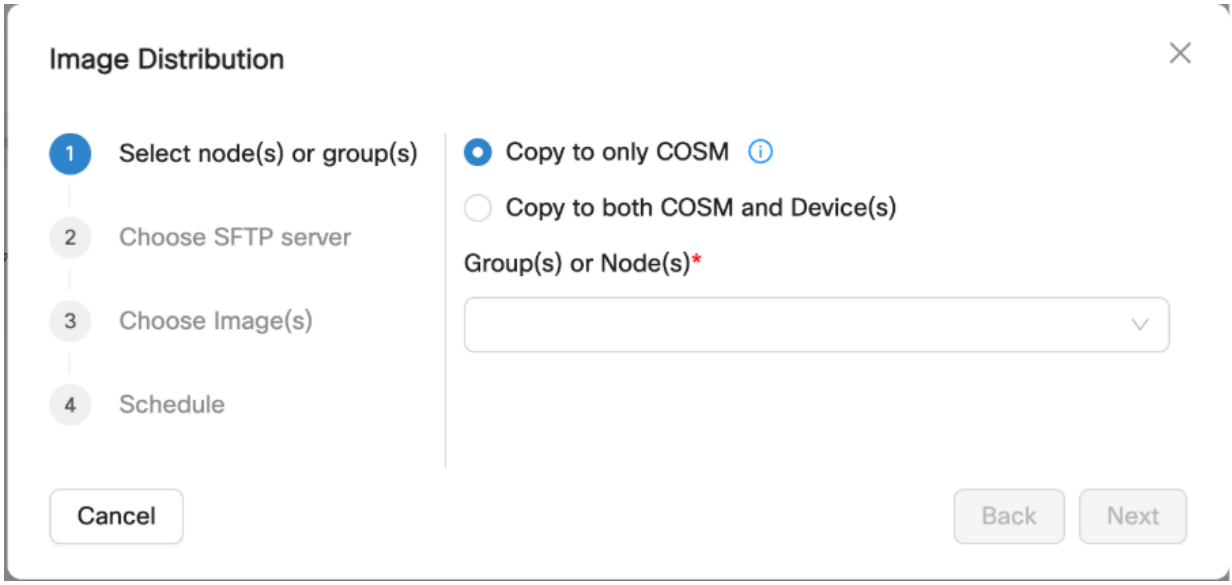
2. Distribute the host images.

   Use the external SFTP server to distribute the appropriate target image to each host group.

   Select **Copy to only COSM**.

   This figure shows the image distribution option used to copy the image only to Cisco Optical Site Manager.

   Figure 22: Image distribution for Cisco Optical Site Manager hosts



Note

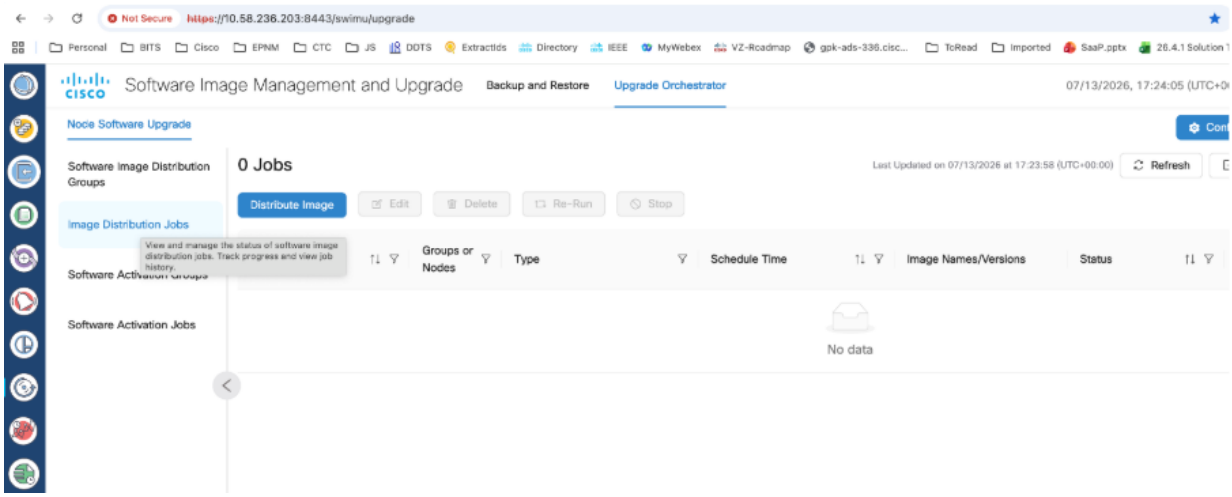
Distribute managed-device images only after the Cisco Optical Site Manager hosts are upgraded.

