



Cisco DCNM Installation and Upgrade Guide for SAN Deployment, Release 11.5(2)

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CHAPTER 1

Overview

Cisco Data Center Network Manager (DCNM) is a management system for Cisco NXOS-based storage fabrics. In addition to provisioning, monitoring, and troubleshooting the data center network infrastructure, the Cisco DCNM provides a comprehensive feature-set that meets the routing, switching, and storage administration needs of data centers. It streamlines the provisioning for the Programmable Fabric and monitors the SAN components.

Cisco DCNM provides a high level of visibility and control through a single web-based management console for Cisco Nexus Series Switches, Cisco MDS, and Cisco Unified Computing System (UCS) products. Cisco DCNM also includes Cisco DCNM-SAN client and Device Manager functionality.

This section contains the following sections:

- [Introduction, on page 1](#)
- [Installation Options, on page 2](#)
- [Deployment Options, on page 3](#)
- [root and sysadmin User Privileges, on page 3](#)
- [Upgrading to Cisco DCNM Release 11.5\(2\), on page 4](#)
- [Upgrading to Cisco DCNM Release 11.5\(1\), on page 5](#)
- [System Requirements, on page 7](#)
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Introduction

Cisco DCNM provides an alternative to the command-line interface (CLI) for switch configuration commands.

In addition to complete configuration and status monitoring capabilities for Cisco MDS 9000 switches, Cisco DCNM-SAN provides powerful fiber channel troubleshooting tools. The in-depth health and configuration analysis capabilities leverage unique MDS 9000 switch capabilities: Fiber Channel Ping and Traceroute.

Beginning with Release 11.1(1), Cisco DCNM allows you to monitor Cisco UCS Blade servers also.

Cisco DCNM Release 11.5(2) offers a Software Maintenance Update (SMU) that can be applied only on top of the DCNM Release 11.5(1) for the OVA/ISO/Appliance form factor. In addition, DCNM Release 11.5(2) also offers Cisco SAN Deployment on Windows and Linux.

Cisco DCNM includes these management applications:

Cisco DCNM Server

The Cisco DCNM-SAN Server component must be started before running Cisco DCNM-SAN. Cisco DCNM-SAN server is installed as a service. This service can then be administered using the Windows Services in the control panel. Cisco DCNM-SAN Server is responsible for discovery of the physical and logical fabric and for listening for SNMP traps, syslog messages, and Performance Manager threshold events.

Cisco DCNM Web UI

Cisco DCNM Web UI allows operators to monitor and obtain reports for Cisco MDS and Nexus events, performance, and inventory from a remote location using a web browser. Licensing and discovery are part of the Cisco DCNM Web UI. You can configure the MDS9000 Fabric, also.

Cisco DCNM-SAN Client

The Cisco DCNM-SAN Client displays a map of your network fabrics, including Cisco MDS 9000 Family switches, third-party switches, hosts, and storage devices. The Cisco DCNM-SAN Client provides multiple menus for accessing the features of the Cisco DCNM SAN functionality.

Device Manager

The Device Manager is embedded with the Cisco DCNM Web UI. After the switches are discovered, navigate to **Inventory > Switches > Device Manager** to launch the Device Manager.

Cisco DCNM-SAN automatically installs the Device Manager. Device Manager provides two views of a single switch:

- **Device View:** displays a graphic representation of the switch configuration and provides access to statistics and configuration information.
- **Summary View:** displays a summary of xE ports (Inter-Switch Links), Fx ports (fabric ports), and Nx ports (attached hosts and storage) on the switch, Fibre Channels, and IP neighbor devices. You can create charts, print, or save the summary or real-time statistics to a file in tab-delimited format.

Performance Manager

Performance Manager presents detailed traffic analysis by capturing data with SNMP. This data is compiled into various graphs and charts that can be viewed on the Cisco DCNM Web UI.

Installation Options

Cisco DCNM software images are packaged with the Cisco DCNM installer, signature certificate, and signature verification script. Unzip the desired Cisco DCNM installer image ZIP file to a directory. Verify the image signature by following the steps in the README file. The installer from this package installs the Cisco DCNM software.

DCNM Open Virtual Appliance (OVA) Installer

This installer is available as an Open Virtual Appliance file (.ova). The installer contains a pre-installed OS, DCNM, and other applications needed for programmable fabric.

DCNM ISO Virtual Appliance (ISO) Installer

This installer is available as an ISO image file (.iso). The installer is a bundle of OS, DCNM, and other applications needed for dynamic fabric automation.



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

DCNM Windows Installer

This installer is available as an executable (.exe) file.

DCNM Linux Installer

This installer is available as a binary (.bin) file.

Deployment Options

You can deploy the Cisco DCNM installer in one of the following modes:

Standalone Server

All types of installers are packaged along with PostgreSQL database. The default installation steps for the respective installers result in this mode of deployment.

Standalone with external Oracle

If you have more switches in your setup or you expect your setup to grow over time, we recommend that you use an external Oracle server. This mode of deployment requires the default installation setup, followed by steps to configure DCNM to use the external Oracle. For more information about Scalability, see *Verified Scalability Guide for Cisco DCNM*.

DCNM Federation

Cisco DCNM federation is the HA mechanism for SAN devices. Every node in the DCNM federated setup can manage many groups of SAN devices. A single client interface can manage all devices. Federation mode is used for resilience and scalability. It allows you to monitor 20,000 FC ports. DCNM Windows and Linux Installers can be deployed in Federation mode to have resilience in case of application or OS failures. For Cisco DCNM-SAN federation, the database URL (properties) must remain the same for all Cisco DCNM-SAN nodes in the federation.

root and sysadmin User Privileges

The following table summarizes the user privileges differences between DCNM 11.5 and previous releases.



Note This is applicable to Cisco DCNM OVA/ISO deployments only.

Description	Functionality in DCNM 11.5 Release	Functionality in DCNM 11.4(1) and 11.3(1) Releases	Remarks
su command	Requires local root password. sysadmin user can't run sudo su command	Requires sysadmin password su is an alias for sudo su	The su command requires the local password even when the remote authentication is configured.
appmgr change_pwd ssh root command	Only root user can run this command.	sysadmin can also run this command.	-
appmgr root-access {permit deny ...} command	Only root user can run this command	sysadmin user can also run this command	-
appmgr remote-auth command	Only root user can run this command	Not available	-
Other appmgr commands	root or sysadmin user can run these commands	root or sysadmin user can run these commands	-

Upgrading to Cisco DCNM Release 11.5(2)

The following table summarizes the type of upgrade that you must follow to upgrade to Release 11.5(2).

Current Release Number	Deployment Type	Upgrade type to upgrade to Release 11.5(2)
11.5(1)	SAN OVA/ISO Note This upgrade is supported only for specific beta equipment support only. For all other supported hardware, we recommend that you deploy Cisco DCNM Release 11.5(1).	Software Maintenance Upgrade (SMU) version 11.5(2)
	SAN Windows and Linux Installers Note This upgrade is supported only for specific beta equipment only. For all other supported hardware, we recommend that you deploy Cisco DCNM Release 11.5(1).	To Windows → Inline Upgrade To Linux → Inline Upgrade

Upgrading to Cisco DCNM Release 11.5(1)

Before Cisco DCNM Release 11.0(1), DCNM OVA, and ISO supported SAN functionality. From Cisco DCNM Release 11.3(1), you can install Cisco DCNM for SAN Deployment on both OVA and ISO virtual appliances.

The following table summarizes the type of upgrade that you must follow to upgrade to Release 11.5(1).

Table 1: Type of Upgrade for Cisco DCNM SAN deployments

Current Release Number	Upgrade type to upgrade to Release 11.5(1)
11.4(1)	To Windows—Inline Upgrade To Linux—Inline Upgrade To OVA\ISO—Inline Upgrade

Current Release Number	Upgrade type to upgrade to Release 11.5(1)
11.3(1)	To Windows—Inline Upgrade To Linux—Inline Upgrade To OVA\ISO—Inline Upgrade
11.2(1)	To Windows—Inline Upgrade To Linux—Inline Upgrade To OVA\ISO— <ol style="list-style-type: none"> 1. Fresh 11.3(1) SAN Only Installation. 2. Migrate Performance Manager Collections to 11.3(1) <p style="margin-left: 20px;">Note The old Performance Manager data will replace any existing Performance Manager data on 11.3(1).</p> 3. Inline upgrade to 11.5(1)
11.1(1)	To Windows— 11.1(1) → 11.4(1) → 11.5(1) To Linux— 11.1(1) → 11.4(1) → 11.5(1) To OVA\ISO— <ol style="list-style-type: none"> 1. Fresh 11.3(1) SAN Only Installation. 2. Migrate Performance Manager Collections to 11.3(1). <p style="margin-left: 20px;">Note The old Performance Manager data will replace any existing Performance Manager data on 11.3(1).</p> 3. Inline upgrade to 11.5(1)

Cisco DCNM Release 11.5(2) offers a Software Maintenance Update (SMU) that can be applied only on top of the DCNM Release 11.5(1) for the OVA/ISO/Appliance form factor. In addition, DCNM Release 11.5(2) also offers Cisco SAN Deployment on Windows and Linux.

Current Release Number	Deployment Type	Upgrade type to upgrade to Release 11.5(2)
11.5(1)	SAN OVA/ISO Note This upgrade is supported only for specific beta equipment support only. For all other supported hardware, we recommend that you deploy Cisco DCNM Release 11.5(1).	Software Maintenance Upgrade (SMU) version 11.5(2)
	SAN Windows and Linux Installers Note This upgrade is supported only for specific beta equipment only. For all other supported hardware, we recommend that you deploy Cisco DCNM Release 11.5(1).	To Windows → Inline Upgrade To Linux → Inline Upgrade

System Requirements

This section describes the various system requirements for proper functioning of your Cisco DCNM Release 11.5(1).



Note We recommend that you do not upgrade any underlying third-party software separately. All the necessary software components will be updated during the inline upgrade procedure. Upgrading the components outside of DCNM upgrade causes performance issues.

- [Java Requirements, on page 8](#)
- [Server Requirements, on page 8](#)
- [Supported Latency](#)
- [Database Requirements, on page 8](#)
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- [Server Resource \(CPU/Memory\) Requirements, on page 9](#)
- [Client Hardware Requirements, on page 10](#)
- [VMware Snapshot Support for Cisco DCNM, on page 11](#)
- [Supported Web Browsers, on page 12](#)
- [Other Supported Software, on page 13](#)

Java Requirements

The Cisco DCNM server is distributed with JRE 11.0.8 into the following directory:

```
DCNM_root_directory/java/jdk11
```

Server Requirements

Cisco DCNM Release 11.5(1), supports the Cisco DCNM server on these 64-bit operating systems:

- **SAN Deployments:**
 - Microsoft Windows 2016
 - Microsoft Windows 2012 R2 update 2919355
 - Red Hat Enterprise Linux Release 7.8, 8.1, and 8.2
 - Open Virtual Appliance (OVA) with an integrated CentOS Linux release 7.8
 - ISO Virtual Appliance (ISO) with an integrated CentOS Linux release 7.8

Database Requirements

Cisco DCNM Release 11.5(1) supports the following databases:

- Oracle 11g Express (XE), Standard, and Enterprise Editions, and Oracle 11g Real Application Clusters (RAC)
- Oracle 12c Enterprise Edition (Conventional)—(Nonpluggable installation)



Note Oracle 12c pluggable database version installation is not supported.

- Oracle 12c RAC (nonpluggable installation)
- PostgreSQL 10.15 - For Linux/OVA/ISO deployments
- PostgreSQL 10.15 - For Windows deployments



Note The database size increases according to the number of nodes and ports that the DCNM manages, with Performance Manager Collections enabled. You cannot restrict the database size. If you choose an Oracle database, we recommend that you use Oracle SE or Enterprise edition, instead of Oracle XE due to table space limitations.



Note You are responsible for all the support that is associated with the Oracle databases, including maintenance, troubleshooting, and recovery. We recommend that you take regular backup of the database; either daily or weekly, to ensure that all the data is preserved.



Note The ISO and OVA installations support only the embedded PostgreSQL database.

Hypervisors

Cisco DCNM supports the ISO installation on a bare-metal server, no hypervisor, on the following server platforms:

Server	Product ID (PID)	Recommended minimum memory, drive capacity, and CPU count
Cisco UCS C240M4	UCSC-C240-M4S	32G / 500G 16 vCPUs
Cisco UCS C240M4	UCSC-C240-M4L	32G / 500G 16 vCPUs
Cisco UCS C240 M5S	UCSC-C240-M5SX	32G / 500G 16 vCPUs
Cisco UCS C220 M5L	UCSC-C220-M5L	32G / 500G 16 vCPUs



Note Cisco DCNM can work on an alternative computing hardware with appropriate specifications, despite Cisco is only testing on Cisco UCS.

Server Resource (CPU/Memory) Requirements



Note If you install Cisco DCNM on a virtual machine, you must reserve resources equal to the server resource requirements to ensure a baseline with the physical machines.

Table 2: System Requirements for Cisco DCNM SAN Deployment

Deployment Type	Small (Lab or POC)	Large (Production)	Huge (Production with SAN Insights)
Windows	CPU: 8 vCPUs RAM: 24 GB DISK: 500 GB	CPU: 16 vCPUs RAM: 32 GB DISK: 500 GB	Not supported

Deployment Type	Small (Lab or POC)	Large (Production)	Huge (Production with SAN Insights)
Linux (RHEL)	CPU: 8 vCPUs RAM: 24 GB DISK: 500 GB	CPU: 16 vCPUs RAM: 32 GB DISK: 500 GB	CPU: 32 vCPUs RAM: 128 GB DISK: 2 TB
OVA/ISO Standalone	CPU: 8 vCPUs RAM: 24 GB DISK: 500 GB	CPU: 16 vCPUs RAM: 32 GB DISK: 500 GB	CPU: 32 vCPUs RAM: 128 GB DISK: 2 TB

If the existing Elasticsearch database is more than 250GB, Cisco DCNM Server requires more than 500GB HDD space to complete reindexing.



Note For Huge and Compute deployments, you can add extra disk. The size of the disk can range from a minimum of 32GB to a maximum of 1.5TB.

If the existing Elasticsearch database is more than 250GB, Cisco DCNM Server requires more than 500GB HDD space to complete reindexing.

Ensure that there is enough disk space to the root partition or mount another disk where the `/tmp` directory can be mounted during the installation or upgrade.

Allocate sufficient disk space to the root partition to complete DCNM installation and for stable continuous operation of the DCNM applications. Refer to the applications' User guides for disk space requirements. You can mount another disk where the `/tmp` directory can be mounted during the installation or upgrade. You can also add additional disk space and the disk file system using **appmgr system scan-disks-and-extend-fs** command.



- Note**
- From Release 11.3(1), Cisco DCNM Windows deployments does not support the SAN Insights feature.
 - Cisco SAN Insights feature is only supported with the Huge deployment.
 - Every federation deployment consists of three large configuration nodes.
 - From Cisco DCNM Release 11.2(1), synchronize the Federation nodes from the Primary node only.

Client Hardware Requirements

Cisco DCNM SAN desktop client and Cisco Device Manager support Microsoft Windows 10, Microsoft Windows 2012, Microsoft Windows 2016, and Red Hat Linux. The following table lists the minimum hardware requirements for these client systems.

Hardware	Minimum Requirements
RAM (free)	6 GB or more
CPU speed	3 GHz or faster

Hardware	Minimum Requirements
Disk space (free)	20 GB

If you install Cisco DCNM on a virtual machine, reserve resources equal to the server resource requirements to ensure a baseline with the physical machines.

Some Cisco DCNM features require a license. Before using the licensed features, install a Cisco DCNM license for each Nexus-managed or MDS-managed platform. For information about Licensing in DCNM, see https://www.cisco.com/c/en/us/td/docs/switches/datacenter/sw/11_x/licensing/cisco_dcnm_licensing_guide_11_x.html.

VMware Snapshot Support for Cisco DCNM

VMware vSphere Hypervisor (ESXi)	6.0	6.5	6.7	6.7 P01	7.0
VMware vCenter Server	6.0	6.5	6.7	6.7 P01	7.0



Note You need VMware vCenter server to deploy Cisco DCNM OVA Installer. However, to install DCNM directly on VMware ESXi without vCenter, you can choose DCNM ISO deployment. Ensure that correct CPU, Memory, Disk, and NIC resources are allocated to that VM.

To take a snapshot on the VM, perform the following steps:

1. Right-click the virtual machine the inventory and select **Snapshots > Take Snapshot**.
2. In the **Take Snapshot** dialog box, enter a name and description for the snapshot.
3. Click **OK** to save the snapshot.

The following snapshots are available for VMs.

- When VM is powered off.
- When VM is powered on, and active.



Note Cisco DCNM supports snapshots when VM is either powered on or powered off. DCNM doesn't support snapshots when the Virtual Machine memory option is selected.

Ensure that **Snapshot the Virtual Machine's memory** check box must not be selected, as shown in the following figure. However, it is grayed out when the VM is powered off.

Take Snapshot | dcnm-va.11.X.1 ×

Name VM Snapshot taken powered on 12/8/2019,

Description

Snapshot the virtual machine's memory

Quiesce guest file system (Needs VMware Tools installed)

CANCEL OK

You can restore VM to the state in a Snapshot.

Manage Snapshots | dcnm1111 ×

- ▼ dcnm1111
 - ▼ VM Snapshot 12%252f12%252f2019, 11:56:07 AM
 - ▼ 1131 Snapshot 12%252f12%252f2019, 3:04:31 PM
 - ▼ VM Snapshot 12%252f16%252f2019, 6:55:02
 - 📍 You are here

Name	VM Snapshot 12%252f16%252f2019, 6:55:02 AM
Created	12/15/2019, 11:55:31 PM
Disk usage	510.03 MB
Snapshot the virtual machine's memory	No
Quiesce guest file system	No

EDIT

DELETE ALL DELETE REVERT TO

DONE

Right-click on the Virtual Machine and select **Manage Snapshot**. Select the snapshot to restore, and click **Done**.

Supported Web Browsers

Cisco DCNM supports the following web browsers:

- Google Chrome version: 86.0.4240.198
- Mozilla Firefox version: 82.0.3 (64-bit)
- Microsoft Edge version: 86.0.622.63

Other Supported Software

The following table lists the other software that is supported by Cisco DCNM Release 11.5(1).

Table 3: Other Supported Software

Component	Features
Security	<ul style="list-style-type: none"> • ACS versions 4.0, 5.1, 5.5, and 5.8 • ISE version 2.6 • ISE version 3.0 • Telnet Disabled: SSH Version 1, SSH Version 2, Global Enforce SNMP Privacy Encryption. • Web Client and Cisco DCNM-SAN Server Encryption: HTTPS with TLS 1, 1.1 and 1.2 • TLS 1.3
OVA\ISO Installers	CentOS 7.8/Linux Kernel 3.10.x

Also, Cisco DCNM supports call-home events, fabric change events, and events that are forwarded by traps and email.

Clearing Browser Cache

While upgrading, Cisco DCNM allows you to use the same IP Addresses for Release 11.0(1) that were used for Release 10.4(2). To optimize loading times, DCNM 11 stores scripts and other assets in a browser's offline storage. Therefore, you must clear the browser cache before you launch the Cisco DCNM 11.0(1) Web UI using the Management Network IP address.

Cisco DCNM supports the following web browsers:

- Mozilla Firefox
- Microsoft Internet Explorer
- Google Chrome version

Based on your browser, you can perform the following task to clear the browser cache.

Mozilla Firefox

To clear cache on the Mozilla Firefox browser, perform the following task:

1. From the History menu, select **Clear Recent History**.
If the menu bar is hidden, press **Alt** to make it visible.
2. From the **Time range to clear:** drop-down list, select the desired range. To clear your entire cache, select all options.

3. Click the down arrow next to Details to choose which elements of the history to clear. To clear the entire cache, select all items.

Click **Clear Now**.

4. Restart browser.

Google Chrome

To clear cache on the Google Chrome browser, perform the following task:

1. In the browser bar, enter **chrome://settings/clearBrowserData**, and press **Enter**.
2. On the Advanced tab, select the following:
 - Cookies and other site data
 - Cached images and files
3. From the **Time range** drop-down list, you can choose the period of time for which you want to clear cached information. To clear your entire cache, select **All time**.
4. Click **Clear Data**.
5. Restart browser.

Internet Explorer

To clear cache on the Internet Explorer browser, perform the following task:

1. Select **Tools > Safety > Delete browsing history...**
If the menu bar is hidden, press **Alt** to make it visible.
2. Deselect **Preserve Favorites website data**, and select **Cookies or Cookies and website data**.
3. Click **Delete**. You will see a confirmation at the bottom of the window when the process is complete.
4. Restart browser.



CHAPTER 2

Guidelines and Limitations

- [Guidelines and Limitations, on page 15](#)

Guidelines and Limitations

The guidelines and limitations for installing and upgrading Cisco DCNM are as follows:

General Guidelines and Limitations

- Adhere to the following password requirements. If you do not comply with the requirements, the DCNM application might not function properly:
 - It must be at least 8 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: <SPACE> & \$ % ‘ “ ^ = < > ; :
 - From Cisco DCNM Release 11.0(1), the characters that are allowed in the Administrative password is restricted for OVA and ISO installations. Therefore while upgrading, the old password used in DCNM 11.0(1) or 11.1(1) is not valid. However, different passwords are allowed during Upgrade.

The new Administrative password that is entered is used in the following scenarios.

—accessing the DCNM appliance via its console.

—accessing the appliance via SSH

—for applications running on the appliance, e.g. Postgres DBMS

However, after the upgrade, since Postgres DBMS is restored from the backup that is taken on DCNM 10.4(2), you must logon to the Cisco DCNM Web UI using the password used on DCNM Release 10.4(2) appliance.

- Do not interrupt the boot process (such as pressing the Ctrl+ALT + DELETE keys) when installing DCNM. If you interrupt, you must restart the installation process.
- Ensure that you configure the timezone after installation or upgrade, before performing any other operations on the Cisco DCNM Appliance. Use the NTP server for configuring timezones.

