



# Install Cisco Optical Network Controller Using VMware vSphere

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## Installation Requirements

The following list contains the pre-requisites of Cisco Optical Network Controller 24.3.1 installation.

- Before installing Cisco Optical Network Controller 24.3.1, you must first login in to the VMware customer center and download VMware vCenter server version 7.0, as well as vSphere server and client with version 7.0. Cisco Optical Network Controller 24.3.1 is deployed on rack or blade servers within vSphere.



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**Attention** Upgrade to VMware vCenter Server 8.0 U2 if you are using VMware vCenter Server 8.0.2 or VMware vCenter Server 8.0.1.

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- Install ESXi host version of 7.0 or higher on the servers to support creating Virtual Machines.
- You must have a DNS server. The DNS server can be an internal DNS server if the Cisco Optical Network Controller instance is not exposed to the internet.
- You must have an NTP server or NTP Pool for time synchronization. Configure the same NTP server or pool on Cisco Optical Network Controller and the PC or VM you use to access Cisco Optical Network Controller. Configure the ESXi host also with the same NTP configuration.
- Before the Cisco Optical Network Controller 24.3.1 installation, three networks must be created.
  - **Control Plane Network:**

The control plane network helps in the internal communication between the deployed VMs within a cluster. If you are setting up a standalone system, this can refer to any private network.
  - **VM Network or Northbound Network:**

The VM network is used for communication between the user and the cluster. It handles all the traffic to and from the VMs running on your ESXi hosts and this is your Public network through which the UI is hosted.

- **Eastbound Network:**

The Eastbound Network helps in the internal communication between the deployed VMs within a cluster. If you are setting up a standalone system, this can refer to any private network.



**Note** For more details on VMware vSphere, see *VMware vSphere*.

The minimum requirement for Cisco Optical Network Controller 24.3.1 installation is given in the table below.

**Table 1: Minimum Requirement**

Sizing	CPU	Memory	Disk
XS	16 vCPU	64 GB	800 GB
S	32 vCPU	128 GB	1536 GB



**Note** Configure vCPU and memory according to the VM profile (XS=16vCPU+64GB, S=32vCPU+128GB) before you power on the VM in vCenter.

The requirements based on type of deployment are given in the table below.

**Table 2: Deployment Requirements**

Deployment Type	Requirements
Standalone ( SA )	<p><b>Control Plane Network:</b> Can be a private network for standalone setups. Requires 1 IP address.  <b>Gateway:</b> Required. <b>DNS Server:</b> Should be an internal DNS if the node is not exposed to the internet; otherwise, an internet DNS can be used.</p> <p><b>Northbound Network (VM Network):</b> Should be a public network. All communication between the Cisco Optical Network Controller and devices will flow through this network. Requires 1 public IP address.  <b>Gateway:</b> Required. <b>DNS Server:</b> Required. Should be an internal DNS if the node is not exposed to the internet; otherwise, an internet DNS can be used.</p> <p><b>Eastbound Network:</b> Can be a private network for standalone setups. Requires 1 private IP address.  <b>Gateway:</b> Required. <b>DNS Server:</b> Required. Should be an internal DNS if the node is not exposed to the internet; otherwise, an internet DNS can be used.</p>

To create the control plane and virtual management networks follow the steps listed below.

1. From the vSphere client, select the Datacenter where you want to add the ESXi host.
2. Right-click the server from the vCenter inventory and click **Add Networking**.
3. To create a private network for Control Plane and Eastbound Networks, follow the wizard for a Standard Switch addition for each network.
  - a. In **Select connection type**, choose **Virtual Machine Port Group for a Standard Switch** and click **Next**.
  - b. In **Select target device**, select **New Standard Switch (MTU 1500)** and click **Next**.
  - c. In **Create a Standard Switch**, click **Next**, and confirm *There are no active physical network adapters for the switch*.
  - d. In **Connection settings** choose a network label (Control Plane or Eastbound) and select VLAN ID as None(0) click **Next**.
  - e. In **Ready to complete**, review your configuration and click **Finish**.

