



Installing Cisco DCNM for Classic LAN deployment

This chapter contains the following sections:

- [Installing DCNM on Open Virtual Appliance, on page 1](#)
- [Installing DCNM on ISO Virtual Appliance, on page 13](#)

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/>.
- 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 11.0(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.

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 than 50 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 than 50 devices to leverage better RAM, heap memory, and CPUs. For setups that could grow, choose Large.

Click **Next**.

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

Click **Next**.

Step 10 On the 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.

- 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.

Note If you do not configure enhanced-fabric-inband network, Endpoint Locator and Telemetry features are not operational.

However, you can configure the network after installation, if required. For more information, see [Configuring Enhanced-Fabric-Inband Interface \(eth2\) 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 the 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.

Click **Next**.

- Step 13** On the 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 10.4(2) 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
```

```

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. For more information, see [Installing Cisco DCNM OVA in Standalone Mode, on page 5](#) or [#unique_24](#).

Installing Cisco DCNM OVA in Standalone Mode

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

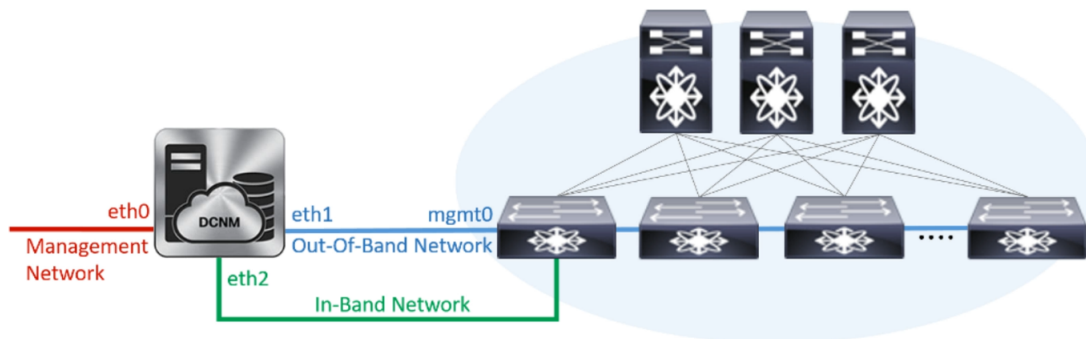
To complete the installation of Cisco DCNM from the web installer, perform the following procedure.

Procedure

- Step 1** On the Welcome to Cisco DCNM screen, click **Get Started**.
- Step 2** On the Cisco DCNM Installer screen, select **Fresh Installation** radio button.
Click **Continue**.
- Step 3** 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 all platforms:
<SPACE> " & \$ % ' ^ = < > ; : ` \ | / , . *
- Click **Next**.
- Step 4** In the Install Mode tab, from the drop-down list, choose **Classic LAN** installation mode for the OVA DCNM Appliance.
- 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.
 - In the DNS Server Address field, enter the DNS IP address.
 - In the NTP Server field, enter the IP address of the NTP server.
The value must be an IP address or RFC 1123 compliant name.
- Click **Next**.

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

Figure 1: Cisco DCNM Management Network Interfaces



- In the Management Network area, verify is the autopopulated IP Address and Default gateway address are correct. Modify, if necessary.
- In the Out-of-Band Network area, enter the IP address, gateway IP Address, and DNS server address. If DCNM is on the IPv6 network, configure the IP Address.

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

- (Optional) 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 configure the in-band network after installation, if required. For more information, see [Configuring Enhanced-Fabric-Inband Interface \(eth2\) Post DCNM Installation](#).

Click **Next**.