- To check the status of the running Postgres database in Native HA setup, use **pg_ctl** command. Do not use the **systemctl** command.
- Do not begin the password with Hash (#) symbol. Cisco DCNM considers the password as an encrypted text if it begins with # symbol.
- We recommend that you do not upgrade any underlying third-party software separately. All the necessary software components will be updated during the inline upgrade procedure. Upgrading the components outside of DCNM upgrade will cause performance issues.

Fresh Installation

- For Windows and Linux installers, the installer installs Cisco DCNM-SAN and Cisco SMI-S agent on your system.
- From Release 11.3(1), you can install a Cisco DCNM SAN Deployment on OVA and ISO.

Upgrade

- Before you start to upgrade, close all instances of DCNM SAN client, both SAN Client and Device Manager running on the server.
- For Windows and Linux installers, the default is to upgrade to the latest version of Cisco DCNM.
- If you need to run Network Insights applications, you must install 3 compute nodes.



CHAPTER 3

Prerequisites

This chapter provides release-specific prerequisites information for your deployment of *Cisco Data Center Network Manager*.

- [General Prerequisites, on page 17](#)
- [Prerequisites for Installing DCNM on Windows, on page 30](#)
- [Prerequisites for Installing DCNM on Linux, on page 31](#)
- [Oracle Database for DCNM Servers, on page 32](#)
- [Remote Oracle Database Utility Scripts for Backup and Restore , on page 37](#)
- [Local PostgreSQL Database Utility Scripts for Backup and Restore, on page 38](#)

General Prerequisites

This section includes the following topics:

Before you begin

Before you can install Cisco DCNM, ensure that the Cisco DCNM system meets the following prerequisites:

- Before installing Cisco DCNM, ensure that the host name is mapped with the IP address in the hosts file under the following location:
 - Microsoft Windows—C:\WINDOWS\system32\drivers\etc\hosts
 - Linux—/etc/hosts



Note If Oracle RAC is chosen as the database for Cisco DCNM, ensure that the database host IP addresses and virtual IP addresses are added to the hosts file with their host-names.

- For RHEL, the maximum shared memory size must be 256 MB or more. To configure the maximum shared memory to 256 MB, use the following command:

```
sysctl -w kernel.shmmax=268435456
```

This setting, `kernel.shmmax=268435456`, should be saved in the `/etc/sysctl.conf` file. If this setting is not present or if it is less than 268435456, the Cisco DCNM server will fail after the server system is rebooted. For more information, visit the following URL:

<http://www.postgresql.org/docs/8.3/interactive/kernel-resources.html>

The server system must be registered with the DNS servers. The server hosting DCNM application must be dedicated to run DCNM alone and must not be shared with any other applications which utilizes memory and system resources.

- While using Remote PostgreSQL Database server, ensure that the Cisco DCNM Host IP addresses are added to the `pg_hba.conf` file present in the PostgreSQL installation directory. After the entries are added, restart the database.
- Users installing Cisco DCNM must have full administrator privileges to create user accounts and start services. Users should also have access to all ports. For more information, see [Running Cisco DCNM Behind a Firewall, on page 91](#).
- When you connect to the server for the first time, Cisco DCNM checks to see if you have the correct Sun Java Virtual Machine version installed on your local workstation. Cisco DCNM desktop clients look for version 1.8(x) during installation. If required, install the Sun Java Virtual Machine software.



Note When launching the Cisco DCNM installer, the `console` command option is not supported.



Note Using the Cisco DCNM installer in GUI mode requires that you must log in to the remote server using VNC or XWindows. Using Telnet or SSH to install Cisco DCNM in GUI mode is not possible.

Before you can use Cisco DCNM to manage network switches, you must complete the following tasks:

- Install a supervisor module on each switch that you want to manage.
- Configure the supervisor module with the following values using the setup routine or the CLI:
 - IP address assigned to the `mgmt0` interface
 - SNMP credentials (v3 user name and password or v1/v2 communities), maintaining the same user name and password for all the switches in the fabric.

Initial Setup Routine

The first time that you access a Cisco NXOS-based switch for MDS or Nexus, it runs a setup program that prompts you for the IP address and other configuration information necessary for the switch to communicate over the supervisor module Ethernet interface. This information is required to configure and manage the switch. All Cisco Nexus or Cisco MDS switches have the network administrator as a default user (Admin). You cannot change the default user at any time. You must explicitly configure a strong password for any switch in the Cisco Nexus or Cisco MDS. The setup scenario differs based on the subnet to which you are adding the new switch:

- Out-of-band management—This feature provides a connection to the network through a supervisor module front panel Ethernet port.
- In-band management—This feature provides IP over Fibre Channel (IPFC) to manage the switches. The in-band management feature is transparent to the network management system (NMS).



Note IP address for a Cisco Nexus switch or a Cisco MDS switch can be set via CLI or USB key or POAP.

Preparing to Configure the Switch

Before you configure a switch in the Cisco Nexus or Cisco MDS 9000 Family for the first time, you need the following information:

- Administrator password, including:
 - Creating a password for the administrator (required).
 - Creating an additional login account and password (optional).
- IP address for the switch management interface—The management interface can be an out-of-band Ethernet interface or an in-band Fibre Channel interface (recommended).
- Subnet mask for the switch's management interface (optional).
- IP addresses, including:
 - Destination prefix, destination prefix subnet mask, and next-hop IP address if you want to enable IP routing. Also, provide the IP address of the default network (optional).
 - Otherwise, provide an IP address of the default gateway (optional).
- SSH service on the switch—To enable this optional service, select the type of SSH key (dsa/rsa/rsa1) and number of key bits (768 to 2048).
- DNS IP address (optional).
- Default domain name (optional).
- NTP server IP address (optional).
- SNMP community string (optional).
- Switch name—This is your switch prompt (optional).



Note Be sure to configure the IP route, the IP default network address, and the IP default gateway address to enable SNMP access. If IP routing is enabled, the switch uses the IP route and the default network IP address. If IP routing is disabled, the switch uses the default gateway IP address.



Note You should verify that the Cisco DCNM-SAN Server host name entry exists on the DNS server, unless the Cisco DCNM-SAN Server is configured to bind to a specific interface during installation.

Default Login

All Cisco Nexus and Cisco MDS 9000 Family switches have the network administrator as a default user (Admin). You cannot change the default user at any time (see the Security Configuration Guide, Cisco DCNM for SAN).

You have an option to enforce a secure password for any switch in the Cisco MDS 9000 Family. If a password is trivial (short, easy-to-decipher), your password configuration is rejected. Be sure to configure a secure password (see the Security Configuration Guide, Cisco DCNM for SAN). If you configure and subsequently forget this new password, you have the option to recover this password (see the Security Configuration Guide, Cisco DCNM for SAN).



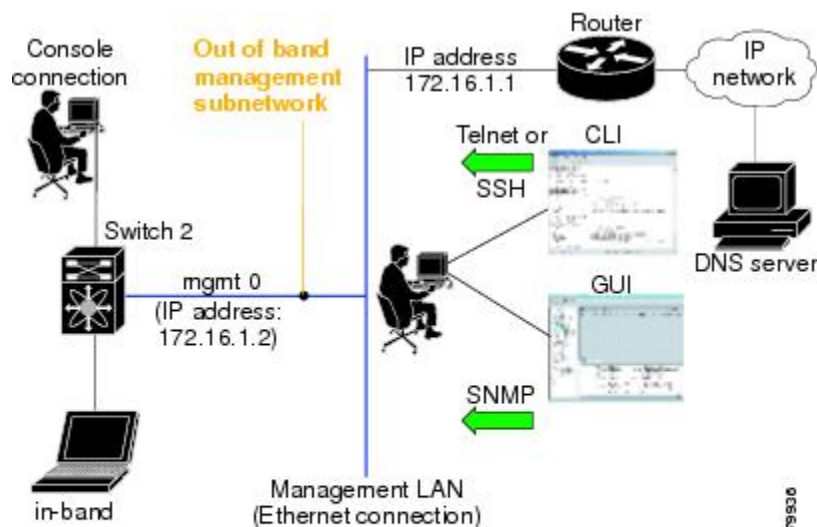
Note Adhere to the following password requirements. If you do not comply with the requirements, the DCNM application might not function properly:

- It must be at least 8 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 any deployment mode: <SPACE> & \$ % ' " ^ = < > ; :

Setup Options

The setup scenario differs based on the subnet to which you are adding the new switch. You must configure a Cisco MDS 9000 Family switch or a Cisco Nexus switch with an IP address to enable management connections from outside of the switch (see [Figure 1: Management Access to Switches, on page 21](#)).

Figure 1: Management Access to Switches



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Assigning Setup Information

This section describes how to initially configure the switch for both out-of-band and in-band management.



Note Press **Ctrl + C** at any prompt to skip the remaining configuration options and proceed with what is configured until that point. Entering a new password for the administrator is a requirement and cannot be skipped.



Tip If you do not wish to answer a previously configured question, or if you wish to skip answers to any questions, press **Enter**. If a default answer is not available (for example, switch name), the switch uses what was previously configured and skips to the next question.

Configuring Out-of-Band Management

You can configure both in-band and out-of-band configuration together by entering **Yes** in both in the following procedure.

Procedure

Step 1 Power on the switch. Switches in the Cisco Nexus and Cisco MDS 9000 Family boot automatically.

Do you want to enforce secure password standard (Yes/No)?

Step 2

Enter Yes to enforce a secure password.

- a) Enter the administrator password.

Enter the password for admin: **2008asdf*1kj17**

Note The password can contain a combination of alphabets, numeric, and special characters. Do not use any of these special characters in the DCNM password for any deployment mode: <SPACE> & \$ % ‘ “ ^ = <> ; :

- b) Confirm the administrator password.

Confirm the password for admin: **2008asdf*1kj17**

Tip If a password is trivial (short, easy to decipher), your password configuration is rejected. Be sure to configure a secure password as shown in the sample configuration. Passwords are case sensitive.

Step 3

Enter **yes** to enter the setup mode.

Note This setup utility guides you through the basic configuration of the system. Setup configures only enough connectivity for management of the system.

Please register Cisco MDS 9000 Family devices promptly with your supplier. Failure to register may affect response times for initial service calls. MDS devices must be registered to receive entitled support services. Press Enter anytime you want to skip any dialog. Use ctrl-c at anytime to skip away remaining dialogs.

Would you like to enter the basic configuration dialog (yes/no): **yes**

The setup utility guides you through the basic configuration process. Press **Ctrl + C** at any prompt to end the configuration process.

Step 4

Enter the new password for the administrator (Admin is the default).

Enter the password for admin: **admin**

Step 5

Enter **yes** (no is the default) to create additional accounts.

Create another login account (yes/no) [n]: **yes**

While configuring your initial setup, you can create an additional user account (in the network administrator role) in addition to the administrator's account. See the Security Configuration Guide, Cisco DCNM for SAN for information on default roles and permissions.

Note User login IDs must contain non-numeric characters.

- a) Enter the user login ID [administrator].

Enter the user login ID: **user_name**

- b) Enter the user password.

Enter the password for user_name: **user-password**

The password can contain a combination of alphabets, numeric, and special characters. Do not use any of these special characters in the DCNM password for any deployment mode: <SPACE> & \$ % ‘ “ ^ = <> ; :

- c) Confirm the user password.

Confirm the password for user_name: **user-password**

- Step 6** Enter **yes** (no is the default) to create an SNMPv3 account.
- ```
Configure read-only SNMP community string (yes/no) [n]: yes
```
- a) Enter the username (Admin is the default).
- ```
SNMPv3 user name [admin]: admin
```
- b) Enter the SNMPv3 password (minimum of eight characters). The default is admin123.
- ```
SNMPv3 user authentication password: admin_pass
```
- Step 7** Enter **yes** (no is the default) to configure the read-only or read-write SNMP community string.
- ```
Configure read-write SNMP community string (yes/no) [n]: yes
```
- a) Enter the SNMP community string.
- ```
SNMP community string: snmp_community
```
- Step 8** Enter a name for the switch.
- ```
Enter the switch name: switch_name
```
- Step 9** Enter **yes** (yes is the default) to configure out-of-band management.
- ```
Continue with Out-of-band (mgmt0) management configuration? [yes/no]: yes
```
- a) Enter the mgmt0 IP address.
- ```
Mgmt0 IPv4 address: ip_address
```
- b) Enter the mgmt0 subnet mask.
- ```
Mgmt0 IPv4 netmask: subnet_mask
```
- Step 10** Enter **yes** (yes is the default) to configure the default gateway (recommended).
- ```
Configure the default-gateway: (yes/no) [y]: yes
```
- a) Enter the default gateway IP address.
- ```
IPv4 address of the default gateway: default_gateway
```
- Step 11** Enter **yes** (no is the default) to configure advanced IP options such as in-band management, static routes, default network, DNS, and domain name.
- ```
Configure Advanced IP options (yes/no)? [n]: yes
```
- a) Enter **no** (no is the default) at the in-band management configuration prompt.
- ```
Continue with in-band (VSAN1) management configuration? (yes/no) [no]: no
```
- b) Enter **yes** (no is the default) to enable IP routing capabilities.
- ```
Enable the ip routing? (yes/no) [n]: yes
```
- c) Enter **yes** (no is the default) to configure a static route (recommended).
- ```
Configure static route: (yes/no) [n]: yes
```
- Enter the destination prefix.
- ```
Destination prefix: dest_prefix
```
- Enter the destination prefix mask.
- ```
Destination prefix mask: dest_mask
```

Enter the next-hop IP address.

Next hop ip address: **next\_hop\_address**

**Note** Be sure to configure the IP route, the default network IP address, and the default gateway IP address to enable SNMP access. If IP routing is enabled, the switch uses the IP route and the default network IP address. If IP routing is disabled, the switch uses the default gateway IP address.

- d) Enter **yes** (no is the default) to configure the default network (recommended).

Configure the default network: (yes/no) [n]: **yes**

Enter the default network IP address.

**Note** The default network IP address is the destination prefix provided in .

Default network IP address [dest\_prefix]: **dest\_prefix**

- e) Enter **yes** (no is the default) to configure the DNS IP address.

Configure the DNS IPv4 address? (yes/no) [n]: **yes**

Enter the DNS IP address.

DNS IPv4 address: **name\_server**

- f) Enter **yes** (default is no) to configure the default domain name.

Configure the default domain name? (yes/no) [n]: **yes**

Enter the default domain name.

Default domain name: **domain\_name**

- Step 12** Enter **yes** (no is the default) to enable Telnet service.

Enable the telnet server? (yes/no) [n]: **yes**

- Step 13** Enter **yes** (no is the default) to enable the SSH service.

Enabled SSH server? (yes/no) [n]: **yes**

- Step 14** Enter the SSH key type.

Type the SSH key you would like to generate (dsa/rsa)? **dsa**

- Step 15** Enter the number of key bits within the specified range.

Enter the number of key bits? (768 to 2048): **768**

- Step 16** Enter **yes** (no is the default) to configure the NTP server.

Configure NTP server? (yes/no) [n]: **yes**

Configure clock? (yes/no) [n] :**yes**

Configure clock? (yes/no) [n] :**yes**

Configure timezone? (yes/no) [n] :**yes**

Configure summertime? (yes/no) [n] :**yes**

Configure the ntp server? (yes/no) [n] : **yes**

- a) Enter the NTP server IP address.

NTP server IP address: **ntp\_server\_IP\_address**

- Step 17** Enter **noshut** (shut is the default) to configure the default switch port interface to the shut state.

Configure default switchport interface state (shut/noshut) [shut]: **noshut**



- Step 18** Enter **on** (on is the default) to configure the switch port trunk mode.  
 Configure default switchport trunk mode (on/off/auto) [on]: **on**
- Step 19** Enter **no** (no is the default) to configure switchport port mode F.  
 Configure default switchport port mode F (yes/no) [n] : **no**
- Step 20** Enter **permit** (deny is the default) to deny a default zone policy configuration.  
 Configure default zone policy (permit/deny) [deny]: **permit**  
 This step permits traffic flow to all members of the default zone.
- Step 21** Enter **yes** (no is the default) to disable a full zone set distribution (see the Fabric Configuration Guide, Cisco DCNM for SAN). Disables the switch-wide default for the full zone set distribution feature.  
 Enable full zoneset distribution (yes/no) [n]: **yes**  
 You see the new configuration. Review and edit the configuration that you have just entered.
- Step 22** Enter **no** (no is the default) if you are satisfied with the configuration.  
 The following configuration will be applied:  
 username admin password admin\_pass role network-admin  
 username user\_name password user\_pass role network-admin  
 snmp-server community snmp\_community ro  
 switchname switch  
 interface mgmt0  
   ip address ip\_address subnet\_mask  
   no shutdown  
 ip routing  
 ip route dest\_prefix dest\_mask dest\_address  
 ip default-network dest\_prefix  
 ip default-gateway default\_gateway  
 ip name-server name\_server  
 ip domain-name domain\_name  
 telnet server enable  
 ssh key dsa 768 force  
 ssh server enable  
 ntp server ipaddr ntp\_server  
 system default switchport shutdown  
 system default switchport trunk mode on  
 system default port-channel auto-create  
 zone default-zone permit vsan 1-4093  
 zoneset distribute full vsan 1-4093  
 Would you like to edit the configuration? (yes/no) [n]: **no**
- Step 23** Enter **yes** (yes is default) to use and save this configuration:  
 Use this configuration and save it? (yes/no) [y]: **yes**
- Caution** If you do not save the configuration at this point, none of your changes are updated the next time the switch is rebooted. Enter **yes** to save the new configuration to ensure that the kickstart and system images are also automatically configured.

## Configuring In-Band Management

The in-band management logical interface is VSAN 1. This management interface uses the Fibre Channel infrastructure to transport IP traffic. An interface for VSAN 1 is created on every switch in the fabric. Each

switch should have its VSAN 1 interface that is configured with an IP address in the same subnetwork. A default route that points to the switch that provides access to the IP network should be configured on every switch in the Fibre Channel fabric (see Fabric Configuration Guide, Cisco DCNM for SAN).



**Note** You can configure both in-band and out-of-band configuration together by entering in the following procedure.

### Procedure

**Step 1** Power on the switch. Switches in the Cisco MDS 9000 Family boot automatically.

**Step 2** Enter the new password for the administrator.

Enter the password for admin: **2004asdf\*1kjh18**

The password can contain a combination of alphabets, numeric, and special characters. The password can contain a combination of alphabets, numeric, and special characters. Do not use any of these special characters in the DCNM password for any deployment mode: <SPACE> & \$ % ‘ “ ^ = < > ; :

**Step 3** Enter **yes** to enter the setup mode.

This setup utility will guide you through the basic configuration of the system. Setup configures only enough connectivity for management of the system. Please register Cisco MDS 9000 Family devices promptly with your supplier. Failure to register may affect response times for initial service calls. MDS devices must be registered to receive entitled support services. Press Enter incase you want to skip any dialog. Use ctrl-c at anytime to skip away remaining dialogs.  
Would you like to enter the basic configuration dialog (yes/no): **yes**

The setup utility guides you through the basic configuration process. Press **Ctrl-C** at any prompt to end the configuration process.

**Step 4** Enter **no** (no is the default) if you do not wish to create more accounts.

Create another login account (yes/no) [no]: **no**

**Step 5** Configure the read-only or read-write SNMP community string.

a) Enter **no** (no is the default) to avoid configuring the read-only SNMP community string.

Configure read-only SNMP community string (yes/no) [n]: **no**

**Step 6** Enter a name for the switch.

**Note** The switch name is limited to 32 alphanumeric characters. The default is switch.

Enter the switch name: **switch\_name**

**Step 7** Enter **no** (yes is the default) at the configuration prompt to configure out-of-band management.

Continue with Out-of-band (mgmt0) management configuration? [yes/no]: **no**

**Step 8** Enter **yes** (yes is the default) to configure the default gateway.

Configure the default-gateway: (yes/no) [y]: **yes**

a) Enter the default gateway IP address.

IP address of the default gateway: **default\_gateway**

- Step 9** Enter **yes** (no is the default) to configure advanced IP options such as in-band management, static routes, default network, DNS, and domain name.
- ```
Configure Advanced IP options (yes/no)? [n]: yes
```
- a) Enter **yes** (no is the default) at the in-band management configuration prompt.
- ```
Continue with in-band (VSAN1) management configuration? (yes/no) [no]: yes
```
- Enter the VSAN 1 IP address.
- ```
VSAN1 IP address: ip_address
```
- Enter the subnet mask.
- ```
VSAN1 IP net mask: subnet_mask
```
- b) Enter **no** (yes is the default) to enable IP routing capabilities.
- ```
Enable ip routing capabilities? (yes/no) [y]: no
```
- c) Enter **no** (yes is the default) to configure a static route.
- ```
Configure static route: (yes/no) [y]: no
```
- d) Enter **no** (yes is the default) to configure the default network.
- ```
Configure the default-network: (yes/no) [y]: no
```
- e) Enter **no** (yes is the default) to configure the DNS IP address.
- ```
Configure the DNS IP address? (yes/no) [y]: no
```
- f) Enter **no** (no is the default) to skip the default domain name configuration.
- ```
Configure the default domain name? (yes/no) [n]: no
```
- Step 10** Enter **no** (yes is the default) to disable Telnet service.
- ```
Enable the telnet service? (yes/no) [y]: no
```
- Step 11** Enter **yes** (no is the default) to enable the SSH service.
- ```
Enabled SSH service? (yes/no) [n]: yes
```
- Step 12** Enter the SSH key type (see the Security Configuration Guide, Cisco DCNM for SAN) that you want to generate.
- ```
Type the SSH key you would like to generate (dsa/rsa/rsa1)? rsa
```
- Step 13** Enter the number of key bits within the specified range.
- ```
Enter the number of key bits? (768 to 1024): 1024
```
- Step 14** Enter **no** (no is the default) to configure the NTP server.
- ```
Configure NTP server? (yes/no) [n]: no
```
- Step 15** Enter **shut** (shut is the default) to configure the default switch port interface to the shut state.
- ```
Configure default switchport interface state (shut/noshut) [shut]: shut
```
- Note** The management Ethernet interface is not shut down at this point—only the Fibre Channel, iSCSI, FCIP, and Gigabit Ethernet interfaces are shut down.
- Step 16** Enter **auto** (off is the default) to configure the switch port trunk mode.

```
Configure default switchport trunk mode (on/off/auto) [off]: auto
```

Step 17 Enter **deny** (deny is the default) to deny a default zone policy configuration.

```
Configure default zone policy (permit/deny) [deny]: deny
```

This step denies traffic flow to all members of the default zone.

