Install Cisco Optical Site Manager on NCS 1000

This chapter describes the Cisco Optical Site Manager installation on NCS 1000.

Table 1: Feature History

Feature Name	Release Information	Feature Description
NCS 2000 Node Upgrade	Cisco NCS 2000 Release 25.1.1	The NCS 2000 nodes will be upgraded from R11.x.x to R25.1.1 to transition the NCS 2000 node management from CTC to COSM. The source releases that upgrade to R25.1.1 SSON are: • R11.1.2.3 SSON • R11.1.3 SSON • R11.1.3.2 SSON • R11.1.1.4 SSON With this upgrade, you can manage the NCS 2000 nodes in the Node view of the COSM application. The node upgrade is a non-traffic-affecting operation and must be performed in the following order: **1.** NCS 2000 nodes that host the SVO line card. **2.** NCS 2000 nodes that do not have the SVO line card. **3.** NCS 2000 transponder nodes before adding them to the NCS 2000 nodes.

• Cisco Optical Site Manager installation workflow on NCS 1010 or NCS 1014, on page 2

Cisco Optical Site Manager installation workflow on NCS 1010 or NCS 1014

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 Installation requirements, on page 3.

Perform these tasks to install and configure Cisco Optical Site Manager on NCS 1010 or NCS 1014 devices.

Procedure

Step 1 Install Cisco Optical Site Manager on NCS 1010 or NCS 1014 device. For more details, see Install Cisco Optical Site Manager on NCS 1010 or NCS 1014, on page 5.

Step 2 Configure Cisco Optical Site Manager in standalone or high availability mode. For more details, see Configure Cisco Optical Site Manager in standalone mode for NCS 1010 or NCS 1014 or High availability for NCS 1000.

Step 3 Follow these tasks to setup Cisco Optical Site Manager:

a) Enable or disable Cisco Optical Site Manager interfaces individually. For more details, see Enable or disable Cisco Optical Site Manager north-bound interfaces.

Note
By default, these interfaces are enabled

- NETCONF
- RESTCONF
- Interactive Web-UI

b) Activate Cisco Optical Site Manager. For more details, see Activate Cisco Optical Site Manager.

Installation requirements

This section lists the prerequisites for installing Cisco Optical Site Manager.

These requirements must be met before using Cisco Optical Site Manager to manage NCS 1000 devices.

- All the Cisco NCS 1000 devices on the network are reachable from the device hosting Cisco Optical Site Manager.
- SSH is configured on all the devices.
- Netconf-Yang agent is configured to use SSH for communication.
- The SSH rate limit is set to 600.
- Before Release 24.3.1, use the *MgmtEth0/RP0/CPU0/1* interface for auto-onboarding of directly connected devices (peer devices). The interface uses IP addresses *192.168.1.1/30* and *192.168.1.2/30*.
- Static routes are added on devices that belong to different subnets or configured as peer devices. For more details, see Configure static routes on peer devices, on page 4.

Enable NETCONF over SSH on host devices

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

Before you begin

Follow these steps to enable netconf:

Procedure

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

Example:

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

Step 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
```

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

Note
Only SSH version 2 is supported. Cisco Optical Site Manager does not accept SSH version 1 connections.

Example:

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

Step 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
```

Step 5 Enable NETCONF protocol over SSH connection using the **ssh server netconf** command.

Example:

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

Step 6 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 netconf
```

What to do next

Configure static route on peer devices

Configure static routes on peer devices

Configure static route to ensure that the Cisco Optical Site Manager host device can reach its peer device for management and high availability communication.

In a high-availability setup, two Cisco Optical Site Manager devices located remotely are directly connected through their *MgmtEth* interfaces.

- Each device must have either a static route or a routing protocol configuration that defines how to reach the peer's *loopback* interface (for example, Loopback 1), using the peer's *MgmtEth* interface as the next hop.
- Static route configuration is optional.

Before you begin

Install Netconf.

Follow these steps to configure a static route on the peer devices:

Procedure

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

Example:

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

Step 2 Enter the static router configuration mode using the **router static** command.

Example:

```
RP/0/RP0/CPU0:ios(config)#router static
```

Step 3 Configure the IPv4 unicast address static routes using the **address-family ipv4 unicast 0.0.0.0/0** *default gateway* command.

Example:

```
RP/0/RSP0/CPU0:ios(config-static)#address-family ipv4 unicast 0.0.0.0/0 192.168.2.1
```

Step 4 Exit the configuration mode using the **exit** command.

Step 5 Verify the configuration using the **show running-config router static** command.

Example:

```
RP/0/RP0/CPU0:ios#show running-config router static
router static
 address-family ipv4 unicast
  0.0.0.0/0 192.168.2.1
 !
!
```

Caution

When using OLC, do not configure **redistribute static** under OSPF if there are static routes configured for any of the IP addresses belonging to OLT nodes or ILA nodes in optical network. This can cause OLC topology discovery failures and prevent control loops from operating properly.

The Cisco Optical Site Manager host device gains reliable network reachability to its peer devices, enabling effective management and failover operations.

This example describes the commands to configure a static route on the peer devices:

```
RP/0/RP0/CPU0:ios#configure terminal
RP/0/RP0/CPU0:ios(config)#router static
RP/0/RSP0/CPU0:ios(config-static)#address-family ipv4 unicast 0.0.0.0/0 192.168.2.1
RP/0/RSP0/CPU0:ios(config-static)#exit
RP/0/RP0/CPU0:ios#show running-config router static
router static
 address-family ipv4 unicast
  0.0.0.0/0 192.168.2.1
 !
!
```

What to do next

- Install Cisco Optical Site Manager on NCS 1010 or NCS 1014, on page 5
- Install Cisco Optical Site Manager on NCS 1001 or NCS 1004, on page 7

Install Cisco Optical Site Manager on NCS 1010 or NCS 1014

Cisco Optical Site Manager is an optional software component that can be installed on NCS 1010 or NCS 1014 platforms. If Cisco IOS XR is already installed, you can install Cisco Optical Site Manager manually

using the provided *.rpm* files. You can download the Cisco Optical Site Manager software image from the Software Download page.

Before you begin

Download 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

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

Step 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.

Step 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
```

Step 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
```

The latest changes are applied to all processes, including the impacted processes.

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

Example:

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

Step 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                                                    25.1.1v1.0.2-1
```

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                                                    25.1.1v1.0.2-1
```

What to do next

Configure Cisco Optical Site Manager in Standalone or High Availability mode.

Install Cisco Optical Site Manager on NCS 1001 or NCS 1004

Cisco Optical Site Manager is an optional software component that can be installed on NCS 1001 or NCS 1004 platforms. If Cisco IOS XR is already running on your device, you can manually install Cisco Optical Site Manager using the supplied *.rpm* packages.

For release 25.4.1, NCS 1004 and NCS 1001 host devices do not support storing multiple software packages of the same release; downloading a new package of the same build replaces the existing one.

This table outlines the supported software package count and device management capacity based on the platform hosting Cisco Optical Site Manager.

Cisco Optical Site Manager hosting platform	Supported software package in repository	Device management capacity
NCS 1001	One	Two including host NCS 1001 device
NCS 1004	One	• Three NCS 1004 devices and • three NCS 1001 devices. **Note** The software upgrade on the NCS1004 or NCS 1001 from Cisco Optical Site Manager does not succeed when using a mini ISO file.

Note NCS 1001 does not support the iXPE boot of a golden ISO with Cisco Optical Site Manager.

Before you begin

Download the *NCS1001 and NCS1004 IOS XR Software optional-rpms* optional package from Software Download page.

Follow these steps to install Cisco Optical Site Manager on NCS 1001 or NCS 1004:

Procedure

Step 1 Copy the downloaded *.rpm* files to the device storage.

Step 2 Install the Cisco Optical Site Manager package source file in synchronous mode using the **install add source** <*folder*> <*pkg name*> **synchronous** command.

Example:

```
RP/0/RP0/CPU0:ios#install add source /harddisk:/cosm ncs1001-cosm-1.0.0.0-r253107I.x86_64.rpm
 synchronous
Install add operation 2.1.1 has started
```

Step 3 Identify the inactive Cisco Optical Site Manager package name using the **show install inactive** command.

Example:

The bold line in this example shows the inactive package name. You will use this package name to activate the package in the next step.