Step 7 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 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
```

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 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 OVA in Native HA mode

The native HA is supported on DCNM appliances with ISO or OVA installation only. Unlike general HA mechanisms, it doesn't require any external dependencies like an Oracle database or a shared NFS filesystem.

By default, Cisco DCNM is bundled with an embedded PostgreSQL database engine. 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 will take over with the same database data and resume the operation.

Perform the following task to setup Native HA for DCNM.

Procedure

Step 1 Deploy two DCNM virtual appliances (OVA/ISO).

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

If both eth0 and eth1 interfaces are in the same subnet, edit the `/etc/sysctl.conf` file for DCNM ISO Virtual appliance Native HA installation on both Active and Standby nodes for both the appliances, as follows:

- Change the value of `net.ipv4.conf.default.rp_filter` from 1 to 2.
- Add `net.ipv4.conf.all.rp_filter = 2` to the `sysctl.conf` file.

Save and close the file. On the SSH terminal, execute the `sysctl --system` command.

Step 2 Wait for all the applications to be operational.

Use the `appmgr status all` command to check the status of the applications.

Example:

```
dcnm1# appmgr status all
dcnm2# appmgr status all
```

Step 3 Use the `appmgr stop all` command to shut down all applications on both the Cisco DCNM applications.

Use the `appmgr status all` command to check the status of the applications.

Example:

```
dcnm1# appmgr stop all
dcnm2# appmgr status all
```

Step 4 On the active node, edit the `ha-setup.properties` file, by using the following command:

```
vi /root/packaged-files/properties/ha-setup.properties
```

Example:

```
dcnm1# vi /root/packaged-files/properties/ha-setup.properties
```

Note Do not turn on `auto_failback` in heartbeat configuration file.

Step 5 Edit the active node parameters and enter appropriate values.

Please refer to [#unique_26](#) section for more information.

Step 6 Install Native HA on the Active node with the following command:

```
appmgr setup native-ha active
```

Example:

```
dcnm1# appmgr setup native-ha active
```

Step 7 On the Standby node, check if the below property values are updated in the `ha-setup.properties` file, by using the following command:

```
vi /root/packaged-files/properties/ha-setup.properties
```

Example:

```
dcnm2# vi /root/packaged-files/properties/ha-setup.properties
```

Step 8 Verify if the Standby node parameters are updated.

Note To setup Cisco DCNM Native HA successfully, it is important to use valid FQDN as hostname for both hosts while installing DCNM OVA/ISO. After installation, you must be able to ping the FQDN for both hosts. If the ping is not successful, the Native HA setup may fail.

Step 9 If it is auto-populated and validated, install Native HA on the stand-by node, using the following command:

```
appmgr setup native-ha standby
```

Example:

```
dcnm2# appmgr setup native-ha standby
```

What to do next

Refer to [Native HA Failover and Troubleshooting](#) for troubleshooting Native HA.

Example for DCNM Native HA Installation

The example in this section considers the following parameters and shows how to install DCNM Native HA.

Parameter	Active	Standby	Virtual IP (VIP)
Eth0 IP	1.1.1.1/24	1.1.1.2/24	1.1.1.3/24
Eth1 IP	2.2.0.1/16	2.2.0.2/16	2.2.0.3/16

Parameter	Active	Standby	Virtual IP (VIP)
Hostname (FQDN)	dcnm1.cisco.com	dcnm2.cisco.com	dcnm3.cisco.com

On the active node, edit the property file by using the following command:

vi /root/packaged-files/properties/ha-setup.properties

```

#Copyright (c) 2017 by Cisco Systems, Inc.
#All rights reserved.
# NODE_ID refers the role of this node in HA.
# Example: NODE_ID=1
# Example: NODE_ID=1
NODE_ID=1

# IPv4 address of the peer
# Example : PEER_ETH0_IP=172.28.172.82
PEER_ETH0_IP=172.28.172.82

# IPv4 address of the Virtual IP address on the DCNM management network (eth0 network)
# Example : VIP_ADDRESS=172.28.172.83
VIP_ADDRESS=172.28.172.83

# Network prefix of Virtual IP address on DCNM management network, example : for a
255.255.255.0 network mask, enter the prefix as 24
# Example : VIP_PREFIX=24
VIP_PREFIX=24

# IPv4 address of the Virtual IP address on the Enhanced Fabric management network (eth1
network)
# Example : VIP1_ADDRESS=4.110.1.83
VIP1_ADDRESS=4.110.1.83