3. Verify host image distribution.

   Confirm that every host has received the correct image for its platform and that all distribution jobs have completed successfully.

   This figure shows the image distribution jobs page where distribution status is monitored.

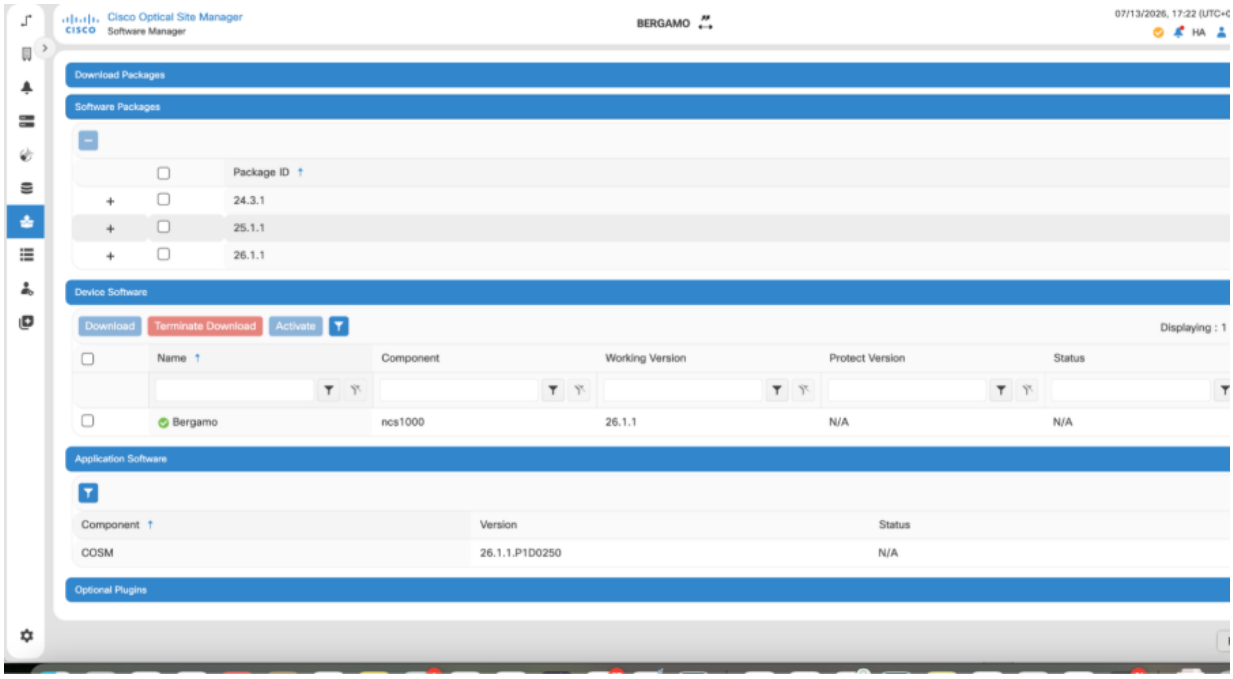
   Figure 23: Image distribution jobs



   Optional: In the Cisco Optical Site Manager web UI, verify that the package is downloaded.

   This figure shows the package download status in Cisco Optical Site Manager.

   Figure 24: Cisco Optical Site Manager package download status



4. Create the host activation groups.

   Create activation groups that contain the hosts that should be activated together. You can reuse a distribution group when it contains the same set of hosts.

   Keep activation groups aligned by platform type and network location.

5. Activate the hosts.

   Activate the hosts in each upgrade domain within the same maintenance window. This minimizes the period during which connected sites operate on different releases.