After adding the ESXi host, create the Control Plane, Northbound, and Eastbound Networks before deploying.

## SSH Key Generation

For accessing SSH, ed25519 key is required. The ed25519 key is different from the RSA key.

Use the CLI given below to generate the ed25519 key.

```
ssh-keygen -t ed25519
Generating public/private ed25519 key pair.
Enter file in which to save the key (/Users/xyz/.ssh/id_ed25519):
./<file-name-of-your-key>.pem
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in ./<file-name-of-your-key>.pem
Your public key has been saved in ./<file-name-of-your-key>.pem.pub
The key fingerprint is:
SHA256:zGW6aGn8rxvEq82sA/97jOaHrl9rnoTaYi+TqU3MeRU xyz@abc
The key's randomart image is:
+--[ED25519 256]--+
|
|          E          |
|        + + .        |
|         S .         |
|      .+ = =         |
|       o@o*+o        |
|       =XX+++=o      |
|      .o*#/X=       |
+-----[SHA256]-----+
```

```
#Once created you can cat the file with .pub extension for the public key. ( ex:
<file-name-of-your-key>.pem.pub )
```

```
cat <file-name-of-your-key>.pem.pub
```

```
#The above key has to be used in the deployment template ( SSH Public Key ) in the Deployment
process
```

# Install Cisco Optical Network Controller Using VMware vSphere

To deploy the OVA template, follow the steps given below.

## Before you begin



**Note** During the OVF deployment, the deployment gets aborted if there is an internet disconnection.

## Procedure

**Step 1** Right click the ESXi host in the vSphere client screen and click **Deploy OVF Template**.

**Step 2** In the **Select an OVF template** screen, select the **URL** radio button for specifying the URL to download and install the OVF package from the Internet or select the **Local file** radio button to upload the downloaded ova files from your local system and click **Next**.

*Figure 1: Select an OVF Template*

The screenshot shows the 'Deploy OVF Template' wizard with the following details:

- Wizard Steps:**
  - 1 Select an OVF template (Active)
  - 2 Select a name and folder
  - 3 Select a compute resource
  - 4 Review details
  - 5 Select storage
  - 6 Ready to complete
- Select an OVF template:**
  - Instructions: Select an OVF template from remote URL or local file system. Enter a URL to download and install the OVF package from the Internet, or browse to a location accessible from your computer, such as a local hard drive, a network share, or a CD/DVD drive.
  - Radio buttons:
    - URL
    - Local file
  - URL input field: `http://10.58.230.32/ncs1k/sirius/onc/CONC-24.3.1-5.ova`
  - Local file section:  No files selected.
  - Buttons:

**Step 3** In the **Select a name and folder** screen, specify a unique name for the virtual machine Instance. From the list of options, select the location of the VM to be used and click **Next**.