# Network prefix of Virtual IP address on Enhanced Fabric management network, example :
for a 255.255.255.0 network, enter the prefix as 24
# Example : VIP1_PREFIX=24
VIP1_PREFIX=24

# Optional eth1 VIP address for IPv6 if configured. If not configured, leave them empty
# IPv6 address has to be in long format, no ':::' in it.
VIP1_ADDRESS_IPV6=
VIP1_PREFIX_IPV6=

# IPv4 address of the Virtual IP address on the Inband Fabric management network (eth2
network)
# Example : VIP2_ADDRESS=
VIP2_ADDRESS=

# Network prefix of Virtual IP address on Inband Fabric management network, example : for
a 255.255.255.0 network, enter the prefix as 24
# Example : VIP2_PREFIX=
VIP2_PREFIX=

# Fully Qualified Domain name for the Virtual IP
# Example : VIP_FQDN=mhari-tb-83.cisco.com
VIP_FQDN=mhari-tb-83.cisco.com

# NTP server IP address (1.2.3.4) or the hostname (clock.cisco.com)
NTP_SERVER=ntp.esl.cisco.com

# If set, this address must be pingable for DCNM services
# to be running in Native HA systems. This address must
# belong to Enhanced Fabric management network
# HA_PING_ADDRESS=X.X.X.X

```

Enter the HA ping IP address if necessary.

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



Note You must configure the HA ping IP Address to avoid the Split Brain scenario.

On the standby node, check if the property values are updated in
`/root/packaged-files/properties/ha-setup.properties`

vi /root/packaged-files/properties/ha-setup.properties

```

#Copyright (c) 2017 by Cisco Systems, Inc.
#All rights reserved.
# NODE_ID refers the role of this node in HA.
# Example: NODE_ID=2
# Example: NODE_ID=2
NODE_ID=2

# IPv4 address of the peer
# Example : PEER_ETH0_IP=172.28.172.81
PEER_ETH0_IP=172.28.172.81

# IPv4 address of the Virtual IP address on the DCNM management network (eth0 network)
# Example : VIP_ADDRESS=172.28.172.83
VIP_ADDRESS=172.28.172.83

# Network prefix of Virtual IP address on DCNM management network, example : for a
255.255.255.0 network mask, enter the prefix as 24
# Example : VIP_PREFIX=24
VIP_PREFIX=24

# IPv4 address of the Virtual IP address on the Enhanced Fabric management network (eth1
network)
# Example : VIP1_ADDRESS=4.110.1.83
VIP1_ADDRESS=4.110.1.83

# Network prefix of Virtual IP address on Enhanced Fabric management network, example :
for a 255.255.255.0 network, enter the prefix as 24
# Example : VIP1_PREFIX=24
VIP1_PREFIX=24

# Optional eth1 VIP address for IPv6 if configured. If not configured, leave them empty
# IPv6 address has to be in long format, no ':::' in it.
VIP1_ADDRESS_IPV6=
VIP1_PREFIX_IPV6=

# IPv4 address of the Virtual IP address on the Inband Fabric management network (eth2
network)
# Example : VIP2_ADDRESS=
VIP2_ADDRESS=

# Network prefix of Virtual IP address on Inband Fabric management network, example : for
a 255.255.255.0 network, enter the prefix as 24
# Example : VIP2_PREFIX=
VIP2_PREFIX=

# Fully Qualified Domain name for the Virtual IP
# Example : VIP_FQDN=mhari-tb-83.cisco.com
VIP_FQDN=mhari-tb-83.cisco.com