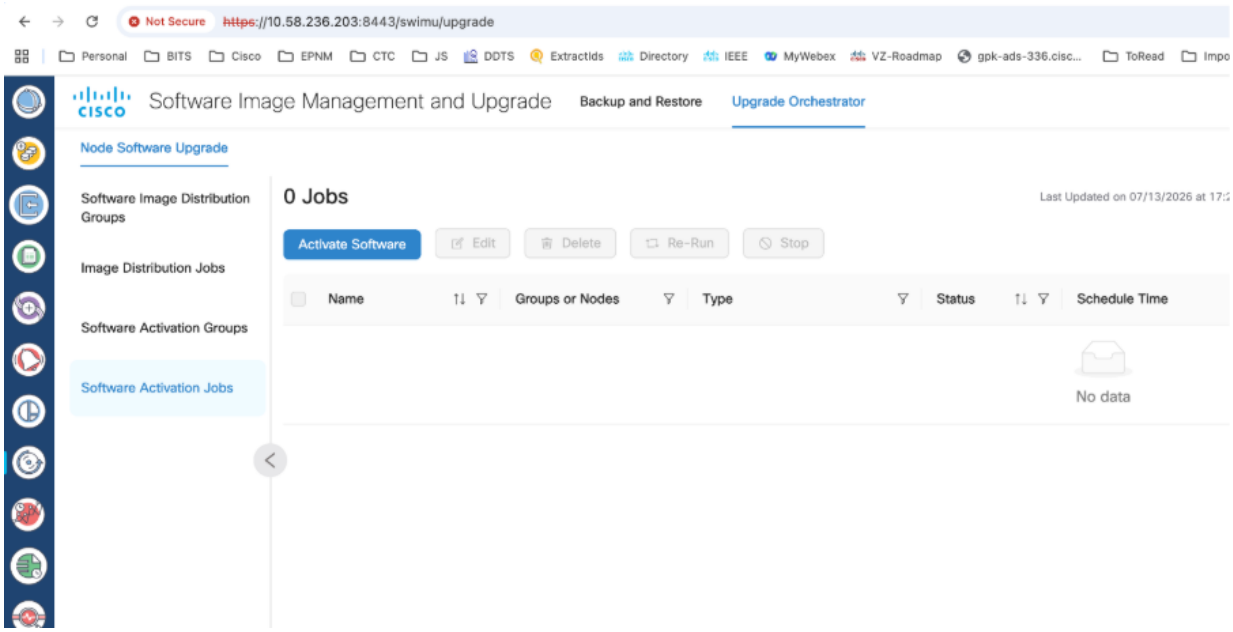
   > **Note**
   >
   > If upgrading all Cisco Optical Site Manager sites together is not feasible, upgrade all Cisco Optical Site Manager sites on a given span together. In a Cisco Optical Site Manager high availability deployment, activate both hosts together.

6. Verify the host upgrade.

   Confirm that the activation job completes successfully and that Cisco Optical Site Manager hosts are upgraded to the target image version.

   This figure shows the software activation jobs page where activation status is monitored.

   Figure 25: Software activation jobs



Optional: Confirm these items directly on each host:

- IOS XR is running the target release by using the **show version** command.
- The install operation has completed by using the **show install request** command.
- The devices successfully completed synchronization in Cisco Optical Site Manager.

Example

```
RP/0/RP0/CPU0:COSM-212# show install request
Mon Jul 13 16:35:44.821 IST
User request: install replace
/misc/disk1/data/software/26.1.1/ncs1010-golden-x86_64-26.1.1-2511_2611_FCS_CSCwn69606_COSM_SMU_validation_2.iso
 commit
Operation ID: 96
State:        Success since 2026-07-13 10:00:03 UTC
Replace to
/misc/disk1/data/software/26.1.1/ncs1010-golden-x86_64-26.1.1-2511_2611_FCS_CSCwn69606_COSM_SMU_validation_2.iso
 via reimage successful
Current activity:    No install operation in progress
```

7. Synchronize the upgraded sites.

   An activation job might report a failure or retain stale status even though IOS XR and Cisco Optical Site Manager have successfully reached the target release.

   After confirming the software versions on the devices, use the **Nodes** application in Cisco Optical Network Controller to **Re-Sync** the affected Cisco Optical Site Manager nodes.