**Figure 2: Select a name and folder**

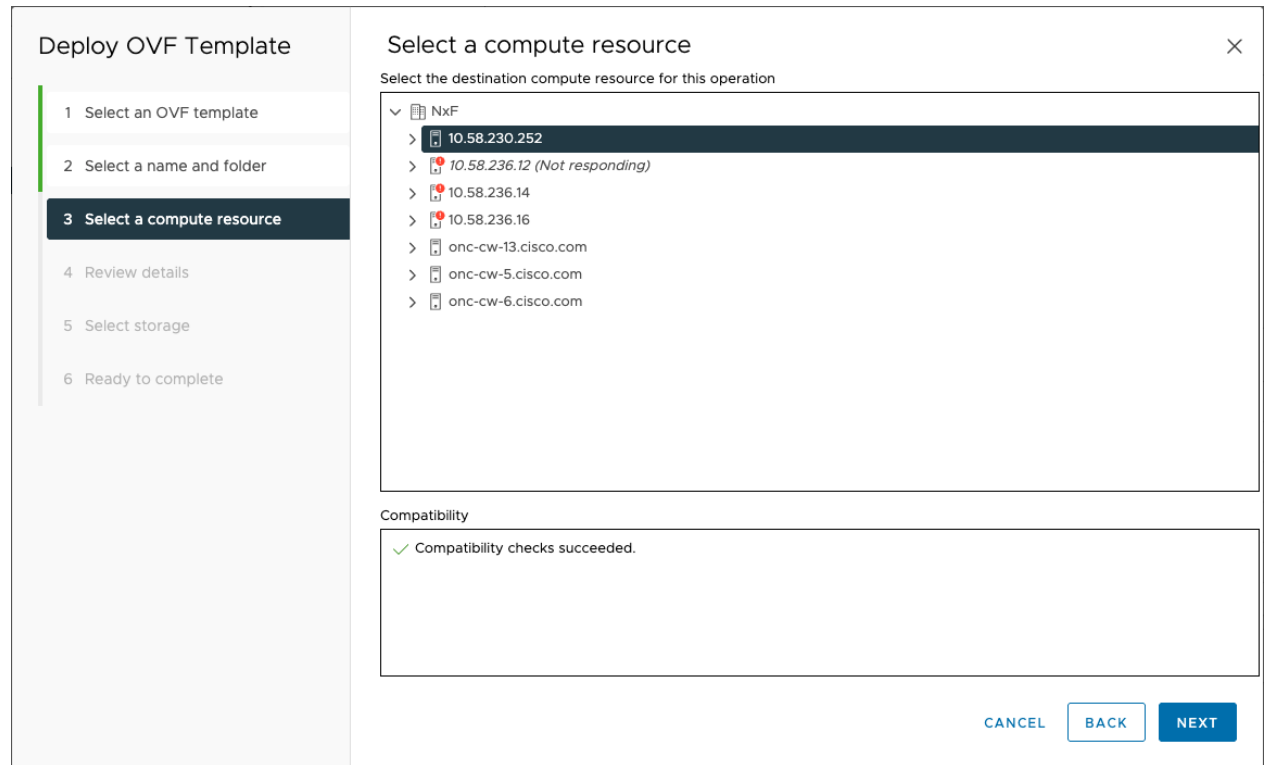
The screenshot shows the 'Deploy OVF Template' wizard with the following components:

- Progress Bar:** A vertical bar on the left indicates the current step. Step 2, 'Select a name and folder', is highlighted in dark blue. Other steps include '1 Select an OVF template', '3 Select a compute resource', '4 Review details', '5 Select storage', and '6 Ready to complete'.
- Form Title:** 'Select a name and folder' with a close button (X) in the top right corner.
- Instructions:** 'Specify a unique name and target location'.
- Input Field:** 'Virtual machine name:' with the text 'CONC-24.3.1' entered.
- Folder Selection:** A tree view titled 'Select a location for the virtual machine.' showing a folder structure under 'svt-vcenter3.cisco.com'. The 'NxF' folder is selected and highlighted in dark blue. Other folders include 'BGL', 'SVT-Crosswork', 'SVT-Crosswork1', 'SVT-Crosswork2', and 'SVT-E2E'.
- Navigation Buttons:** 'CANCEL', 'BACK', and 'NEXT' buttons are located at the bottom right.

**Step 4**

In the **Select a compute resource** screen, select the destination compute resource on which you want to deploy the VM and click **Next**.

Figure 3: Select a Compute Resource



**Note** While selecting the compute resource the compatibility check proceeds till it completes successfully.

**Step 5** In the **Review details** screen, verify the template details and click **Next**.

Figure 4: Review Details

Deploy OVF Template

- 1 Select an OVF template
- 2 Select a name and folder
- 3 Select a compute resource
- 4 Review details
- 5 Select storage
- 6 Select networks
- 7 Customize template
- 8 Ready to complete

Review details ×

Verify the template details.