# NTP server IP address (1.2.3.4) or the hostname (clock.cisco.com)
NTP_SERVER=ntp.esl.cisco.com

# If set, this address must be pingable for DCNM services
# to be running in Native HA systems. This address must
# belong to Enhanced Fabric management network
# HA_PING_ADDRESS=X.X.X.X

```



Note The Virtual IP (VIP) is seen on the active node. You can verify VIP by using the **ip address show** command.

Installing DCNM on ISO Virtual Appliance

This chapter contains the following sections:

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/>.
 - 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 11.0(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 17](#) or [Installing the DCNM ISO Virtual Appliance on UCS \(Bare Metal\), on page 13](#) for more information.

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

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.

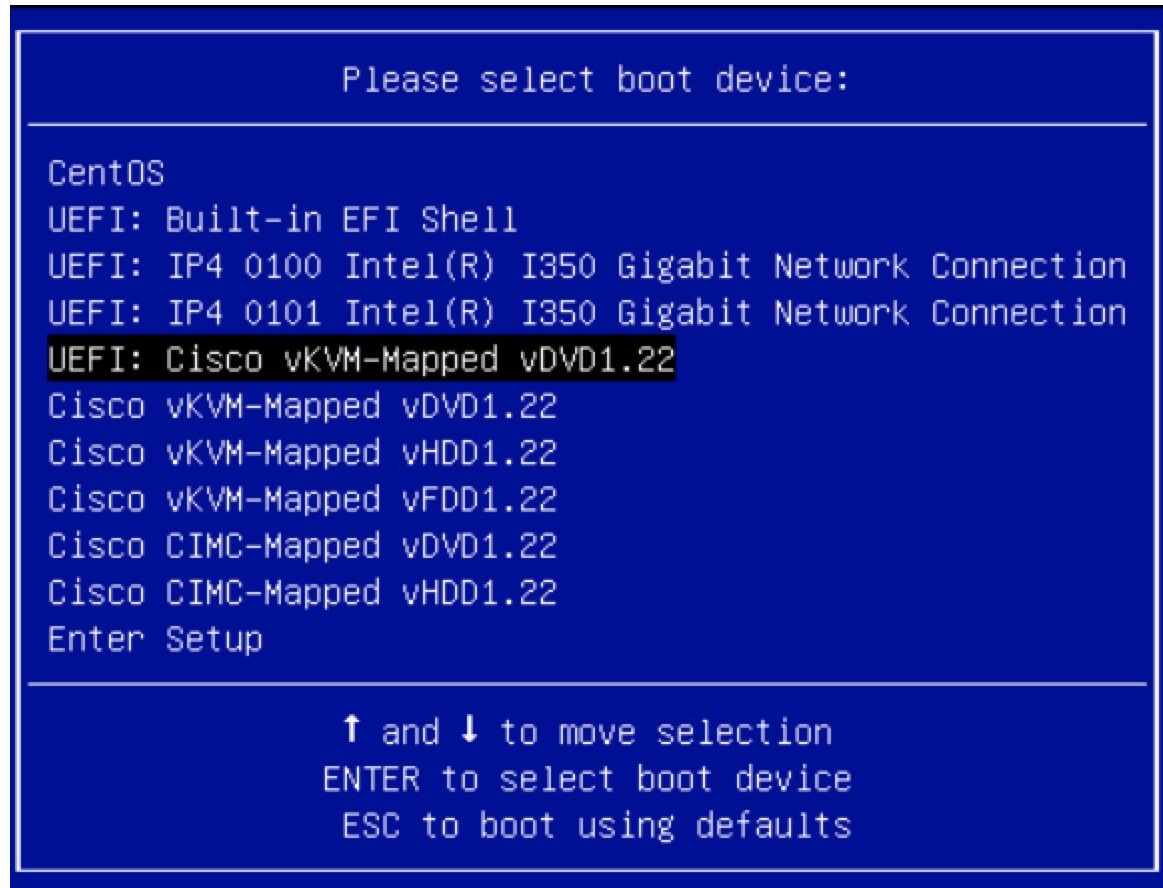
For more information about using the UCS KVM Console window, see the Cisco UCS Server Configuration Utility, Release 3.1 User Guide at the following URL:

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.