```
RP/0/RP0/CPU0:ios#show install inactive
Fri Apr 11 08:10:57.969 UTC
1 inactive package(s) found:
    ncs1001-cosm-1.0.0.0-r253107I
```

Step 4 Activate the package using the **install activate** <*package name*> **synchronous** command.

Example:

```
RP/0/RP0/CPU0:ios#install activate ncs1001-cosm-1.0.0.0-r253107I synchronous
```

Use the <*package name*> from the output of the **show install inactive** command.

Warning
Do not activate a base IOS XR GISO on a device that is running Cisco Optical Site Manager, as this action will remove the application.

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

Example:

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

Cisco Optical Site Manager is installed on the device.

This example shows the commands to install Cisco Optical Site Manager on NCS 1001 or NCS 1004:

```
RP/0/RP0/CPU0:ios#install add source /harddisk:/cosm ncs1001-cosm-1.0.0.0-r253107I.x86_64.rpm
 synchronous
Install add operation 2.1.1 has started
RP/0/RP0/CPU0:ios#show install inactive
Fri Apr 11 08:10:57.969 UTC
1 inactive package(s) found:
    ncs1001-cosm-1.0.0.0-r253107I
RP/0/RP0/CPU0:ios#install activate ncs1001-cosm-1.0.0.0-r253107I synchronous
RP/0/RP0/CPU0:ios#install commit
```

What to do next

Configure Cisco Optical Site Manager in Standalone mode.

Install a Cisco Optical Site Manager SMU

A Software Maintenance Upgrade is a package that can be installed on a system to deliver patch fixes or security updates to a released image. A Cisco Optical Site Manager SMU is an updated Cisco Optical Site Manager image bundled as an XR SMU, providing the latest enhancements or fixes for Cisco Optical Site Manager \within the XR environment.

Install a SMU to update your Cisco Optical Site Manager with bug fixes and enhancements. Transfer the installation file, install the SMU, and verify that the new image is active.

In high availability (HA) deployments, install the SMU on the standby node first. Then, install it on the active node.

Warning Installing a SMU triggers the host device's controller to reload.

Before you begin

Download the SMU from the Cisco Software Download page.

Follow these steps to install a Cisco Optical Site Manager SMU:

Procedure

Step 1 Use the **scp** command to copy the file to the standby node and confirm the md5sum value.

Example:

```
[root@NCS1k-ZTP smu]# scp /harddisk/cosm/smu/ncs1010-x86_64-25.1.1-CSCwr67302.tgz
cixxx@10.xx.xx.xx:/harddisk:/

[node0_RP0_CPU0:/harddisk:]$md5sum ncs1010-x86_64-25.1.1-CSCwr67302.tgz
c28dcced4e562e329e36baf1d7621ca0  ncs1010-x86_64-25.1.1-CSCwr67302.tgz
```

Step 2 Use the **install source** command to install the SMU.

Example:

```
RP/0/RP0/CPU0:COSM_OLT-3_214# install source /harddisk:/ncs1010-x86_64-25.1.1-CSCwr67302.tgz
```

Wait for the installation to complete.

Step 3 Use the **show install request** command to verify the status of installation was successful.

Example:

```
RP/0/RP0/CPU0:COSM_OLT-3_214#show install request
Mon Oct 27 11:12:05 UTC

User request: install source /harddisk:/ncs1010-x86_64-25.1.1-CSCwr67302.tgz
Operation ID: 33.1
State:        Success since 2025-10-27 11:09:59 UTC
Current activity:    Await user input
```

```
Time started:        2025-10-27 11:09:59 UTC
The following actions are available:
    install package add
    install package remove
    install package upgrade
    install package downgrade
    install package replace
    install package rollback
    install replace
    install rollback
    install source
    install commit
    install replace reimage
```

Step 4 Use the **install commit** command to commit the SMU.

Example:

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

Step 5 Use the **show install fixes committed** command to verify that the SMU image is committed.

Example:

The bold text displays the committed SMU *CSCwr67302 xr-cosm-25.1.1v1.0.1-1*.