8. Select the appropriate image for each managed-device type.

   Use this guidance:

   - For managed Cisco NCS 1010 or Cisco NCS 1014 devices, use the same GISO used by the host when the host and managed device use the same base release.
   - For managed Cisco NCS 1010 or Cisco NCS 1014 devices that require a different image, use the platform-appropriate image without the Cisco Optical Site Manager RPM. Downloading another image can replace the previously staged GISO on the host.

- For managed Cisco NCS 1004 devices, use the target image built for Cisco NCS 1004.
- For managed Cisco NCS 1001 devices, use the target image built for Cisco NCS 1001.

9. Create managed-device distribution groups.

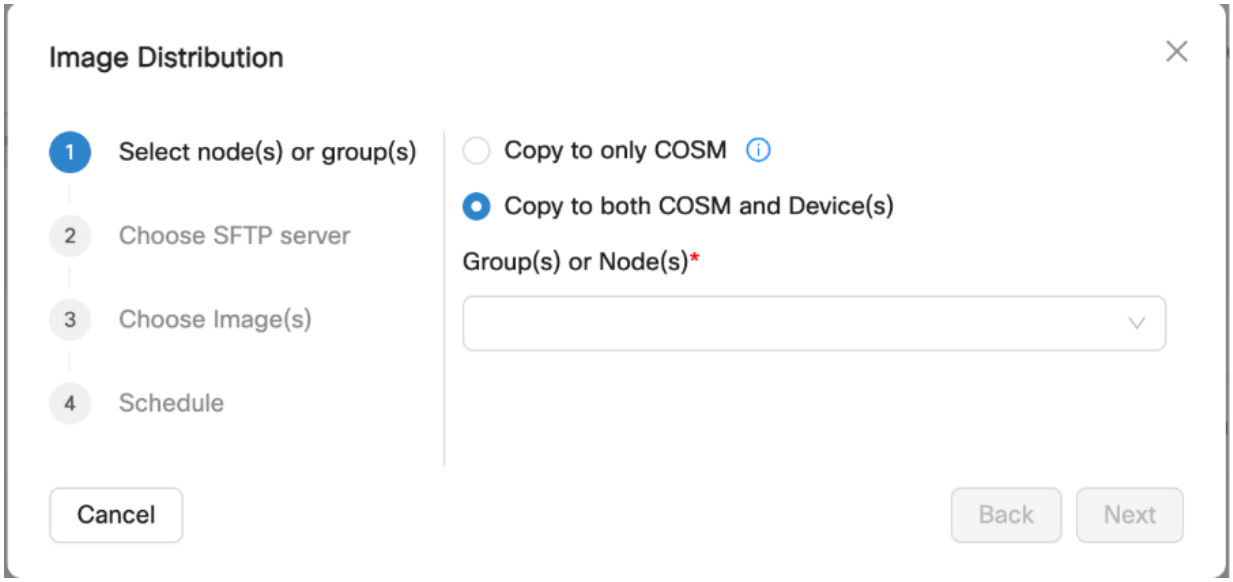
   Create a separate group for each managed-device type. Do not combine different platform images in the same distribution group.

10. Distribute the managed-device images.

    For each device group, distribute the corresponding image to Cisco Optical Site Manager and the managed devices by using the external FTP server. Create a separate image distribution job for each managed-device type.

    This figure shows the image distribution option used to copy the image to Cisco Optical Site Manager and managed devices.