Step 18 Enter **no** (no is the default) to disable a full zone set distribution.

```
Enable full zoneset distribution (yes/no) [n]: no
```

This step disables the switch-wide default for the full zone set distribution feature.

You see the new configuration. Review and edit the configuration that you have entered.

Step 19 Enter **no** (no is the default) if you are satisfied with the configuration.

```
The following configuration will be applied:
username admin password admin_pass role network-admin
snmp-server community snmp_community rw
switchname switch
interface vsan1
  ip address ip_address subnet_mask
  no shutdown
ip default-gateway default_gateway
no telnet server enable
ssh key rsa 1024 force
ssh server enable
no system default switchport shutdown
system default switchport trunk mode auto
no zone default-zone permit vsan 1-4093
no zoneset distribute full vsan 1-4093
Would you like to edit the configuration? (yes/no) [n]: no
```

Step 20 Enter **yes** (yes is default) to use and save this configuration.

```
Use this configuration and save it? (yes/no) [y]: yes
```

Caution If you do not save the configuration at this point, none of your changes are updated the next time the switch is rebooted. Enter **yes** to save the new configuration. To ensure that the kickstart and system images are also automatically configured.

Using the setup Command

To make changes to the initial configuration at a later time, you can enter the **setup** command in EXEC mode.

```
switch# setup
---- Basic System Configuration Dialog ----
This setup utility will guide you through the basic configuration of
the system. Setup configures only enough connectivity for management
of the system.
*Note: setup always assumes a predefined defaults irrespective
of the current system configuration when invoked from CLI.
Press Enter incase you want to skip any dialog. Use ctrl-c at anytime
to skip away remaining dialogs.
Would you like to enter the basic configuration dialog (yes/no): yes
```

The setup utility guides you through the basic configuration process.

Starting a Switch in the Cisco MDS 9000 Family

The following procedure is a review of the tasks you should have completed during hardware installation, including starting up the switch. These tasks must be completed before you can configure the switch.



Note You must use the CLI for initial switch start up.

Procedure

- Step 1** Verify the following physical connections for the new Cisco MDS 9000 Family switch:
- The console port is physically connected to a computer terminal (or terminal server).
 - The management 10/100 Ethernet port (mgmt0) is connected to an external hub, switch, or router.
- Tip** Save the host ID information for future use (for example, to enable licensed features). The host ID information is provided in the Proof of Purchase document that accompanies the switch.
- Step 2** Verify that the default console port parameters are identical to those of the computer terminal (or terminal server) attached to the switch console port:
- 9600 baud
 - 8 data bits
 - 1 stop bit
 - No parity
- Step 3** Power on the switch.
- The switch boots automatically and the switch# prompt appears in your terminal window.
-

Accessing the Switch

After initial configuration, you can access the switch in one of the three ways:

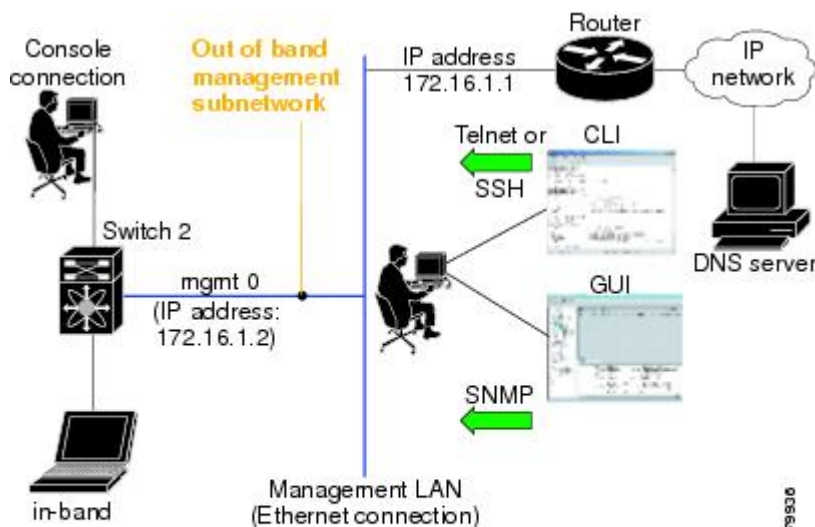
- Serial console access—You can use a serial port connection to access the CLI.
- In-band IP (IPFC) access—You can use Telnet or SSH to access a switch in the Cisco MDS 9000 Family or use SNMP to connect to a Cisco DCNM-SAN application.
- Out-of-band (10/100BASE-T Ethernet) access—You can use Telnet or SSH to access a switch in the Cisco MDS 9000 Family or use SNMP to connect to a Cisco DCNM-SAN application.

After initial configuration, you can access the switch in one of three ways (see [Figure 2: Switch Access Options, on page 30](#)):

- Serial console access—You can use a serial port connection to access the CLI.

- In-band IP (IPFC) access—You can use Telnet or SSH to access a switch in the Cisco MDS 9000 Family or use Cisco DCNM-SAN to access the switch.
- Out-of-band (10/100BASE-T Ethernet) access—You can use Telnet or SSH to access a switch in the Cisco MDS 9000 Family or use Cisco DCNM-SAN to access the switch.

Figure 2: Switch Access Options



Prerequisites for Installing DCNM on Windows

- During the initial installation, disable all security and post antivirus tools that are running on your Windows server.
- Do not run any other management applications on the Cisco DCNM server or the Cisco DCNM database server.
- Before installing Cisco DCNM, ensure that the hostname is mapped with the IP address in the hosts file under the location `C:\WINDOWS\system32\drivers\etc\hosts`.
- On Windows, remote Cisco DCNM installations or upgrades must be done through the console using VNC or through the Remote Desktop Client (RDC) in console mode (ensuring RDC is used with the `/Console` option). This process is important if the default PostgreSQL database is used with Cisco DCNM, because this database requires the local console for all installations and upgrades.
- Telnet Client application is not installed by default on Microsoft Windows Vista. To install Telnet Client, choose **Start > Programs > Control Panel > Click Turn Windows features on or off** (if you have UAC turned on, provide permissions to continue). Check **Telnet Client** check box and click **Ok**.

- You can run CiscoWorks on the same PC as Cisco DCNM although the Java requirements are different. When installing the later Java version for Cisco DCNM, make sure that it does not overwrite the earlier Java version that is required for CiscoWorks. Both versions of Java can coexist on your PC.
- Ensure that you use the same Operating System for all the nodes in the Federation setup.
- In the Federation setup, ensure that the server time is synchronized across all the nodes of the Federation setup. The servers will not be able to communicate if the time is not synchronized. We recommend that you use NTP server to synchronize time across all the nodes.
- Ensure that you uninstall the Windows Defender application, and restart Windows 2016 server before installing Cisco DCNM on Windows 2016 server.

Prerequisites for Installing DCNM on Linux

- For RHEL, the maximum shared memory size must be 256 MB or more. To configure the maximum shared memory to 256 MB, use the following command: `sysctl -w kernel.shmmax=268435456`. Save the `kernel.shmmax=268435456` value in the `/etc/sysctl.conf` file. If this value is not correct, the Cisco DCNM server fails after the server system reboots. For more information, visit the following URL:

<http://www.postgresql.org/docs/8.4/interactive/kernel-resources.html>



Note Ensure that you've installed Visual C++ Redistributable Packages for Visual Studio 2013 64 bit before installing or upgrading to Cisco DCNM Release 11.4(1).

- The server system must be registered with the DNS servers.
- No other programs must be running on the server.
- Ensure that you select English as the preferred language during RHEL installation.
- Ensure that you use the same Operating System for all the nodes in the Federation setup.
- In the Federation setup, ensure that the server time is synchronized across all the nodes of the Federation setup. The servers will not be able to communicate if the time is not synchronized. We recommend that you use NTP server to synchronize time across all the nodes.
- After you upgrade from Cisco DCNM Release 11.2(1) on Linux Standalone server, ensure that you clear the browser cache and Java console cache before you launch the Web UI and download the SAN Client. The Java console remembers the previous version of the SAN client data. If you do not clear Java console cache, you will not be able to use the latest downloaded SAN Client.

Antivirus exclusion

Scanning the Cisco DCNM includes the scanning of the database files. This process will hamper the performance on the DCNM while operation. While scanning the Cisco DCNM on Linux RHEL server, exclude the directory `/usr/local/cisco/dcm/db` and `/var/lib/dcnm`.

For more information, refer to <https://wiki.postgresql.org>.



Note We recommend you to stop Anti-Virus scanning while installing DCNM because the port being used or blocked might cause failures. After the installation, you can enable or install Anti-Virus application with specific guidelines to avoid DCNM directories as part of the scan.

Oracle Database for DCNM Servers

This section details about the database required for the installation of DCNM server.



Note This section is not applicable for Cisco DCNM Native HA installation.

Cisco DCNM supports the following databases:

- Oracle Database 11g
- Oracle Database 12c
- Oracle RAC 11g, and 12c

You can change from the local database to an external Oracle database, if required.



Note Cisco DCNM is configured with AL32UTF8 character set.

The Cisco DCNM Database size is not limited and increases based on the number of nodes and ports that the DCNM manages with Performance Manager Collections enabled. You cannot restrict the database size. Cisco recommends that you use Oracle SE or Enterprise edition, instead of Oracle XE, due to table space limitations.

This section contains the following:

Oracle SQLPlus Command-Line Tool

The Oracle database procedures in this section require the use of the SQL*Plus command-line tool. The SQL*Plus executable is typically installed in the bin directory under the Oracle home directory.

Linux Environment Variables

If you are using Linux, before you use the SQL*Plus command-line tool, ensure that the ORACLE_HOME and ORACLE_SID environment variables are set to correct values.

For example, if you are using Oracle 11g on Linux, the following commands set the environment variables to the default Oracle home directory and SID if you are using a bash shell:

```
export ORACLE_HOME=<usr_home_directory>/app/oracle/product/11.2.0/  
(or identify the Oracle home on the Oracle installed server)  
export ORACLE_SID=XE
```


init.ora File

The init.ora file specifies startup parameters. The default name and location of the file is platform specific, as shown in the following table.

Table 4: Name and Default Location of init.ora File

Oracle Version	Operating System	Location of init.ora File
12c	Microsoft Windows	C:\app\Administrator\virtual\product\12.2.0\dbhome_1\svrm\admin\init.ora
	Linux	/usr/lib/oracle/orcl/app/oracle/product/12.2.0/db_1/svrm/initORCL.ora
11g	Microsoft Windows	C:\app\Administrator\product\11.1.0\db_1\dfs\initORCL.ora
	Linux	/usr/lib/oracle/orcl/app/oracle/product/11.1.0/db_1/dfs/initORCL.ora

Backing up the Oracle Database

Copy the oracle backup/restore script from the Cisco DCNM server directory
DCNM_SERVER_Install/dcm/dcnm/bin.

For Linux, the script name is backup-remote-oracledb.sh/restore-remote-oracledb.sh and edit the DB_HOME variable to point to the Oracle installation.

For Windows, the script name is **backup-remote-oracledb.bat/restore-remote-oracledb.bat** and edit *DB_HOME* variable to point to the Oracle installation.

Use the following path for Oracle DBHOME:

- On Linux- /usr/lib/oracle/xe/app/oracle/product/10.2.0/server
Replace /usr/lib/oracle with the Oracle installation path.
- On windows- C:\oraclexe\app\oracle\product\10.2.0\server
Replace C:\oraclexe with the Oracle installation path.

Preparing the Oracle Database

You can prepare an Oracle database.

Procedure

-
- Step 1** Increase the number of sessions and processes to 150 each. For more information, see the [Increasing the Number of Sessions and Processes to 150 Each, on page 35](#).
- Step 2** Increase the number of open cursors to 1000. For more information, see the [Increasing the Number of Open Cursors to 1000, on page 35](#).
-

Logging Into Oracle

You can log into the Oracle database by using the SQL*Plus command-line tool.

Before you begin

Ensure that you know the database administrator username and password.

Procedure

- Step 1** Run the SQL*Plus executable.
A command prompt appears.
- Step 2** Enter the **connect** command.
The Username prompt appears.
- Step 3** Enter the database administrator username.
The Password prompt appears.
- Step 4** Enter the password for the username that you specified.
For example, if the Oracle administrator username is system and the password is oracle, you would log in as follows:

Example:

```
Username: sys as sysdba
Password: oracle
```

What to do next

For more information about using SQL*Plus, see the documentation for the Oracle database version that you are using.

Increasing the SYSTEM Tablespace

You can increase the SYSTEM tablespace.

Procedure

- Step 1** Use the SQL*Plus command-line tool to log in to the Oracle database. For more information, see the [Oracle SQLPlus Command-Line Tool, on page 32](#).
- Step 2** Enter the following command:
- ```
select file_name, bytes, autoextensible, maxbytes
from dba_data_files where tablespace_name='SYSTEM';
```
- Step 3** Enter the following command:
- ```
alter database datafile filename autoextend on next 100m maxsize 2000m;
```

where *file_name* is the filename from the output of the **select** command in the previous step.

The SYSTEM tablespace is increased.

Step 4 Enter the **exit** command.

Increasing the Number of Sessions and Processes to 150 Each

For each DCNM instance configured in the same Oracle database, the number of cursors and processes must be increased to more than the 150 and 1000.

For example, if two DCNM standalone (non HA) instances are configured to use the same Oracle database, the cursors and process must be increased to 300 and 2000 approximately, depending on any performance degradation or SQL Exception errors occurred during normal operations of either of the DCNM instances.

Procedure

- Step 1** Ensure that the `init.ora` file exists and that it contains the single line that is applicable for your Oracle database installation. If there are additional lines, remove them.
- For more information, see the [init.ora File, on page 33](#).
- Step 2** Use the SQL*Plus command-line tool to log in to the Oracle database. For more information, see the [Oracle SQLPlus Command-Line Tool, on page 32](#).
- Step 3** Shut down the system by entering the **shutdown** command. If the command fails, use the **shutdown abort** command.
- Step 4** Enter the following command:
- ```
startup pfile='init_file_name';
```
- where *init\_file\_name* is the `init.ora` filename for your Oracle database installation. For more information, see the [init.ora File, on page 33](#).
- Step 5** Set the number of sessions to 150 by entering the following command:
- ```
alter system set sessions = 150 scope=spfile;
```
- Step 6** Shut down the system by entering the **shutdown** command. If the command fails, use the **shutdown abort** command.
- Step 7** Start up the system by entering the **startup** command.
- Step 8** Verify that the number of sessions and processes is changed to 150 by entering the following command:
- ```
show parameter sessions
```
- Step 9** Exit by entering the **exit** command.
- 

## Increasing the Number of Open Cursors to 1000

You can increase the number of open cursors to 1000.

## Procedure

---

- Step 1** Ensure that the `init.ora` file exists and that it contains the single line that is applicable for your Oracle database installation. If there are additional lines in the file, remove them.
- For more information, see the [init.ora File, on page 33](#).
- Step 2** Use the SQL\*Plus command-line tool to log in to the Oracle database. For more information, see the [Oracle SQLPlus Command-Line Tool, on page 32](#).
- Step 3** Shut down the system by entering the **shutdown** command. If the command fails, use the **shutdown abort** command.
- Step 4** Enter the following command:
- ```
startup pfile='init_file_name'
```
- where `init_file_name` is the `init.ora` filename for your Oracle database installation. For more information, see the [init.ora File, on page 33](#).
- Step 5** Set the number of open cursors to 1000 by entering the following command:
- ```
alter system set open_cursors = 1000 scope=spfile;
```
- Step 6** Shut down the system by entering the **shutdown** command. If the command fails, use the **shutdown abort** command.
- Step 7** Start up the system by entering the **startup** command.
- Step 8** Verify that the number of open cursors is changed to 1000 by entering the following command:
- ```
show parameter open_cursors
```
- Step 9** Exit by entering the **exit** command.
-

Creating an Oracle DB User using the Command Prompt

To create an Oracle DB user using the command prompt, follow these steps:

```
export ORACLE_SID=XE
export ORACLE_HOME=/usr/lib/oracle/xe/app/oracle/product/10.2.0/server
cd $ORACLE_HOME/bin
sqlplus
sys as sysdba
create user dcnmdbusername identified by dcnmdbuserpassword default tablespace users temporary
tablespace temp;
grant connect, resource to dcnmdbusername;
grant create session to dcnmdbusername;
grant dba to dcnmdbusername;
```



Note Ensure you set the `Oracle_SID` and `Oracle_Home` and enter the values for the DB Username and password fields.



Note When a DBA account cannot be created, an account with DML/DDl/schema privilege is sufficient.

Connecting to an Oracle RAC with SCAN Feature Type DB

To connect to an Oracle RAC with SCAN Feature type DB, enter the following command:

```
# appmgr update -u jdbc:oracle:thin:@//[ip_addr]:1521/[service name] -n [username] -p [password]
```

Database for Federation Setup

Cisco DCNM can be deployed as Cisco DCNM-SAN federation. For Cisco DCNM-SAN federation, the database URL (properties) must remain the same for all Cisco DCNM-SAN nodes in the federation.



Note Ensure that you do not provide multicast addresses to form the federation.

Remote Oracle Database Utility Scripts for Backup and Restore

Irrespective of the platform, Cisco DCNM is installed (Windows or Linux), the following scripts to backup and restore the remote Oracle database.

Utility scripts for Oracle database that is installed on Linux platform are;

1. backup-remote-oracledb.sh
2. restore-remote-oracledb.sh

Utility scripts for Oracle database that is installed on Windows platform are:

1. backup-remote-oracledb.bat
2. restore-remote-oracledb.bat

Cisco DCNM host is configured to run with a remote Oracle database. As part of housekeeping, you can copy DCNM utility scripts to a remote Oracle database and restore the DCNM database schema.

To run the utility scripts, you need the database administrator credentials. These scripts will prompt you for:

1. DCNM database password (the user name is already present)
2. Username/password of the admin user.

While entering the DBA user credentials, ensure that you do not to enter "sys" as sysdba" because in some versions of Oracle, the presence of space might cause the backup/restore to fail. Instead, user should provide valid user credentials that does not have a space in the user name, for example, system or sysdba. The admin credentials are not saved/cached and hence they do not leak sensitive credential information.



Note User scripts under **dcnm/bin** can be run only by administrator user.

Local PostgreSQL Database Utility Scripts for Backup and Restore

Utility scripts for Local PostgreSQL database that is installed in RHEL machine are:

1. backup-pgsql-dcnm-db.sh
2. restore-pgsql-dcnm-db.sh

Utility scripts for Local PG database that is installed in Windows machine are:

1. backup-pgsql-dcnm-db.bat
2. restore-pgsql-dcnm-db.bat



CHAPTER 4

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 Cisco DCNM on Windows, on page 39](#)
- [Installing Cisco DCNM on Linux, on page 46](#)
- [Launching SAN Client and Device Manager, on page 54](#)

Installing Cisco DCNM on Windows

Perform the following tasks to install Cisco DCNM on Windows.

Uninstalling the Cisco DCNM on Windows

Perform this procedure to uninstall Cisco DCNM on Windows.



Note We recommend that you follow these steps in the same order.

Before you begin

You must remove the Cisco DCNM instance completely before you use the same server to install a different version of DCNM. Ensure that you delete the `pgevent.dll` (located at `dcm db path \db\lib\pgevent.dll`) before beginning to upgrade.

Procedure

- Step 1** Stop Cisco DCNM Services.
Close all instances of DCNM SAN client and Device Manager running on the server.
- Step 2** Uninstall the Postgres database.
- Step 3** Uninstall the Cisco DCNM.
- Step 4** Navigate to `C:\Users\Administrator` location, and delete `.cisco_mds9000` folder.

- Step 5** Navigate to C:\Program Files\Zero G Registry location, and delete the **Zero G Registry** folder.
 - Step 6** Navigate to C:\Users\Administrator location, and delete **InstallAnywhere** folder.
 - Step 7** Ensure that all the ports required for Cisco DCNM installation are free and available.
 - Step 8** Delete the Cisco DCNM directory.
 - Step 9** Restart the Windows VM.
-

Downloading the Cisco DCNM Windows Installer and Properties File

The first step to installing the DCNM on Windows is to download the `dcnm.exe` file.



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

Before you begin

To support specific beta equipment support, download DCNM Release 11.5(2) installer and properties file. For all other supported hardware, we recommend that you deploy Cisco DCNM Release 11.5(1).

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 11.5(1)Release 11.5(2).
 - Step 5** Locate the DCNM Windows Installer and click the **Download** icon.
The installer file is of the format
`dcnm-installer-x64.11.5.1.exe``dcnm-installer-x64.11.5.2.exe`.
 - Step 6** Locate the DCNM Silent Installer Property Files and click the **Download** icon.
This file will be used during Silent Installation.
 - Step 7** Save both the files to your directory that will be easy to find when you begin the installation.
-

Installing Cisco DCNM on Windows Using the GUI

Perform the following steps to install DCNM Windows using the GUI:

Procedure

- Step 1** Locate the `dcnm.exe` file that you have downloaded.
Double click on the `dcnm.exe` file.
InstallAnywhere progress bar appears to show the progress.
- Step 2** On the Introduction screen, read the instructions.
Choose a vendor from the OEM Vendor drop-down list.
- Cisco Systems, Inc—to install Cisco Data Center Network Manager.
 - IBM—to install the IBM Data Center Network Manager.
- The following message appears:
- ```
Please close the DCNM Installation wizard gracefully using "Done" option
on last installation step and wait for the installation wizard to close automatically.
Do not restart the system or forcefully terminate the Installation wizard while it is still
in progress."
```
- Click **OK** to continue.  
Click **Next**.
- Step 3** Check **Add server to existing federation** checkbox if DCNM is installed as a secondary appliance in a Federation setup.
- Step 4** Check **Secure Ciphers** checkbox to allow only switches with strong ciphers to be discovered by DCNM.
- Step 5** To install DCNM-SAN and SMI-S for the first time, choose the location for installation. In the Install Location field, click **Choose**, and provide the appropriate folder path. Click **Restore Default Folder** if DCNM is installed as a part of the Federation setup.  
Click **Next**.
- Step 6** Choose the appropriate RDBMS for the DCNM server.  
Select the database that is based on your requirement.
- Install PostgreSQL—Installs the PostgreSQL database that is bundled along with the `dcnm.exe`.
  - Existing PostgreSQL 9.4
  - Existing Oracle 10g/11g/12c
  - Existing Oracle 10g/11g/12c RAC
- In the Service Name field, enter the service name of the Oracle RAC server. Enter a maximum of three host IP addresses. Click **OK**. The DB URL is generated.