```
RP/0/RP0/CPU0:ios#show install fixes committed
Mon Dec  8 05:16:35.319 UTC

Committed Fixes (count: 2):
Bug Id      Packages
----------- ------------------------------------------------------------
CSCwr31650  xr-ncs1010-forwarder-25.1.1v1.0.1-1
CSCwr67302  xr-cosm-25.1.1v1.0.1-1
```

Step 6 Use the **show install fixes active** command to verify that the SMU image is active.

Example:

The text in bold in this example displays the active SMU version *CSCwr67302 xr-cosm-25.1.1v1.0.1-1*.

```
RP/0/RP0/CPU0:ios#show install fixes active
Tue Dec  9 06:51:23.276 UTC

Active Fixes (count: 2):
Bug Id      Packages
----------- ------------------------------------------------------------
CSCwr31650  xr-ncs1010-forwarder-25.1.1v1.0.1-1
CSCwr67302  xr-cosm-25.1.1v1.0.2-1
RP/0/RP0/CPU0:ios#show cosm status
Tue Dec  9 06:51:31.549 UTC
COSM state: APP_ACTIVATED
AppMgr app state: ACTIVATED
AppMgr container state: RUNNING
Container status: Up 13 hours
Last error: No error
COSM version: 25.1.1.D0372
```

Step 7 Use the **show cosm status** command to verify that the Cisco Optical Site Manager SMU version is activated.

Example:

The text in bold in this example displays the active Cisco Optical Site Manager version *25.1.1.R0366*.

```
RP/0/RP0/CPU0:HAN-1#show cosm status
Thu Oct 30 10:21:25.374 UTC
COSM state: APP_ACTIVATED
```

```
AppMgr app state: ACTIVATED
AppMgr container state: RUNNING
Container status: Up 2 days
Last error: No error
COSM version: 25.1.1.R0366
Redundancy role: ACTIVE (NONE)
```

The status of the standby node appears as **NONE** in the output of the **show cosm status** command.

Step 8 Perform the same installation process on the active node.
After the installation is completed and the controller is reloaded, these redundancy status changes occur:

- On the active node, during the SMU installation, the redundancy status transitions through **UNKNOWN** → **STARTING** → **NONE** → **STANDBY** (connected active 1.1.1.1-COSM) after the active node reloads.
- The redundancy status of the standby node changes to **NONE** during the SMU installation on the active node and updates to **ACTIVE (standby not connected)** after the active node completes its reload.

The Cisco Optical Site Manager SMU is installed.

This table explains the redundancy status changes in the output of the `show cosm status` command on both nodes during the SMU installation.

Table 2: Cisco Optical Site Manager redundancy status transitions during SMU installation

Node	Node Operation	Redundancy Status	Details
Standby Node	Install SMU, the reloads	Status varies (install / reload in progress)	The standby node temporarily disconnects during SMU installation.
Active Node	No action / monitoring	**ACTIVE (standby not connected)**	The active node displays **standby not connected** while the SMU installs on the standby node.
Active Node	Install SMU, then reloads	Transitions: **UNKNOWN** → **STARTING** → **NONE** → **STANDBY (connected active 1.1.1.1-COSM)**	The active node undergoes state transitions while coming back online.
Standby Node (becomes new Active)	Monitors while old active reloads	**NONE** → **ACTIVE (standby not connected)** → **ACTIVE (connected active 2.2.2.2-COSM)**	• The standby node initially shows a redundancy status of **NONE** during the SMU installation on the active node. • Once the active node completes its reload, the standby node transitions to **ACTIVE (connected active 2.2.2.2-COSM)** and remains active thereafter.