    Figure 26: Image distribution for Cisco Optical Site Manager and devices

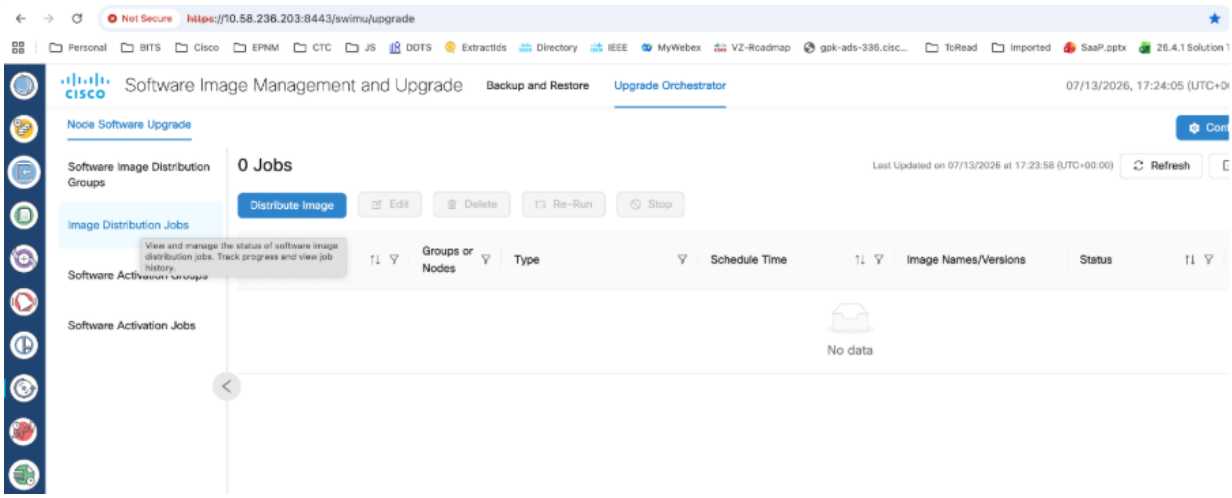


11. Verify managed-device image distribution.

    Confirm that the distribution job completes successfully and that the correct target image is available on every device before proceeding to activation.

    This figure shows the image distribution jobs page where distribution status is monitored.

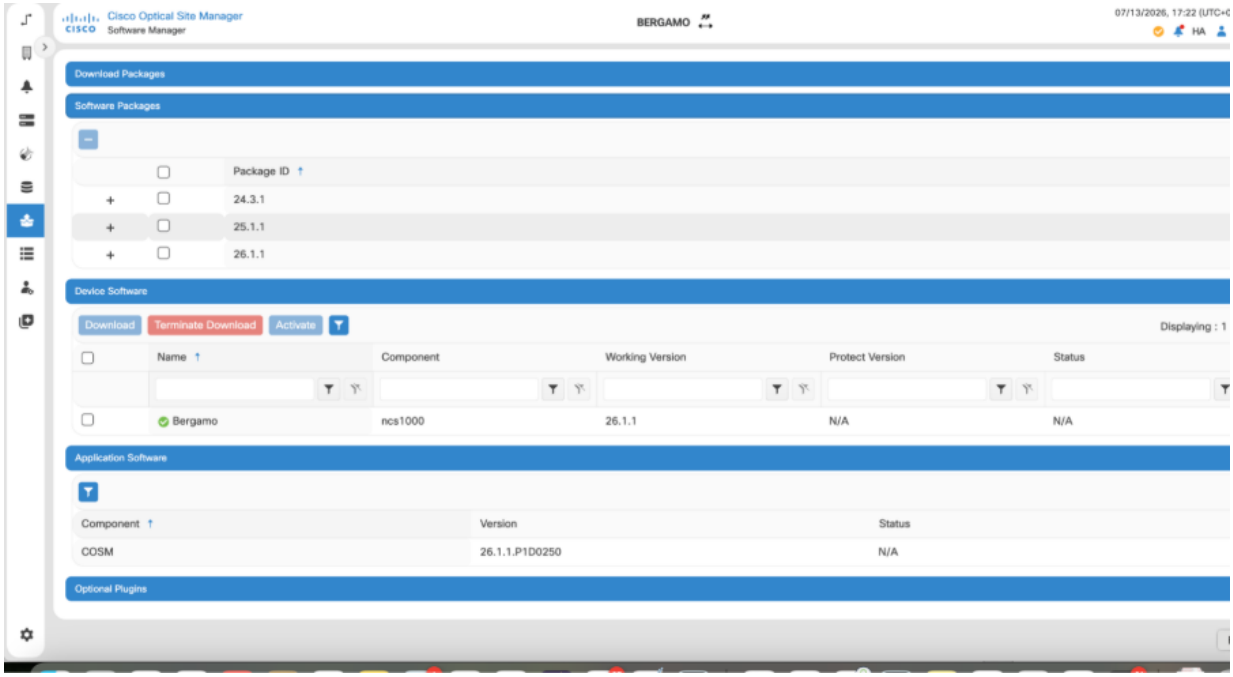
    Figure 27: Image distribution jobs



Optional: In the Cisco Optical Site Manager web UI, verify that the package is downloaded.