If the Cisco DCNM installer detected an existing RDBMS installation, the DB URL field shows the hostname. Cisco DCNM installation with existing PostgreSQL requires an existing schema with the same name as the DCNM username, which is owned by the same username. When there are no schemas existing with the DCNM username, or if you don't have the ownership of the schema with the same `dcnmuser` name, the tables are created in the default schema, which is known as "public".

**Note** You can't upgrade the DCNM Server with tables created in the default public schema.

**Note** In Oracle, when a new user is created, a schema name with the same name as the username is created automatically.

In the DCNM DB User field, enter the username that the Cisco DCNM uses to access the database. In the DCNM DB Password field, enter the password for the database user account that you specified. If you select **Add Server to an existing federation**, modify the database URL by selecting the corresponding RDBMS option. Because all the servers in federation refer to the same database, you must provide the dcnmuser name and password of the primary server.

Click **Next**. Review the limitations with Oracle Database and click **OK**.

Click **Next**.

**Step 7** In the Port Configuration Options screen, choose the interface and web ports for Cisco DCNM.

- From the Server IP Address list, choose the IP address that you want to use for the Cisco DCNM server. The list shows only the IP addresses currently that are assigned to network interfaces on the server system.
- If you want to change the port that the Cisco DCNM-SAN web server listens to, enter the new port number in the SAN Web Server Port field. By default, the Cisco DCNM-SAN web server listens to TCP port 443.

**Note** During Cisco DCNM installation, use port numbers that are not commonly used. For example, 87 and 23 are reserved or restricted web ports.

Click **Next**.

**Step 8** In the Choose archive Folder for DCNM screen, provide a folder path to store device configuration files, user preferences and so on.

Perform one of the following:

- Click **Choose** to select a path to store the DCNM LAN archive directory.

**Note** If you must choose a remote system, provide the UNC path. For example:  
`//Server/Share/directorypath.`

- Click **Restore Default Folder** to retain the default folder.

**Note** Ensure that this folder is accessible by all nodes in the Federation setup.

Click **Next**.

**Step 9** In the Local User Credentials screen, provide a valid username and password to access both DCNM SAN and DCNM LAN appliances.

- In the Admin Username field, enter a name for a Cisco DCNM server user. The installer creates the Cisco DCNM server user and assigns the Administrator role to it.
- In the Password field, enter a password for the user, and in the Confirm Password field, reenter the password.

Adhere to the following password requirements. If you don't comply with the requirements, the DCNM application may not function properly:

- It must be at least 8 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 any deployment mode:  
<SPACE> & \$ % ‘ “ ^ = < > ; ; :

Click **Next**.

**Step 10** In the Authentication Settings screen, choose the authentication method that the Cisco DCNM server should use to authenticate users who log on to the Cisco DCNM client. You can choose one of the following:

- **Local**—Cisco DCNM client users are authenticated by the Cisco DCNM server user accounts only.
- **RADIUS**—Cisco DCNM client users are authenticated by a RADIUS server.
- **TACACS+**—Cisco DCNM client users are authenticated by a TACACS+ server.

You can configure LDAP authentication after installing DCNM.

**Note** After TACACS/RADIUS/LDAP is enabled, Local user "admin" can't be accessible. This is default behavior.

Only if the TACACS/RADIUS/LDAP server isn't reachable or down, the Local user will be validated and is able to log in.

If LDAP/RADIUS/TACACS server is reachable and authentication fails on TACACS/LDAP/RADIUS, then no fall back to local.

**Step 11** If you chose RADIUS or TACACS+, do the following:

- a) In the primary server address field, enter the IPv4 address of the server in dotted-decimal format.
- b) In the primary server key field, enter the shared secret of the server.
- c) (Optional) If you want to ensure that Cisco DCNM can communicate with the server, click **Verify**.
- d) In the secondary server address field, enter the IPv4 address of the server in dotted-decimal format.
- e) In the secondary server key field, enter the shared secret of the server.
- f) (Optional) If you want to ensure that Cisco DCNM can communicate with the server, click **Verify**.
- g) In the tertiary server address field, enter the address of the server in the dotted-decimal format.
- h) In the tertiary server key field, enter the shared secret of the server.
- i) (Optional) If you want to ensure that Cisco DCNM can communicate with the server, click **Verify**.

Click **Next**.

**Step 12** In the Choose Shortcut Folder screen, specify path where you want to create the DCNM icons.

If you want the installer to create the shortcuts for all users who can log into the server system, check the **Create icons for All Users** check box.

Click **Next**.

**Step 13** In the Pre-Installation Summary screen, review the installation configuration.

Click **Previous** to go to the previous tabs and modify the configuration.

Click **Next**.

**Step 14** On the confirmation window, click **Yes** to begin the DCNM installation.

The progress bar description shows the process during the installation.

**Step 15** On the Install Complete screen, the installed components are listed. Click **Done** to start the DCNM server.

**Note** Do not close the installer, nor kill the wizard. Ensure that you click **Done**.

Wait until the DCNM is deployed on the system.

The prompt will return after the silent install is complete.

- Step 16** Open a browser and enter **https://<<DCNM\_server\_IP\_Address>>**.  
Press **Return** key to launch the Web Interface of Cisco DCNM on Windows for LAN and SAN Management.
- 

## Installing Cisco DCNM Windows in a Server Federation Environment using GUI

To install DCNM in a server federation environment:

### Before you begin

Ensure that you have installed DCNM on the Primary server. Follow the instructions provided in [Installing Cisco DCNM on Windows Using the GUI, on page 40](#) section.

### Procedure

---

- Step 1** While installing DCNM on the Secondary server, check **Add server to existing federation** checkbox.  
This makes the DCNM installed as a secondary appliance in a Federation setup. The Pre-installation Summary screen displays the Federation status and nodes in the Federation Settings area.  
The following message appears:
- ```
Please close the DCNM Installation wizard gracefully using "Done" option
on last installation step and wait for the installation wizard to close automatically.
Do not restart the system or forcefully terminate the Installation wizard while it is still
in progress."
```
- Click **OK** to continue.
- Step 2** Check Secure Ciphers checkbox to allow only switches with strong ciphers to be discovered by DCNM, only if the Secure Ciphers was enabled on the Primary.
Cisco DCNM uses both strong and weak ciphers when connecting to switches. If user you wants to use only strong ciphers for network, select the checkbox. Ensure that the switches in your network support strong ciphers before you select checkbox, as DCNM will not be able to connect to switches which do not support strong ciphers.
- Step 3** Modify the database URL by selecting the corresponding RDBMS option.
- Note** All the servers in federation refer to the same database, and therefore you must provide the DCNM user name and password of the primary server. Also, you must provide the database user name and password of the primary server.

The user name and password of the database are same for all the server installation forming the federation. Similarly, the user name and password of DCNM are same for all the server installation forming the federation.

Installing Cisco DCNM Windows through Silent Installation

Cisco DCNM supports Silent installation only on Local Authorization mode and not on Remote Authorization mode.

Perform the following steps to install DCNM Windows through silent installation.

Procedure

Step 1 Unzip, extract and open the `installer.properties` file and update the following properties.

```
#-----BASIC Properties-----
DCNM_IP_ADDRESS=<ip_address_of_host_machine>
USER_INSTALL_DIR=C:\\Program Files\\Cisco Systems
INSTALLATION_TYPE=NEW_INSTALL
#INSTALLATION_TYPE=UPGRADE
SAN_FEDERATION=FALSE
#SAN_FEDERATION=TRUE
```

Step 2 Configure the database parameters.

If you are using PostgreSQL database, edit this block:

```
#-----DATABASE Properties-----
#User can configure these properties to use existing database or
# install fresh Postgres as database for the DCNM. Existing database
# can be postgres (remote or local), Oracle (remote or local)
# or it can be Oracle RAC.
#-----
USE_EXISTING_DB=FALSE
#USE_EXISTING_DB=TRUE

PG_DB_PATH=C:\\Program Files\\Cisco Systems\\dcm\\db

#-----New Postgres-----
DCNM_DB_URL=jdbc\:postgresql://localhost\:5432/dcmdb
DCNM_DB_NAME=dcmdb
SELECTED_DATABASE=postgresql
DCNM_DB_USERNAME=dcnmuser
DCNM_DB_USER_PASSWORD=dcnmuser
```

If you are using the Oracle database, edit this block:

```
#-----DATABASE Properties-----
#User can configure these properties to use existing database or
# install fresh Postgres as database for the DCNM. Existing database
# can be postgres (remote or local), Oracle (remote or local)
# or it can be Oracle RAC.
#-----
USE_EXISTING_DB=FALSE
#USE_EXISTING_DB=TRUE

ORA_DB_PATH=C:\\oraclexe\\app\\oracle\\product\\10.2.0\\server
```

Step 3 Configure the user credentials for DCNM.

```
#-----User Configuration-----
#DCNM User Configuration Properties
#If you want to use special characters in DCNM_ADMIN
#credentials, Please use escape character(\) before
#the symbol [For eg. Password "an$6x12" must be specified as "an\$6x12" ].
#-----

DECRYPT_PASSWORDS=FALSE
DCNM_ADMIN_USER=admin
DCNM_ADMIN_USER_PASSWORD=admin123

#-----User Configuration-----
```

Step 4 Enable the Secure Ciphers.

```
#-----Secure Ciphers-----
#DCNM uses both strong and weak ciphers when connecting to switches
#If user wants to use only strong ciphers for connection, please set
#property to TRUE. Make sure your switches support strong ciphers before
#setting the property as DCNM will not be able to connect to switches which
#support only weak ciphers.

#-----
SECURE_CIPHER=FALSE
#SECURE_CIPHER=TRUE
#-----
```

Step 5 Configure IBM Raven to install IBM Data Center Network Manager.

```
#-----IBM Raven Support-----
#Set true if Vendor is IBM, by default false
#-----

IBM_INSTALL=FALSE /*Does not install IBM Data Center Network Manager*/
#-----
```

Step 6 Navigate to the directory where you downloaded the Cisco DCNM Windows software and run the appropriate installer by using the following command:

```
dcnm-release.exe -i silent -f path_of_installer.properties_file
```

You can check the status of installation in the Task Manager process.

Step 7 Open a browser and enter **https://<<DCNM_server_IP_Address>>**.

Press **Return** key to launch the Web Interface of Cisco DCNM for SAN Management.

Installing Cisco DCNM on Linux

Perform the following tasks to install Cisco DCNM on Linux.

Uninstalling the Cisco DCNM on Linux

Perform this procedure to uninstall Cisco DCNM on Linux.



Note We recommend that you follow these steps in the same order.

Before you begin

You must remove the Cisco DCNM instance completely before you use the same server to install a different version of DCNM.

Procedure

-
- Step 1** Stop DCNM services on the DCNM server using the `/root/Stop_DCNM_Servers` command.
Close all instances of DCNM SAN client and Device Manager running on the server.
- Step 2** Uninstall the Postgres database using the `<<dcnm_directory_location>/db/uninstall-postgresql` command.
- Step 3** Uninstall the Cisco DCNM Server using the `/root/Uninstall_DCNM` command.
- Note** If you're uninstalling RHEL 8.x, use `./Uninstall_DCNM -i silent` command. However, RHEL 8.x doesn't support uninstalling via the Web UI.
- Step 4** Delete the hidden `.cisco_mds9000` file, using the `rm -rf .cisco_mds9000` command.
- Step 5** Delete the Zero G Registry using the `rm -rf /var/.com.zerog.registry.xml` command.
- Step 6** Delete the hidden `InstallAnywhere` folder using the `rm -rf .InstallAnywhere` command.
- Step 7** Ensure that all the ports required for Cisco DCNM installation are free and available.
- Step 8** Delete the DCNM directory using the `rm -rf /usr/local/cisco/*`. Delete the DCNM directory if you've saved in any other directory.
- Step 9** Restart the RHEL system.
-

Uninstalling the Cisco DCNM on Linux

The following sample shows the list of commands that you must run, to uninstall the Cisco DCNM on Linux.

```
[dcnm-linux]# /root/Stop_DCNM_Servers
[dcnm-linux]# /<<dcnm_installed_dir>>/db/uninstall-postgresql
[dcnm-linux]# /root/Uninstall_DCNM /* for uninstalling RHEL 7.x */
[dcnm-linux]# ./Uninstall_DCNM -i silent /* for uninstalling RHEL 8.x */
[dcnm-linux]# rm -rf .cisco_mds9000
[dcnm-linux]# rm -rf /var/.com.zerog.registry.xml
[dcnm-linux]# rm -rf .InstallAnywhere
[dcnm-linux]# rm -rf /usr/local/cisco/*
[dcnm-linux]# restart
[dcnm-linux]#
```

Downloading the Cisco DCNM Linux Installer and Properties File

The first step to installing the DCNM on Linux is to download the `dcnm.bin` file.



Note If you plan to use Federation application functions, you must deploy the dcnm.bin file twice.

Before you begin

To support specific beta equipment support, download DCNM Release 11.5(2) installer and properties file. For all other supported hardware, we recommend that you deploy Cisco DCNM Release 11.5(1).

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 11.5(1)Release 11.5(2).
- Step 5** Locate the DCNM Linux Installer and click the **Download** icon.
The installer file is of the format
`dcnm-installer-x64.11.5.2.bindcnm-installer-x64.11.5.1.bin`.
- Step 6** Locate the DCNM Silent Installer Property Files and click the **Download** icon.
This file will be used during Silent Installation.
- Step 7** Save both the files to your directory that will be easy to find when you begin the installation.
-

Installing Cisco DCNM on Linux Using the GUI

Perform the following steps to install DCNM Linux using the GUI:

Before you begin

Ensure that the DISPLAY variable is set to 1.

- Check if DISPLAY variable is set to 1 by using the following command:
`echo $DISPLAY`
- Set DISPLAY variable to 1 by using the following command:
`export DISPLAY=:1`

Procedure

- Step 1** Locate the `dcnm-installer-x64.<release-name>.bin` file that you have downloaded.

Run the `dcnm.bin` installer file.

InstallAnywhere progress bar appears showing the progress.

Step 2

On the Introduction screen, read the instructions.

Choose a vendor from OEM Vendor drop-down list.

- Cisco Systems, Inc—to install Cisco Data Center Network Manager
- IBM—to install IBM Data Center Network Manager

The following message appears:

```
Please close the DCNM Installation wizard gracefully using "Done" option
on last installation step and wait for the installation wizard to close automatically.
Do not restart the system or forcefully terminate the Installation wizard while it is still
in progress."
```

Click **OK** to continue.

Click **Next**.

Step 3

Check **Add server to existing federation** checkbox if DCNM is installed as a secondary appliance in a Federation setup.

Step 4

Check **Secure Ciphers** checkbox to allow only switches with strong ciphers to be discovered by DCNM.

Step 5

To install DCNM-SAN and SMI-S for the first time, choose the location for installation.

Note The location for installation must be within the partition where the required disk space is provisioned. Ensure that there is sufficient disk space for deployment.

In the Install Location field, click **Choose**, and provide the appropriate folder path. Click **Restore Default Folder** if DCNM is installed as a part of the Federation setup.

Click **Next**.

Step 6

Choose the appropriate RDBMS for the DCNM server.

Select the database that is based on your requirement.

- Install PostgreSQL—Installs the PostgreSQL database that is bundled along with the `dcnm.bin`.
- Existing PostgreSQL 9.4—Existing PostgreSQL database that is already set up, with a clean schema.
- Existing Oracle 10g/11g/12c—Existing Oracle database that is already set up, with a clean schema.
- Existing Oracle 10g/11g/12c RAC—Existing Oracle database that is already set up, with a clean schema.

In the Service Name field, enter the service name of the Oracle RAC server. Enter a maximum of three host IP addresses. Click **OK**. The DB URL is generated.

If the Cisco DCNM installer detected an existing RDBMS installation, the DB URL field shows the hostname.

Note Cisco DCNM installation with existing PostgreSQL requires an existing schema with the same name as the DCNM username, which is owned by the same username. When there is no schema existing with the DCNM username, or if you do not have the ownership of the schema with the same `dcnmuser` name, the tables are created in the default schema, known as “public”.

If the tables are created in the default schema, you may encounter authentication issues after upgrading Cisco DCNM. You will have to create a schema with the same name as the DCNM username owned by the same username. For instructions, see [User and Schemas, on page 103](#).

Note In Oracle, when a new user is created, a schema name with the same name as the username is created automatically.

In the **DCNM DB User** field, enter the username that Cisco DCNM user uses to access the database. In the **DCNM DB Password** field, enter the password for the database user account that you specified. If you select **Add Server to an existing federation**, modify the database URL by selecting the corresponding RDBMS option. Because all the servers in Federation refer to the same database, you must provide the dcnmuser name and password of the primary server.

Click **Next**. Review the limitations with Oracle Database and click **OK**.

Click **Next**.

Step 7 In the Port Configuration Options screen, choose the interface and web ports for Cisco DCNM.

- From the Server IP Address list, choose the IP address that you want to use for the Cisco DCNM server. The list shows only the IP addresses currently that are assigned to network interfaces on the server system.
- If you want to change the port that the Cisco DCNM-SAN web server listens to, enter the new port number in the SAN Web Server Port field. By default, the Cisco DCNM-SAN web server listens to TCP port 443.

Note During Cisco DCNM installation, use port numbers that are free. For example, 87 and 23 are reserved or restricted web ports.

Click **Next**.

Step 8 In the Choose archive Folder for DCNM screen, provide a folder path to store device configuration files, user preferences and so on.

Perform one of the following:

- Click **Choose** to select a path to store the DCNM archive directory.

Note If you must choose a remote system, provide the UNC path. For example:
`//Server/Share/directorypath.`

- Click **Restore Default Folder** to retain the default folder.

Click **Next**.

Step 9 In the Local User Credentials screen, provide a valid username and password to access DCNM SAN appliances.

- In the Admin Username field, enter a name for a Cisco DCNM server user. The installer creates the Cisco DCNM server user and assigns the Administrator role to it.
- In the Password field, enter a password for the user, and in the Confirm Password field, reenter the password.

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 any deployment mode:
<SPACE> & \$ % ‘ “ ^ = < > ; ; :

Click **Next**.

Step 10 In the Authentication Settings screen, choose the authentication method that the Cisco DCNM server must use to authenticate users who log on to the Cisco DCNM client. You can choose one of the following:

- **Local**—Cisco DCNM client users are authenticated by the Cisco DCNM server user accounts only.
- **RADIUS**—Cisco DCNM client users are authenticated by a RADIUS server.
- **TACACS+**—Cisco DCNM client users are authenticated by a TACACS+ server.

Step 11 If you chose RADIUS or TACACS+, do the following:

- a) In the primary server address field, enter the IPv4 address of the server in dotted-decimal format.
- b) In the primary server key field, enter the shared secret of the server.
- c) (Optional) If you want to ensure that Cisco DCNM can communicate with the server, click **Verify**.
- d) In the secondary server address field, enter the IPv4 address of the server in dotted-decimal format.
- e) In the secondary server key field, enter the shared secret of the server.
- f) (Optional) If you want to ensure that Cisco DCNM can communicate with the server, click **Verify**.
- g) In the tertiary server address field, enter the address of the server in the dotted-decimal format.
- h) In the tertiary server key field, enter the shared secret of the server.
- i) (Optional) If you want to ensure that Cisco DCNM can communicate with the server, click **Verify**.

Click **Next**.

The Choose Link Folder is skipped and by default the location is `/root` directory.

Step 12 In the Pre-Installation Summary screen, review the installation configuration.

Click **Previous** to go to the previous tabs and modify the configuration.

Click **Next**.

Step 13 On the confirmation window, click **Yes** to begin the DCNM installation.

The progress bar description shows the process during the installation.

Step 14 On the Install Complete screen, the installed components are listed. Click **Done** to start the DCNM server.

Wait until the DCNM is deployed on the system.

Step 15 Open a browser and enter **https://<<DCNM_server_IP_Address>>**.

Press **Return** key to launch the Web Interface of Cisco DCNM for SAN Management.

Installing Cisco DCNM Linux in a Server Federation Environment Using GUI

To install DCNM in a server federation environment:

Before you begin

- Ensure that you have installed DCNM on the Primary server. Follow the instructions in [Installing Cisco DCNM on Linux Using the GUI, on page 48](#) section.
- Ensure that the DISPLAY variable is set to 1.
 - Check if DISPLAY variable is set to 1 by using the following command:
echo \$DISPLAY
 - Set DISPLAY variable to 1 by using the following command:
export DISPLAY=:1

Procedure

Step 1 While installing DCNM on the Secondary server, check **Add server to existing federation** checkbox.

This makes the DCNM installed as a secondary appliance in a Federation setup. The Pre-installation Summary screen displays the Federation status and nodes in the Federation Settings area.

The following message appears:

```
Please close the DCNM Installation wizard gracefully using "Done" option
on last installation step and wait for the installation wizard to close automatically.
Do not restart the system or forcefully terminate the Installation wizard while it is still
in progress."
```

Click **OK** to continue.

Step 2 Check Secure Ciphers checkbox to allow only switches with strong ciphers to be discovered by DCNM, only if the Secure Ciphers were enabled on the Primary.

Cisco DCNM uses both strong and weak ciphers when connecting to switches. If you use only strong ciphers for the network, select the checkbox. Ensure that the switches in your network support strong ciphers before you select checkbox, as DCNM will not be able to connect to switches which do not support strong ciphers.

Step 3 Modify the database URL by selecting the corresponding RDBMS option.

Note All the servers in federation refer to the same database, and therefore you must provide the DCNM username and password of the primary server. Also, you must provide the database username and password of the primary server.

The username and password of the database are same for all the server installation forming the federation. Similarly, the username and password of DCNM are same for all the server installation forming the federation.

