Installing the Cisco DCNM

This chapter contains the following sections:

If you are installing Cisco DCNM on SE, install the DCNM ISO Virtual Appliance (.iso) installer.

- Installing DCNM on Open Virtual Appliance, on page 1
- Installing DCNM on ISO Virtual Appliance, on page 16
- Installing Cisco DCNM SE ISO on Cisco APIC SE, on page 34
- Convert Standalone Setup to Native-HA Setup, on page 36
- Installing Cisco DCNM Compute Node, on page 40

Installing DCNM on Open Virtual Appliance

This chapter contains the following sections:

Downloading the Open Virtual Appliance File

The first step to install the Open Virtual Appliance is to download the `dcnm.ova` file. Point to that `dcnm.ova` file on your computer when deploying the OVF template.

Note If you plan to use HA application functions, you must deploy the `dcnm.ova` file twice.

Procedure

Step 1 Go to the following site: http://software.cisco.com/download/http://software.cisco.com/download/.

Step 2 In the Select a Product search box, enter **Cisco Data Center Network Manager**.

Click **Search** icon.

Step 3 Click **Data Center Network Manager** from the search results.

A list of the latest release software for Cisco DCNM available for download is displayed.

Step 4 In the Latest Releases list, choose Release 11.3(1).

Step 5 Locate the DCNM Open Virtual Appliance Installer and click the **Download** icon.

Step 6 Save the `dcnm.ova` file to your directory that is easy to find when you start to deploy the OVF template.

Deploying the Open Virtual Appliance as an OVF Template

After you download the Open Virtual Appliance file, you must deploy the OVF template from the vSphere Client application or the vCenter Server.

Note Deploy two OVAs for the HA setup.

Procedure

Step 1 Open the vCenter Server application and connect to the vCenter Server with your vCenter user credentials.

Note ESXi host must be added to the vCenter Server application.

Depending on the version of the VMware vsphere web HTML5 interface may not work properly when deploying Huge or Compute OVA, as it does not allow users to specify extra disk size. Therefore, we recommend that you use Flex interface for deploying VMs.

If you're deploying OVF template using the ESXi 6.7, the installation fails if you use Internet Explorer browser with HTML5. Ensure that you one of the following options to successfully deploy OVF template with ESXi and 6.7:

- Mozilla Firefox browser, with HTML 5 support

  Use flex interface if HTML 5 is not supported
- Mozilla Firefox browser, with flex\flash support
- Google Chrome browser, with HTML 5 support

  Use flex interface if HTML 5 is not supported

Step 2 Navigate to **Home > Inventory > Hosts and Clusters** and choose the host on which the OVF template is deployed.

Step 3 On the correct Host, right-click and select **Deploy OVF Template**.

You can also choose **Actions > Deploy OVF Template.**

Deploy OVF Template Wizard opens.

Step 4 On the Select template screen, navigate to the location where you have downloaded the OVA image.

You can choose the OVA file by one of the following methods:

- Select the **URL** radio button. Enter the path of the location of the image file.
- Select **Local File** radio button. Click **Browse**. Navigate to the directory where the image is stored. Click **OK**.

Click **Next**.

Step 5 Verify the OVA template details and click **Next**.

Step 6 On the End User License Agreement screen, read the license agreement.

Click **Accept** and click **Next**.

Step 7 On the Select name and location screen, enter the following information:

- In the Name field, enter an appropriate name for the OVF.

  Note Ensure that the VM name is unique within the Inventory.

- In the Browse tab, select **Datacenter** as the deployment location under the appropriate ESXi host.

Click **Next**.

Step 8 On the Select configuration screen, select the configuration from the drop-down list.

- Choose **Small** (Lab or POC) to configure the virtual machine with 8 vCPUs, 24GB RAM.

  Choose Small for proof-of-concept and other small-scale environments with fewer switches that are not expected to grow with time.

- Choose **Large** (Production) to configure the virtual machine with 16 vCPUs, 32GB RAM.

  We recommend that you use a Large deployment configuration when you are managing more devices to leverage better RAM, heap memory, and CPUs. For setups that could grow, choose Large.

- Choose **Compute** to configure the virtual machine with 16 vCPUs, 64GB RAM.

  You must have DCNM deployed in Compute mode to use applications in your deployment.

- Choose **Huge** to configure the virtual machine with 32 vCPUs, 128GB RAM.

  This configuration is recommended if you deploy DCNM for SAN Management and use SAN Insights feature.

Click **Next**.

Step 9 On **Select a resource** screen, select the host on which you want to deploy the OVA template.

Click **Next**.

Step 10 On **Select storage** screen, based on the Datastore and Available space choose the disk format and the destination storage for the virtual machine file.

a) Select the virtual disk format from the drop-down list.

The available disk formats are:

Note Choose one of the thick provision types if you have enough storage capacity as required by the virtual appliance and want to set a specific allocation of space for the virtual disks.

- **Thick Provision Lazy Zeroed**: The space that is required for the virtual disk is allocated when the virtual disk is created. The data that remains on the physical device is not erased when the virtual disk is created but is zeroed out on demand later on first write from the virtual disk.
- **Thin Provision**: The disk space available is less than 100 GB. The initial disk consumption is 3GB and increases as the size of the database increases with the number of devices being managed.

- **Thick Provision Eager Zeroed**: The space that is required for the virtual disk is allocated when the virtual disk is created. Unlike the Lazy Zeroed option, the data that remains on the physical device is erased when the virtual disk is created.

  Note With 500G, the DCNM installation will appear to be stuck with option Thick Provision Eager Zeroed. However, it takes longer time to complete.

b) Select the VM storage policy from the drop-down list.

By default, no policy is selected.

c) Check the **Show datastores from Storage DRS clusters** to view the clusters' datastores.
d) Select the destination storage for the virtual machine, available in the datastore.

Click **Next**.

Step 11 On the Select Networks screen, map the networks that are used in the OVF template to networks in your inventory.

- **dcnm-mgmt network**

  This network provides connectivity (SSH, SCP, HTTP, HTTPS) to the Cisco DCNM Open Virtual Appliance. Associate this network with the portgroup that corresponds to the subnet that is associated with the DCNM Management network.

- **enhanced-fabric-mgmt**

  This network provides enhanced fabric management of Nexus switches. You must associate this network with the port group that corresponds to management network of leaf and spine switches.

- **enhanced-fabric-inband**

  This network provides in-band connection to the fabric. You must associate this network with port group that corresponds to a fabric in-band connection.

However, you can edit the network properties after installation, if required, using the **appmgr update network-properties** command. For more information, see Editing Network Properties Post DCNM Installation.

From the Destination Network drop-down list, choose to associate the network mapping with the port group that corresponds to the subnet that is associated with the corresponding network.

If you are deploying more than one DCNM Open Virtual Appliance for HA functionality, you must meet the following criteria:

- Both OVAs must have their management access (eth0), enhanced fabric management (eth1) and inband management (eth2) interfaces in the same subnet.
- Each OVA must have their eth0-eth1 and eth2 interfaces in different subnets.
- Both OVAs must be deployed with the same administrative password. This is to ensure that both OVAs are duplicates of each other for application access.

  Do not use the following characters in your password: <SPACE> " & $ % ' ^ = < > ; : ` \ | / , .*

Click **Next**.

Step 12 On **Customize template** screen, enter the Management Properties information.

Enter the **IP Address** (for the outside management address for DCNM), **Subnet Mask**, and **Default Gateway**.

Note During Native HA installation and upgrade, ensure that you provide appropriate Management Properties for both Active and Standby appliances.

Ensure that add valid values for the **Management Network** properties. Properties with invalid values will not be assigned. The VM will not power on until you enter valid values.

From Release 11.3(1), for Huge and Compute configurations, you can add extra disk space on the VM. You can add from 32GB up to 1.5TB of disk space. In the **Extra Disk Size** field, enter the extra disk size that will be created on the VM.

Click **Next**.

Step 13 On **Ready to Complete** screen, review the deployment settings.

Click **Back** to go to the previous screens and modify the configuration.

Click **Finish** to deploy the OVF template.

You can see the deployment status in the Recent Tasks area on the vSphere Client.

Note If this deployment is a part of the upgrade process, do not Power on the VM. Edit and provide the 11.0(1) or 11.1(1) or 11.2(1) MAC address and power on the VM.

Step 14 After the installation is complete, right click on the installed VM and select **Power > Power On**.

Note Before you power on the VM, ensure that you have reserved appropriate resources for the VM, such as CPU and memory, based on the chosen deployment configuration.

You can see the status in the Recent Tasks area.

Step 15 Navigate to the Summary tab and click **Settings** icon and select **Launch Web Console**.

A message indicating that the DCNM appliance is configuring appears on the screen.

```
************************************************************
Please point your web browser to
https://<IP-address>:<port-number>
to complete the application
************************************************************
```

Copy and paste the URL to the browser to complete the installation, using the Web Installer.

What to do next

The DCNM installer creates a _deviceImage-0.iso in the DCNM VM folder and mounts the ISO permanently to the VM. If this ISO is removed or the CD/DVD is disconnected, the VM will not boot. The VM will enter Emergency Mode and prompt you with the message: Give root password for maintenance. If the VM is down, CD/DVD drive can be disconnected. However, after you power it up again, the VM will enter Emergency Mode and provide a prompt.

You can choose to install DCNM in Standalone mode or Native HA mode. Refer to Installing Cisco DCNM ISO in Standalone Mode, on page 24 or Installing the Cisco DCNM ISO in Native HA mode, on page 27 for more information.

Installing the Cisco DCNM OVA in Standalone Mode

Paste the URL displayed on the Console tab and hit Enter key. A welcome message appears.

To complete the installation of Cisco DCNM from the web installer, perform the following procedure.

Procedure

Step 1 On **Welcome to Cisco DCNM** screen, click **Get Started**.

Step 2 On **Cisco DCNM Installer** screen, select **Fresh Installation – Standalone** radio button.

Click **Continue**.

Step 3 On **Administration** tab, enter the password that is used to connect to all the applications in the Cisco DCNM Open Virtual Appliance.

Adhere to the following password requirements. If you do not comply with the requirements, the DCNM application may not function properly.

- It must be at least eight characters long and contain at least one alphabet and one numeral.
- It can contain a combination of alphabets, numerals, and special characters.
- Do not use any of these special characters in the DCNM password for all platforms:

  <SPACE> " & $ % ' ^ = < > ; : ` \ | / , .*

Select the **Show passwords in clear text** checkbox to view the password you have typed.

Click **Next**.

Step 4 In **Install Mode** tab, from the drop-down list, choose **Media Controller** installation mode for the OVA DCNM Appliance.

Click **Next**.

Step 5 On the **System Settings** tab, configure the settings for the DCNM Appliance.

- In the Fully Qualified Hostname field, enter the hostname that is a fully qualified domain name (FQDN) as per RFC1123, section 2.1.
- In the DNS Server Address field, enter the DNS IP address.

  Beginning with Release 11.2(1), you can also configure the DNS server using an IPv6 address.
- In the NTP Server field, enter the IP address of the NTP server.

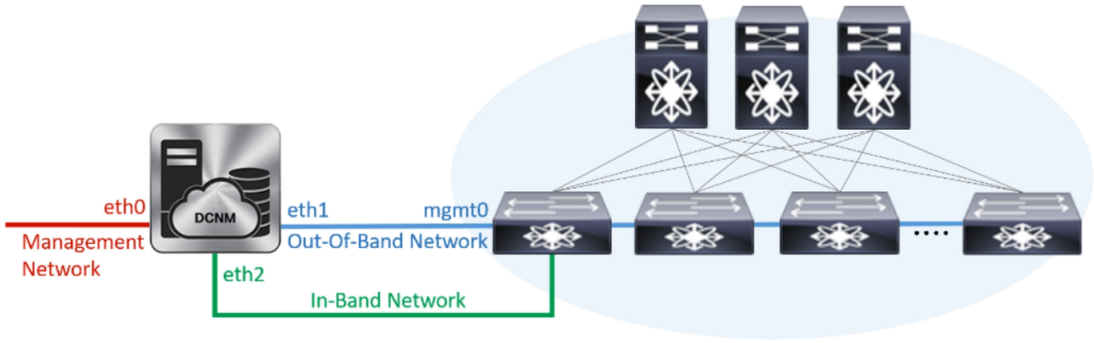
  The value must be an IP or IPv6 address or RFC 1123 compliant name.

From Release 11.3(1), you can configure more than one DNS server and NTP server.

Click **Next**.

Step 6 On **Network Settings** tab, configure the network parameters.

Figure 1: Cisco DCNM Management Network Interfaces



a) In **Management Network** area, verify if the auto-populated IP Address and Default Gateway address are correct. Modify, if necessary.

Note Beginning with Cisco DCNM Release 11.2(1), you can also use an IPv6 address for the Management Network.

(Optional) Enter a valid IPv6 address along with the prefix to configure the Management address and the Management Network Default IPv6 Gateway.

b) In **Out-of-Band Network** area, enter the IP address, gateway IP Address. If DCNM is on the IPv6 network, configure the network with an IPv6 Address.