This figure shows the package download status in Cisco Optical Site Manager.

Figure 28: Cisco Optical Site Manager package download status



12. Create managed-device activation groups.

    Create a separate activation group for each managed-device type. Activating platform types separately simplifies validation and recovery. You can reuse the distribution group if all devices in the distribution group are upgraded together.

13. Activate the managed devices.

    Activate each managed-device group and monitor the job from the SWIMU application.

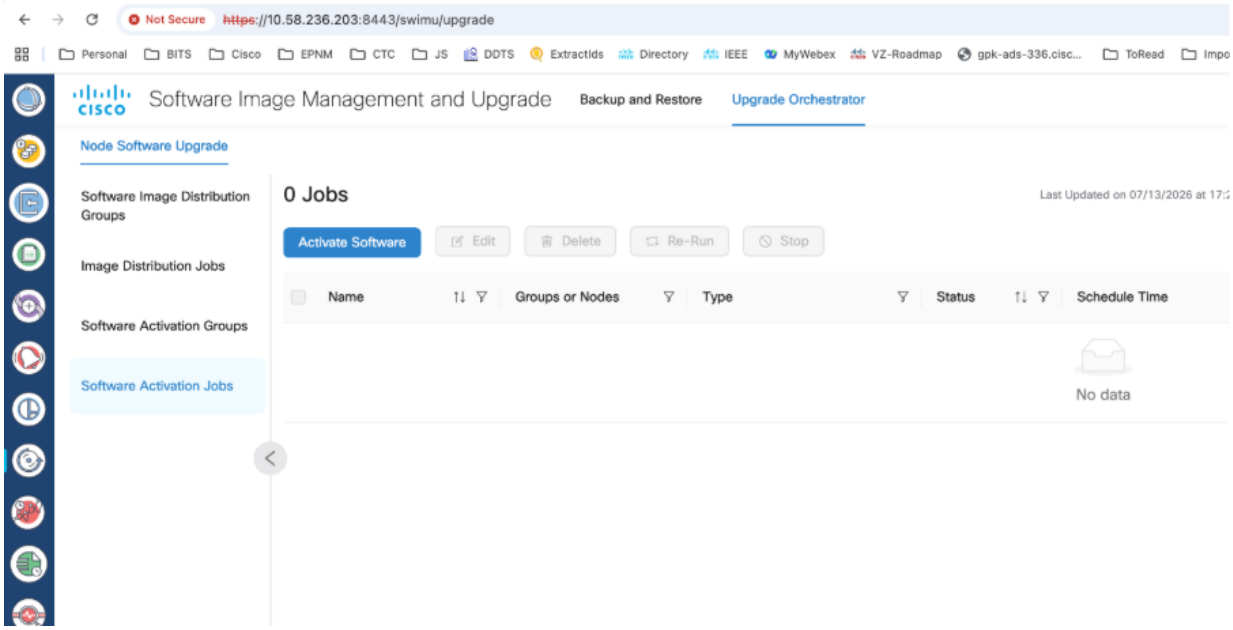
> **Note**
>
> Cisco Optical Network Controller automatically displays or selects the associated host during managed-device activation. If the host is already running the target release, SWIMU does not initiate another host upgrade.

14. Verify each managed-device upgrade.

    Confirm that the activation job completes successfully and that the managed devices are upgraded to the target image version.

    This figure shows the software activation jobs page where activation status is monitored.

    Figure 29: Software activation jobs



    Optional: Confirm these items directly on each host:

    - IOS XR is running the target release by using the **show version** command.
    - The install operation has completed by using the **show install request** command.
    - The devices successfully completed synchronization in Cisco Optical Site Manager.

    Example

```
RP/0/RP0/CPU0:COSM-212# show install request
Mon Jul 13 16:35:44.821 IST
User request: install replace
/misc/disk1/data/software/26.1.1/ncs1010-golden-x86_64-26.1.1-2511_2611_FCS_CSCwn69606_COSM_SMU_validation_2.iso
 commit
Operation ID: 96
State:        Success since 2026-07-13 10:00:03 UTC
Replace to
/misc/disk1/data/software/26.1.1/ncs1010-golden-x86_64-26.1.1-2511_2611_FCS_CSCwn69606_COSM_SMU_validation_2.iso
 via reimage successful
Current activity:    No install operation in progress
```

15. Synchronize affected sites.

    An activation job might report a failure or retain stale status even though IOS XR has successfully reached the target release.