Installing Cisco DCNM Linux Through Silent Installation

Cisco DCNM supports Silent installation only on Local Authorization mode and not on Remote Authorization mode.

Perform the following steps to install DCNM Linux through silent installation.

Before you begin

Ensure that you have execution permissions to the /tmp directory before you begin to install Cisco DCNM on Linux.

Procedure

Step 1 Unzip, extract, and open the `installer.properties` file and update the following properties.

```
#-----BASIC Properties-----
DCNM_IP_ADDRESS=<ip_address_of_host_machine>
USER_INSTALL_DIR=/usr/local/cisco/dcm
INSTALLATION_TYPE=NEW_INSTALL
#INSTALLATION_TYPE=UPGRADE
SAN_FEDERATION=FALSE
#SAN_FEDERATION=TRUE
```

Step 2 Configure the database parameters.

If you are using PostgreSQL database, edit this block:

```
#-----New Postgress-----
PG_DB_PATH=/usr/local/cisco/dcm/db

#PG_DB_PATH=/opt/dctest/cisco/dcm/db /*non-default installation directory*/
#BACKUP_FILE=/opt/dctest/cisco/dcm/dcnm/bin/<backup-filename> /*non-default backup file
directory*/

DCNM_DB_URL=jdbc\:postgresql\://localhost\:5432/dcmdb
DCNM_DB_NAME=dcmdb
SELECTED_DATABASE=postgresql
DCNM_DB_USERNAME=dcnmuser
DCNM_DB_USER_PASSWORD=dcnmuser
#CLEAN_DATABASE=TRUE
```

If you are using the Oracle database, edit this block:

```
#-----DATABASE Properties-----
#User can configure these properties to use existing database or
# install fresh Postgres as database for the DCNM. Existing database
# can be postgres (remote or local), Oracle (remote or local)
# or it can be Oracle RAC.
#-----
USE_EXISTING_DB=FALSE
#USE_EXISTING_DB=TRUE
ORA_DB_PATH=C:\oracle\app\oracle\product\10.2.0\server
```

Step 3 Configure the Data Path for DCNM.

```
#-----DATA PATH-----
#Data path is the folder location where DCNM LAN related
#information like Config archives, templates etc. are stored.
# In DCNM LAN Cluster mode this folder has to be a shared folder.
#For linux and windows it will be different as the folder structure varies
#-----
DATA_PATH=/usr/local/cisco/dcm/dcnm
#-----DATA PATH-----
```

Step 4 Configure the user credentials for DCNM.

```
#-----User Configuration-----
#DCNM User Configuration Properties
```

```
#If you want to use special characters in DCNM_ADMIN
#credentials, Please use escape character(\) before
#the symbol [For eg. Password "an$6x12" must be specified as "an\$6x12" ].
#-----

DECRYPT_PASSWORDS=FALSE
DCNM_ADMIN_USER=admin
DCNM_ADMIN_USER_PASSWORD=admin123

#-----User Configuration-----
```

Step 5 Enable the Secure Ciphers.

```
#-----Secure Ciphers-----
#DCNM uses both strong and weak ciphers when connecting to switches
#If user wants to use only strong ciphers for connection, please set
#property to TRUE. Make sure your switches support strong ciphers before
#setting the property as DCNM will not be able to connect to switches which
#support only weak ciphers.

#-----
SECURE_CIPHER=FALSE
#SECURE_CIPHER=TRUE
#-----
```

Step 6 Configure IBM Raven to install IBM Data Center Network Manager.

```
#-----IBM Raven Support-----
#Set true if Vendor is IBM, by default false
#-----

IBM_INSTALL=FALSE /*Does not install IBM Data Center Network Manager*/
#-----
```

Step 7 Navigate to the directory where you downloaded the Cisco DCNM Linux software and run the appropriate installer by using the following command:

```
dcnm-release.bin -i silent -f path_of_installer.properties_file
```

You can check the status of installation by using the following command **ps -ef | grep 'LAX'**. The prompt will return after the silent install is complete.

Step 8 Open a browser and enter **https://<<DCNM_server_IP_Address>>**.

Press **Return** key to launch the Web Interface of Cisco DCNM on Linux for SAN Management.

Launching SAN Client and Device Manager

This following sections explain the various methods to launch Cisco DCNM SAN Client and Device Manager.

**Note**

For OVA/ISO deployments, you must update the certificates after upgrading to Cisco DCNM Release 11.5(1), before launching the SAN Client or Device Manager. Use the **appmgr afw update-cert-dcnm-client** command to update the certificates.

Launching SAN Client and Device Manager from Web UI

To launch Cisco DCNM SAN Client and Device Manager from the Cisco DCNM Web UI, perform the following steps:

Procedure

- Step 1** Log in to Cisco DCNM Web UI after installing Cisco DCNM SAN deployment.
- Step 2** Click on the gear icon, and click **DCNM SAN & DM**.
Save the `dcnm-client.zip` to your directory.
- Step 3** Extract the contents of `dcnm-client.zip` to `dcnm-clientzip/bin` directory.
- Step 4** To launch the SAN Client and Device Manager:
- **If you are launching DCNM on Windows environment:**
 - Double-click on the **FMClient.bat** file to launch the Cisco DCNM SAN Client.
 - Double-click on the **DeviceManager.bat** to launch the Cisco DCNM Device Manager.
 - **If you are launching DCNM on Linux environment:**
 - Run `./FMClient.sh` Script to launch SAN Client.
 - Run `./Devicemanager.sh` script to launch Device Manager.
-

Launching SAN Client and Device Manager from DCNM Server

By default, the SAN Client and Device Manager are installed along with the Cisco DCNM Server, when you install DCNM. To launch Cisco DCNM SAN Client and Device Manager from the Cisco DCNM Server, perform the following steps:

Procedure

- Step 1** Log in to the DCNM server.
- Step 2** Navigate to `Cisco Systems\dcm\fm\bin\` directory.
- Step 3** To launch the SAN Client and Device Manager:
- **For Windows deployment:**
 - Double-click on the **FabricManager.bat** file to launch the Cisco DCNM SAN Client.
 - Double-click on the **DeviceManager.bat** file to launch the Cisco DCNM Device Manager.
 - **For Linux deployment:**
 - Run the `./FabricManager.sh` script to launch the Cisco DCNM SAN Client.

Run the `./DeviceManager.sh` script to launch the Cisco DCNM Device Manager.

Launching DCNM SAN Client from DCNM SAN for Windows deployment with Custom SSL Certificate

When you install Cisco DCNM for Windows with custom SSL configured on the DCNM server, you can't launch the SAN Client. Modify the certificates to launch the SAN Client successfully.

To modify the certificates and launch the DCNM SAN Client from Windows Deployment, perform the following steps:

Procedure

- Step 1** Extract public key using the following command. command.
- ```
keytool.exe -exportcert -file dcnmweb.crt -alias sme -keystore C:[DCNM Install directory]\cisco\dcm\wildfly-14.0.1.Final\Standalone\configuration\fmserver.jks
```
- Step 2** Generate key store using the following command.
- ```
keytool.exe -importcert -trustcacerts -file dcnmweb.crt -keystore fmtrust.jks -storetype jks
```
- Step 3** Copy the newly created `fmtrust.jks` to `\fm\lib\fm` directory.
- Step 4** Locate the `dcnm-client.zip`, downloaded from Web UI or DCNM server.
- Step 5** Unzip and replace the `bin\fmtrust.jks` with the newly created `fmtrust.jks` file.
- Step 6** Run the `FabricManager.bat` batch file to launch the Cisco DCNM SAN Client.

Example

The following sample example shows the command to modify the certificates and launch the DCNM SAN Client from Windows Deployment.

```
// extract public key from the new fmserver.jks and save it to dcnmweb.crt,
alias "sme", password "<<storepass-kwd>>"
c:[DCNM install directory]\dcm\java\jdk11\bin>
keytool.exe -exportcert -file dcnmweb.crt -alias sme -keystore C:[DCNM Install directory]
\dcm\cisco\dcm\wildfly-14.0.1.Final\Standalone\configuration\fmserver.jks
Enter keystore password:
Certificate stored in file <dcnmweb.crt>
c:[DCNM install directory]\dcm\java\jdk11\bin> dir
chain-cert.pem dcnmweb.crt jjs keytool rmiregistry
dcnm.csr java jrunscript rmid

// generate key store without password, during the command,
just use random password dcnm123
c:[DCNM install directory]\dcm\java\jdk11\bin> keytool.exe -importcert -trustcacerts
-file dcnmweb.crt -keystore fmtrust.jks -storetype jks
Enter keystore password:
```



```

Re-enter new password:
Owner: CN=Lin, OU=cisco, O=cisco, L=sj, ST=ca, C=US
Issuer: CN=rhell144, OU=DCBu, O=Cisco, L=BGL, ST=KA, C=IN
Serial number: 1086
Valid from: Wed Nov 13 12:17:23 PST 2019 until: Thu Nov 12 12:17:23 PST 2020
Certificate fingerprints:
    SHA1: F8:19:CB:79:FC:93:08:54:74:9A:BC:F3:8F:CB:9C:A7:22:56:3D:0F
    SHA256: 8F:06:1F:72:15:FD:12:B5:E9:43:E4:61:0E:00:E0:1C:96:CE:9C:90:82:
           3C:5C:EA:A1:49:A8:A9:66:9B:86:31
Signature algorithm name: SHA256withRSA
Subject Public Key Algorithm: 2048-bit RSA key
Version: 3

Extensions:

#1: ObjectID: 2.16.840.1.113730.1.13 Criticality=false
0000: 16 1D 4F 70 65 6E 53 53 4C 20 47 65 6E 65 72 61 ..OpenSSL Genera
0010: 74 65 64 20 43 65 72 74 69 66 69 63 61 74 65 ted Certificate

#2: ObjectID: 2.5.29.35 Criticality=false
AuthorityKeyIdentifier [
KeyIdentifier [
0000: C9 1E 9B 17 EF AE E4 AF 7A E3 88 BC 2D C9 B9 E9 .....z....-...
0010: FC EC 40 82 ..@.
]
]#3: ObjectID: 2.5.29.19 Criticality=false
BasicConstraints:[
CA:false
PathLen: undefined
]

#4: ObjectID: 2.5.29.14 Criticality=false
SubjectKeyIdentifier [
KeyIdentifier [
0000: 9A 9E B4 98 95 8C 9F FB 0B 57 A5 6D 78 EB 8D C1 .....W.mx...
0010: BB 80 00 DE ....
]
]

Trust this certificate? [no]: yes
Certificate was added to keystore
c:\[DCNM install directory]\dcm\java\jdk11\bin>dir
chain-cert.pem dcnmweb.crt java jrunscript rmid
dcnm.csr fmtrust.jks jjs keytool rmiregistry

c:\[DCNM install directory]\dcm\java\jdk11\bin> cp fmtrust.jks ..\..\fm\lib\fm
cp: overwrite a..\..\fm\lib\fm\fmtrust.jks? y

c:\[DCNM install directory]\dcm\java\jdk11\bin> FabricManager.bat

```

Launching DCNM SAN Client from DCNM SAN for Linux deployment with Custom SSL Certificate

When you install Cisco DCNM for Linux with custom SSL configured on the DCNM server, you can't launch the SAN Client. You must modify the certificates to launch the SAN Client successfully.

To modify the certificates and launch the DCNM SAN Client from Linux Deployment, perform the following steps:

Procedure

- Step 1** Extract public key using the following command.
- ```
./keytool -exportcert -file dcnmweb.crt -alias sme -keystore /usr/local/cisco/dcm/wildfly-14.0.1.Final/standalone/configuration/fmserver.jks
```
- Step 2** Generate key store using the following command.
- ```
./keytool -importcert -trustcacerts -file dcnmweb.crt -keystore fmtrust.jks -storetype jks
```
- Step 3** Copy the newly created **fmtrust.jks** to `/fm/lib/fm` directory.
- Step 4** Locate the **dcnm-client.zip**, downloaded from Web UI or DCNM server.
- Step 5** Replace the **fmtrust.jks** in the `/bin` directory with the newly created **fmtrust.jks** file.
- Step 6** Run the `./FabricManager.sh` script to launch the Cisco DCNM SAN Client.
-

Example

The following sample example shows the command to modify the certificates and launch the DCNM SAN Client from Linux Deployment.

```
// extract public key from the new fmserver.jks and save it to dcnmweb.crt,
alias "sme", password "<<storepass-pwd>>"
[root@dcnm-lnx1 bin]# ./keytool -exportcert -file dcnmweb.crt -alias sme
-keystore /usr/local/cisco/dcm/wildfly-14.0.1.Final/standalone/configuration/fmserver.jks
Enter keystore password:
Certificate stored in file <dcnmweb.crt>
[root@dcnm-M5-2-lnx1 bin]# ls
chain-cert.pem  dcnmweb.crt  jjs          keytool  rmiregistry
dcnm.csr       java         jrunscript  rmid

// generate key store without password, during the command.
[root@dcnm-lnx1 bin]# ./keytool -importcert -trustcacerts -file dcnmweb.crt
-keystore fmtrust.jks -storetype jks
Enter keystore password: //Navigate to
/usr/local/cisco/dcm/fm/conf/serverstore.properties.
//Fetch the keystore password from dcnmtrustedclient.token field.
Re-enter new password:
Owner: CN=Lin, OU=cisco, O=cisco, L=sj, ST=ca, C=US
Issuer: CN=rhel144, OU=DCBu, O=Cisco, L=BGL, ST=KA, C=IN
Serial number: 1086
Valid from: Wed Nov 13 12:17:23 PST 2019 until: Thu Nov 12 12:17:23 PST 2020
Certificate fingerprints:
    SHA1: F8:19:CB:79:FC:93:08:54:74:9A:BC:F3:8F:CB:9C:A7:22:56:3D:0F
    SHA256: 8F:06:1F:72:15:FD:12:B5:E9:43:E4:61:0E:00:E0:1C:96:CE:9C:90:82:
        3C:5C:EA:A1:49:A8:A9:66:9B:86:31
Signature algorithm name: SHA256withRSA
Subject Public Key Algorithm: 2048-bit RSA key
Version: 3

Extensions:

#1: ObjectId: 2.16.840.1.113730.1.13 Criticality=false
0000: 16 1D 4F 70 65 6E 53 53 4C 20 47 65 6E 65 72 61 ..OpenSSL Genera
```

```

0010: 74 65 64 20 43 65 72 74    69 66 69 63 61 74 65    ted Certificate

#2: ObjectId: 2.5.29.35 Criticality=false
AuthorityKeyIdentifier [
KeyIdentifier [
0000: C9 1E 9B 17 EF AE E4 AF    7A E3 88 BC 2D C9 B9 E9    .....z...-...
0010: FC EC 40 82                ..@.
]
]

#3: ObjectId: 2.5.29.19 Criticality=false
BasicConstraints:[
  CA:false
  PathLen: undefined
]

#4: ObjectId: 2.5.29.14 Criticality=false
SubjectKeyIdentifier [
KeyIdentifier [
0000: 9A 9E B4 98 95 8C 9F FB    0B 57 A5 6D 78 EB 8D C1    .....W.mx...
0010: BB 80 00 DE                ....
]
]

Trust this certificate? [no]: yes
Certificate was added to keystore
[root@dcnm-M5-2-lnx1 bin]# ls
chain-cert.pem  dcnmweb.crt    java  jrunscript  rmid
dcnm.csr        fmtrust.jks   jjs   keytool     rmiregistry
[root@dcnm-M5-2-lnx1 bin]# pwd
/usr/local/cisco/dcm/java/jdk11/bin

[root@dcnm-M5-2-lnx1 bin]#

[root@dcnm-M5-2-lnx1 bin]# cp fmtrust.jks ../../fm/lib/fm
cp: overwrite â../../fm/lib/fm/fmtrust.jks? y

[root@dcnm-M5-2-lnx1 dcm]# cd fm/download/
[root@dcnm-M5-2-lnx1 download]# pwd
/usr/local/cisco/dcm/fm/download
[root@dcnm-M5-2-lnx1 download]# ls
dcnm-clientzip.zip
// for remote access, in fm/download/dcnm-clientzip.zip,
replace bin/fmtrust.jks with this new fmtrust.jks

[root@dcnm-M5-2-lnx1 bin]# ./ FabricManager.sh

```

Launching Cisco DCNM SAN Client in Linux Federation Setup with Self-signed DCNM Certificates

Before 11.4.1, the static password **fmserver_1_2_3** was used by DCNM for **fmtrust.jks** deployment. Therefore, you can download SAN client from Node1 or VNC to Node1 and launch the SAN Client. You can then logon to any server in the Federation setup (Node1/Node2/Node3).

Beginning from 11.4.1, DCNM uses a unique **dcnm.fmserver.token** password. Therefore, the **fmtrust.jks** file is different in each server in the Federation setup, by default. If you download SAN client from Node1 or VNC to Node1 and try to launch SAN client with Node2 or Node3, it fails.

If you are using a default DCNM self-signed certificate in Federation setup, you must download the SAN client from the respective server, and launch the SAN Client. You must open the fabric managed by the same server.

For Example:

- Downloaded SAN Client from Node1 or VNC to Node1, Launch SAN Client and Login to Node1
- Downloaded SAN Client from Node2 or VNC to Node2, Launch SAN Client and Login to Node2
- Downloaded SAN Client from Node3 or VNC to Node3, Launch SAN Client and Login to Node3



Note This is applicable on all DCNM Federation fresh installation, with default DCNM self-signed certificate. It is also applicable on DCNM Federation upgrade with default DCNM self-signed certificate.

Launching DCNM SAN Client from DCNM SAN for OVA/ISO deployment with Custom SSL Certificate

When you install Cisco DCNM SAN OVA/ISO with custom SSL configured on the DCNM server, you can't launch the SAN Client. Install the CA signed certificate, and then, download and launch the DCNM SAN Client from the Web UI.

Refer to [Installing a CA Signed Certificate, on page 114](#) for instructions on how to install the CA signed certificate on the Cisco DCNM SAN OVA/ISO server.

For OVA/ISO deployments, you must update the certificates after upgrading to Cisco DCNM Release 11.5(1), before launching the SAN Client or Device Manager. Use the **appmgr afw update-cert-dcnm-client** command to update the certificates.

Launch the Web UI. Download the DCNM SAN Client. Launch the DCNM SAN Client and Device Manager.

Launching DCNM SAN Client from Cisco SAN OVA/ISO Server

To launch DCNM SAN client on the Cisco DCNM SAN OVA/ISO server, perform the following steps:



Note Do not install any GUI package / X11 or VNC on DCNM SAN OVA/ISO server.

Before you begin

For OVA/ISO deployments, you must update the certificates after upgrading to Cisco DCNM Release 11.5(1), before launching the SAN Client or Device Manager. Use the **appmgr afw update-cert-dcnm-client** command to update the certificates.

Procedure

Step 1 VNC to any DCNM server where VNC is installed, for example, `vnc-1nx:2`.

- Step 2** Open two terminals in `vnc-lnx`.
 - Step 3** In one terminal execute the command `xhost +`.
 - Step 4** In the second terminal, SSH to DCNM OVA server.
 - Step 5** Export `DISPLAY=vnc-lnx:2.0`.
 - Step 6** Launch the SAN client from the terminal in Step [Step 4, on page 61](#).
-

Launching Fabric Manager and Device Manager using VNC

From Release 11.5(1), Cisco DCNM provisions an environment to use Device Manager and Fabric Manager on a local VNC server. This environment is set up during installation of Cisco DCNM SAN for OVA/ISO deployments.

For OVA/ISO deployments, you must update the certificates after upgrading to Cisco DCNM Release 11.5(1), before launching the SAN Client or Device Manager. Use the `appmgr afw update-cert-dcnm-client` command to update the certificates.

Connect the DCNM IP address with the VNC client software. After the connection is established, VNC client displays the virtual desktop.

On the Menu bar, select **Applications**. Locate **Cisco Systems, Inc.**. The relevant applications are displayed. You can select and run Device Manager and Fabric Manager applications.



Note The VNC client-server session is not encrypted.



CHAPTER 5

Upgrading Cisco DCNM

This chapter provides information about upgrading Cisco DCNM, and contains the following section:

- [Upgrading to Cisco DCNM Release 11.5\(2\), on page 63](#)
- [Upgrading to Cisco DCNM Release 11.5\(1\), on page 64](#)
- [Retaining the CA Signed Certificate, on page 66](#)
- [Upgrading to Cisco SAN on Windows from Release 11.4\(1\) to 11.5\(1\) from Release 11.5\(1\) to 11.5\(2\) from Release 11.5\(1\) to 11.5\(4\), on page 67](#)
- [Upgrading to Cisco SAN on Linux from Release 11.4\(1\) to 11.5\(1\) from Release 11.5\(1\) to 11.5\(2\), on page 72](#)
- [Upgrade Cisco DCNM SAN 11.2\(1\) or 11.3\(1\) to 11.5\(1\) on Windows and Linux Deployments, on page 77](#)
- [Dropping Performance Manager Data , on page 82](#)

Upgrading to Cisco DCNM Release 11.5(2)

The following table summarizes the type of upgrade that you must follow to upgrade to Release 11.5(2).

Current Release Number	Deployment Type	Upgrade type to upgrade to Release 11.5(2)
11.5(1)	SAN OVA/ISO Note This upgrade is supported only for specific beta equipment support only. For all other supported hardware, we recommend that you deploy Cisco DCNM Release 11.5(1).	Software Maintenance Upgrade (SMU) version 11.5(2)
	SAN Windows and Linux Installers Note This upgrade is supported only for specific beta equipment only. For all other supported hardware, we recommend that you deploy Cisco DCNM Release 11.5(1).	To Windows → Inline Upgrade To Linux → Inline Upgrade

Upgrading to Cisco DCNM Release 11.5(1)

Before Cisco DCNM Release 11.0(1), DCNM OVA, and ISO supported SAN functionality. From Cisco DCNM Release 11.3(1), you can install Cisco DCNM for SAN Deployment on both OVA and ISO virtual appliances.

The following table summarizes the type of upgrade that you must follow to upgrade to Release 11.5(1).