Out-of-band management provides a connection to the device management ports (Typically mgmt0).

Note If the out-of-band network is not configured, you cannot configure Cisco DCNM in Cluster mode.

c) In **In-Band Network** area, enter the IP Address and gateway IP Address for the in-band network.

The In-Band Network provides reachability to the devices via the front-panel ports.

Note If you do not configure in-band network, Endpoint Locator and Telemetry features are not operational.

However, you can edit the network properties after installation, if required, using the **appmgr update network-properties** command. For more information, see Editing Network Properties Post DCNM Installation.

Click **Next**.

Step 7 On the **Applications** tab, in the IPv4 Subnet field, enter the IP subnet to access the applications that run internally to DCNM.

All the applications use the IP Address from this subnet.

The Cluster Mode configuration area appears only if you have selected the Enable Clustered Mode checkbox in Step Step 4, on page 6.

Note In Clustered mode, the Cisco DCNM Applications run on separate DCNM Compute Nodes.

a. In the **Out-of-Band IPv4 Network Address Pool**, enter the address pool from the out-of-band IPv4 network to be used in the Clustered Mode.

The address must be a smaller prefix of available IP addresses from the eth1 subnet. For example: Use 10.1.1.240/28 if the eth1 subnet was configured as 10.1.1.0/24 during installation.

This subnet must be a minimum of /28 (16 addresses) and maximum of /24 (256 addresses). It should also be longer than the east-west pool. This subnet is assigned to containers, to communicate with the switches.

b. In the **Out-of-Band IPv6 Network Address Pool**, enter the address pool from the out-of-band IPv6 network to be used in the Clustered Mode. The address pool must be an IPv6 subnet.

c. In the In-Band IPv4 Network Address Pool, enter the address pool from the out-of-band IPv4 network to be used in the Clustered Mode.

The address must be a smaller prefix of available IP addresses eth2 subnet. For example: Use 11.1.1.240/28 if the eth2 subnet was configured as 11.1.1.0/24 during installation.

This subnet must be a minimum of /28 (16 addresses) and maximum of /24 (256 addresses). It should also be longer than the east-west pool. This subnet is assigned to containers, to communicate with the switches.

d. In the In-Band IPv6 Network Address Pool, enter the address pool from the in-band IPv6 network to be used in the Clustered Mode. The address pool must be an IPv6 subnet.

Click **Next**.

Step 8 On the Summary tab, review the configuration details.

Click **Previous** to go to the previous tabs and modify the configuration. Click **Start Installation** to complete the Cisco DCNM Installation for the chosen deployment mode.

A progress bar appears showing the completed percentage, description of the operation, and the elapsed time during the installation. After the progress bar shows 100%, click **Continue**.

A success message appears with the URL to access DCNM Web UI.

```
************************************************************
Your Cisco Data Center Network Manager software has been installed.
DCNM Web UI is available at
https://<<IP Address>>
You will be redirected there in 60 seconds.
Thank you
************************************************************
```

Note If the Cisco DCNM is running behind a firewall, ensure that you open the port 2443 to launch Cisco DCNM Web UI.

Note If you try to access the DCNM Web UI using the Management IP address while the installation is still in progress, an error message appears on the console.

```
************************************
*Preparing Appliance*

************************************
```

What to do next

Log on to the DCNM Web UI with appropriate credentials.

Click the **Settings** icon and choose **About DCNM**. You can view and verify the Installation type that you have deployed.

If you have configured inband management (eth2) IP addresses for device management, login to standalone server and configure the inband network reachability from eth2 of the server to the switches by using the following commands:

```
dcnm# appmgr setup inband-route --subnet switches-fabric-links-IP-subnet/mask
dcnm# appmgr setup inband-route --subnet switch-loopback-IP-subnet>/mask
```

For example: If you have four switches with all fabric links connected through 10.0.0.x/30 subnet, and if all switches are configured with the loopback interface for inband reachability in subnet 40.1.1.0/24, use the following commands:

```
dcnm# appmgr setup inband-route --subnet 10.0.0.0/24
dcnm# appmgr setup inband-route --subnet 40.1.1.0/24
```

Installing the Cisco DCNM OVA in Native HA mode

The native HA is supported on DCNM appliances with ISO or OVA installation only.

By default, an embedded PostgreSQL database engine with the Cisco DCNM. The native HA feature allows two Cisco DCNM appliances to run as active and standby applications, with their embedded databases synchronized in real time. Therefore, when the active DCNM is not functioning, the standby DCNM takes over with the same database data and resume the operation.

Perform the following task to set up Native HA for DCNM.

Procedure

Step 1 Deploy two DCNM Virtual Appliances (either OVA or ISO).

For example, let us indicate them as **dcnm1** and **dcnm2**.

Step 2 Configure **dcnm1** as the Primary node. Paste the URL displayed on the Console tab of **dcnm1** and press **Enter** key.

A welcome message appears.

a) On the Welcome to Cisco DCNM screen, click **Get Started**.
b) On the Cisco DCNM Installer screen, select **Fresh Installation - HA Primary** radio button, to install **dcnm1** as Primary node.

   Click **Continue**.

c) On the Administration tab, enter the password that is used to connect to all the applications in the Cisco DCNM Open Virtual Appliance.

   Adhere to the following password requirements. If you do not comply with the requirements, the DCNM application may not function properly.

   - It must be at least eight characters long and contain at least one alphabet and one numeral.
   - It can contain a combination of alphabets, numerals, and special characters.

- Do not use any of these special characters in the DCNM password for Linux, Windows, OVA, and ISO platforms:

  <SPACE> " & $ % ' ^ = < > ; : ` \ | / , .*

Select the **Show passwords in clear text** checkbox to view the password you have typed.

Click **Next**.

d) In the Install Mode tab, from the drop-down list, choose **Media Controller** installation mode for the DCNM Appliance.

Check the **Enable Clustered Mode** checkbox, if you want to deploy Cisco DCNM in Cluster mode.

The Compute nodes will be displayed on the Cisco DCNM **Web UI > Applications > Compute**. You can add the compute nodes to a Cluster, later.

Note If **Enable Clustered Mode** is selected, applications such as, Config Compliance, EPL, and NIA, and NIR won't work until you install the compute nodes.

Click **Next**.

e) On the System Settings, configure the settings for the DCNM Appliance.

- In the Fully Qualified Hostname field, enter the hostname that is a fully qualified domain name (FQDN) as per RFC1123, section 2.1.
- In the DNS Server Address field, enter the DNS IP address.

  Beginning with Release 11.2(1), you can also configure the DNS server using an IPv6 address.
- In the NTP Server field, enter the IP address of the NTP server.

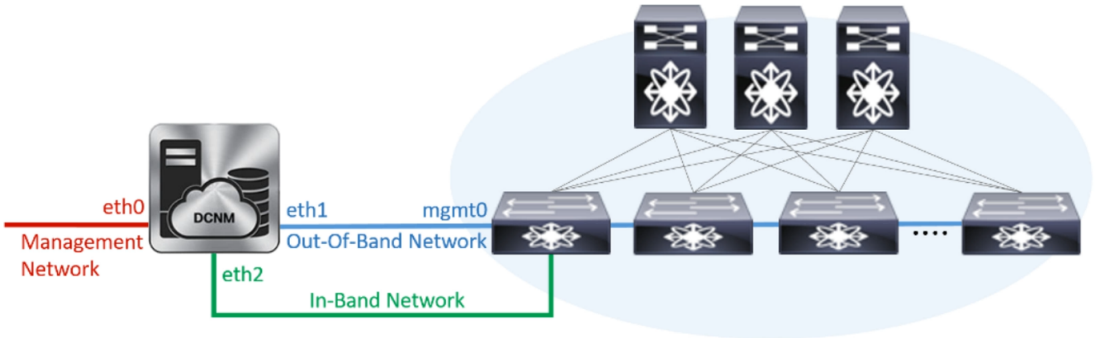
  The value must be an IP or IPv6 address or RFC 1123 compliant name.

From Release 11.3(1), you can configure more than one DNS server and NTP server.

Click **Next**.

f) On the **Network Settings** tab, configure the network parameters.

Figure 2: Cisco DCNM Management Network Interfaces



- In the Management Network area, verify is the auto-populated IP Address and Default gateway address are correct. Modify, if necessary.

Note Beginning with Cisco DCNM Release 11.2(1), you can also use an IPv6 address for the Management Network.

(Optionally) Enter a valid IPv6 address along with the prefix to configure the Management address and the Management Network Default IPv6 Gateway.

- In the Out-of-Band Network area, enter the IP address, gateway IP Address. If DCNM is on the IPv6 network, configure the network with an IPv6 Address.

  Out-of-band management provides a connection to the device management ports (Typically mgmt0).

  Note If the out-of-band network is not configured, you cannot configure Cisco DCNM in Cluster mode.

- In the In-Band Network area, enter the VIP Address and gateway IP Address for the in-band network. The In-Band Network provides reachability to the devices via the front-panel ports.

  Note If you do not configure in-band network, Endpoint Locator and Telemetry features are not operational.

- In the Internal Application Services Network area, enter the IP subnet to access the applications that run internally to DCNM.

  All the applications use the IP Address from this subnet.

  Note Ensure that you configure the same IP subnet on both the Primary HA and the Secondary HA node.

However, you can edit the network properties after installation, if required, using the **appmgr update network-properties** command. For more information, see Editing Network Properties Post DCNM Installation.

Click **Next**.

g) On the HA Settings tab, a confirmation message appears.

```
You are installing the primary DCNM HA node.
Please note that HA setup information will need to
be provided when the secondary DCNM HA node is
installed.
```

Click **Next**.

h) On the **Applications** tab, in the IPv4 Subnet field, enter the IP subnet to access the applications that run internally to DCNM.

All the applications use the IP Address from this subnet.

The Cluster Mode configuration area appears only if you have selected the Enable Clustered Mode checkbox in Step 2.d, on page 10.

Note In Clustered mode, the Cisco DCNM Applications run on separate DCNM Compute Nodes.

1. In the **Out-of-Band IPv4 Network Address Pool**, enter the address pool from the out-of-band IPv4 network to be used in the Clustered Mode.

   The address must be a smaller prefix of available IP addresses from the eth1 subnet. For example: Use 10.1.1.240/28 if the eth1 subnet was configured as 10.1.1.0/24 during installation.

   This subnet must be a minimum of /28 (16 addresses) and maximum of /24 (256 addresses). It should also be longer than the east-west pool. This subnet is assigned to containers, to communicate with the switches.

2. In the **Out-of-Band IPv6 Network Address Pool**, enter the address pool from the out-of-band IPv6 network to be used in the Clustered Mode. The address pool must be an IPv6 subnet.

3. In the In-Band IPv4 Network Address Pool, enter the address pool from the out-of-band IPv4 network to be used in the Clustered Mode.

   The address must be a smaller prefix of available IP addresses eth2 subnet. For example: Use 11.1.1.240/28 if the eth2 subnet was configured as 11.1.1.0/24 during installation.

   This subnet must be a minimum of /28 (16 addresses) and maximum of /24 (256 addresses). It should also be longer than the east-west pool. This subnet is assigned to containers, to communicate with the switches.

4. In the In-Band IPv6 Network Address Pool, enter the address pool from the in-band IPv6 network to be used in the Clustered Mode. The address pool must be an IPv6 subnet.

Click **Next**.

i) On the Summary tab, review the configuration details.

Click **Previous** to go to the previous tabs and modify the configuration. Click **Start Installation** to complete the Cisco DCNM Installation for the chosen deployment mode.

A progress bar appears to show the completed percentage, description of the operation, and the elapsed time during the installation. After the progress bar shows 100%, click **Continue**.

A warning message appears stating that the setup is not complete until you install the Secondary node.

```
WARNING: DCNM HA SETUP IS NOT COMPLETE!
Your Cisco Data Center Network Manager software has been installed on
this HA primary node.
However, the system will be ready to be used only after installation
of the secondary node has been completed.
Thank you.
```

Step 3 Configure **dcnm2** as the Secondary node. Paste the URL displayed on the Console tab of **dcnm2** and hit Enter.

A welcome message appears.

a) On the Welcome to Cisco DCNM screen, click **Get Started**.
b) On the Cisco DCNM Installer screen, select **Fresh Installation - HA Secondary** radio button, to install **dcnm2** as Secondary node.

Click **Continue**.

c) On the Administration tab, enter the password that is used to connect to all the applications in the Cisco DCNM Open Virtual Appliance.

Note The password for the secondary node must be the same as the Administrative password for primary, as entered in Step 2.c, on page 9.

Click **Next**.

d) In the Install Mode tab, from the drop-down list, choose the same installation mode that you selected for the Primary node.

Note The HA installation fails if you do not choose the same installation mode as Primary node.

Click **Next**.

e) On the System Settings, configure the settings for the DCNM Appliance.

- In the Fully Qualified Hostname field, enter the hostname that is a fully qualified domain name (FQDN) as per RFC1123, section 2.1.
- In the DNS Server Address field, enter the DNS IP address.