    After confirming the software versions on the devices, use the Device Manager application in Cisco Optical Network Controller to **Re-Sync** the affected Cisco Optical Site Manager nodes.

16. Perform post-upgrade validation.

    Verify these items:

    - Host and managed-device software versions.
    - Device reachability and synchronization.
    - Network topology.
    - Inventory.
    - Active alarms.
    - Optical parameters.
    - Circuit and service state.

The Cisco Optical Site Manager hosts and their managed Cisco NCS 1010, Cisco NCS 1014, Cisco NCS 1004, and Cisco NCS 1001 devices are upgraded to the appropriate target images and synchronized with Cisco Optical Network Controller.

Recover from an incomplete optical network upgrade

Use this task to recover when an IOS XR install operation remains active or a Cisco Optical Network Controller activation job fails.

Recover from conditions that prevent a SWIMU activation job from continuing or being retried.

Cisco Optical Site Manager and Cisco Optical Network Controller cannot automatically terminate an IOS XR install operation that remains active on a device. A subsequent activation attempt cannot begin until the existing operation is resolved.

This condition can occur when a prerequisite, such as license compliance, prevents the install operation from completing.

Cisco Optical Network Controller does not automatically retry a failed activation job.

Before you begin

To recover, follow these steps.

Procedure

---

1. Log in to the affected device.
2. Identify and resolve the condition that interrupted the install operation.

   Example

```
RP/0/RP0/CPU0:Perugia-70# show install request
Fri Jun 12 14:25:17.939 CEST
User request: install replace
/misc/disk1/data/software/26.1.1/ncs1010-golden-x86_64-26.1.1-26_11_Bridge_25_11_COSM.iso
```

```
 commit
Operation ID: 15
State:        Failure since 2026-05-29 19:08:05 UTC+02:00
Operation vetoed by 1 install client. Error is from plat_sl_client on
0/RP0/CPU0: Device upgrade is not allowed due to SIA Out of Compliance, please
 check 'show license platform detail' for more details.
Current activity:    Await user input
```

3. Complete or terminate the existing IOS XR install operation as appropriate.
4. If the target software is already active and valid, commit the installation.

   Example

```
RP/0/RP0/CPU0:Perugia-70# install commit
Fri Jun 12 14:29:54.969 CEST
Install commit operation 15 has started
Install operation will continue in the background
```

5. Verify that no install operation remains in progress.

   Example

```
RP/0/RP0/CPU0:Perugia-70# show install request
Fri Jun 12 14:31:58.556 CEST
User request: install commit
Operation ID: 15
State:        Success since 2026-06-12 14:30:50 UTC+02:00
Current activity:    No install operation in progress
```

6. Retry or resume the SWIMU activation job.

   Resolving the original condition does not automatically resume an interrupted IOS XR install operation.

7. If a Cisco Optical Network Controller activation job fails, review the job details and identify the underlying failure.
8. Correct the reported condition.
9. Verify the device actual software and install status.
10. Resume the existing activation job from the SWIMU application.

The incomplete upgrade condition is resolved, and Cisco Optical Network Controller can continue upgrade validation.

What to do next

If the activation job reports a failure or retains stale status even though IOS XR and Cisco Optical Site Manager reached the target release, use the **Nodes** application in Cisco Optical Network Controller to **Re-Sync** the affected Cisco Optical Site Manager nodes.

A Related Documents

Find related Cisco Optical Automation Solution documentation for planning, deployment, operations, and network expansion.

The Cisco Optical Automation Solution documentation suite comprises a set of resources for planning, deploying, and operating optical networks. Use the related documents to locate the information required for a specific workflow or network.

The related Cisco Optical Automation Solution documentation includes:

- Cisco Optical Automation Solution for Multidegree NCS 1010 ROADM Network: Provides the end-to-end workflow for Cisco NCS 1010, Cisco NCS 1014, and Cisco NCS 1004 devices, including network planning, device bringup, Cisco Optical Site Manager setup, Cisco Optical Network Controller operations, and live network import.