Table 5: Type of Upgrade for Cisco DCNM SAN deployments

Current Release Number	Upgrade type to upgrade to Release 11.5(1)
11.4(1)	To Windows—Inline Upgrade To Linux—Inline Upgrade To OVA\ISO—Inline Upgrade

Current Release Number	Upgrade type to upgrade to Release 11.5(1)
11.3(1)	To Windows—Inline Upgrade To Linux—Inline Upgrade To OVA\ISO—Inline Upgrade
11.2(1)	To Windows—Inline Upgrade To Linux—Inline Upgrade To OVA\ISO— <ol style="list-style-type: none"> 1. Fresh 11.3(1) SAN Only Installation. 2. Migrate Performance Manager Collections to 11.3(1) Note The old Performance Manager data will replace any existing Performance Manager data on 11.3(1). 3. Inline upgrade to 11.5(1)
11.1(1)	To Windows— 11.1(1) → 11.4(1) → 11.5(1) To Linux— 11.1(1) → 11.4(1) → 11.5(1) To OVA\ISO— <ol style="list-style-type: none"> 1. Fresh 11.3(1) SAN Only Installation. 2. Migrate Performance Manager Collections to 11.3(1). Note The old Performance Manager data will replace any existing Performance Manager data on 11.3(1). 3. Inline upgrade to 11.5(1)

Cisco DCNM Release 11.5(2) offers a Software Maintenance Update (SMU) that can be applied only on top of the DCNM Release 11.5(1) for the OVA/ISO/Appliance form factor. In addition, DCNM Release 11.5(2) also offers Cisco SAN Deployment on Windows and Linux.

Current Release Number	Deployment Type	Upgrade type to upgrade to Release 11.5(2)
11.5(1)	SAN OVA/ISO Note This upgrade is supported only for specific beta equipment support only. For all other supported hardware, we recommend that you deploy Cisco DCNM Release 11.5(1).	Software Maintenance Upgrade (SMU) version 11.5(2)
	SAN Windows and Linux Installers Note This upgrade is supported only for specific beta equipment only. For all other supported hardware, we recommend that you deploy Cisco DCNM Release 11.5(1).	To Windows → Inline Upgrade To Linux → Inline Upgrade

Retaining the CA Signed Certificate

Perform this procedure if you need to retain the CA signed SSL Certificate after upgrade.

When you configure a 3-node federation setup and apply external CA certificate, do the following:

1. Stop DCNM servers in Federation.
 - For Windows – Navigate to `C:\Program Files\Cisco Systems\dcm\dcnm\bin`. Double-click on the `StopLANSANServer.bat` to stop the services.
 - For Linux – Logon to `/root`. Execute `/root/Stop_DCNM_Servers` command to stop services.
2. Generate CA certificates for Primary Servers, and apply the same CA certificate in the three secondary servers.
3. Start the Primary server first, then the secondary, third server thereafter, on Federation.

Note that if you change the keystore password or alias, you need to update it in the **standalone-san.xml** document located at:

```
<DCNM_install_root>\dcm\wildfly-14.0.1.Final\standalone\configuration\standalone-san.xml
```

Update the password in the **keystore** tag and alias:

```
<keystore key-password>="<<storepass-pwd>> key-alias="updated-key-alias"
keystore-password="updated-password"
path="<DCNM_install_root>\dcm\wildfly-14.0.1.Final\standalone\configuration\fmserver.jks">
```



Note <<storepass-pwd>> is the password string generated while installing DCNM Server. This string is located in the <install_dir>/dcm/fm/conf/serverstore.properties directory. Fetch the **dcnm.fmserver.token** value for the **storepass-pwd**.

Procedure

- Step 1** Backup the signed certificate from the location:
- For Windows: <DCNM_install_root>\dcm\wildfly-14.0.1.Final\standalone\configuration\fmserver.jks
 - For Linux: <DCNM_install_root>/dcm/wildfly-14.0.1.Final/standalone/configuration/fmserver.jks
- Step 2** Upgrade to Cisco DCNM Release 11.5(1).
- Step 3** After upgrade, copy the certificate to the same location on the upgraded version of the Cisco DCNM.
- Note** You must load the certificates to the same location as mentioned in [Step 1, on page 67](#).
- Step 4** Restart the DCNM Services.

Upgrading to Cisco SAN on Windows from Release 11.4(1) to 11.5(1) from Release 11.5(1) to 11.5(2) from Release 11.5(1) to 11.5(4)

The following sections provide instructions to upgrade Cisco DCNM SAN on Windows to the latest version:



Note Cisco DCNM SAN Deployment using Windows and Linux installers supports specific beta equipment support. To enable this support with DCNM SAN deployment, upgrade to Cisco DCNM Release 11.5(2). For all other supported hardware, we recommend that you deploy Cisco DCNM Release 11.5(1).

You can upgrade to DCNM Release 11.5(2) from DCNM Release 11.5(1) only.

Upgrading Cisco DCNM Windows using GUI

Before you begin

- Ensure that Cisco DCNM 11.4(1)11.5(1) is up and running.
- Ensure that the Elasticsearch service is operational.
- Before you start to upgrade, close all instances of DCNM SAN client and Device Manager running on the server.
- For DCNM SAN deployment on Windows, disable all Antivirus software for the entire duration of DCNM upgrade. The antivirus software might block the DCNM upgrade process.

Procedure

Step 1 Stop the DCNM services.

- For Windows – Navigate to `C:\Program Files\Cisco Systems\dcm\dcnm\bin`. Double-click on the `StopLANSANServer.bat` to stop the services.
- For Linux – Logon to `/root`. Execute `/root/Stop_DCNM_Servers` command to stop services.

Note When DCNM services are stopped, Elasticsearch is also stopped. You must restart the Elasticsearch service.

- For Windows – Launch the task manager on the Windows server. Choose **Services** tab. Select the **Elasticsearch** application. Right click on the application and choose **Start**.
- For Linux – Execute `service elasticsearch start` command.

Step 2 Run the Cisco DCNM software for Release 11.5(1)11.5(2) executable file.

The following message appears:

```
Please close the DCNM Installation wizard gracefully using "Done" option
on last installation step and wait for the installation wizard to close automatically.
Do not restart the system or forcefully terminate the Installation wizard while it is still
in progress."
```

Click **OK** to continue.

Step 3 Click **OK** to begin the upgrade.

Step 4 Click **Done** after the upgrade is complete.

The Cisco DCNM Release 11.5(1)11.5(2) services will start automatically.

Upgrading Cisco DCNM Windows Federation using GUI



Note Ensure that both primary and secondary database properties are same.

Before you begin

- Ensure that Cisco DCNM 11.4(1)11.5(1) is up and running.
- Ensure that the Elasticsearch service is operational.
- Before you start to upgrade, close all instances of DCNM SAN client and Device Manager running on the server.
- For DCNM SAN deployment on Windows, disable all Antivirus software for the entire duration of DCNM upgrade. The antivirus software might block the DCNM upgrade process.

Procedure

Step 1 Stop both the primary and secondary DCNM services.

Note Ensure that the Elasticsearch service is running.

Step 2 On the primary server, run the Cisco DCNM Release 11.5(1)11.5(2) executable file.

Upgrade notification window appears.

The following message appears:

```
Please close the DCNM Installation wizard gracefully using "Done" option
on last installation step and wait for the installation wizard to close automatically.
Do not restart the system or forcefully terminate the Installation wizard while it is still
in progress."
```

Click **OK** to continue.

Step 3 Click **OK** to begin the upgrade.

Step 4 On the primary server, click **Done** after the upgrade is complete.

The Cisco DCNM Release 11.5(1)11.5(2) services will start automatically on the primary server.

Step 5 On the secondary server, run the Cisco DCNM Release 11.5(1)11.5(2) executable file.

Upgrade notification window appears.

The following message appears:

```
Please close the DCNM Installation wizard gracefully using "Done" option
on last installation step and wait for the installation wizard to close automatically.
Do not restart the system or forcefully terminate the Installation wizard while it is still
in progress."
```

Click **OK** to continue.

Step 6 Click **OK** to begin the upgrade.

- Step 7** On the secondary server, click **Done** after the upgrade is complete.
The Cisco DCNM Release 11.5(1)11.5(2) services will start automatically on the secondary server.
-

Upgrading Cisco DCNM Windows through Silent Installation



Note Cisco DCNM supports Silent installation and upgrade only on Local Authorization mode and not on Remote Authorization mode.

Before you begin

- Ensure that Cisco DCNM 11.4(1)11.5(1) is up and running.
- Ensure that the Elasticsearch service is operational.
- Before you start to upgrade, close all instances of DCNM SAN client and Device Manager running on the server.
- For DCNM SAN deployment on Windows, disable all Antivirus software for the entire duration of DCNM upgrade. The antivirus software might block the DCNM upgrade process.

Procedure

Step 1 Stop the DCNM services.

Step 2 Open the installer.properties file and update the following properties:

```
INSTALLATION_TYPE=UPGRADE
USE_EXISTING_DB=TRUE

ORA_DB_PATH=C:\oracle\app\oracle\product\10.2.0\server
#-----Use Existing Oracle-----
DCNM_DB_URL=jdbc\:oracle\:thin\:@<ip_address_of_oracle_machine>\:1521\:XE
DCNM_DB_NAME=XE
SELECTED_DATABASE=oracle
DCNM_DB_USERNAME=oracledbadmin1
DCNM_DB_USER_PASSWORD=oracledbadmin1
```

Step 3 Go to the directory where you downloaded the Cisco DCNM software and run the appropriate installer by using the following command:

dcnm-release.exe -i silent -f <path_of_installer.properties>

The Cisco DCNM Release 11.5(1)11.5(2) services will start after the upgrade is complete.

You can check the status of the upgrade in the Task Manager process.

Upgrading Cisco DCNM Windows Federation through Silent Installation



Note Cisco DCNM supports Silent installation and upgrade only on Local Authorization mode and not on Remote Authorization mode.



Note Ensure that both primary and secondary database properties are same.

Before you begin

- Ensure that Cisco DCNM 11.4(1)11.5(1) is up and running.
- Ensure that the Elasticsearch service is operational.
- Before you start to upgrade, close all instances of DCNM SAN client and Device Manager running on the server.
- For DCNM SAN deployment on Windows, disable all Antivirus software for the entire duration of DCNM upgrade. The antivirus software might block the DCNM upgrade process.

Procedure

Step 1 Stop both the primary and secondary DCNM services.

Step 2 On the primary server, open the installer.properties file and update the following properties:

```
INSTALLATION_TYPE=UPGRADE
USE_EXISTING_DB=TRUE
```

Step 3 Go to the directory where you downloaded the Cisco DCNM software and run the appropriate installer by using the following command:

```
dcnm-release.exe -i silent -f <path_of_installer.properties>
```

You can check the status of the upgrade in the Task Manager process.

The Cisco DCNM Release 11.5(1)11.5(2) services will start automatically on the primary server.

Step 4 On the secondary server, open the installer.properties file and update the following properties:

```
INSTALLATION_TYPE=UPGRADE
USE_EXISTING_DB=TRUE

ORA_DB_PATH=C:\oracle\app\oracle\product\10.2.0\server
#-----Use Existing Oracle-----
DCNM_DB_URL=jdbc\:oracle\:thin:@<ip_address_of_oracle_machine>:1521:XE
DCNM_DB_NAME=XE
SELECTED_DATABASE=oracle
DCNM_DB_USERNAME=oracledbadmin1
DCNM_DB_USER_PASSWORD=oracledbadmin1
```

Step 5 Go to the directory where you downloaded the Cisco DCNM software and run the appropriate installer by using the following command:

```
dcnm-release.exe -i silent -f <path_of_installer.properties>
```

You can check the status of the upgrade in the Task Manager process.

The Cisco DCNM Release 11.5(1)11.5(2) services will start automatically on the secondary server.

Upgrading Cisco DCNM Windows Federation when Elasticsearch Schema is modified

Before you begin

Ensure that the Elasticsearch must be running on 2 nodes in the Federation setup.

Procedure

Step 1 Stop the following DCNM services:

- For Windows – Navigate to `C:\Program Files\Cisco Systems\dcm\dcnm\bin`. Double-click on the `StopLANSANServer.bat` to stop the services.
- For Linux – Logon to `/root`. Execute `/root/Stop_DCNM_Servers` command to stop services.

Step 2 Upgrade Primary server first, and then the Secondary server in the Federation setup. For instructions, see [Upgrading Cisco DCNM Windows Federation through Silent Installation, on page 71](#).

Step 3 Start the DCNM Services.

Upgrading to Cisco SAN on Linux from Release 11.4(1) to 11.5(1) from Release 11.5(1) to 11.5(2)

The following sections provide instructions to upgrade Cisco DCNM SAN on Linux to the latest version:



Note

Cisco DCNM SAN Deployment using Windows and Linux installers supports specific beta equipment support. To enable this support with DCNM SAN deployment, upgrade to Cisco DCNM Release 11.5(2). For all other supported hardware, we recommend that you deploy Cisco DCNM Release 11.5(1).

You can upgrade to DCNM Release 11.5(2) from DCNM Release 11.5(1) only.

Upgrading Cisco DCNM Linux using GUI

Before you begin

- Ensure that Cisco DCNM 11.4(1)11.5(1) is up and running.
- Ensure that the Elasticsearch service is operational.
- Before you start to upgrade, close all instances of DCNM SAN client and Device Manager running on the server.

Procedure

Step 1 Stop the DCNM services.

Note Ensure that the Elasticsearch service is running.

Step 2 Run the Cisco DCNM software for Release 11.5(1)11.5(2) executable file.

Upgrade Notification window appears

Step 3 Click **OK** to begin the upgrade.

The following message appears:

```
Please close the DCNM Installation wizard gracefully using "Done" option
on last installation step and wait for the installation wizard to close automatically.
Do not restart the system or forcefully terminate the Installation wizard while it is still
in progress."
```

Click **OK** to continue.

Step 4 Click **Done** after the upgrade is complete.

The Cisco DCNM Release 11.5(1)11.5(2) services will start automatically.

What to do next

After you upgrade from Cisco DCNM Release 11.2(1) on Linux Standalone server, ensure that you clear the browser cache and Java console cache before you launch the Web UI and download the SAN Client. The Java console remembers the previous version of the SAN client data. If you do not clear Java console cache, you will not be able to use the latest downloaded SAN Client.

Upgrading Cisco DCNM Linux Federation using GUI



Note Ensure that both primary and secondary database properties are same.

Before you begin

- Ensure that Cisco DCNM 11.4(1)11.5(1) is up and running.
- Ensure that the Elasticsearch service is operational.
- Before you start to upgrade, close all instances of DCNM SAN client and Device Manager running on the server.

Procedure

Step 1 Stop both the primary and secondary DCNM services.

Note Ensure that the Elasticsearch service is running.

Step 2 On the primary server, run the Cisco DCNM Release 11.5(1)11.5(2) executable file.

Upgrade notification window appears.

The following message appears:

```
Please close the DCNM Installation wizard gracefully using "Done" option
on last installation step and wait for the installation wizard to close automatically.
Do not restart the system or forcefully terminate the Installation wizard while it is still
in progress."
```

Click **OK** to continue.

Step 3 Click **OK** to begin the upgrade.

Step 4 On the primary server, click **Done** after the upgrade is complete.

The Cisco DCNM Release 11.5(1)11.5(2) services will start automatically on the primary server.

Step 5 On the secondary server, run the Cisco DCNM Release 11.5(1)11.5(2) executable file.

Upgrade notification window appears.

The following message appears:

```
Please close the DCNM Installation wizard gracefully using "Done" option
on last installation step and wait for the installation wizard to close automatically.
Do not restart the system or forcefully terminate the Installation wizard while it is still
in progress."
```

Click **OK** to continue.

Step 6 Click **OK** to begin the upgrade.

Step 7 On the secondary server, click **Done** after the upgrade is complete.

The Cisco DCNM Release 11.5(1)11.5(2) services will start automatically on the secondary server.

Upgrading Cisco DCNM Linux through Silent Installation



Note Cisco DCNM supports Silent installation and upgrade only on Local Authorization mode and not on Remote Authorization mode.



Note You must use the same database for Release 11.5(1)11.5(2) as in the existing DCNM set up.

Before you begin

- Ensure that Cisco DCNM 11.4(1)11.5(1) is up and running.
- Ensure that the Elasticsearch service is operational.
- Before you start to upgrade, close all instances of DCNM SAN client and Device Manager running on the server.

Procedure

Step 1 Stop the DCNM services.

Step 2 Open the `installer.properties` file and update the following properties:

```
INSTALLATION_TYPE=UPGRADE
USE_EXISTING_DB=TRUE
```

Step 3 Go to the directory where you downloaded the Cisco DCNM software and run the appropriate installer by using the following command:

```
dcnm-release.bin -i silent -f <path_of_installer.properties>
```

The Cisco DCNM Release 11.5(1)11.5(2) services will start after the upgrade is complete.

You can check the status of the upgrade process by using the following command: `ps -ef | grep 'LAX'`. The prompt will return after the silent install is complete.

Upgrading Cisco DCNM Linux Federation through Silent Installation



Note Cisco DCNM supports Silent installation and upgrade only on Local Authorization mode and not on Remote Authorization mode.



Note Ensure that both primary and secondary database properties are same as in the previous Release set up.

Before you begin

- Ensure that Cisco DCNM 11.4(1)11.5(1) is up and running.
- Ensure that the Elasticsearch service is operational.
- Before you start to upgrade, close all instances of DCNM SAN client and Device Manager running on the server.

Procedure

Step 1 Stop both the primary and secondary DCNM services.

Step 2 On the primary server, open the `installer.properties` file and update the following properties:

```
INSTALLATION_TYPE=UPGRADE
USE_EXISTING_DB=TRUE
```

Step 3 Go to the directory where you downloaded the Cisco DCNM software and run the appropriate installer by using the following command:

```
dcnm-release.bin -i silent -f <path_of_installer.properties>
```

You can check the status of the upgrade process by using the following command: `ps -ef | grep 'LAX'`. The prompt will return after the silent install is complete.

The Cisco DCNM Release 11.5(1)11.5(2) services will start automatically on the primary server.

Step 4 On the primary server, click **Done** after the upgrade is complete.

The Cisco DCNM Release 11.5(1)11.5(2) services will start automatically on the primary server.

Step 5 On the secondary server, open the `installer.properties` file and update the following properties:

```
INSTALLATION_TYPE=UPGRADE
USE_EXISTING_DB=TRUE
```

Step 6 Go to the directory where you downloaded the Cisco DCNM software and run the appropriate installer by using the following command:

```
dcnm-release.bin -i silent -f <path_of_installer.properties>
```

You can check the status of the upgrade process by using the following command: `ps -ef | grep 'LAX'`. The prompt will return after the silent install is complete.

The Cisco DCNM Release 11.5(1)11.5(2) services will start automatically on the secondary server.

Upgrading Cisco DCNM Linux Federation when Elasticsearch Schema is modified

Before you begin

Ensure that the Elasticsearch must be running on 2 nodes in the Federation setup.

Procedure

- Step 1** Stop the following DCNM services:
- For Windows – Navigate to `C:\Program Files\Cisco Systems\dcm\dcnm\bin`. Double-click on the `StopLANSANServer.bat` to stop the services.
 - For Linux – Logon to `/root`. Execute `/root/Stop_DCNM_Servers` command to stop services.
- Step 2** Upgrade Primary server first, and then the Secondary server in the Federation setup. For instructions, see [Upgrading Cisco DCNM Linux Federation through Silent Installation, on page 75](#).
- Step 3** Start the DCNM Services.
-

Upgrade Cisco DCNM SAN 11.2(1) or 11.3(1) to 11.5(1) on Windows and Linux Deployments

This sections includes the following topics:

Reindexing PMDB before upgrade to DCNM SAN Release 11.5(1)

If the Elasticsearch is not compatible for upgrade, you must reindex the performance manager data before upgrading to Release 11.5(1). To reindex the performance manager data, perform the following task:

If the existing Elasticsearch database is more than 250GB, Cisco DCNM Server requires more than 500GB HDD space to complete reindexing.

Procedure

- Step 1** Stop the **FMServer** to prevent further population of old PM index.
- Step 2** If alarms and DCNM database indices are created with Elasticsearch version 2.3, then reindex the alarms indices and delete the DCNM database indices.
- Reindex alarms using the **ReindexAlarmsCurl.bat** script for DCNM on Windows.
Use **ReindexAlarmsCurl.sh** for DCNM on Linux and OVA/ISO.
 - Delete **dcnmdb** index.
 - For Elasticsearch in Release 11.2(1)
`curl -XDELETE -k --tlsv1.2 https://localhost:9200/dcmdb`
 - For Elasticsearch in Release 11.3(1)
`curl -XDELETE http://localhost:9200/dcmdb`
- Step 3** Delete the old PMDB index using **DeletePMDbIndexCurl.bat** script for DCNM on Windows.

Use **DeletePMDBIndexCurl.sh** for DCNM on Linux and OVA/ISO.

Note Reindexing task may still run in background if user gets http timeout code 504.

PmdbReindex.log file is generated for PMDB reindexing script.

Step 4 Verify if the Elasticsearch is not reindexing in the background, using the following commands:

This command output shows reindex tasks running in background.

- For Elasticsearch in Release 11.2(1)

```
curl -XGET -k --tlsv1.2
"https://localhost:9200/_tasks?detailed=true&actions=*reindex&pretty=true"
```

- For Elasticsearch in Release 11.3(1)

```
curl -XGET "http://localhost:9200/_tasks?detailed=true&actions=*reindex&pretty=true"
```

What to do next

After reindexing is complete, you can upgrade the DCNM to Release 11.5(1).

Upgrading Cisco DCNM Using GUI from Release 11.2(1) or 11.3(1) to 11.5(1)

As the Elasticsearch version supported in 11.2(1) and 11.3(1) is not compatible with the Elasticsearch supported with 11.5(1), you must reindex the Elasticsearch data before upgrading to Release 11.5(1).

The upgrade script will verify if the current version of Elasticsearch is compatible for upgrade. If it is not compatible, the upgrade process stops. When you run the upgrade script, the upgrade process terminates when it encounters the non-compatible performance data. You must reindex the data and continue with the upgrade.

If the existing Elasticsearch database is more than 250GB, Cisco DCNM Server requires more than 500GB HDD space to complete reindexing.

To upgrade Cisco DCNM Windows/Linux from 11.2(1) or 11.3(1) to Release 11.5(1), perform the following steps.