  Beginning with Release 11.2(1), you can also configure the DNS server using an IPv6 address.
- In the NTP Server field, enter the IP address of the NTP server.

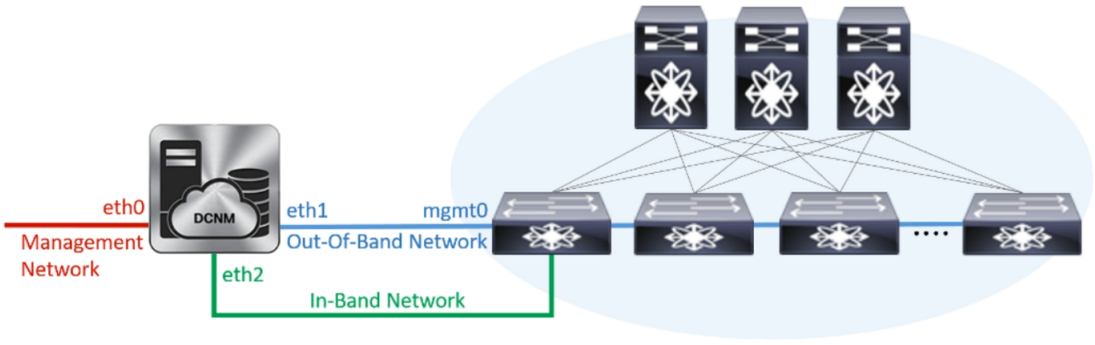
  The value must be an IP or IPv6 address or RFC 1123 compliant name.

From Release 11.3(1), you can configure more than one DNS server and NTP server.

Click **Next**.

f) On the Network Settings tab, configure the network parameters.

Figure 3: Cisco DCNM Management Network Interfaces



- In the Management Network area, verify is the auto-populated IP Address and Default gateway address are correct. Modify, if necessary.

  Note Ensure that the IP Address belongs to the same Management Network as configured on the Primary node for HA setup to complete successfully.

  Note Beginning with Cisco DCNM Release 11.2(1), you can also use an IPv6 address for the Management Network.

(Optionally) Enter a valid IPv6 address along with the prefix to configure the Management address and the Management Network Default IPv6 Gateway.

- In the Out-of-Band Network area, enter the IP address, gateway IP Address. If DCNM is on the IPv6 network, configure the network with an IPv6 Address.

  Out-of-band management provides a connection to the device management ports (Typically mgmt0).

  Note Ensure that the IP Address, IP address gateway, and the IPv6 address belong to the same Out-of-Band Network as configured on the Primary node for HA setup to complete successfully.

  Note If the out-of-band network is not configured, you cannot configure Cisco DCNM in Cluster mode.

  You can also configure an IPv6 address for out-of-band management network.

- In the In-Band Network area, enter the IP Address and gateway IP Address for the in-band network. The In-Band Network provides reachability to the devices via the front-panel ports.

  Note If you do not configure in-band network, Endpoint Locator and Telemetry features are not operational.

  However, you can edit the network properties after installation, if required, using the **appmgr update network-properties** command. For more information, see Editing Network Properties Post DCNM Installation.

- In the Internal Application Services Network area, enter the IP subnet to access the applications that run internally to DCNM.

  All the applications use the IP Address from this subnet.

  Note Ensure that you configure the same IP subnet on both the Primary HA and the Secondary HA node.

Click **Next**.

g) On the **Applications** tab, in the IPv4 Subnet field, enter the IP subnet to access the applications that run internally to DCNM.

All the applications use the IP Address from this subnet.

Note Ensure that you configure the same IP subnet on both the Primary HA and the Secondary HA node.

Click **Next**.

h) On the HA Settings tab, configure the system settings..

- In the Management IP Address of primary DCNM node field, enter the appropriate IP Address to access the DCNM UI.
- In the VIP Fully qualified Host Name field, enter hostname that is a fully qualified domain name (FQDN) as per RFC1123, section 2.1.
- Enter the Management Network VIP address, VIPv6 address, and OOB Network VIP address appropriately.

Note If you have configured the Management network using IPv6 address, ensure that you configure the Management Network VIPv6 Address.

- Enter OOB Network VIPv6 Address to configure IPv6 address for VIP.
- In the In-Band Network area, enter the VIP Address for the in-band network.

  This is the VIP address for the In-Band network. This field is mandatory if you have provided an IP address for In-Band network in the Network Settings tab.
- Enter the HA ping IP address if necessary.

  HA_PING_ADDRESS, must be different from the DCNM Active and Standby addresses.

  You must configure the HA ping IP Address to avoid the Split Brain scenario. This address must belong to Enhanced Fabric management network.

Click **Next**.

i) On the Summary tab, review the configuration details.

Click **Previous** to go to the previous tabs and modify the configuration. Click **Start Installation** to complete the Cisco DCNM OVA Installation for the chosen deployment mode.

A progress bar appears to show the completed percentage, description of the operation, and the elapsed time during the installation. After the progress bar shows 100%, click **Continue**.

A success message appears with the URL to access DCNM Web UI.

```
************************************************************
Your Cisco Data Center Network Manager software has been installed.
DCNM Web UI is available at
https://<<IP Address>>
You will be redirected there in 60 seconds.
Thank you
************************************************************
```

Note If the Cisco DCNM is running behind a firewall, ensure that you open the port 2443 to launch Cisco DCNM Web UI.

What to do next

Log on to the DCNM Web UI with appropriate credentials.

Click the **Settings** icon and choose **About DCNM**. You can view and verify the Installation type that you have deployed.

If you have configured inband management (eth2) IP addresses for device management, login to standalone server and configure the inband network reachability from eth2 of the server to the switches by using the following commands:

```
dcnm# appmgr setup inband-route --subnet switches-fabric-links-IP-subnet/mask
dcnm# appmgr setup inband-route --subnet switch-loopback-IP-subnet>/mask
```

For example: If you have four switches with all fabric links connected through 10.0.0.x/30 subnet, and if all switches are configured with the loopback interface for inband reachability in subnet 40.1.1.0/24, use the following commands:

```
dcnm# appmgr setup inband-route --subnet 10.0.0.0/24
dcnm# appmgr setup inband-route --subnet 40.1.1.0/24
```

Installing DCNM on ISO Virtual Appliance

This chapter contains the following sections:

Note The screenshots in this section may change in your setup based on how you are booting the ISO; you will either see the blue (BIOS) screen or the black (UEFI) screen.

If you are installing Cisco DCNM on SE, install the DCNM ISO Virtual Appliance (.iso) installer.

Downloading the ISO Virtual Appliance File

The first step to installing the ISO Virtual Appliance is to download the `dcnm.iso` file. You must point to that dcnm.iso file on your computer when preparing the server for installing DCNM.

Note If you plan to use HA application functions, you must deploy the `dcnm.iso` file twice.

Procedure

Step 1 Go to the following site: http://software.cisco.com/download/http://software.cisco.com/download/.

Step 2 In the Select a Product search box, enter Cisco Data Center Network Manager.

Click on Search icon.

Step 3 Click on **Data Center Network Manager** from the search results.

A list of the latest release software for Cisco DCNM available for download is displayed.

Step 4 In the Latest Releases list, choose Release 11.3(1).

Step 5 Locate the DCNM ISO Virtual Appliance Installer and click the **Download** icon.

Step 6 Locate the DCNM VM templates at DCNM Virtual Appliance definition files for VMWare (.ovf) and KVM (domain XMLs) environment and click **Download**.

Step 7 Save the `dcnm.iso` file to your directory that will be easy to find when you being the installation.

What to do next

You can choose to install DCNM On KVM or Baremetal servers. Refer to Installing the DCNM ISO Virtual Appliance on KVM, on page 23 or Installing the DCNM ISO Virtual Appliance on UCS (Bare Metal), on page 17 for more information.

Installing the DCNM ISO Virtual Appliance on UCS (Bare Metal)

From Release 11.3(1), you can install Cisco DCNM ISO using an additional mode where the physical interfaces are bound together for a port channel or ethernet channel configured as a trunk with the management traffic, out-of-band traffic, and in-band traffic separated in different VLANs.

Ensure that the switch is configured correctly for bundled interface mode. The following shows a sample switch configuration for bundled interface mode:

```
vlan 100
vlan 101
vlan 102
interface port-channel1
  switchport
  switchport mode trunk

interface Ethernet101/1/1
  switchport mode trunk
  channel-group 1
  no shutdown

interface Ethernet101/1/2
  switchport mode trunk
  channel-group 1
  no shutdown

interface Ethernet101/1/3
  switchport mode trunk
  channel-group 1
  no shutdown

interface Ethernet101/1/4
  switchport mode trunk
  channel-group 1
  no shutdown
```

Perform the following tasks to install the DCNM ISO virtual appliance on UCS.

Procedure

Step 1 Launch Cisco Integrated Management Controller (CIMC).

Step 2 Click the **Launch KVM** button.

You can either launch Java-based KVM or HTML-based KVM.

Step 3 Click the URL displayed on the window to continue loading the KVM client application.

Step 4 On the Menu bar, click **Virtual Media > Activate Virtual Devices**.

Step 5 Click **Virtual Media** and choose one of the following mediums to browse and upload DCNM ISO images from the following:

- Map CD/DVD
- Map Removable Disk
- Map Floppy Disk

Navigate to the location where the ISO image is located and load the ISO image.

Step 6 Select **Power > Reset System (warm boot)** and Ok to continue and restart the UCS box.

Step 7 Press **F6** interrupt the reboot process when the server starts to select a boot device. The boot selection menu appears.

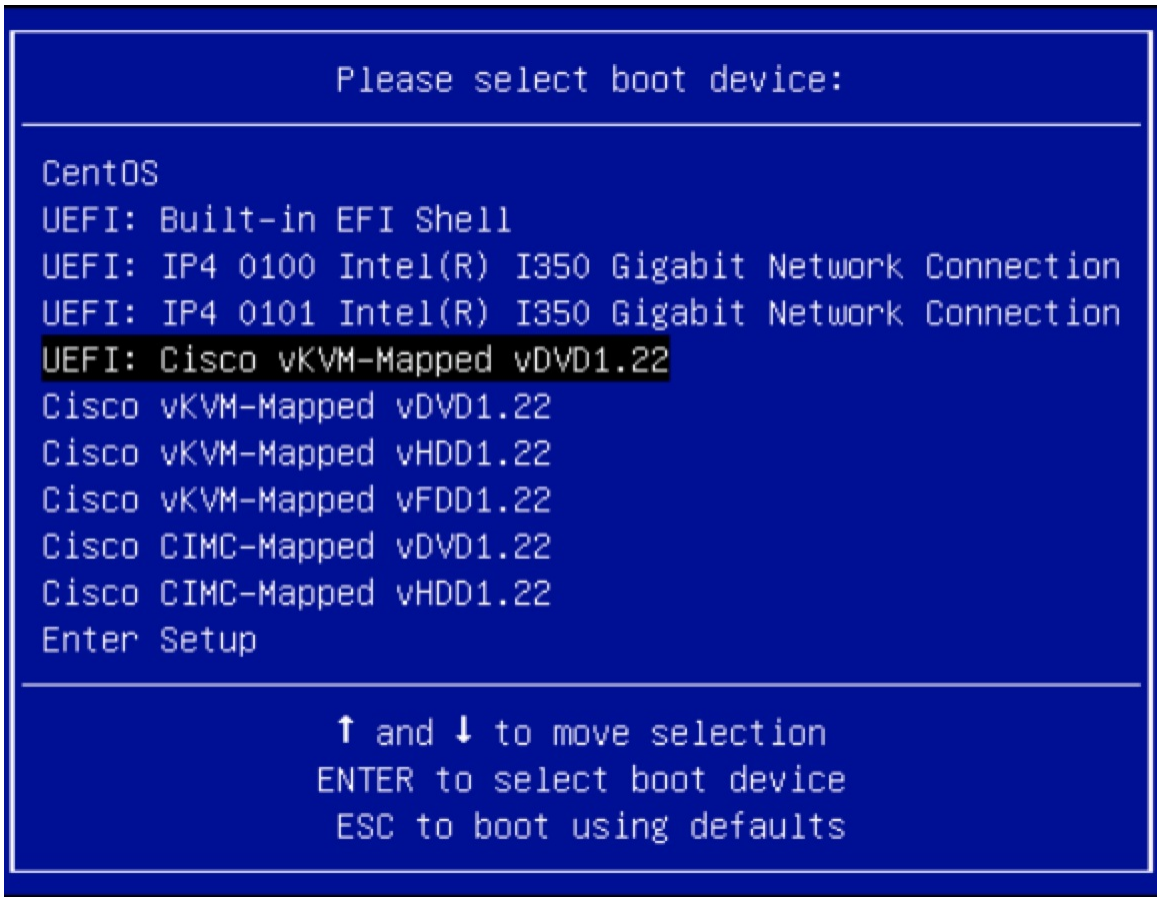
For more information about using the UCS KVM Console window, see the Cisco UCS Server Configuration Utility, Release 3.1 User Guide at the following URL:

https://www.cisco.com/c/en/us/td/docs/unified_computing/ucs/sw/ucsscu/user/guide/31/UCS_SCU/booting.html#wp1078073

Step 8 Use the arrow keys to select Cisco Virtual CD/DVD and press **Enter**. The server boots with the DCNM ISO image from the mapped location.