Publisher	No certificate present
Product	CONC
Version	CONC 24.3.1
Download size	5.4 GB
Size on disk	Unknown (thin provisioned) 69.6 GB (thick provisioned)

CANCEL BACK NEXT

**Step 6**

In the Select storage screen, select the virtual disk format based on provision type requirement. **VM Storage Policy** is set as *Datastore Default* and click **Next**. Select the **virtual disk format** as *Thin Provision*.

You must select "Thin provision" as the virtual disk format.

Figure 5: Select Storage

### Deploy OVF Template

- 1 Select an OVF template
- 2 Select a name and folder
- 3 Select a compute resource
- 4 Review details
- 5 Select storage
- 6 Select networks
- 7 Customize template
- 8 Ready to complete

### Select storage

Select the storage for the configuration and disk files

Encrypt this virtual machine (Requires Key Management Server)

Select virtual disk format: Thin Provision

VM Storage Policy: Datastore Default

Disable Storage DRS for this virtual machine

	Name	Storage Compatibility	Capacity	Provisioned	Free	Type	Cluster
<input checked="" type="radio"/>	1.75TB_RAI...	--	1.75 TB	1.36 TB	1.23 TB	VMFS 6	
<input type="radio"/>	vm-storage	--	446 GB	411.15 GB	35.19 GB	VMFS 6	

2 items

Compatibility

✓ Compatibility checks succeeded.

CANCEL
BACK
NEXT

**Step 7**

In the **Select networks** screen, select the control and management networks as **Control Plane**, **Eastbound**, and **Northbound** from the networks created earlier and **click Next**.



Figure 6: Select Networks

### Deploy OVF Template

- 1 Select an OVF template
- 2 Select a name and folder
- 3 Select a compute resource
- 4 Review details
- 5 Select storage
- 6 Select networks
- 7 Customize template
- 8 Ready to complete

### Select networks ×

Select a destination network for each source network.

Source Network	Destination Network
Control Plane	control plane <span style="float: right;">▼</span>
Northbound	VM Network <span style="float: right;">▼</span>
Eastbound	Eastbound Network <span style="float: right;">▼</span>

3 items

#### IP Allocation Settings

IP allocation: Static - Manual

IP protocol: IPv4

CANCEL
BACK
NEXT

**Step 8**

In the **Customize template** screen, set the values using the following table as a guideline for deployment.

Figure 7: Customize Template

### Deploy OVF Template

- 1 Select an OVF template
- 2 Select a name and folder
- 3 Select a compute resource
- 4 Review details
- 5 Select storage
- 6 Select networks
- 7 Customize template
- 8 Ready to complete

### Customize template

Customize the deployment properties of this software solution.

General 2 settings	
Instance Hostname	<input type="text" value="conc2431"/>
SSH Public Key	<input type="text" value="ssh-ed25519 AAAAC3Nz"/>
Node Config 11 settings	
Node Name	Must be a valid DNS name per RFC1123 (will be converted to one by if invalid). Name should match one of the zone assignments in Initiator Config <input type="text" value="conc2431"/>
Initiator Node	<input checked="" type="checkbox"/>
Supercluster Cluster Index	<input type="text" value="1"/>
Supercluster Cluster Name	Must be a valid DNS name per RFC1123 (will be converted to one by NxF if invalid) <input type="text" value="cluster1"/>
Data Volume Size (GB)	<input type="text" value="800"/>
NTP Pools (comma separated)	<input type="text" value="debian.pool.ntp.org"/>

CANCEL
BACK
NEXT

### Deploy OVF Template

- 1 Select an OVF template
- 2 Select a name and folder
- 3 Select a compute resource
- 4 Review details
- 5 Select storage
- 6 Select networks
- 7 Customize template
- 8 Ready to complete