```

Boot existing Cisco Data Center Network Manager
Install Cisco Data Center Network Manager
Rescue Cisco Data Center Network Manager

Use the ▲ and ▼ keys to change the selection.
Press 'e' to edit the selected item, or 'c' for a command prompt.

```

- Step 10** 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 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

```

Note If you do not configure In-Band interface, Endpoint Locator and Telemetry features are not operational.

However, you can configure the network after installation, if required. For more information, see [Configuring Enhanced-Fabric-Inband Interface \(eth2\) Post DCNM Installation](#).

- Step 11** Review the selected interfaces. Press **y** to confirm and continue with the installation.
- Step 12** 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 [#unique\\_34](#) or [#unique\\_24](#) 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.11.0.1.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.11.0.1.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.
- ```
sudo virsh define dcnm-kvm-vm.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 with the following specifications:

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

We recommend that you use storage size of 100GB for Programmable Fabric deployments.

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 configure the network after installation, if required. For more information, see [Configuring Enhanced-Fabric-Inband Interface \(eth2\) 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 [#unique_34](#) or [#unique_24](#) for more information.

Installing Cisco DCNM ISO in Standalone Mode

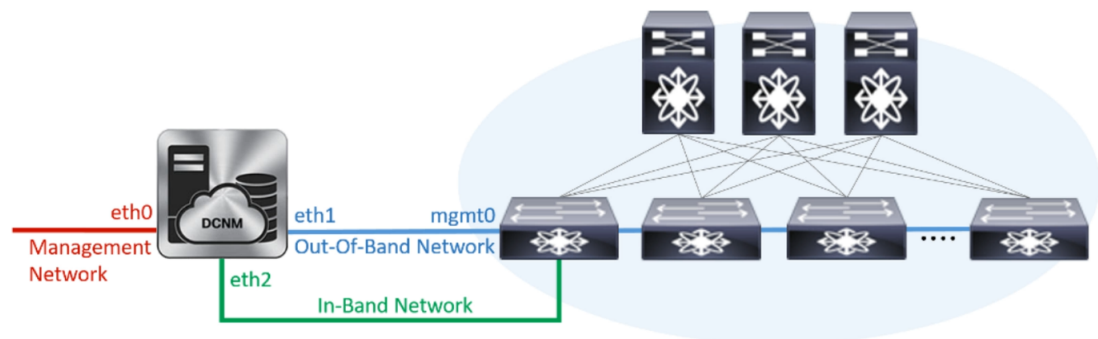
Paste the URL displayed on the Console tab and hit Enter key. A welcome message appears.

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

Procedure

- Step 1** On the Welcome to Cisco DCNM screen, click **Get Started**.
- Step 2** On the Cisco DCNM Installer screen, select **Fresh Installation** radio button.
Click **Continue**.
- Step 3** 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 all platforms:
<SPACE> " & \$ % ' ^ = < > ; : ` \ | / , . *
- Click **Next**.
- Step 4** In the Install Mode tab, from the drop-down list, choose **Classic LAN** installation mode for the OVA DCNM Appliance.
- 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.
 - In the DNS Server Address field, enter the DNS IP address.
 - In the NTP Server field, enter the IP address of the NTP server.
The value must be an IP address or RFC 1123 compliant name.
- Click **Next**.
- Step 6** On the Network Settings tab, configure the network parameters.

Figure 2: Cisco DCNM Management Network Interfaces



- a) In the Management Network area, verify is the autopopulated IP Address and Default gateway address are correct. Modify, if necessary.
- b) In the Out-of-Band Network area, enter the IP address, gateway IP Address, and DNS server address. If DCNM is on the IPv6 network, configure the IP Address.

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

- c) (Optional) 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 configure the in-band network after installation, if required. For more information, see [Configuring Enhanced-Fabric-Inband Interface \(eth2\) Post DCNM Installation](#).

Click **Next**.

Step 7 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 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
```

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 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 ISO in Native HA mode