Note The following image highlights UEFI installation. However, you can also choose **Cisco vKVM-Mapped vDVD1.22** for BIOS installation. ISO can be booted in both modes, BIOS, and UEFI.

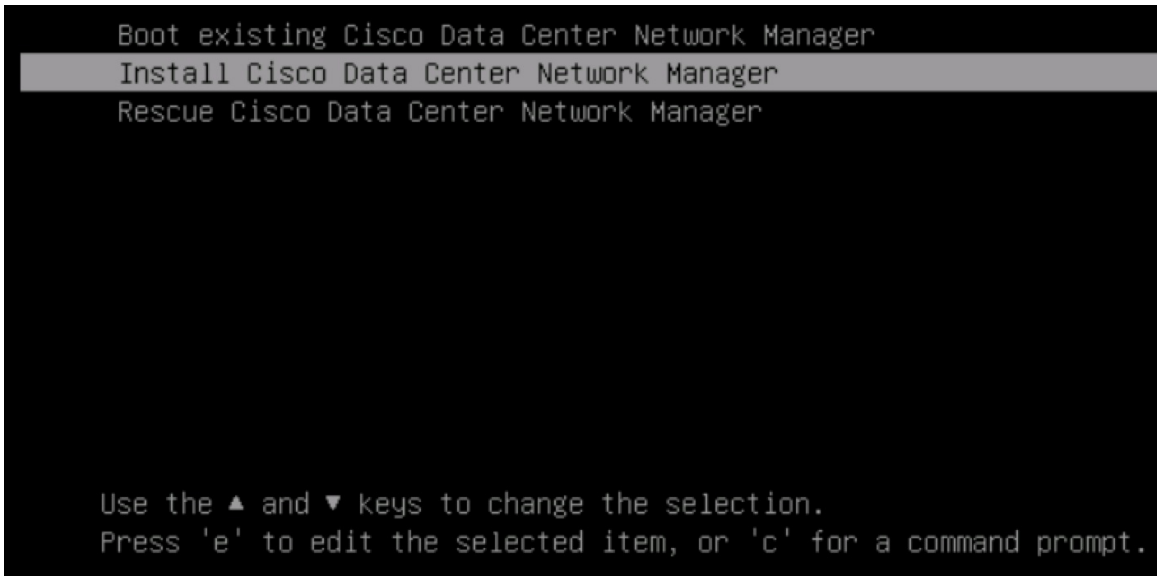
UEFI is mandatory for a system with minimum of 2TB disks.



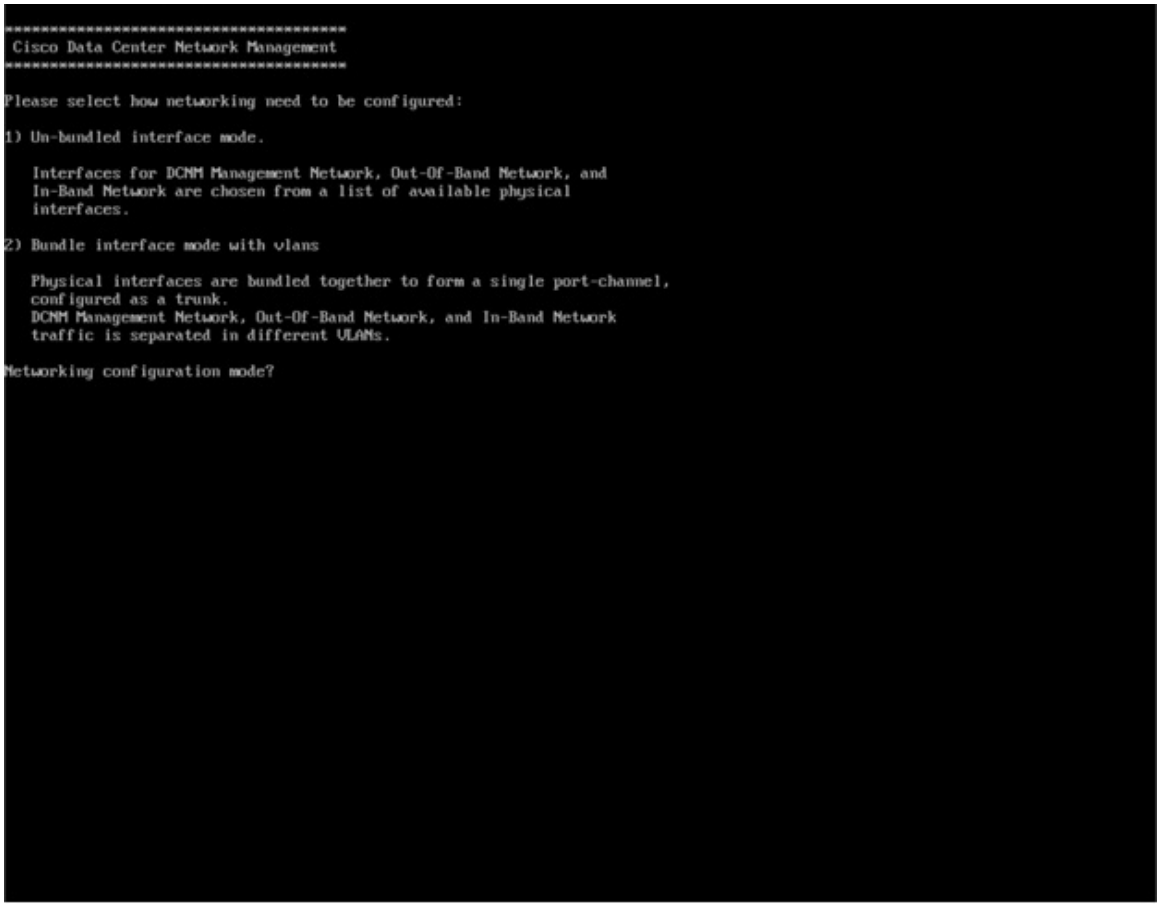
For Cisco UCS with the disk size of 2TB or higher and with 4K sector size drivers, the UEFI boot option is required. For more information, see UEFI Boot Mode.

Step 9 Select **Install Cisco Data Center Network Manager** using the up or down arrow keys. Press **Enter**.

The option shown in the following image appears when the ISO image is booted with UEFI.



Step 10 On the Cisco Management Network Management screen, select the mode to configure the network.



Enter 1 to configure the Cisco DCNM network interfaces from the available physical interfaces.

Enter 2 to configure the Cisco DCNM network interfaces from the available physical interfaces that are bundled together to form a single port-channel, configured as a trunk.

Step 11 If you entered 1, to install Cisco DCNM ISO in un-bundled interface mode, select the interface for the networks. The list of available interfaces is displayed on the screen.

Choose the Management Interface (eth0) and Out-of-Band interface (eth1) from the Network Interface List. You can also configure the in-band interface (eth2) if necessary.

```
*************************************
 Cisco Data Center Network Management
*************************************

Network Interface List
------------------------------------------------------------
1) 0b:00.0 Cisco Systems Inc VIC Ethernet NIC (rev a2)
   Address: 70:69:5a:f9:5e:19    Link:UP
2) 0c:00.0 Cisco Systems Inc VIC Ethernet NIC (rev a2)
   Address: 70:69:5a:f9:5e:1a    Link:DOWN
3) 01:00.0 Intel Corporation I350 Gigabit Network Connection (rev 01)
   Address: 00:be:75:49:c2:86    Link:UP
4) 01:00.1 Intel Corporation I350 Gigabit Network Connection (rev 01)
   Address: 00:be:75:49:c2:87    Link:UP

Please select the interfaces to use from the list above:
Management Interface (eth0) : 3
Out-Of-Band Interface (eth1) : 4

Configure In-Band Interface (eth2)? [y/n]: y
In-Band Interface (eth2) : 1
```

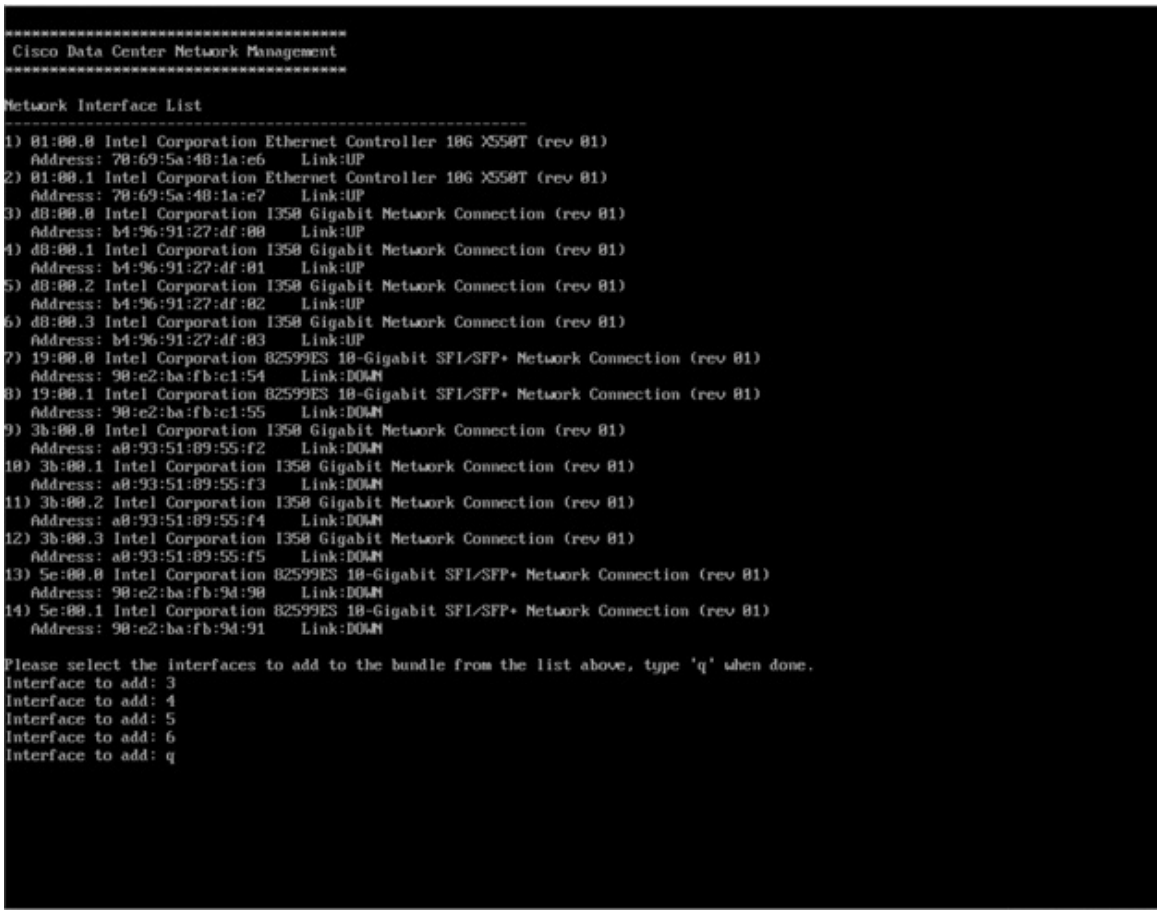
However, you can edit the network properties after installation, if required, using the **appmgr update network-properties** command. For more information, see Editing Network Properties Post DCNM Installation.

Step 12 If you entered 2, to install Cisco DCNM ISO in bundled interface mode, perform the following tasks:

a) Select interface from the list to form a bundle.

Note A minimum of one physical interface must be a part of the bundle.