### Customize template

NTP Servers (comma separated)	<input type="text" value="1.ntp.esl.cisco.com"/>
Cluster Join Token	<input type="text" value="hjdraqg.h3jz7w2qo61c7ynj"/>
Control Plane Node Count	<input type="text" value="1"/>
Control Plane IP (ip[/subnet])	<input type="text" value="10.1.0.71"/>
Initiator IP	Control plane IP of initiator node <input type="text" value="10.1.0.71"/>
Northbound Interface 4 settings	
Protocol	<input type="text" value="Static IP"/>
IP (ip[/subnet])	Used only if DHCP is disabled <input type="text" value="10.58.245.71/24"/>
Gateway	Used only if DHCP is disabled <input type="text" value="10.58.245.1"/>
DNS	Used only if DHCP is disabled <input type="text" value="144.254.71.184"/>
Eastbound Interface 4 settings	
Protocol	<input type="text" value="Static IP"/>

CANCEL
BACK
NEXT

### Deploy OVF Template

- 1 Select an OVF template
- 2 Select a name and folder
- 3 Select a compute resource
- 4 Review details
- 5 Select storage
- 6 Select networks
- 7 Customize template
- 8 Ready to complete

### Customize template ✕

▼ Eastbound Interface 4 settings

Protocol	Static IP ▼
IP (ip[/subnet])	Used only if DHCP is disabled 172.10.71
Gateway	Used only if DHCP is disabled 172.10.1
DNS	Used only if DHCP is disabled 144.254.71.184

▼ Initiator Config 1 settings

Northbound Virtual IP Type	Required if node is initiator L2 ▼
----------------------------	---------------------------------------

▼ Cluster Config 3 settings

Northbound Virtual IP	Required if node is initiator 10.58.245.71
Supercluster Cluster Role	worker ▼
Arbitrator Node Name	node3

CANCEL
BACK
NEXT

**Table 3: Customize Template**

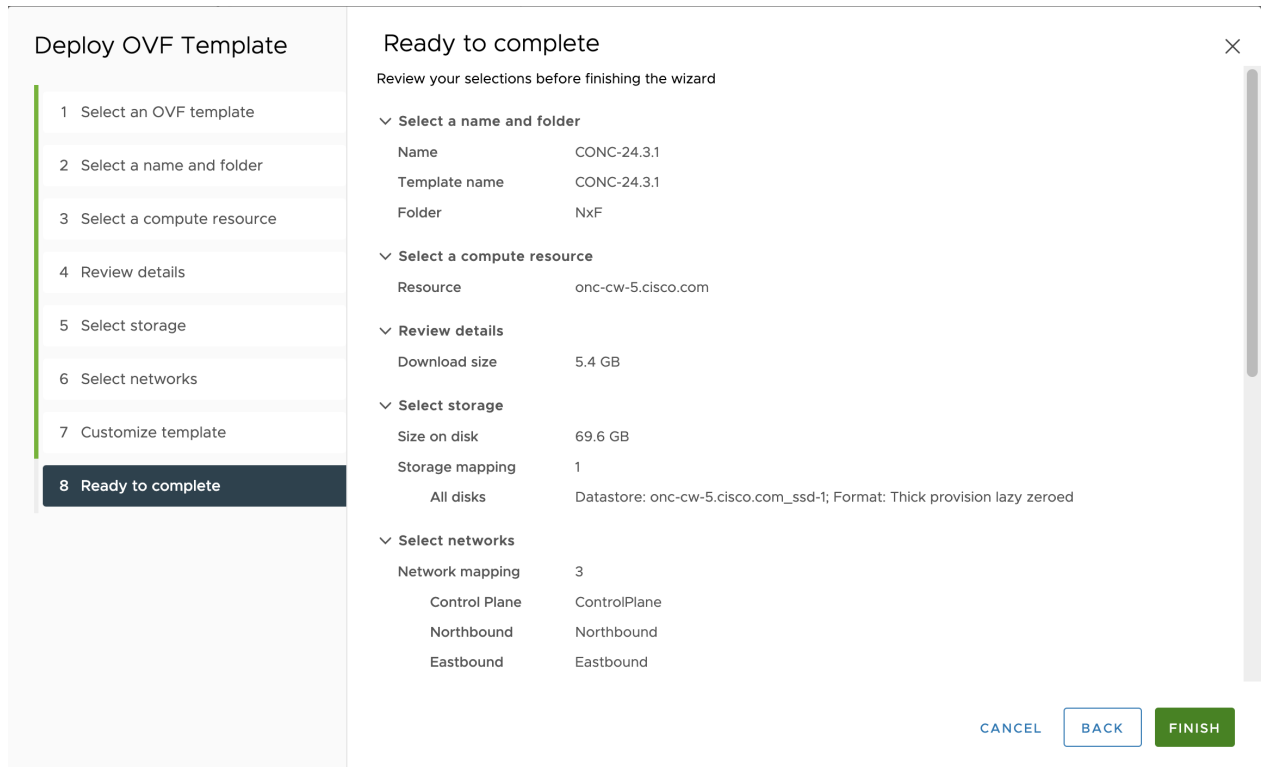
Key	Values
Instance Hostname	<instance-name>
SSH Public Key	<ssh-public-key>. Used for SSH access that allows you to connect to the instances securely without the need to manage credentials for multiple instances. SSH public key must be a ed25519 key.
Node Name	node1 Must be a valid DNS name per RFC1123.1.2.4 <ul style="list-style-type: none"> <li>Contain at most 63 characters.</li> <li>Contain only lowercase alphanumeric characters or '-'.3</li> <li>Start with an alphanumeric character.</li> <li>End with an alphanumeric character.</li> <li>Node Name should be the same as instance name.</li> </ul>
Initiator Node	Select the Checkbox
Supercluster Cluster Index	1 If you want to add your Cisco Optical Network Controller instance to a GeoHA SuperCluster in the future, use different Super Cluster Index values for each instance.