Before you begin

- Ensure that Cisco DCNM 11.2(1) or 11.3(1) is up and running.
- Ensure that the Elasticsearch service is operational.
Elasticsearch service must be operation on all nodes in a federation setup.
- Before you start to upgrade, close all instances of DCNM SAN client and Device Manager running on the server.
- For DCNM SAN deployment on Windows, disable all Antivirus software for the entire duration of DCNM upgrade. Antivirus software might block the DCNM upgrade process.

Additionally for Federation setup, perform upgrade in the following order:

1. Upgrade the Primary node.

Start the services. Reindex the primary node PM data.

2. Upgrade the Secondary node.

Start the services.

3. Upgrade the Tertiary node.

Start the services.

Procedure

Step 1

Stop the DCNM services.

Note Ensure that the Elasticsearch service is running.

For Federation setup, ensure that the Elasticsearch is running on all nodes for upgrade to continue.

Step 2

Run the Cisco DCNM software for Release 11.5(1) executable file.

The following message appears:

```
Please close the DCNM Installation wizard gracefully using "Done" option
on last installation step and wait for the installation wizard to close automatically.
Do not restart the system or forcefully terminate the Installation wizard while it is still
in progress."
```

Click **OK** to continue.

Step 3

Click **OK** to begin the upgrade.

The installer verifies if the Elasticsearch is upgradable.

- If the Elasticsearch is not compatible for upgrade, the following error message is generated.

Elasticsearch indices need manual reindexing

```
Some Elastic Search indices are created with ES version 2.3.
Please reindex these manually and proceed with upgrade.
Reindexing package can be downloaded from CCO. DCNM Installer will now quit.
```

Click **OK** to stop the upgrade process.

You must reindex the PMDB data and begin to upgrade. For instructions to reindex PM data, see [Reindexing PMDB before upgrade to DCNM SAN Release 11.5\(1\), on page 77](#).

- If the Elasticsearch upgrade is compatible, or if you've completed the reindexing the Elasticsearch, the process continues.

The Elasticsearch is also upgraded as a part of DCNM upgrade to Release 11.5(1). After the upgrade is complete, a message regarding the reindexing of the old PMDB data is generated.

PM DB manual reindexing

```
PMDB Elastic Search index needs to be reindexed manually using the
scripts under INSTALL_DIR/dcnm/dcnm/fm/reindexes/esmapping.
The old PMDB data will be available after reindexing.
```

Step 4

Click **Done** after the upgrade is complete.

The following message is generated:

Elasticsearch(ES) indices for historical Performance Monitoring (PM) data need to be reindexed manually.
Check DCNM installation and upgrade guide for more details.

Step 5 Click **OK**.

The Cisco DCNM Release 11.5(1) services will start automatically.

Note Upgrade process will not reindex PMDB data. You must perform this task manually. If you need the PMDB data from the previous version on Release 11.5(1), you must reindex the data manually. For instructions to reindex PMDB data manually, see [Reindexing PMDB post upgrade to DCNM SAN Release 11.5\(1\), on page 81](#).

Upgrading Cisco DCNM through Silent Installation from Release 11.2(1) or 11.3(1) to 11.5(1)

As the Elasticsearch version supported in 11.2(1) and 11.3(1) is not compatible with the Elasticsearch supported with 11.5(1), you must reindex the Elasticsearch data before upgrading to Release 11.5(1).

The upgrade script will verify if the current version of Elasticsearch is compatible for upgrade. If it is not compatible, the upgrade process stops. When you run the upgrade script, the upgrade process terminates when it encounters the non-compatible performance data. You must reindex the data and continue with the upgrade.

If the existing Elasticsearch database is more than 250GB, Cisco DCNM Server requires more than 500GB HDD space to complete reindexing.

To upgrade Cisco DCNM Windows/Linux from 11.2(1) or 11.3(1) to Release 11.5(1), perform the following steps.

Before you begin

- Ensure that Cisco DCNM 11.2(1) or 11.3(1) is up and running.
- Ensure that the Elasticsearch service is operational.
- Before you start to upgrade, close all instances of DCNM SAN client, both SAN Client and Device Manager running on the server.
- For DCNM SAN deployment on Windows, disable all Antivirus software for the entire duration of DCNM upgrade. Antivirus software might block the DCNM upgrade process.

Additionally for Federation setup, perform upgrade in the following order:

1. Upgrade the Primary node.
Start the services. Reindex the primary node PM data.
2. Upgrade the Secondary node.
Start the services.
3. Upgrade the Tertiary node.
Start the services.

Procedure

Step 1 Stop the DCNM services.

Note Ensure that the Elasticsearch service is running.

For Federation setup, ensure that the Elasticsearch is running on all nodes for upgrade to continue.

Step 2 Open the `installer.properties` file and update the following properties:

```
INSTALLATION_TYPE=UPGRADE
USE_EXISTING_DB=TRUE
```

Step 3 Go to the directory where you downloaded the Cisco DCNM software and run the appropriate installer by using the following command:

```
dcnm-release.exe -i silent -f <path_of_installer.properties>
```

If the Elasticsearch is not compatible for upgrade, the upgrade stops. An error message is generated in the **error.properties** file. You must reindex the PMDB data and begin to upgrade. For instructions about how to reindex see [Reindexing PMDB before upgrade to DCNM SAN Release 11.5\(1\)](#), on page 77.

If the Elasticsearch upgrade is compatible, or if you've completed the reindexing the Elasticsearch, the process continues.

What to do next

The Cisco DCNM Release 11.5(1) services will start after the upgrade is complete. You can check the status of the upgrade in the Task Manager process.

The message to reindex PMDB is generated in the `dcnm_installer.log` file.



Note Upgrade process will not reindex PMDB data. You must perform this task manually. If you need the PMDB data from the previous version on Release 11.5(1), you must reindex the data manually. For instructions to reindex PMDB data manually, see [Reindexing PMDB post upgrade to DCNM SAN Release 11.5\(1\)](#), on page 81.

The following message is included in the `dcnm_installer.log` file.

```
Elasticsearch(ES) indices for historical Performance Monitoring (PM)
data need to be reindexed manually.
Check DCNM installation and upgrade guide for more details.
```

Reindexing PMDB post upgrade to DCNM SAN Release 11.5(1)

If the Elasticsearch is not compatible for upgrade, you must reindex the performance manager data before upgrading to Release 11.5(1). To reindex the performance manager data, perform the following tasks:

If the existing Elasticsearch database is more than 250GB, Cisco DCNM Server requires more than 500GB HDD space to complete reindexing.

Before you begin

After you upgrade DCNM Release 11.2(1) or 11.3(1) to Release 11.5(1), you must delete the old PM database index.

If you choose to conserve the Performance Manager data when you upgrade to Release 11.5(1), we recommend that you contact Cisco TAC for further assistance.

Procedure

Step 1 Navigate to the **esmapping** directory, and locate the following scripts:

For DCNM on Windows:

- ReindexPMDBCurl.bat
- DeletePMDBIndexCurl.bat

Note Windows installation may need curl utility. Please install curl utility. A zip file is provided as **curl-win64.zip** in the **/esmapping** directory.

For DCNM on Linux:

- ReindexPMDBCurl.sh
- DeletePMDBIndexCurl.sh

If you choose to conserve the Performance Manager data when you upgrade to Release 11.5(1), we recommend that you contact Cisco TAC for further assistance.

Step 2 Run **ReindexPMDBCurl.bat** script for DCNM on Windows, or **ReindexPMDBCurl.sh** script for DCNM on Linux.

Ensure that you don't see any errors while running the script. Collect the output from the script to a file and verify if all the files are reindexed.

PmdbReindex.log file is generated for PMDB reindexing script.

Dropping Performance Manager Data



Note If you choose to conserve the Performance Manager data when you upgrade to Release 11.5(1), we recommend that you contact Cisco TAC for further assistance.

To drop the Performance Manager (PM) data, perform the following steps:

Before you begin

- Ensure that the DCNM appliance is operational. (for standalone upgrade)

- If you have a Federation setup, ensure that all the nodes in the DCNM Federation setup are operational. (for Federation setup)

Procedure

Step 1 Launch the SSH session and run the following command to view the PMDB indices.

Identify the PMDB indices in the performance manager database.

For example:

```
dcnm-root-11-4# curl http://127.0.0.1:33500/_cat/indices?pretty | grep pmdb
```

```

  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
             Dload  Upload   Total     Spent    Left     Speed
100 2448 100 2448    0     0  4523      0 --:--:-- --:--:-- --:--:-- 4524
green open  pmdb_cpumemdata          rb-CJf-NR0my8M3mO-7QkA 5 1  7286    0
1.4mb 760.2kb
green open  pmdb_ethintfratedata      P18gMKdPTkCODv0TomYAdw 5 1  9283    0
2.4mb  1.2mb

```

You will see indices prefixed with "pmdb_"

Step 2 On the Cisco DCNM Web UI, choose **Administration > Performance Setup > LAN Collections**.

Uncheck all the check boxes and click **Apply** to disable all switches and collections.

Administration / Performance Setup / LAN Collections

For all selected licensed LAN Switches collect: Trunks Access Errors & Discards Temperature Sensor

Apply

Performance Default Polling Interval 5 Mins

- Fab-1-externalfab
 - 9k_aragon
 - C93108TC-FX_116
 - C93108TC-FX_41
 - n3k_72
 - N77-TGEN-195
 - N9k_27
 - N9K-C9232C_28
 - N9K-C9364C_49
 - N9K-C9504_44
 - sugarbowl_56
 - suharbowl_57
- Fab-2-ClassicLAN
 - N3k_Utopia_70
 - switch
- Fab3-otherswitches
 - IND13-P1-A1
 - N6K-96Q-63
- test
- Default_LAN

Step 3 Choose **Administration > DCNM Server > Server Status**.

Step 4 Against the **Performance Collector** service, click the stop icon in the Actions column to stop the data collection.

DCNM Server	Actions	Service Name	Status
localhost		Database Server	Running
10.106.228.37	Re-init Elasticsearch DB Schema	dexer	Last updated: 2020-12-13 16:30:00
10.106.228.37	Stop Service, Clean up PM DB stale entry(s)	Performance Collector	Stopped
10.106.228.37		Agent	Running
10.106.228.37		Elasticsearch	Status:yellow, Docs: pmdb_*=0
0.0.0.0:123		NTPD Server	Running
0.0.0.0:67		DHCP Server	Running
0.0.0.0:2162		SNMP Traps	Running
0.0.0.0:514		Syslog Server	Running

Step 5 Click the delete icon to clean the Performance Manager database.

This action deletes the stale entries in the performance manager database.

Step 6 Click on the reinitialize icon to reindex the Elasticsearch database schema.

This operation cleans the performance manager data in the Elasticsearch database and restarts the performance manager. It may take a few minutes to complete.

Step 7 Click **Continue**.

The status of the Performance Collector service shows **Stopped**.

Step 8 Ensure that you've deleted all the PMDB entries using the following command:

- For upgrading from Release 11.1(1)
curl https://127.0.0.1:33500/_cat/indices?pretty | grep pmdb
- For upgrading from Release 11.2(1)
curl https://127.0.0.1:33500/_cat/indices?pretty | grep pmdb
- For upgrading from Release 11.3(1)
curl http://127.0.0.1:33500/_cat/indices?pretty | grep pmdb
- For upgrading from Release 11.4(1)
curl http://127.0.0.1:33500/_cat/indices?pretty | grep pmdb

For example:

```
dcnm-root-11-4# curl http://127.0.0.1:33500/_cat/indices?pretty | grep pmdb

% Total    % Received % Xferd  Average   Speed  Time     Time     Time  Current
           0         0     0         0      0      0 --:--:-- --:--:-- --:--:--  3636
```

Step 9 Proceed to upgrade the DCNM to Release 11.5(1).



CHAPTER 6

Disaster Recovery (Backup and Restore)

This chapter contains the following sections:



Note This section is applicable only for Cisco DCNM OVA/ISO installations.

- [Backup and Restore Cisco DCNM and Application Data on Standalone DCNM setup, on page 87](#)
- [Backup and Restore Cisco DCNM on a Cluster Setup, on page 88](#)

Backup and Restore Cisco DCNM and Application Data on Standalone DCNM setup

You can take a backup of Cisco DCNM application data for analytics and troubleshooting.



Note In Release 11.3(1), the sysadmin and the root user's password are not identical. When you upgrade to 11.5(1)11.5(2), the sysadmin and root user passwords are preserved.

However, when you perform backup and restore on Cisco DCNM after upgrade, the sysadmin user inherits the password from the root user, and therefore both the users will have the same password. You can change the password for both the users after restore is complete.

Perform the following task to take a backup of Cisco DCNM and Application data.

Procedure

Step 1 Logon to the Cisco DCNM appliance using SSH.

Step 2 Take a backup of the application data using the **appmgr backup** command.

```
dcnm# appmgr backup
```

From Release 11.4(1), Cisco DCNM allows you to configure a cron job that allows saves the backup to a remote scp server. Use **appmgr backup schedule** command to configure a scheduled backup.

```
dcnm# appmgr backup schedule [day] <hh<hh>:<mm>
[destination <user>@<host>:[<dir>]]
```

Copy the backup file to a safe location and shut down the DCNM Appliance.

Step 3 Right click on the installed VM and select **Power > Power Off**.

Step 4 Deploy the new DCNM appliance.

Step 5 After the VM is powered on, click on **Console** tab.

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

Copy and paste the URL to the browser to continue with restore process.

Step 6 On the DCNM Web Installer UI, click **Get Started**.

Step 7 On the Cisco DCNM Installer screen, select radio button.

Select the backup file that was generated in [Step 2, on page 87](#).

Continue to deploy the DCNM.

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** complete Cisco DCNM Virtual Appliance 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**.

Step 9 After the data is restored, check the status using the **appmgr status all** command.

Backup and Restore Cisco DCNM on a Cluster Setup

You can take a backup of Cisco DCNM application data for analytics and troubleshooting.

Perform the following task to take perform backup and restore of data in a Cisco DCNM Cluster setup.

Before you begin

Check and ensure that the Active and Standby servers are operational, using the `appmgr show ha-role` command.

Example:

On the Active node:

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

On the Standby node:

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


Procedure

- Step 1** Log on to the Cisco DCNM appliance using SSH.
- Step 2** Take a backup of the application data using the **appmgr backup** command on both Active, Standby appliances, and on all Compute nodes.
- ```
dcnm-active# appmgr backup
dcnm-standby# appmgr backup
dcnm-compute1# appmgr backup
dcnm-compute2# appmgr backup
dcnm-compute3# appmgr backup
```
- Copy the backup files of all nodes to a safe location and shut down the DCNM Appliance.
- Step 3** Right click on the installed VM and select **Power > Power Off**.
- Step 4** Install two Cisco DCNM Release 11.5(1) appliances.
- Note** Ensure that the Hostnames match the earlier Active and Standby appliances.
- For instructions, see [Installing the Cisco DCNM](#).
- Step 5** Install three Cisco DCNM Compute nodes.
- Note** Ensure that the Hostnames match the earlier Compute nodes.
- For instructions, see [Installing Cisco DCNM Compute Node](#).
- Step 6** Install the Software Maintenance Update (SMU) version 11.5(2) on all five nodes.
- For instructions, see [Installing Software Maintenance Update](#).
- Step 7** Provide access to the `/root` directory on all nodes using the following command.
- ```
dcnm# appmgr root-access permit
```
- Step 8** Stop telemetry on Active and Standby nodes using the following command:
- ```
dcnm-active# systemctl stop pmn-telemetry
dcnm-standby# systemctl stop pmn-telemetry
```
- Step 9** Set the environment variable to allow restore process using CLI and restore the node with the same hostname as respective Active and Standby backup files, using the following command:
- Note** Ensure that you perform the restore in the same order—Active, Standby, Compute1, Compute2, and Compute3.
- ```
dcnm-active# APPMGR_ALLOW_RESTORE=1 appmgr restore <dcnm1-backup-file>
dcnm-standby# APPMGR_ALLOW_RESTORE=1 appmgr restore <dcnm2-backup-file>
dcnm-compute1# APPMGR_ALLOW_RESTORE=1 appmgr restore <compute1-backup-file>
dcnm-compute2# APPMGR_ALLOW_RESTORE=1 appmgr restore <compute2-backup-file>
dcnm-compute3# APPMGR_ALLOW_RESTORE=1 appmgr restore <dcnm2-backup-file>
```
- Step 10** After the data is restored, check the status using the **appmgr status all** command.

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 didn't enable clustered mode while installing DCNM, use the **appmgr afw config-cluster** command to enable the compute cluster. For instructions, refer to [Enabling the Compute Cluster](#) in the Cisco DCNM LAN Fabric Configuration Guide.

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



CHAPTER 7

Running Cisco DCNM Behind a Firewall

This chapter provides information about running Cisco DCNM behind a firewall.

- [Running Cisco DCNM Behind a Firewall, on page 91](#)
- [Configuring Custom Firewalls, on page 99](#)

Running Cisco DCNM Behind a Firewall

Generally, an Enterprise (external world) and Datacenter is separated by a firewall, i.e., DCNM is configured behind a firewall. The Cisco DCNM Web Client, Cisco DCNM SAN Client, and Cisco Device Manager connectivity will pass-through that firewall. A firewall can be placed between the DCNM Server and DCNM-managed devices also.

Beginning with Cisco DCNM Release 11.0(1), DCNM SAN Client initiates communication with DCNM SAN Server on HTTPS port 443. However, both DCNM SAN Client and Device Manager communicate with the devices directly also. Device Manager can be invoked through DCNM SAN Server UI and it runs within the context of the DCNM SAN Server. The Device Manager communication with devices remains same, as if it was running independently.

DCNM SNMP proxy services on DCNM SAN Server use a configurable TCP port (9198 by default) for SNMP communications between the DCNM SAN Client or Device Manager, and DCNM Server.

Performance Manager uses TCP, by default, for data collections.

The UDP SNMP_TRAP local ports are between 1163-1170, for both Cisco DCNM-SAN and Device Manager. DCNM-SAN Client and Device Manager use the first available UDP port for sending and receiving SNMP responses.

You can select the UDP port that the Device Manager uses for SNMP responses by uncommenting the following statement:

- On a Windows desktop, uncomment the following in the `DeviceManager.bat` file in the `C:\Program Files\Cisco Systems\MDS9000\bin` directory:

```
rem JVMARGS=%JVMARGS% -Dsnmp.localport=[localport]
```

Where [localport] is the value of free local port.



Note On the windows VM, run the `netstat -nab` command, to view the ports that are used by the `javaw.exe` process.

- On a LINUX desktop, uncomment the following in the `DeviceManager.sh` file in the `$HOME/.cisco_mds9000/bin` directory:

```
# JVMARGS=$JVMARGS -Dsnmp.localport=[localport]
```

Where [localport] is the value of free local port.

Any standard port where the Ingress traffic enters from clients cannot be modified unless you disable the local firewall.

The following table lists all ports that are used for communication between DCNM Web Client, DCNM SAN Client, Device Manager, SSH Client, and DCNM Server.

Port Number	Protocol	Service Name	Direction of Communication	Remarks
22	TCP	SSH	SSH to DCNM SAN Server	SSH access to external world is optional.
443	TCP	HTTPS	Client to DCNM SAN Server	Cisco DCNM Web Client, Cisco DCNM SAN Client to the Cisco DCNM Server
1099	TCP	Java RMI	Client to DCNM SAN Server	Cisco DCNM SAN Client to Server
1163 to 1170	UDP	SNMP_TRAP	Device to SAN Client and Device Manager	Cisco DCNM SAN Client and Cisco Device Manager use same range of ports.
2443	TCP	HTTPS	Client to DCNM Server	Required during installation, to reach the server. DCNM closes this port after installation completes. Required only for DCNM SAN OVA/ISO during installation, to reach the server. DCNM SAN server closes this port after installation completes.
3528	TCP	JBOSS	Client to DCNM SAN Server	Wildfly JBOSS IIOP
3529	TCP	JBOSS	Client to DCNM SAN Server	Wildfly JBOSS IIOP SSL

Port Number	Protocol	Service Name	Direction of Communication	Remarks
9198	UDP/TCP	SNMP	<p>SAN Client, Device Manager to DCNM SAN Server.</p> <p>Cisco DCNM SAN Client picks a random free local port (UDP) or 9198 (TCP) if SNMP proxy is enabled. The port can be changed with the <code>client -Dsnmp.localport</code> option.</p> <p>Cisco Device Manager picks a random free local port (UDP) or 9198 (TCP) if SNMP proxy is enabled. The port can be changed in <code>server.properties</code> file.</p> <p>DCNM SNMP proxy is used when SAN Client or Device Manager cannot reach managed devices directly and SNMP responses coming to DCNM SAN Server from managed devices can be relayed to SAN Client and Device Manager. DCNM SAN Client and Device Manager must reach to DCNM SAN Server port 9198 (or whatever port is configured) to get the SNMP response.</p>	<p>Cisco DCNM SNMP proxy services use the TCP port (9198 by default) for SNMP communications between the Cisco DCNM SAN Client or Cisco Device Manager and the Cisco DCNM Server.</p>

Port Number	Protocol	Service Name	Direction of Communication	Remarks
61616	TCP	Messaging	DCNM SAN Client to DCNM SAN Server	

The following table lists all the ports that are used for communication between the Cisco DCNM Server and other services which can be hosted on either side of the firewall.

Port Number	Protocol	Service Name	Direction of Communication	Remarks
49	TCP/UDP	TACACS+	Cisco DCNM SAN Server to ACS Server	ACS Server can be on either side of the firewall.
53	TCP/UDP	DNS	Cisco DCNM SAN Server to DNS Server	DNS Server can be on either side of the firewall.
123	UDP	NTP	Cisco DCNM SAN Server to NTP Server	NTP Server can be on either side of the firewall.
1521	TCP	Oracle	DCNM SAN Server to the Oracle database Server	<p>This is necessary if the Oracle server is installed external to the DCNM host machine. Oracle server may be configured to listen on a different port and in that case that port in question must be taken into account.</p> <p>Note You can choose the Oracle server port during DCNM SAN installation and must not be modified later, after installation.</p>

Port Number	Protocol	Service Name	Direction of Communication	Remarks
5432	TCP	Postgres	Cisco DCNM SAN Server to Postgres Server	The default installation of DCNM does not need this port. This is necessary if Postgres is installed externally to the DCNM host machine.