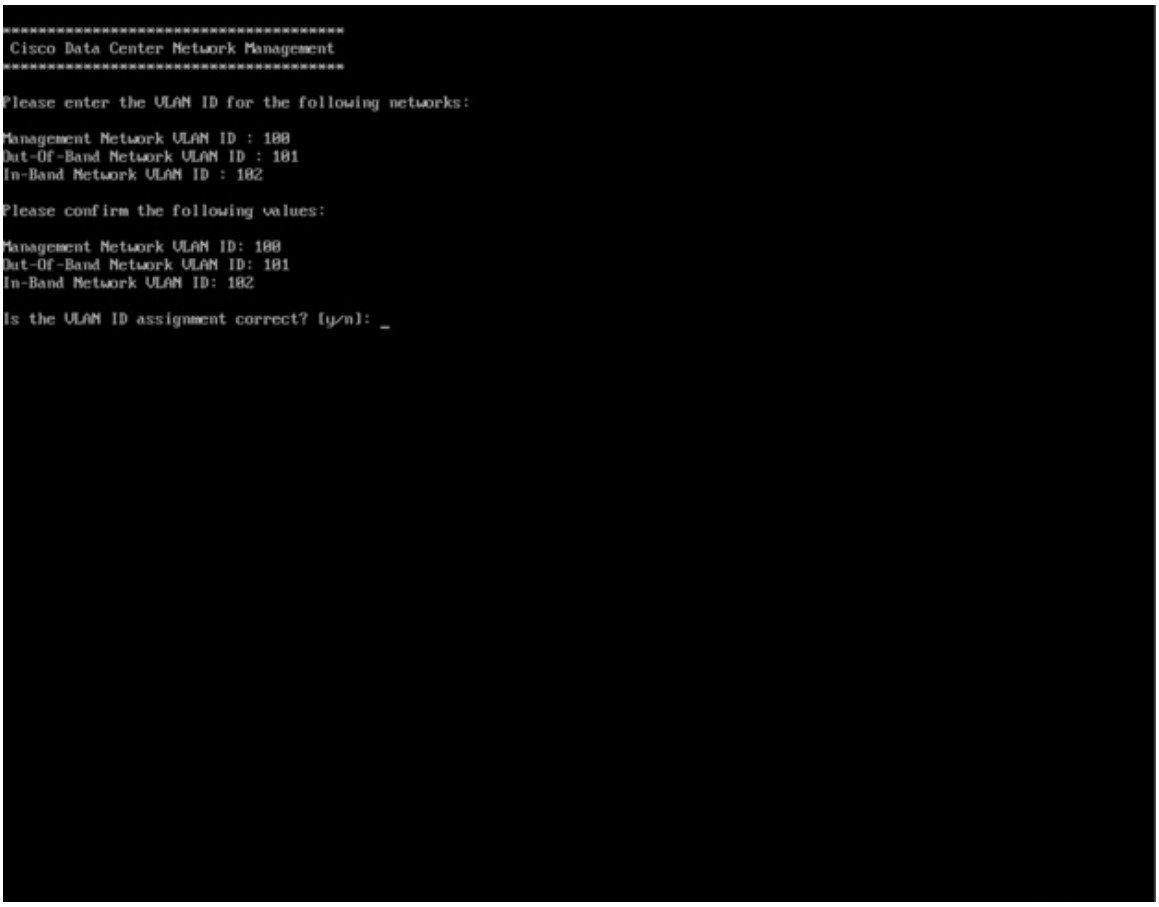
Enter **q** after you enter all the interface that must be added to the bundle.



b) Enter the VLAN IDs to be used for Management Network, Out-Of-Band Network and In-band Network Select interface from the list to form a bundle.

Verify and confirm if the correct VLAN IDs are assigned.

Note The VLAN IDs for Management Network and Out-Of-Band Network can be the same when Management Network and Out-Of-Band Network use the same subnet (that is, when eth0/eth1 are in the same subnet)



Step 13 Review the selected interfaces. Press **y** to confirm and continue with the installation.

Step 14 Configure the Management Network for Cisco DCNM. Enter the IP address, Subnet Mask, and Gateway. Press **y** to continue with the installation.

After the installation is complete, the system reboots and a message indicating that the DCNM appliance is configuring appears on the screen.

```
************************************************************
Please point your web browser to
http://<IP-address>:<port-number>
to complete the application
************************************************************
```

Copy and paste the URL to the browser to complete the installation using the Web Installer.

What to do next

You can choose to install DCNM in Standalone mode or Native HA mode. Refer to *Installing Cisco DCNM ISO in Standalone Mode* or *Installing Cisco DCNM ISO in Native HA Mode* sections for more information.

Installing the DCNM ISO Virtual Appliance on KVM

Perform the following tasks to install the ISO virtual appliance on KVM.

Procedure

Step 1 Unzip and extract **dcnm-va-ovf-kvm-files.11.3.1.zip** and locate the **dcnm-kvm-vm.xml** file.

Step 2 Upload this file on the RHEL server that is running KVM to the same location as the ISO.

Step 3 Connect to the RHEL server running KVM via SCP File transfer terminal.

Step 4 Upload the **dcnm-va.11.3.1.iso** and **dcnm-kvm-vm.xml** to the RHEL server.

Step 5 Close the file transfer session.

Step 6 Connect to the RHEL server running KVM via SSH terminal.

Step 7 Navigate to the location where both the ISO and domain XMLs is downloaded.

Step 8 Create the VM (or Domains, as they are known in the KVM terminology) using the **virsh** command.

need info on dcnm-kvm-vm-huge.xml

```
sudo virsh define [{dcnm-kvm-vm-huge.xml|dcnm-kvm-vm-compute.xml|
dcnm-kvm-vm-large.xml|dcnm-kvm-vm-small.xml}]
```

Step 9 Enable a VNC server and open the required firewall ports.

Step 10 Close the SSH session.

Step 11 Connect to the RHEL server running KVM via a VNC terminal.

Step 12 Navigate to **Applications > System Tools > Virtual Machine Manager (VMM)**.

A VM is created in the Virtual Machine Manager.

Step 13 From Virtual Machine Manager, edit the VM by selecting the VM in the listing. Click **Edit > Virtual Machine Details > Show virtual hardware details**.

Step 14 In the Virtual Hardware Details, navigate to **Add Hardware > Storage**.

Step 15 Create a hard disk with Device type withe the following specifications:

- device type: IDE disk
- cache-mode: default
- storage format: raw

We recommend that you use storage size of 500GB.

Step 16 Select IDE CDROM on the edit window of the Virtual Machine and click **Connect**.

Step 17 Navigate to dcnm-va.iso and click **OK**.

Step 18 Select both the NICs and assign appropriate networks that are created.

Step 19 Power on the Virtual Machine.

Note Before you power on the VM, ensure that you have reserved appropriate resources for the VM, such as CPU and memory, based on the chosen deployment configuration.

The operating system is installed.

Step 20 On the Cisco Management Network Management screen, select the interface for the networks. The list of available interfaces is displayed on the screen.

Choose the Management Interface (eth0) and Out-of-Band interface (eth1) from the Network Interface List. You can also configure in-band interface (eth2) if necessary.

Note If you do not configure in-band interface (eth2), Endpoint Locator and Telemetry features are not operational.

However, you can edit the network properties after installation, if required, using the **appmgr update network-properties** command. For more information, see Editing Network Properties Post DCNM Installation.

Step 21 Press **y** to confirm and continue with the installation.

Step 22 Configure the Management Network. Enter the IP address, Subnet Mask, and Gateway. Press **y** to continue with the installation.

After the installation is complete, the system reboots and a message indicating that the DCNM appliance is configuring appears on the screen.

```
************************************************************
Please point your web browser to
http://<IP-address>:<port-number>
to complete the application
************************************************************
```

Copy and paste the URL to the browser to complete the installation using the Web Installer.

What to do next

You can choose to install DCNM in Standalone mode or Native HA mode. Refer to *Installing Cisco DCNM ISO in Standalone Mode* or *Installing Cisco DCNM ISO in Native HA Mode* sections for more information.

Installing Cisco DCNM ISO in Standalone Mode

Paste the URL displayed on the Console tab and hit Enter key. A welcome message appears.

To complete the installation of Cisco DCNM from the web installer, perform the following procedure.

Procedure

Step 1 On **Welcome to Cisco DCNM** screen, click **Get Started**.

Step 2 On **Cisco DCNM Installer** screen, select **Fresh Installation – Standalone** radio button.

Click **Continue**.

Step 3 On **Administration** tab, enter the password that is used to connect to all the applications in the Cisco DCNM Open Virtual Appliance.

Adhere to the following password requirements. If you do not comply with the requirements, the DCNM application may not function properly.

- It must be at least eight characters long and contain at least one alphabet and one numeral.
- It can contain a combination of alphabets, numerals, and special characters.

- Do not use any of these special characters in the DCNM password for all platforms:

  <SPACE> " & $ % ' ^ = < > ; : ` \ | / , .*

Select the **Show passwords in clear text** checkbox to view the password you have typed.

Click **Next**.

Step 4 In **Install Mode** tab, from the drop-down list, choose **Media Controller** installation mode for the OVA DCNM Appliance.

Click **Next**.

Step 5 On the **System Settings** tab, configure the settings for the DCNM Appliance.

- In the Fully Qualified Hostname field, enter the hostname that is a fully qualified domain name (FQDN) as per RFC1123, section 2.1.
- In the DNS Server Address field, enter the DNS IP address.

  Beginning with Release 11.2(1), you can also configure the DNS server using an IPv6 address.
- In the NTP Server field, enter the IP address of the NTP server.

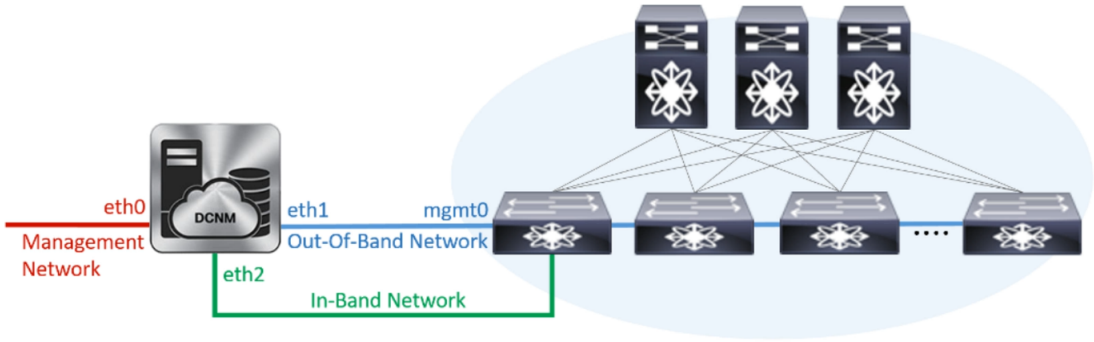
  The value must be an IP or IPv6 address or RFC 1123 compliant name.

From Release 11.3(1), you can configure more than one DNS server and NTP server.

Click **Next**.

Step 6 On **Network Settings** tab, configure the network parameters.

Figure 4: Cisco DCNM Management Network Interfaces



a) In **Management Network** area, verify if the auto-populated IP Address and Default Gateway address are correct. Modify, if necessary.

Note Beginning with Cisco DCNM Release 11.2(1), you can also use an IPv6 address for the Management Network.

(Optional) Enter a valid IPv6 address along with the prefix to configure the Management address and the Management Network Default IPv6 Gateway.

b) In **Out-of-Band Network** area, enter the IP address, gateway IP Address. If DCNM is on the IPv6 network, configure the network with an IPv6 Address.

Out-of-band management provides a connection to the device management ports (Typically mgmt0).

Note If the out-of-band network is not configured, you cannot configure Cisco DCNM in Cluster mode.

c) In **In-Band Network** area, enter the IP Address and gateway IP Address for the in-band network.

The In-Band Network provides reachability to the devices via the front-panel ports.

Note If you do not configure in-band network, Endpoint Locator and Telemetry features are not operational.

However, you can edit the network properties after installation, if required, using the **appmgr update network-properties** command. For more information, see Editing Network Properties Post DCNM Installation.

Click **Next**.

Step 7 On the **Applications** tab, in the IPv4 Subnet field, enter the IP subnet to access the applications that run internally to DCNM.

All the applications use the IP Address from this subnet.

The Cluster Mode configuration area appears only if you have selected the Enable Clustered Mode checkbox in Step Step 4, on page 25.

Note In Clustered mode, the Cisco DCNM Applications run on separate DCNM Compute Nodes.

a. In the **Out-of-Band IPv4 Network Address Pool**, enter the address pool from the out-of-band IPv4 network to be used in the Clustered Mode.

The address must be a smaller prefix of available IP addresses from the eth1 subnet. For example: Use 10.1.1.240/28 if the eth1 subnet was configured as 10.1.1.0/24 during installation.

This subnet must be a minimum of /28 (16 addresses) and maximum of /24 (256 addresses). It should also be longer than the east-west pool. This subnet is assigned to containers, to communicate with the switches.

b. In the **Out-of-Band IPv6 Network Address Pool**, enter the address pool from the out-of-band IPv6 network to be used in the Clustered Mode. The address pool must be an IPv6 subnet.

c. In the In-Band IPv4 Network Address Pool, enter the address pool from the out-of-band IPv4 network to be used in the Clustered Mode.

The address must be a smaller prefix of available IP addresses eth2 subnet. For example: Use 11.1.1.240/28 if the eth2 subnet was configured as 11.1.1.0/24 during installation.

This subnet must be a minimum of /28 (16 addresses) and maximum of /24 (256 addresses). It should also be longer than the east-west pool. This subnet is assigned to containers, to communicate with the switches.

d. In the In-Band IPv6 Network Address Pool, enter the address pool from the in-band IPv6 network to be used in the Clustered Mode. The address pool must be an IPv6 subnet.

Click **Next**.

Step 8 On the Summary tab, review the configuration details.

Click **Previous** to go to the previous tabs and modify the configuration. Click **Start Installation** to complete the Cisco DCNM Installation for the chosen deployment mode.

A progress bar appears showing the completed percentage, description of the operation, and the elapsed time during the installation. After the progress bar shows 100%, click **Continue**.