Supercluster Cluster Name	cluster1 Must be a valid DNS name per RFC1123 If you want to add your Cisco Optical Network Controller instance to a GeoHA SuperCluster in the future, use unique Super Cluster Names for each instance.
Data Volume Size (GB)	Configure data volume according to the VM profile. 800 GB and 1.5 TB for XS and S profiles respectively.
NTP Pools (comma separated)	<a href="http://debian.pool.ntp.org">debian.pool.ntp.org</a>
NTP Servers (comma separated)	<a href="http://1.ntp.esl.cisco.com">1.ntp.esl.cisco.com</a>
Cluster Join Token	Can be left with the default value
Control Plane Node Count	1
Control Plane IP (ip[/subnet])	<Private IP for the Instance> Control Plane Network
Initiator IP	<Same IP as Control Plane> Control Plane Network
Protocol	Static IP
IP (ip[/subnet]) - if not using DHCP	<Public IP for the Instance> Northbound Network
Gateway - if not using DHCP	<Gateway IP for the Instance> Northbound Network
DNS	DNS Server IP
Protocol	Static IP
IP (ip[/subnet]) - if not using DHCP	< IP for the Instance> Eastbound Network Can be a private IP <b>Warning</b> Do not include subnet when you enter this IP address.
Gateway - if not using DHCP	<Gateway IP for the Network> Eastbound Network
DNS	DNS Server IP
Northbound Virtual IP Type	L2
Northbound Virtual IP	Same as Northbound IP
Supercluster Cluster Role	worker
Arbitrator Node Name	node3

**Step 9**

In **Review the details** screen, review all your selections and click **Finish**. To check or change any properties from the review screen anytime, before clicking Finish **click BACK** to go back to the previous screen **Customize template** to add your changes.

Figure 8: Ready to Complete



**Step 10** After the VM is created, try connecting to the VM using the pem key which was generated earlier, see [SSH Key Generation](#) above. For this, use the private key that is generated along with the public key during customizing the public key options.

**Step 11** Log in to the VM using the private key.

**Note:**

- After the nodes are deployed, the deployment of OVA progress can be checked in the Tasks console of vSphere Client. After Successful deployment Cisco Optical Network Controller takes around 30 minutes to boot.
- By default, the user ID is admin, and only the password needs to be set.