Procedure

- Step 1** Deploy two DCNM virtual appliances (OVA/ISO).
- Note** For example, let us indicate them as **dcnm1** and **dcnm2**.
- If both eth0 and eth1 interfaces are in the same subnet, edit the `/etc/sysctl.conf` file for DCNM ISO Virtual appliance Native HA installation on both Active and Standby nodes for both the appliances, as follows:
- Change the value of `net.ipv4.conf.default.rp_filter` from 1 to 2.
 - Add `net.ipv4.conf.all.rp_filter = 2` to the `sysctl.conf` file.
- Save and close the file. On the SSH terminal, execute the `sysctl --system` command.
- Step 2** Wait for all the applications to be operational.
- Use the `appmgr status all` command to check the status of the applications.
- Example:**
- ```
dcnm1# appmgr status all
dcnm2# appmgr status all
```
- Step 3** Use the `appmgr stop all` command to shut down all applications on both the Cisco DCNM applications.
- Use the `appmgr status all` command to check the status of the applications.
- Example:**
- ```
dcnm1# appmgr stop all
dcnm2# appmgr status all
```
- Step 4** On the active node, edit the `ha-setup.properties` file, by using the following command:
- ```
vi /root/packaged-files/properties/ha-setup.properties
```
- Example:**
- ```
dcnm1# vi /root/packaged-files/properties/ha-setup.properties
```
- Note** Do not turn on `auto_failback` in heartbeat configuration file.
- Step 5** Edit the active node parameters and enter appropriate values.
- Please refer to [#unique_26](#) section for more information.
- Step 6** Install Native HA on the Active node with the following command:
- ```
appmgr setup native-ha active
```
- Example:**
- ```
dcnm1# appmgr setup native-ha active
```
- Step 7** On the Standby node, check if the below property values are updated in the `ha-setup.properties` file, by using the following command:
- ```
vi /root/packaged-files/properties/ha-setup.properties
```
- Example:**

```
dcnm2# vi /root/packaged-files/properties/ha-setup.properties
```

**Step 8** Verify if the Standby node parameters are updated.

**Note** To setup Cisco DCNM Native HA successfully, it is important to use valid FQDN as hostname for both hosts while installing DCNM OVA/ISO. After installation, you must be able to ping the FQDN for both hosts. If the ping is not successful, the Native HA setup may fail.

**Step 9** If it is auto-populated and validated, install Native HA on the stand-by node, using the following command:  
**appmgr setup native-ha standby**

**Example:**

```
dcnm2# appmgr setup native-ha standby
```

### What to do next

Refer to [Native HA Failover and Troubleshooting](#) for troubleshooting Native HA.

## Example for DCNM Native HA Installation

The example in this section considers the following parameters and shows how to install DCNM Native HA.

| Parameter       | Active          | Standby         | Virtual IP (VIP) |
|-----------------|-----------------|-----------------|------------------|
| Eth0 IP         | 1.1.1.1/24      | 1.1.1.2/24      | 1.1.1.3/24       |
| Eth1 IP         | 2.2.0.1/16      | 2.2.0.2/16      | 2.2.0.3/16       |
| Hostname (FQDN) | dcnm1.cisco.com | dcnm2.cisco.com | dcnm3.cisco.com  |