A success message appears with the URL to access DCNM Web UI.

```
************************************************************
Your Cisco Data Center Network Manager software has been installed.
DCNM Web UI is available at
https://<<IP Address>>
You will be redirected there in 60 seconds.
Thank you
************************************************************
```

Note If the Cisco DCNM is running behind a firewall, ensure that you open the port 2443 to launch Cisco DCNM Web UI.

Note If you try to access the DCNM Web UI using the Management IP address while the installation is still in progress, an error message appears on the console.

```
************************************
*Preparing Appliance*

************************************
```

What to do next

Log on to the DCNM Web UI with appropriate credentials.

Click the **Settings** icon and choose **About DCNM**. You can view and verify the Installation type that you have deployed.

If you have configured inband management (eth2) IP addresses for device management, login to standalone server and configure the inband network reachability from eth2 of the server to the switches by using the following commands:

```
dcnm# appmgr setup inband-route --subnet switches-fabric-links-IP-subnet/mask
dcnm# appmgr setup inband-route --subnet switch-loopback-IP-subnet>/mask
```

For example: If you have four switches with all fabric links connected through 10.0.0.x/30 subnet, and if all switches are configured with the loopback interface for inband reachability in subnet 40.1.1.0/24, use the following commands:

```
dcnm# appmgr setup inband-route --subnet 10.0.0.0/24
dcnm# appmgr setup inband-route --subnet 40.1.1.0/24
```

Installing the Cisco DCNM ISO in Native HA mode

The native HA is supported on DCNM appliances with ISO or OVA installation only.

By default, an embedded PostgreSQL database engine with the Cisco DCNM. The native HA feature allows two Cisco DCNM appliances to run as active and standby applications, with their embedded databases synchronized in real time. Therefore, when the active DCNM is not functioning, the standby DCNM takes over with the same database data and resume the operation.

Perform the following task to set up Native HA for DCNM.

Procedure

Step 1 Deploy two DCNM Virtual Appliances (either OVA or ISO).

For example, let us indicate them as **dcnm1** and **dcnm2**.

Step 2 Configure **dcnm1** as the Primary node. Paste the URL displayed on the Console tab of **dcnm1** and press **Enter** key.

A welcome message appears.

a) On the Welcome to Cisco DCNM screen, click **Get Started**.

b) On the Cisco DCNM Installer screen, select **Fresh Installation - HA Primary** radio button, to install **dcnm1** as Primary node.

Click **Continue**.

c) On the Administration tab, enter the password that is used to connect to all the applications in the Cisco DCNM Open Virtual Appliance.

Adhere to the following password requirements. If you do not comply with the requirements, the DCNM application may not function properly.

- It must be at least eight characters long and contain at least one alphabet and one numeral.
- It can contain a combination of alphabets, numerals, and special characters.
- Do not use any of these special characters in the DCNM password for Linux, Windows, OVA, and ISO platforms:

  <SPACE> " & $ % ' ^ = < > ; : ` \ | / , .*

Select the **Show passwords in clear text** checkbox to view the password you have typed.

Click **Next**.

d) In the Install Mode tab, from the drop-down list, choose **Media Controller** installation mode for the DCNM Appliance.

Check the **Enable Clustered Mode** checkbox, if you want to deploy Cisco DCNM in Cluster mode.

The Compute nodes will be displayed on the Cisco DCNM **Web UI > Applications > Compute**. You can add the compute nodes to a Cluster, later.

Note If **Enable Clustered Mode** is selected, applications such as, Config Compliance, EPL, and NIA, and NIR won't work until you install the compute nodes.

Click **Next**.

e) On the System Settings, configure the settings for the DCNM Appliance.

- In the Fully Qualified Hostname field, enter the hostname that is a fully qualified domain name (FQDN) as per RFC1123, section 2.1.
- In the DNS Server Address field, enter the DNS IP address.

  Beginning with Release 11.2(1), you can also configure the DNS server using an IPv6 address.
- In the NTP Server field, enter the IP address of the NTP server.

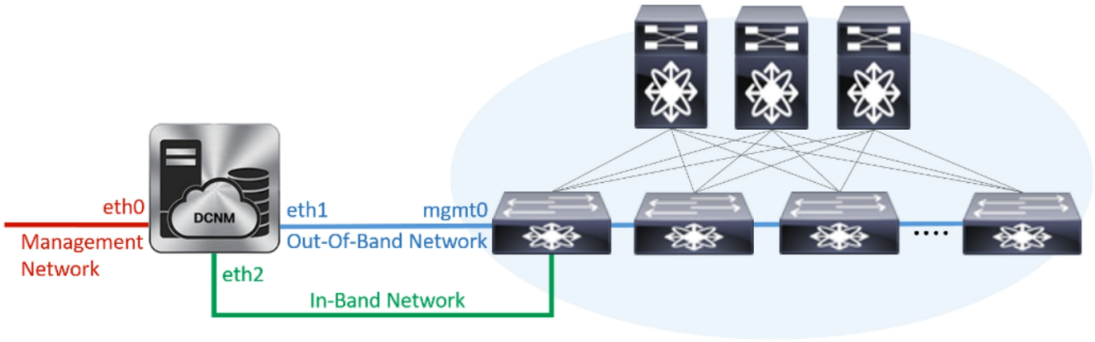
The value must be an IP or IPv6 address or RFC 1123 compliant name.

From Release 11.3(1), you can configure more than one DNS server and NTP server.

Click **Next**.

f) On the **Network Settings** tab, configure the network parameters.

Figure 5: Cisco DCNM Management Network Interfaces



- In the Management Network area, verify is the auto-populated IP Address and Default gateway address are correct. Modify, if necessary.

  Note Beginning with Cisco DCNM Release 11.2(1), you can also use an IPv6 address for the Management Network.

  (Optionally) Enter a valid IPv6 address along with the prefix to configure the Management address and the Management Network Default IPv6 Gateway.

- In the Out-of-Band Network area, enter the IP address, gateway IP Address. If DCNM is on the IPv6 network, configure the network with an IPv6 Address.

  Out-of-band management provides a connection to the device management ports (Typically mgmt0).

  Note If the out-of-band network is not configured, you cannot configure Cisco DCNM in Cluster mode.

- In the In-Band Network area, enter the VIP Address and gateway IP Address for the in-band network. The In-Band Network provides reachability to the devices via the front-panel ports.

  Note If you do not configure in-band network, Endpoint Locator and Telemetry features are not operational.

- In the Internal Application Services Network area, enter the IP subnet to access the applications that run internally to DCNM.

  All the applications use the IP Address from this subnet.

  Note Ensure that you configure the same IP subnet on both the Primary HA and the Secondary HA node.

However, you can edit the network properties after installation, if required, using the **appmgr update network-properties** command. For more information, see Editing Network Properties Post DCNM Installation.

Click **Next**.

g) On the HA Settings tab, a confirmation message appears.

```
You are installing the primary DCNM HA node.
Please note that HA setup information will need to
be provided when the secondary DCNM HA node is
installed.
```

Click **Next**.

h) On the **Applications** tab, in the IPv4 Subnet field, enter the IP subnet to access the applications that run internally to DCNM.

All the applications use the IP Address from this subnet.

The Cluster Mode configuration area appears only if you have selected the Enable Clustered Mode checkbox in Step 2.d, on page 28.

Note In Clustered mode, the Cisco DCNM Applications run on separate DCNM Compute Nodes.

1. In the **Out-of-Band IPv4 Network Address Pool**, enter the address pool from the out-of-band IPv4 network to be used in the Clustered Mode.

   The address must be a smaller prefix of available IP addresses from the eth1 subnet. For example: Use 10.1.1.240/28 if the eth1 subnet was configured as 10.1.1.0/24 during installation.

   This subnet must be a minimum of /28 (16 addresses) and maximum of /24 (256 addresses). It should also be longer than the east-west pool. This subnet is assigned to containers, to communicate with the switches.

2. In the **Out-of-Band IPv6 Network Address Pool**, enter the address pool from the out-of-band IPv6 network to be used in the Clustered Mode. The address pool must be an IPv6 subnet.

3. In the In-Band IPv4 Network Address Pool, enter the address pool from the out-of-band IPv4 network to be used in the Clustered Mode.

   The address must be a smaller prefix of available IP addresses eth2 subnet. For example: Use 11.1.1.240/28 if the eth2 subnet was configured as 11.1.1.0/24 during installation.

   This subnet must be a minimum of /28 (16 addresses) and maximum of /24 (256 addresses). It should also be longer than the east-west pool. This subnet is assigned to containers, to communicate with the switches.

4. In the In-Band IPv6 Network Address Pool, enter the address pool from the in-band IPv6 network to be used in the Clustered Mode. The address pool must be an IPv6 subnet.

Click **Next**.

i) On the Summary tab, review the configuration details.

Click **Previous** to go to the previous tabs and modify the configuration. Click **Start Installation** to complete the Cisco DCNM Installation for the chosen deployment mode.

A progress bar appears to show the completed percentage, description of the operation, and the elapsed time during the installation. After the progress bar shows 100%, click **Continue**.

A warning message appears stating that the setup is not complete until you install the Secondary node.

```
WARNING: DCNM HA SETUP IS NOT COMPLETE!
Your Cisco Data Center Network Manager software has been installed on
this HA primary node.
However, the system will be ready to be used only after installation
of the secondary node has been completed.
Thank you.
```

Step 3 Configure **dcnm2** as the Secondary node. Paste the URL displayed on the Console tab of **dcnm2** and hit Enter.

A welcome message appears.

a) On the Welcome to Cisco DCNM screen, click **Get Started**.

b) On the Cisco DCNM Installer screen, select **Fresh Installation - HA Secondary** radio button, to install **dcnm2** as Secondary node.

Click **Continue**.

c) On the Administration tab, enter the password that is used to connect to all the applications in the Cisco DCNM Open Virtual Appliance.

Note The password for the secondary node must be the same as the Administrative password for primary, as entered in Step 2.c, on page 28.

Click **Next**.

d) In the Install Mode tab, from the drop-down list, choose the same installation mode that you selected for the Primary node.

Note The HA installation fails if you do not choose the same installation mode as Primary node.

Click **Next**.

e) On the System Settings, configure the settings for the DCNM Appliance.

- In the Fully Qualified Hostname field, enter the hostname that is a fully qualified domain name (FQDN) as per RFC1123, section 2.1.
- In the DNS Server Address field, enter the DNS IP address.

  Beginning with Release 11.2(1), you can also configure the DNS server using an IPv6 address.
- In the NTP Server field, enter the IP address of the NTP server.

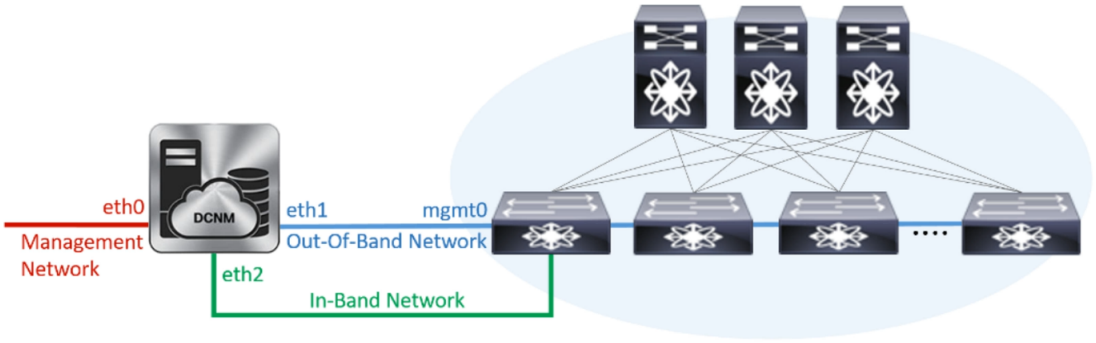
  The value must be an IP or IPv6 address or RFC 1123 compliant name.

From Release 11.3(1), you can configure more than one DNS server and NTP server.

Click **Next**.

f) On the Network Settings tab, configure the network parameters.

Figure 6: Cisco DCNM Management Network Interfaces



- In the Management Network area, verify is the auto-populated IP Address and Default gateway address are correct. Modify, if necessary.

  Note Ensure that the IP Address belongs to the same Management Network as configured on the Primary node for HA setup to complete successfully.

  Note Beginning with Cisco DCNM Release 11.2(1), you can also use an IPv6 address for the Management Network.

  (Optionally) Enter a valid IPv6 address along with the prefix to configure the Management address and the Management Network Default IPv6 Gateway.

- In the Out-of-Band Network area, enter the IP address, gateway IP Address. If DCNM is on the IPv6 network, configure the network with an IPv6 Address.

  Out-of-band management provides a connection to the device management ports (Typically mgmt0).

  Note Ensure that the IP Address, IP address gateway, and the IPv6 address belong to the same Out-of-Band Network as configured on the Primary node for HA setup to complete successfully.

  Note If the out-of-band network is not configured, you cannot configure Cisco DCNM in Cluster mode.

  You can also configure an IPv6 address for out-of-band management network.

- In the In-Band Network area, enter the IP Address and gateway IP Address for the in-band network. The In-Band Network provides reachability to the devices via the front-panel ports.