**Step 12** **SSH to the node** and execute the following CLI command.

```
##Command to change permissions of key file
chmod 400 <file-name-of-your-key>.pem

ssh -i [ed25519 Private key] nxf@<northbound-ip>/<dns name assigned too the IP>
Enter passphrase for key '<file-name-of-your-key>.pem':
```

**Note** Private key is created as part of the key generation with just the **.pem** extension, and it must be set with the least permission level before using it.

**Step 13** **SSH to the node** and execute the following CLI command.

```
ssh -i [ed25519 Private key] nxf@<northbound-vip>
Enter passphrase for key '<file-name-of-your-key>.pem':
```

**Note** Private key is created as part of the key generation with just the **.pem** extension, and it must be set with the least permission level before using it.

**Step 14** After you SSH into the node, use the `sedo system status` command to check the status of all the pods.

```
sedo system status
```

System Status (Fri, 20 Sep 2024 08:21:27 UTC)					
OWNER	NAME	NODE	STATUS	RESTARTS	STARTED
onc	monitoring	node1	Running	0	3 hours ago
onc	onc-alarm-service	node1	Running	0	3 hours ago
onc	onc-apps-ui-service	node1	Running	0	3 hours ago
onc	onc-circuit-service	node1	Running	0	3 hours ago
onc	onc-collector-service	node1	Running	0	3 hours ago
onc	onc-config-service	node1	Running	0	3 hours ago
onc	onc-devicemanager-service	node1	Running	0	3 hours ago
onc	onc-inventory-service	node1	Running	0	3 hours ago
onc	onc-nbi-service	node1	Running	0	3 hours ago
onc	onc-netconfcollector-service	node1	Running	0	3 hours ago
onc	onc-osapi-gw-service	node1	Running	0	3 hours ago
onc	onc-pce-service	node1	Running	0	3 hours ago
onc	onc-pm-service	node1	Running	0	3 hours ago
onc	onc-pmcollector-service	node1	Running	0	3 hours ago
onc	onc-topology-service	node1	Running	0	3 hours ago
onc	onc-torch-service	node1	Running	0	3 hours ago
system	authenticator	node1	Running	0	12 hours ago
system	controller	node1	Running	0	12 hours ago
system	flannel	node1	Running	0	12 hours ago
system	ingress-proxy	node1	Running	0	12 hours ago
system	kafka	node1	Running	0	12 hours ago
system	loki	node1	Running	0	12 hours ago
system	metrics	node1	Running	0	12 hours ago
system	minio	node1	Running	0	12 hours ago
system	postgres	node1	Running	0	12 hours ago
system	promtail-cltmk	node1	Running	0	12 hours ago
system	vip-add	node1	Running	0	12 hours ago

**Note**

- The different pods along with their statuses including active and standby modes are all displayed in the different terminal sessions for each pod.
- All the services with owner *onc* must display the status as *Running*.

**Step 15** You can check the current version using the `sedo version` command.

```
sedo version
```

Installer: CONC 24.3.1		
NODE NAME	OS VERSION	KERNEL VERSION
node1	NxFOS 3.0-408 (f2beddad9abeb84896cc13efcd9a87c48ccb5d0c)	6.1.0-23-amd64