On the active node, edit the property file by using the following command:

```
vi /root/packaged-files/properties/ha-setup.properties
```

```

#Copyright (c) 2017 by Cisco Systems, Inc.
#All rights reserved.
NODE_ID refers the role of this node in HA.
Example: NODE_ID=1
Example: NODE_ID=1
NODE_ID=1

IPv4 address of the peer
Example : PEER_ETH0_IP=172.28.172.82
PEER_ETH0_IP=172.28.172.82

IPv4 address of the Virtual IP address on the DCNM management network (eth0 network)
Example : VIP_ADDRESS=172.28.172.83
VIP_ADDRESS=172.28.172.83

Network prefix of Virtual IP address on DCNM management network, example : for a
255.255.255.0 network mask, enter the prefix as 24
Example : VIP_PREFIX=24
VIP_PREFIX=24

IPv4 address of the Virtual IP address on the Enhanced Fabric management network (eth1
network)
Example : VIP1_ADDRESS=4.110.1.83
VIP1_ADDRESS=4.110.1.83

Network prefix of Virtual IP address on Enhanced Fabric management network, example :
for a 255.255.255.0 network, enter the prefix as 24
Example : VIP1_PREFIX=24
VIP1_PREFIX=24

Optional eth1 VIP address for IPv6 if configured. If not configured, leave them empty
IPv6 address has to be in long format, no ':::' in it.
VIP1_ADDRESS_IPV6=
VIP1_PREFIX_IPV6=

IPv4 address of the Virtual IP address on the Inband Fabric management network (eth2
network)
Example : VIP2_ADDRESS=
VIP2_ADDRESS=

Network prefix of Virtual IP address on Inband Fabric management network, example : for
a 255.255.255.0 network, enter the prefix as 24
Example : VIP2_PREFIX=
VIP2_PREFIX=

Fully Qualified Domain name for the Virtual IP
Example : VIP_FQDN=mhari-tb-83.cisco.com
VIP_FQDN=mhari-tb-83.cisco.com

NTP server IP address (1.2.3.4) or the hostname (clock.cisco.com)
NTP_SERVER=ntp.esl.cisco.com

If set, this address must be pingable for DCNM services
to be running in Native HA systems. This address must
belong to Enhanced Fabric management network
HA_PING_ADDRESS=X.X.X.X

```

Enter the HA ping IP address if necessary.

HA\_PING\_ADDRESS, must be different from the DCNM Active and Standby addresses.



---

**Note** You must configure the HA ping IP Address to avoid the Split Brain scenario.

---

On the standby node, check if the property values are updated in  
/root/packaged-files/properties/ha-setup.properties

**vi /root/packaged-files/properties/ha-setup.properties**



```

#Copyright (c) 2017 by Cisco Systems, Inc.
#All rights reserved.
NODE_ID refers the role of this node in HA.
Example: NODE_ID=2
Example: NODE_ID=2
NODE_ID=2

IPv4 address of the peer
Example : PEER_ETH0_IP=172.28.172.81
PEER_ETH0_IP=172.28.172.81

IPv4 address of the Virtual IP address on the DCNM management network (eth0 network)
Example : VIP_ADDRESS=172.28.172.83
VIP_ADDRESS=172.28.172.83

Network prefix of Virtual IP address on DCNM management network, example : for a
255.255.255.0 network mask, enter the prefix as 24
Example : VIP_PREFIX=24
VIP_PREFIX=24

IPv4 address of the Virtual IP address on the Enhanced Fabric management network (eth1
network)
Example : VIP1_ADDRESS=4.110.1.83
VIP1_ADDRESS=4.110.1.83

Network prefix of Virtual IP address on Enhanced Fabric management network, example :
for a 255.255.255.0 network, enter the prefix as 24
Example : VIP1_PREFIX=24
VIP1_PREFIX=24

Optional eth1 VIP address for IPv6 if configured. If not configured, leave them empty
IPv6 address has to be in long format, no '::' in it.
VIP1_ADDRESS_IPV6=
VIP1_PREFIX_IPV6=

IPv4 address of the Virtual IP address on the Inband Fabric management network (eth2
network)
Example : VIP2_ADDRESS=
VIP2_ADDRESS=

Network prefix of Virtual IP address on Inband Fabric management network, example : for
a 255.255.255.0 network, enter the prefix as 24
Example : VIP2_PREFIX=
VIP2_PREFIX=

Fully Qualified Domain name for the Virtual IP
Example : VIP_FQDN=mhari-tb-83.cisco.com
VIP_FQDN=mhari-tb-83.cisco.com

NTP server IP address (1.2.3.4) or the hostname (clock.cisco.com)
NTP_SERVER=ntp.esl.cisco.com

If set, this address must be pingable for DCNM services
to be running in Native HA systems. This address must
belong to Enhanced Fabric management network
HA_PING_ADDRESS=X.X.X.X

```



**Note** The Virtual IP (VIP) is seen on the active node. You can verify VIP by using the **ip address show** command.