  Note If you do not configure in-band network, Endpoint Locator and Telemetry features are not operational.

  However, you can edit the network properties after installation, if required, using the **appmgr update network-properties** command. For more information, see Editing Network Properties Post DCNM Installation.

- In the Internal Application Services Network area, enter the IP subnet to access the applications that run internally to DCNM.

  All the applications use the IP Address from this subnet.

Note Ensure that you configure the same IP subnet on both the Primary HA and the Secondary HA node.

Click **Next**.

g) On the **Applications** tab, in the IPv4 Subnet field, enter the IP subnet to access the applications that run internally to DCNM.

All the applications use the IP Address from this subnet.

Note Ensure that you configure the same IP subnet on both the Primary HA and the Secondary HA node.

Click **Next**.

h) On the HA Settings tab, configure the system settings..

- In the Management IP Address of primary DCNM node field, enter the appropriate IP Address to access the DCNM UI.
- In the VIP Fully qualified Host Name field, enter hostname that is a fully qualified domain name (FQDN) as per RFC1123, section 2.1.
- Enter the Management Network VIP address, VIPv6 address, and OOB Network VIP address appropriately.

  Note If you have configured the Management network using IPv6 address, ensure that you configure the Management Network VIPv6 Address.

- Enter OOB Network VIPv6 Address to configure IPv6 address for VIP.
- In the In-Band Network area, enter the VIP Address for the in-band network.

  This is the VIP address for the In-Band network. This field is mandatory if you have provided an IP address for In-Band network in the Network Settings tab.

- Enter the HA ping IP address if necessary.

  HA_PING_ADDRESS, must be different from the DCNM Active and Standby addresses.

  You must configure the HA ping IP Address to avoid the Split Brain scenario. This address must belong to Enhanced Fabric management network.

Click **Next**.

i) On the Summary tab, review the configuration details.

Click **Previous** to go to the previous tabs and modify the configuration. Click **Start Installation** to complete the Cisco DCNM OVA Installation for the chosen deployment mode.

A progress bar appears to show the completed percentage, description of the operation, and the elapsed time during the installation. After the progress bar shows 100%, click **Continue**.

A success message appears with the URL to access DCNM Web UI.

```
************************************************************
Your Cisco Data Center Network Manager software has been installed.
DCNM Web UI is available at
https://<<IP Address>>
You will be redirected there in 60 seconds.
```

```
Thank you
*****************************************************************
```

Note If the Cisco DCNM is running behind a firewall, ensure that you open the port 2443 to launch Cisco DCNM Web UI.

What to do next

Log on to the DCNM Web UI with appropriate credentials.

Click the **Settings** icon and choose **About DCNM**. You can view and verify the Installation type that you have deployed.

If you have configured inband management (eth2) IP addresses for device management, login to standalone server and configure the inband network reachability from eth2 of the server to the switches by using the following commands:

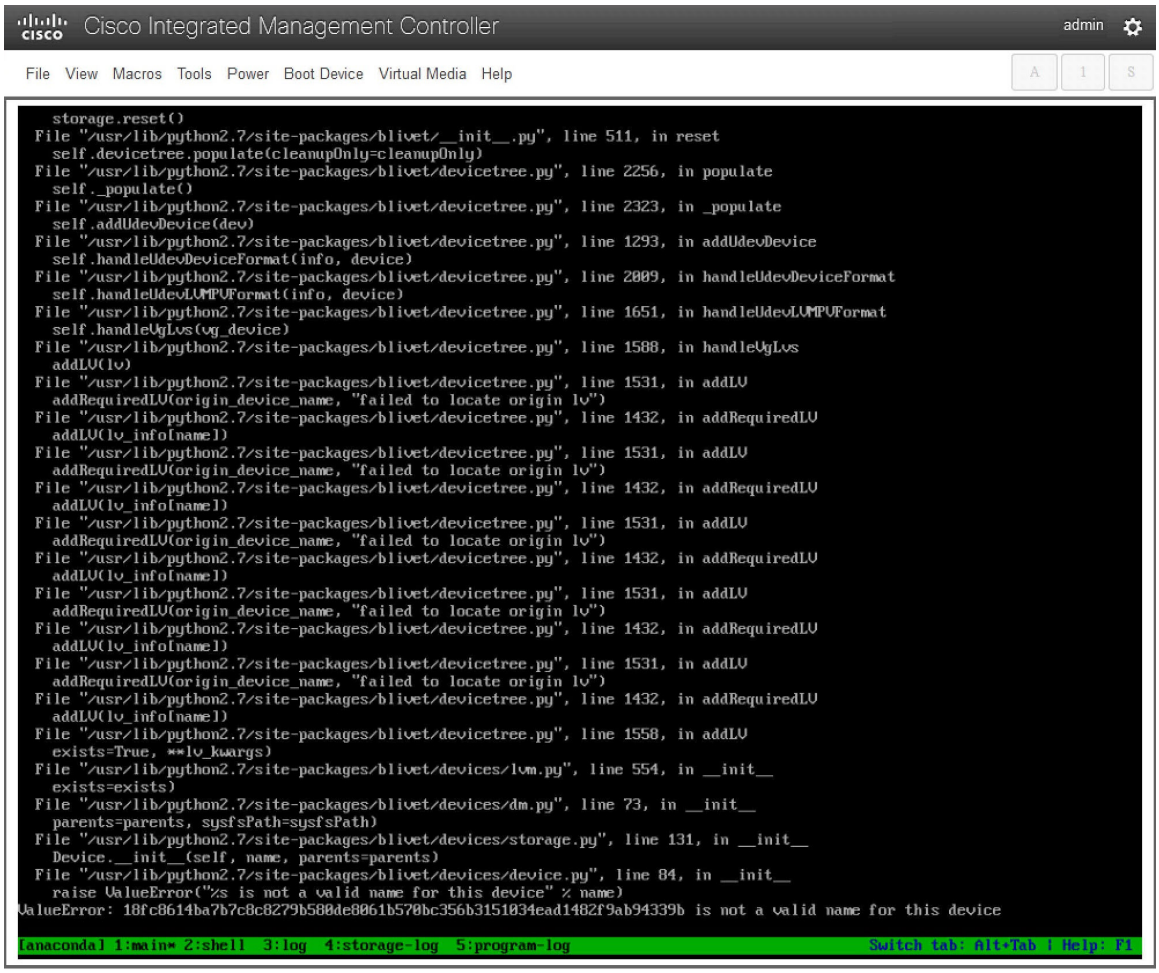
```
dcnm# appmgr setup inband-route --subnet switches-fabric-links-IP-subnet/mask
dcnm# appmgr setup inband-route --subnet switch-loopback-IP-subnet>/mask
```

For example: If you have four switches with all fabric links connected through 10.0.0.x/30 subnet, and if all switches are configured with the loopback interface for inband reachability in subnet 40.1.1.0/24, use the following commands:

```
dcnm# appmgr setup inband-route --subnet 10.0.0.0/24
dcnm# appmgr setup inband-route --subnet 40.1.1.0/24
```

Installing Cisco DCNM SE ISO on Cisco APIC SE

You can install both DCNM and APIC on Cisco Application Services Engine. If you have ordered APIC ASE PID, and later choose to install Cisco DCNM Release 11.3(1) or 11.4(1) on the same ASE, the following error message appears.



To install Cisco DCNM 11.3(1) or 11.4(1) on an existing APIC ASE, perform the following steps:

Procedure

Step 1 At the prompt, press **CTRL-ALT-F2** to move to a different console.
A shell prompt appears.

Step 2 Get the list of disks by using the **lsblk -d** command.

Step 3 For each disk, execute the following command:

Note Ensure that you do not run this command on the UNIGEN 16GB disk.

dd if=/dev/zero of=/dev/<*disk*>** bs=10M count=1**

```
root@se-appliance$ lsblk -d
NAME HCTL       TYPE VENDOR   MODEL             REV TRAN
sda  0:2:0:0    disk Cisco    UCSC-RAID12G-2GB 5.10
sdb  0:2:1:0    disk Cisco    UCSC-RAID12G-2GB 5.10
sdc  0:2:2:0    disk Cisco    UCSC-RAID12G-2GB 5.10
sdd  0:2:3:0    disk Cisco    UCSC-RAID12G-2GB 5.10
sde  0:2:4:0    disk Cisco    UCSC-RAID12G-2GB 5.10
sdf  2:0:0:0    disk ATA      Micron_5100_MTFD H072 sata
```

```
sdg  1:0:0:0    disk UNIGEN   PHF16H0CM1-ETG   PMAP usb
root@se-appliance$
```

Step 4 Reboot the Cisco Applications Service Engine.

Step 5 Install the Cisco DCNM ISO Release 11.3(1) or 11.4(1).

Refer the following URLs for more information.

- Cisco Application Services Engine Installation Guide For Cisco DCNM, Release 11.3 (1)
- Cisco Application Services Engine Installation Guide For Cisco DCNM, Release 11.4(1)

Convert Standalone Setup to Native-HA Setup

To convert an existing Cisco DCNM Standalone setup to a Native HA setup, perform the following steps:

Before you begin

Ensure that the Standalone setup is active and operational, by using the **appmgr show version** command.

```
dcnm# appmgr show version

Cisco Data Center Network Manager
Version:
Install mode: LAN Fabric
Standalone node. HA not enabled.
dcnm#
```

Procedure

Step 1 On the Standalone setup, launch SSH and enable **root** user access by using the **appmgr root-access permit** command:

```
dcnm# appmgr root-access permit
```

Step 2 Deploy a new DCNM as secondary node. Choose **Fresh installation - HA Secondary**

For example, let us indicate the existing setup as **dcnm1** and the new DCNM as secondary node as **dcnm2**.

Caution If the system configuration does not meet minimum resource requirements, **SYSTEM RESOURCE ERROR** is displayed on the Web Installer, and the installation will be aborted. Modify the system requirements, and launch the Web Installer to complete the installation.

Step 3 Configure **dcnm2** as the Secondary node. Paste the URL displayed on the Console tab of **dcnm2** and hit Enter.

A welcome message appears.

a) On the **Welcome to Cisco DCNM** screen, click **Get Started**.

Caution If the system configuration does not meet minimum resource requirements, **SYSTEM RESOURCE ERROR** is displayed on the Web Installer, and the installation will be aborted. Modify the system requirements, and launch the Web Installer to complete the installation.

b) On the Cisco DCNM Installer screen, select **Fresh Installation - HA Secondary** radio button, to install **dcnm2** as Secondary node.

Click **Continue**.

c) On the **Install Mode** tab, from the drop-down list, choose the same installation mode that you selected for the Primary node.

Note The HA installation fails if you do not choose the same installation mode as Primary node.

Click **Next**.

d) On the **Administration** tab, enter information about passwords.

Note All the passwords must be same as the passwords that you provided while configuring the Primary node.

e) On the **System Settings**, configure the settings for the DCNM Appliance.

- In the **Fully Qualified Hostname** field, enter the hostname that is a fully qualified domain name (FQDN) as per RFC1123, section 2.1. Hostnames with only digits is not supported.
- In the **DNS Server Address List** field, enter the DNS IP address.

  Beginning with Release 11.2(1), you can also configure the DNS server using an IPv6 address.

  From Release 11.3(1), you can configure more than one DNS server.
- In the **NTP Server Address List** field, enter the IP address of the NTP server.

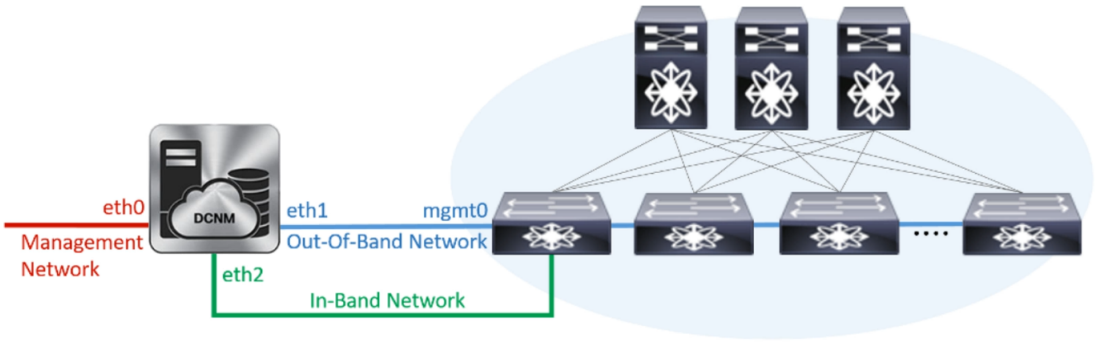
  The value must be an IP or IPv6 address or RFC 1123 compliant name.

  From Release 11.3(1), you can configure more than one NTP server.
- From the **Timezone** drop-down list, select the timezone in which you are deploying the DCNM.

Click **Next**.

f) On the **Network Settings** tab, configure the network parameters used to reach the DCNM Web UI.

Figure 7: Cisco DCNM Management Network Interfaces



1. In the **Management Network** area, verify if the auto-populated addresses for **Management IPv4 Address** and **Management Network Default IPv4 Gateway** are correct. Modify, if necessary.