IMAGE NAME	VERSION
docker.io/library/alpine	3.20.0
node1	
docker.io/rancher/local-path-provisioner	v0.0.27

```

node1 |
dockerhub.cisco.com/cisco-onc-docker/dev/ciscotestautomation/pyats | 23.7.1-beta2
node1 |
quay.io/coreos/etcd | v3.5.12
node1 |
registry.k8s.io/coredns/coredns | v1.11.1
node1 |
registry.k8s.io/kube-apiserver | v1.30.2
node1 |
registry.k8s.io/kube-controller-manager | v1.30.2
node1 |
registry.k8s.io/kube-proxy | v1.30.2
node1 |
registry.k8s.io/kube-scheduler | v1.30.2
node1 |
registry.k8s.io/pause | 3.9
node1 |
registry.nxf-system.svc:8443/cisco-onc-docker/dev/alarmservice | 24.3.1-3
node1 |
registry.nxf-system.svc:8443/cisco-onc-docker/dev/circuit-service | 24.3.1-3
node1 |
registry.nxf-system.svc:8443/cisco-onc-docker/dev/collector-service | 24.3.1-3
node1 |
registry.nxf-system.svc:8443/cisco-onc-docker/dev/config-service | 24.3.1-3
node1 |
registry.nxf-system.svc:8443/cisco-onc-docker/dev/devicemanager-service | 24.3.1-3
node1 |
registry.nxf-system.svc:8443/cisco-onc-docker/dev/inventory-service | 24.3.1-3
node1 |
registry.nxf-system.svc:8443/cisco-onc-docker/dev/monitoring | release2431_latest
node1 |
registry.nxf-system.svc:8443/cisco-onc-docker/dev/nbi-service | 24.3.1-3
node1 |
registry.nxf-system.svc:8443/cisco-onc-docker/dev/netconfcollector-service | 24.3.1-3
node1 |
registry.nxf-system.svc:8443/cisco-onc-docker/dev/onc-apps-ui-service | 24.3.1-3
node1 |
registry.nxf-system.svc:8443/cisco-onc-docker/dev/osapi-gw-service | 24.3.1-3
node1 |
registry.nxf-system.svc:8443/cisco-onc-docker/dev/pce_service | 24.3.1-3
node1 |
registry.nxf-system.svc:8443/cisco-onc-docker/dev/pm-service | 24.3.1-3
node1 |
registry.nxf-system.svc:8443/cisco-onc-docker/dev/pmcollector-service | 24.3.1-3
node1 |
registry.nxf-system.svc:8443/cisco-onc-docker/dev/topology-service | 24.3.1-3
node1 |
registry.nxf-system.svc:8443/cisco-onc-docker/dev/torch | 24.3.1-3
node1 |
registry.sedona.ciscolabs.com/nxf/authenticator | 3.0-348
node1 |
registry.sedona.ciscolabs.com/nxf/bgp | 3.0-365
node1 |
registry.sedona.ciscolabs.com/nxf/controller | 3.0-384
node1 |
registry.sedona.ciscolabs.com/nxf/firewalld | 3.0-365
node1 |
registry.sedona.ciscolabs.com/nxf/flannel | 3.0-365
node1 |
registry.sedona.ciscolabs.com/nxf/ingress-proxy | 3.0-370
node1 |
registry.sedona.ciscolabs.com/nxf/iptables | 3.0-370
node1 |
registry.sedona.ciscolabs.com/nxf/kafka | 3.0-365

```

node1	registry.sedona.ciscolabs.com/nxf/loki	3.0-365
node1	registry.sedona.ciscolabs.com/nxf/metrics-exporter	3.0-365
node1	registry.sedona.ciscolabs.com/nxf/minio	3.0-365
node1	registry.sedona.ciscolabs.com/nxf/service-proxy	3.0-370
node1	registry.sedona.ciscolabs.com/nxf/syslog-forwarder	3.0-340
node1	registry.sedona.ciscolabs.com/nxf/timescale	3.0-359
node1		

**Step 16** SSH to the node and set the initial UI password for the admin user.

```
sedo security user set admin --password
```

**Step 17** To check the default admin user ID, use the command `sedo security user list`. To change the default password, use the command `sedo security user admin set --password` on the CLI console of the VM or through the web UI.

**Step 18** Use a web browser to access <https://<virtual ip>:8443/> to access the Cisco Optical Network Controller Web UI. Use the admin id and the password you set to log in to Cisco Optical Network Controller.

**Note** Access the web UI only after all the `onc` services are running. Use the `sedo system status` to verify that all services are running.