   Note Ensure that the IP address belongs to the same Management Network configured on the Primary node.

(Optionally) Enter a valid IPv6 address along with the prefix to configure the **Management IPv6 Address** and the **Management Network Default IPv6 Gateway**.

2. In the **Out-of-Band Network** area, enter the **IPv4 address** and **Gateway IPv4 Address**.

   If DCNM is on the IPv6 network, configure the network by entering relevant IPv6 Address for **IPv6 address** and **Gateway IPv6 Address**.

   Note Ensure that the IP addresses belong to the same Out-of-Band network configured on the Primary node.

   Out-of-band management provides a connection to the device management ports (Typically mgmt0).

   Note If the out-of-band network is not configured, you cannot configure Cisco DCNM in Cluster mode.

3. In the **In-Band Network** area, enter the **IPv4 address** and **Gateway IPv4 Address** for the in-band network.

   If DCNM is on the IPv6 network, configure the network by entering relevant IPv6 Address for **IPv6 address** and **Gateway IPv6 Address**.

   Note Ensure that the IP addresses belong to the same In-Band network configured on the Primary node.

   The In-Band Network provides reachability to the devices via the front-panel ports.

   Note If you do not configure in-band network, Endpoint Locator and Telemetry features are not operational.

Click **Next**.

g) On the **Applications** tab, configure the Internal Applications Services Network.

1. In the **Internal Application Services Network** area, in the **IPv4 Subnet field**, enter the IP subnet to access the applications that run internally to DCNM.

h) On the **HA Settings** tab, configure the system settings for the Secondary node.

- In the **Management IPv4 Address of Primary DCNM node** field, enter the appropriate IP Address to access the DCNM UI.
- In the **VIP Fully qualified Host Name** field, enter hostname that is a fully qualified domain name (FQDN) as per RFC1123, section 2.1. Host names with only digits is not supported.
- In the **Management Network VIP address** field, enter the IP address used as VIP in the management network.

  Optionally, you can also enter an IPv6 VIP address in the **Management Network VIPv6 address** field.

  Note If you have configured the Management network using IPv6 address, ensure that you configure the Management Network VIPv6 Address.

- In the **Out-of-Band Network VIP Address** field, enter the IP address used as VIP in the Out-of-Band network.

  Optionally, you can also enter an IPv6 VIP address in the **Out-of-Band Network VIPv6 Address** field.

- In the **In-Band Network VIP Address** field, enter the IP address used as VIP in the Out-of-Band network.

  Optionally, you can also enter an IPv6 VIP address in the **In-Band Network VIPv6 Address** field.

  Note This field is mandatory if you have provided an IP address for In-Band network in the **Network Settings** tab.

- In the **HA Ping Feature IPv4 Address** field, enter the HA ping IP address and enable this feature, if necessary.

  Note The configured IPv4 address must respond to the ICMP echo pings.

  HA_PING_ADDRESS, must be different from the DCNM Active and Standby addresses.

  You must configure the HA ping IPv4 Address to avoid the Split Brain scenario. This IP address must belong to Enhanced Fabric management network.

Click **Next**.

i) On the **Summary** tab, review the configuration details.

Click **Previous** to go to the previous tabs and modify the configuration. Click **Start Installation** to complete the Cisco DCNM OVA Installation for the chosen deployment mode.

A progress bar appears to show the completed percentage, description of the operation, and the elapsed time during the installation. After the progress bar shows 100%, click **Continue**.

A success message appears with the URL to access DCNM Web UI.

```
************************************************************
Your Cisco Data Center Network Manager software has been installed.
DCNM Web UI is available at
https://<<IP Address>>
You will be redirected there in 60 seconds.
Thank you
************************************************************
```

Note If the Cisco DCNM is running behind a firewall, ensure that you open the port 2443 to launch Cisco DCNM Web UI.

What to do next

Verify the HA role by using the appmgr show ha-role command.

On the Active node (old standalone node):

```
dcnm1# appmgr show ha-role
Native HA enabled.
Deployed role: Active
Current role: Active
```

On the Standby node (newly deployed node):

```
dcnm2# appmgr show ha-role
Native HA enabled.
Deployed role: Standby
Current role: Standby
```

Installing Cisco DCNM Compute Node

Paste the URL displayed on the Console tab and hit Enter key. A welcome message appears. You can install compute nodes on both Cisco DCNM OVA and ISO deployments.

Note Compute nodes allows users to scale DCNM, as application load can be shared across all the compute nodes, instead of the usual 1 or 2 (if you have HA) nodes.

Note If **Enable Clustered Mode** was selected during DCNM installation, applications such as, Configuration Compliance, EPL, NIA, and NIR won't work until you install the compute nodes.

You can also watch the video that demonstrates how to how to configure Cisco DCNM in Clustered mode from the Cisco DCNM Web Installer. See Video: Installing Cisco DCNM in Clustered Mode from Web Installer.

To complete the installation of Cisco DCNM Compute Node from the web installer, perform the following procedure.

Before you begin

Ensure that you have 16 vCPUs, 64GB RAM, and 500GB hard disc to install compute nodes.

Procedure

Step 1 On the **Welcome to Cisco DCNM** screen, click **Get Started**.

Step 2 On the Cisco DCNM Installer screen, select the **Fresh Installation – Standalone** radio button.

Click **Continue**.

Step 3 On the **Install Mode** tab, choose **Compute** to deploy this DCNM instance as a compute node.

Note **Compute** option appears in the drop-down list only if you have chosen **Compute** while configuring the OVF template or ISO hypervisors.

Click **Next**.

Step 4 On the **Administration** tab, enter information about passwords.

- In the **Administrator Password** field, enter the password that is used to connect to the applications in the Cisco DCNM.

  All special characters, except **%$^=;.*\'" <SPACE>** is allowed in the password.

  Enter the password again in the **Repeat Administrator Password** field.

- In the **Database Password** field, enter the password for the PostgreSQL database.

  All special characters, except **%$^=;.*\'" <SPACE>** is allowed in the password.

Enter the password again in the **Repeat Database Password** field.

Note If this field is left blank, it shall consider the Administrator password as the PostgreSQL password.

Select the **Show passwords in clear text** check box to view the password that you have entered.

Click **Next**.

Step 5 On the **System Settings**, configure the settings for the DCNM Appliance.

- In the **Fully Qualified Hostname** field, enter the hostname that is a fully qualified domain name (FQDN) as per RFC1123, section 2.1. Hostnames with only digits is not supported.
- In the **DNS Server Address List** field, enter the DNS IP address.

  Beginning with Release 11.2(1), you can also configure the DNS server using an IPv6 address.

  From Release 11.3(1), you can configure more than one DNS server.

  Note If you're using Network Insights applications, ensure that the DNS server is valid and reachable.
- In the **NTP Server Address List** field, enter the IP address of the NTP server.

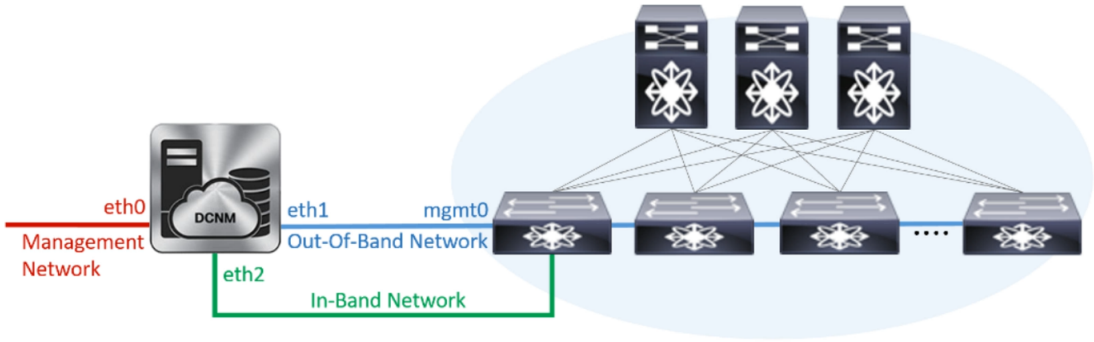
  The value must be an IP or IPv6 address or RFC 1123 compliant name.

  From Release 11.3(1), you can configure more than one NTP server.
- From the **Timezone** drop-down list, select the timezone in which you are deploying the DCNM.

Click **Next**.

Step 6 On the **Network Settings** tab, configure the network parameters used to reach the DCNM Web UI.

Figure 8: Cisco DCNM Management Network Interfaces



a) In the **Management Network** area, verify if the auto-populated addresses for **Management IPv4 Address** and **Management Network Default IPv4 Gateway** are correct. Modify, if necessary.

Note Beginning with Cisco DCNM Release 11.2(1), you can also use an IPv6 address for the Management Network.

(Optionally) Enter a valid IPv6 address along with the prefix to configure the **Management IPv6 Address** and the **Management Network Default IPv6 Gateway**.

b) In the **Out-of-Band Network** area, enter the **IPv4 address** and **Gateway IPv4 Address**.

If DCNM is on the IPv6 network, configure the network by entering relevant IPv6 Address for **IPv6 address** and **Gateway IPv6 Address**.

Out-of-band management provides a connection to the device management ports (Typically mgmt0).

Note If the out-of-band network is not configured, you cannot configure Cisco DCNM in Cluster mode.

c) In the **In-Band Network** area, enter the **IPv4 address** and **Gateway IPv4 Address** for the in-band network.

If DCNM is on the IPv6 network, configure the network by entering relevant IPv6 Address for **IPv6 address** and **Gateway IPv6 Address**.

The In-Band Network provides reachability to the devices via the front-panel ports.

Note If you do not configure in-band network, Endpoint Locator and Telemetry features are not operational.

However, you can edit the network properties after installation, if required, using the **appmgr update network-properties** command. For more information, see Editing Network Properties Post DCNM Installation.

Click **Next**.

Step 7 In the **Internal Application Services Network** area, in the **IPv4 Subnet field**, enter the IP subnet to access the applications that run internally to DCNM.

All the applications use the IP Address from this subnet.

Click **Next**.

Step 8 On the **Summary** tab, review the configuration details.

Click **Previous** to go to the previous tabs and modify the configuration. Click **Start Installation** to complete the Cisco DCNM Installation for the chosen deployment mode.

A progress bar appears to show the completed percentage, description of the operation, and the elapsed time during the installation. After the progress bar shows 100%, click **Continue**.

A success message appears with the URL to access DCNM Compute Node.

```
************************************************************
Your Cisco DCNM Compute Node has been installed.
Click on the following link to go to DCNM GUI's Application page:
DCNM GUI's Applications
You will be redirected there in 60 seconds.
Thank you
************************************************************
```

Step 9 Logon to the compute node via SSH, using **sysadmin@**<*dcnm-compute-eth0-ip-address*>.

Step 10 Run the **sudo reboot** command to ensure that this compute node joins the Cluster in a fully initialized state.

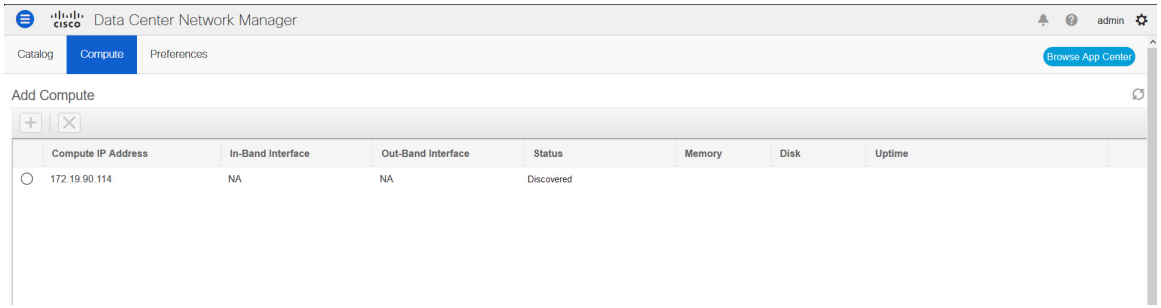
```
dcnm-compute# sudo reboot
```

After reboot, verify if you can SSH into the compute node using **sysadmin@**<*dcnm-compute-eth0-ip-address*>.

What to do next

Log on to the DCNM Web UI with appropriate credentials.

The **Applications** tab displays all the services running on the DCNM deployment that you have installed. Click **Compute** tab to view the new Compute in Discovered state on the Cisco DCNM Web UI.



To add the compute nodes to a cluster, see Adding Computes to a Cluster Node in your deployment-specific *Cisco DCNM Configuration Guide* for more information.

Note If you did not enable clustered mode while installing DCNM, use the **appmgr afw config-cluster**command to enable the compute cluster. For instructions, refer to the Enabling the Compute Cluster in the Cisco DCNM LAN Fabric Configuration Guide.

When a compute node goes through a unscheduled powercycle and restarts, the Elasticsearch container will not start. It is possible that some filesystems are corrupted. To resolve this issue. reboot the Compute node in safe mode by using **fsck -y** command.