Port Number	Protocol	Service Name	Direction of Communication	Remarks
9198	UDPTCP	SNMP	DCNM SAN Client, Device Manager to DCNM SAN Server	

Port Number	Protocol	Service Name	Direction of Communication	Remarks
				<p>Cisco DCNM SNMP proxy services use the TCP port (9198 by default) on DCNM SAN Server for SNMP communications between the Cisco DCNM SAN Client or Cisco Device Manager and the Cisco DCNM Server.</p> <p>Cisco DCNM SAN Client picks a random free local port (UDP) or 9198 (TCP) to reach SNMP proxy. The port can be changed with the client <code>-Dsnmp.localportoption</code>.</p> <p>Cisco Device Manager picks a random free local port (UDP) or 9198 (TCP) to reach SNMP proxy. The port can be changed in the <code>server.properties</code> file.</p> <p>DCNM SNMP proxy is used when SAN Client or Device Manager cannot reach the managed devices directly and SNMP responses coming to DCNM SAN Server from managed devices can be relayed to SAN Client and Device Manager. DCNM</p>

Port Number	Protocol	Service Name	Direction of Communication	Remarks
				SAN Client and Device Manager must reach to DCNM SAN Server port 9198 (or whatever port is configured) to get the SNMP response.

The following table lists all the ports that are used for communication between Cisco DCNM Server and Managed devices.

Port Number	Protocol	Service Name	Direction of Communication	Remarks
22	TCP	SSH	Both Direction	Server to Device – To manage devices. Device to Server – SCP (POAP)
67	UDP	DHCP	Device to DCNM SAN Server	
69	TCP	TFTP	Device to DCNM SAN Server	Required for POAP
161	TCP/UDP	SNMP	DCNM SAN Server to Device	Cisco DCNM configured via <code>server.properties</code> to use TCP on port 161 instead of UDP port 161.
514	UDP	Syslog	Device to DCNM SAN Server	
2162	UDP	SNMP_TRAP	Device to DCNM SAN Server	

Port Number	Protocol	Service Name	Direction of Communication	Remarks
5989	TCP	SMI-S Agent	Both direction	<p>Server to Device. This is where the Storage device listens.</p> <p>An application to DCNM Server – When DCNM Server is acting as storage proxy.</p> <p>Server to the Storage device port number is depended upon where the storage device is listening on. It could be 5989, 5888, or other ports.</p>
33000	TCP	gRPC	Device to DCNM SAN Server	SAN Telemetry Streaming

Configuring Custom Firewalls



Note This is applicable for DCNM OVA/ISO deployments only.

Cisco DCNM Server deploys a set of IPTables rules, known as DCNM Local Firewall. These rules open TCP/UDP ports that are required for Cisco DCNM operations. You can't manipulate the built-in Local Firewall without accessing the OS interface, through SSH, and change the rules. Don't change the Firewall rules, as it may become vulnerable to attacks, or impact the normal functioning of DCNM.

To cater to a given deployment or a network, Cisco DCNM allows you to configure your own firewall rules, from Release 11.3(1), using CLIs.



Note These rules can be broad or granular, and supersedes the built-in Local Firewall rules. Therefore, configure these rules carefully, during a maintenance period.

You don't need to stop or restart DCNM server or applications to configure custom firewalls.

**Caution**

IPTable prioritizes the rules in the order that they are configured. Therefore, more granular rules must be installed in the beginning. To ensure that the order of the rules is as required, you can create all rules in a text editor, and then execute the CLIs in the desired order. If rules need to be adjusted, you can flush all rules and configure the rules in the desired order.

You can perform the following operations on the Custom Firewalls.

**Note**

Run all the commands on the Cisco DCNM server using SSH.

Custom Firewall CLI

View the custom firewall CLI chain help and examples using the **appmgr user-firewall** command.

```
dcnm# appmgr user-firewall
dcnm# appmgr user-firewall - h
```

Configure Rules for Custom Firewall

Configure the custom firewall rules using the **appmgr user-firewall {add | del}** command.

```
appmgr user-firewall add|del proto tcp|udp port <port><port range n1:n2> [in |
out <interface name>] [srcip <ip-address> [/<mask>]] [dstip <ip-address> [/<mask>]]
action permit|deny
```

**Note**

The custom firewall rules supersede the local Firewall rules. Therefore, be cautious and ensure that the functionalities aren't broken.

Example: Sample Custom Firewall Rules

- dcnm# **appmgr user-firewall add proto tcp port 7777 action deny**

This rule drops all TCP port 7777 traffic on all interfaces.

- dcnm# **appmgr user-firewall add proto tcp port 443 in eth1 action deny**

This rule drops all TCP port 443 incoming traffic on interface eth1.

- dcnm# **appmgr user-firewall add proto tcp port 7000:7050 srcip 1.2.3.4 action deny**

This rule drops TCP port range 10000-10099 traffic coming from IP address 1.2.3.4.

Preserving Custom Firewall Rules

Preserve the custom firewall rules across reboots, using the **appmgr user-firewall commit** command.

**Note**

Each time you modify the rules, you must execute this command to preserve the rules across reboots.

Installing Custom Firewall Rules on Native HA Standby Node

In a Cisco DCNM Native HA setup, when you execute the **appmgr user-firewall commit** on the Active node, the rules are synchronized to the Standby node automatically. However, the new rules are operational only after a system reboot.

To apply the rules immediately, install the custom firewall rules on Standby node using the **appmgr user-firewall user-policy-install** command.

Deleting Custom Firewalls

Delete all the custom firewalls using the **appmgr user-firewall flush-all** command.

To delete the custom firewalls permanently, use the **appmgr user-firewall commit** command.



CHAPTER 8

User and Schemas

This chapter provides information about creating Users and user-specific schema for *Cisco Data Center Network Manager*.

- [Creating New Users, on page 103](#)
- [Creating New Schema for Existing Users, on page 103](#)

Creating New Users

Perform this task, to create a new user.

Procedure

- | | |
|---------------|---|
| Step 1 | Logon to the SSH terminal of the DCNM Appliance. |
| Step 2 | Create a new user using the create user <i>username</i> command. |
| Step 3 | Enter a valid password at the password prompt. |
| Step 4 | Create a new schema with same name as the user, using the create schema <i>username</i> authorization <i>username</i> . |
| Step 5 | Enable all permissions on the schema, using the grant all on schema <i>username</i> to <i>username</i> . |
-

Example

The following example shows the sample output for creating new users

```
dcnm# create user user1
password: password
dcnm# create schema user1 authorization user1;
dcnm# grant all on schema user1 to user1;
```

Creating New Schema for Existing Users

Perform this task to retain the same create new schema to an existing user.

Procedure

- Step 1** Logon to the SSH terminal of the DCNM Appliance.
 - Step 2** Drop the existing user by using the **drop user***username***cascade** command.
 - Step 3** Drop the existing schema with same name as username, by using the **drop schema***username***cascade** command.
 - Step 4** Create a new user using the **create user** *username* command.
 - Step 5** Enter a valid password at the password prompt.
 - Step 6** Create a new schema with same name as the user, using the **create schema***username***authorization***username* command.
 - Step 7** Enable all permissions on the schema, using the **grant all on schema***username***to***username*.
-

Example

The following example shows the sample output for creating new users

```
dcnm# drop user user_old cascade
dcnm# drop schema user_old cascade
dcnm# create user user_new
password: password
dcnm# create schema user_new authorization user_new;
dcnm# grant all on schema user_new to user_new;
```




CHAPTER 9

Certificates

- [Retaining the CA Signed Certificate, on page 105](#)
- [Certificates Management for SAN Windows/Linux, on page 106](#)
- [Certificate Management for SAN OVA/ISO, on page 112](#)

Retaining the CA Signed Certificate

Perform this procedure if you need to retain the CA signed SSL Certificate after upgrade.

When you configure a 3-node federation setup and apply external CA certificate, do the following:

1. Stop DCNM servers in Federation.
 - For Windows – Navigate to C:\Program Files\Cisco Systems\dcm\dcnm\bin. Double-click on the StopLANSANServer.bat to stop the services.
 - For Linux – Logon to /root. Execute /root/Stop_DCNM_Servers command to stop services.
2. Generate CA certificates for Primary Servers, and apply the same CA certificate in the three secondary servers.
3. Start the Primary server first, then the secondary, third server thereafter, on Federation.

Note that if you change the keystore password or alias, you need to update it in the **standalone-san.xml** document located at:

```
<DCNM_install_root>\dcm\wildfly-14.0.1.Final\standalone\configuration\standalone-san.xml
```

Update the password in the **keystore** tag and alias:

```
<keystore key-password>=<<storepass-pwd>> key-alias="updated-key-alias"  
keystore-password="updated-password"  
path="<DCNM_install_root>\dcm\wildfly-14.0.1.Final\standalone\configuration\fmserver.jks">
```



Note <<storepass-pwd>> is the password string generated while installing DCNM Server. This string is located in the <install_dir>/dcm/fm/conf/serverstore.properties directory. Fetch the **dcnm.fmserver.token** value for the **storepass-pwd**.

Procedure

- Step 1** Backup the signed certificate from the location:
- For Windows: <DCNM_install_root>\dcm\wildfly-14.0.1.Final\standalone\configuration\fmserver.jks
 - For Linux: <DCNM_install_root>/dcm/wildfly-14.0.1.Final/standalone/configuration/fmserver.jks
- Step 2** Upgrade to Cisco DCNM Release 11.5(1).
- Step 3** After upgrade, copy the certificate to the same location on the upgraded version of the Cisco DCNM.
- Note** You must load the certificates to the same location as mentioned in [Step 1, on page 106](#).
- Step 4** Restart the DCNM Services.
-

Certificates Management for SAN Windows/Linux

This section describes three ways on how to configure the certificates in Cisco DCNM.

Note that if you change the keystore password or alias, you need to update it in the **standalone-san.xml** document located at:

```
<DCNM_install_root>\dcm\wildfly-14.0.1.Final\standalone\configuration\standalone-san.xml
```

Update the password in the **keystore** tag and alias in the **key-alias** tag:

```
<keystore key-password>="<<storepass-pwd>> key-alias="updated-key-alias"
keystore-password="updated-password"
path="<DCNM_install_root>\dcm\wildfly-14.0.1.Final\standalone\configuration\fmserver.jks">
```



- Note** <<storepass-pwd>> is the password string generated while installing DCNM Server. This string is located in the <install_dir>/dcm/fm/conf/serverstore.properties directory. Fetch the **dcnm.fmserver.token** value for the **storepass-pwd**.
-

This section contains the following topics:

Using a Self-Signed SSL Certificate

Procedure

- Step 1** Stop the DCNM services.
- Step 2** Rename the keystore located at
- ```
<DCNM_install_root>\dcm\wildfly-14.0.1.Final\standalone\configuration\fmserver.jks
```
- to
- ```
<DCNM_install_root>\dcm\wildfly-14.0.1.Final\standalone\configuration\fmserver.jks.old
```

- Step 3** From command prompt, navigate to `<DCNM install root>\dcm\java\jre1.8\bin\<DCNM install root>\dcm\java\jdk11\bin\`
- Step 4** Generate a self signed certificate using following command:
keytool -genkey -trustcacerts -keyalg RSA -sigalg SHA256withRSA -alias sme -keystore <DCNM_install_root>\dcm\wildfly-10.1.0.Final\standalone\configuration\fmserver.jks -storepass <<storepass-pwd>> -validity 360 -keysize 2048
- Note** <<storepass-pwd>> is the password string generated while installing DCNM Server. This string is located in the `<install dir>/dcm/fm/conf/serverstore.properties` directory. Fetch the `dcnm.fmserver.token` value for the `storepass-pwd`.
- Step 5** Start the DCNM services.

Using an SSL Certificate when certificate request is generated using Keytool on Windows

Procedure

- Step 1** Stop the DCNM services.
- Step 2** Rename the keystore located at
`<DCNM_install_root>\dcm\wildfly-14.0.1.Final\standalone\configuration\fmserver.jks`
to
`<DCNM_install_root>\dcm\wildfly-14.0.1.Final\standalone\configuration\fmserver.jks.old`
- Step 3** From command prompt, navigate to `<DCNM install root>\dcm\java\jre1.8\bin\<DCNM install root>\dcm\java\jdk11\bin\`
- Step 4** Generate the public-private key pair in DCNM keystore by using the following command:
keytool -genkey -keyalg RSA -sigalg SHA256withRSA -alias sme -keystore "<DCNM_install_root>\dcm\wildfly-14.0.1.Final\standalone\configuration\fmserver.jks" -storepass <<storepass-pwd>> -validity 360 -keysize 2048
- Note** <<storepass-pwd>> is the password string generated while installing DCNM Server. This string is located in the `<install dir>/dcm/fm/conf/serverstore.properties` directory. Fetch the `dcnm.fmserver.token` value for the `storepass-pwd`.
- Step 5** Generate the certificate-signing request (CSR) from the public key generated in [Step 4, on page 107](#).
keytool -certreq -alias sme -file dcnm.csr -keystore "<DCNM install root>\dcm\wildfly-14.0.1.Final\standalone\configuration\fmserver.jks" -storepass <<storepass-pwd>>
- Note** <<storepass-pwd>> is the password string generated while installing DCNM Server. This string is located in the `<install dir>/dcm/fm/conf/serverstore.properties` directory. Fetch the `dcnm.fmserver.token` value for the `storepass-pwd`.

Note The `dcnm.csr` file is created in the keytool directory, located at `/usr/local/cisco/dcm/java/jdk11/bin`.

Step 6 Submit the CSR to CA, and download the signed certificate chain in Base-64 format which creates the `.p7b` file.

CA may provide the certificate and signing certificate as certificate chain in PKCS 7 format (`.p7b` file) or PEM (`.pem`) file. If CA provided PKCS 7 format go to [Step 7, on page 108](#) to convert it to PEM format. If CA provided PEM format, then go to [Step 8, on page 108](#).

Step 7 Convert the PKCS 7 certificate chain to X509 certificate chain using `openssl`.

```
openssl pkcs7 -print_certs -in cert-chain.p7b -out cert-chain.pem
```

Note Ensure that the user provides either absolute or relative path to the correct location of `cert-chain.p7b` file in the above command.

Step 8 Import the intermediate certificate first, then the root certificate, and finally the signed certificate by following these steps:

```
keytool -importcert -trustcacerts -file cert-chain.pem -keystore
"<DCNM_install_root>\dcm\wildfly-14.0.1.Final\standalone\configuration\fmserver.jks" -storepass
<<storepass-pwd>> -alias sme
```

Note `<<storepass-pwd>>` is the password string generated while installing DCNM Server. This string is located in the `<install_dir>/dcm/fm/conf/serverstore.properties` directory. Fetch the `dcnm.fmserver.token` value for the `storepass-pwd`.

Note Ensure that the user provides either the absolute path or relative path to the correct location of the `cert-chain.pem` file in the above command.

Step 9 Create the store for each server in the Federation setup using the following command on the Primary server:

```
keytool -importkeystore -srckeystore
/usr/local/cisco/dcm/wildfly-14.0.1.Final/standalone/configuration/fmserver.jks -srckeypass
<<storepass-pwd of primary>> -srcstorepass <<storepass-pwd of primary>> -srcstoretype JKS
-destkeystore /usr/local/cisco/dcm/wildfly-14.0.1.Final/standalone/configuration/fmserver2.jks
-destkeypass <<storepass-pwd-of-federation-server>> -deststorepass
<<storepass-pwd-of-federation-server>> -deststoretype JKS -alias sme
```

Note `<<storepass-pwd>>` is the password string generated while installing DCNM Server. This string is located in the `<install_dir>/dcm/fm/conf/serverstore.properties` directory. Fetch the `dcnm.fmserver.token` value for the `storepass-pwd`.

Step 10 Copy the new `fmserver2.jks` to the Federation server as `fmserver.jks` at `/usr/local/cisco/dcm/wildfly-14.0.1.Final/standalone/configuration` directory on the Federation server.

Step 11 Repeat [Step 9, on page 108](#) and [Step 10, on page 108](#) on every server in the Federation setup.

Step 12 Start the DCNM service.

Ensure that you start the primary server, second sever and the third server in the Federation setup in the sequential order.

Step 13 To enable launching of SAN Client, copy the `fmtrust.jks` on server1 located at `/usr/local/cisco/dcm/fm/lib/fm/fmtrust.jks` to both second and third servers in the Federation setup.

For further instructions, refer to [Launching SAN Client and Device Manager, on page 54](#).

Using an SSL Certificate When Certificate Request Is Generated Using Keytool on Linux

Procedure

- Step 1** Stop the DCNM services, or the DCNM application by using the **appmgr stop dcnm** command.
- Step 2** Rename the keystore that is located at:
<DCNM_install_root>/dcm/wildfly-14.0.1.Final/standalone/configuration/fmserver.jks
To
<DCNM_install_root>/dcm/wildfly-14.0.1.Final/standalone/configuration/fmserver.jks.old
- Step 3** From command prompt, navigate to the appropriate folder:
<DCNM_install_root>/dcm/java/jdk11/bin/
- Step 4** Generate the public-private key pair in DCNM keystore by using the following command:
./keytool -genkey -keyalg RSA -sigalg SHA256withRSA -alias sme -keystore <DCNM_install_root>/dcm/wildfly-14.0.1.Final/standalone/configuration/fmserver.jks -storepass <<storepass-pwd>> -validity 360 -keysize 2048
- Note** <<storepass-pwd>> is the password string generated while installing DCNM Server. This string is located in the <install_dir>/dcm/fm/conf/serverstore.properties directory. Fetch the **dcnm.fmserver.token** value for the **storepass-pwd**.
- Step 5** Generate the certificate-signing request (CSR) from the public key that is generated in [Step 4, on page 109](#).
./keytool -certreq -alias sme -file dcnm.csr -keystore "<DCNM_install_root>/dcm/wildfly-14.0.1.Final/standalone/configuration/fmserver.jks" -storepass <<storepass-pwd>>
- Note** <<storepass-pwd>> is the password string generated while installing DCNM Server. This string is located in the <install_dir>/dcm/fm/conf/serverstore.properties directory. Fetch the **dcnm.fmserver.token** value for the **storepass-pwd**.
- Note** The **dcnm.csr** file is created in the keytool directory, which is located at
<usr/local/cisco/dcm/java/jdk11/bin>.
- Step 6** Submit the CSR to CA, and download the signed certificate chain in Base-64 format which creates the .p7b file.

CA may provide the certificate and signing certificate as a certificate chain in PKCS 7 format (.p7b file) or PEM (.pem) file. If CA provided the certificate chain in PKCS 7 format, go to [Step 7, on page 109](#) to convert it to PEM format. If CA provided the certificate chain in PEM format, then go to [Step 8, on page 110](#).
- Step 7** Convert the PKCS 7 certificate chain to the X509 certificate chain using OpenSSL.
openssl pkcs7 -print_certs -in cert-chain.p7b -out cert-chain.pem

Note Ensure that the user provides either absolute or relative path to the correct location of `cert-chain.p7b` file in the above command.

Step 8 Import the intermediate certificate first, then the root certificate, and finally the signed certificate by following these steps:

```
./keytool -importcert -trustcacerts -file cert-chain.pem -keystore
<DCNM_install_root>/dcm/wildfly-14.0.1.Final/standalone/configuration/fmserver.jks -storepass
<<storepass-pwd>> -alias sme
```

Note `<<storepass-pwd>>` is the password string generated while installing DCNM Server. This string is located in the `<install_dir>/dcm/fm/conf/serverstore.properties` directory. Fetch the `dcnm.fmserver.token` value for the `storepass-pwd`.

Note Ensure that the user provides either the absolute path or relative path to the correct location of the `cert-chain.pem` file in the above command.

Step 9 Create the store for each server in the Federation setup using the following command from the Primary server:

```
keytool -importkeystore -srckeystore
/usr/local/cisco/dcm/wildfly-14.0.1.Final/standalone/configuration/fmserver.jks -srckeypass
<<storepass-pwd of primary>> -srcstorepass <<storepass-pwd of primary>> -srcstoretype JKS
-destkeystore /usr/local/cisco/dcm/wildfly-14.0.1.Final/standalone/configuration/fmserver2.jks
-destkeypass <<storepass-pwd-of-federation-server>> -deststorepass
<<storepass-pwd-of-federation-server>> -deststoretype JKS -alias sme
```

Step 10 Copy the new `fmserver2.jks` to the Federation server as `fmserver.jks` at `/usr/local/cisco/dcm/wildfly-14.0.1.Final/standalone/configuration` directory on the Federation server.

Step 11 Repeat Step [Step 9, on page 110](#) and [Step 10, on page 110](#) on every server in the Federation setup.

Step 12 To enable launching of SAN Client, copy the `fmtrust.jks` on server1 located at `/usr/local/cisco/dcm/fm/lib/fm/fmtrust.jks` to both second and third servers in the Federation setup.

For further instructions, refer to [Launching SAN Client and Device Manager, on page 54](#).

Step 13 Start the DCNM service.

Ensure that you start the primary server, second sever and the third server in the Federation setup in the sequential order.

Using a SSL Certificate when certificate request is generated using OpenSSL on Linux

To configure SSL certificates in Cisco DCNM, using certificate request generated using open SSL, perform the following steps.

Procedure

Step 1 Stop the DCNM services, or the DCNM application by using the `appmgr stop dcnm` command.

Step 2 Rename the keystore located at:

```
<DCNM_install_root>/dcm/wildfly-14.0.1.Final/standalone/configuration/fmserver.jks
```

to

<DCNM_install_root>/dcm/wildfly-14.0.1.Final/standalone/configuration/fmserver.jks.old

Step 3

From command prompt, navigate to <DCNM_install_root>/dcm/java/jdk11/bin/.

Step 4

Generate the RSA private key using OpenSSL.

```
openssl genrsa -out dcnm.key 2048
```

Step 5

Generate a certificate-signing request (CSR) by using following command:

```
openssl req -new -key dcnm.key -sha256 -out dcnm.csr
```

Step 6

Submit the CSR to Certificate signing authority, and download the signed certificate chain in Base-64 format which creates the **.p7b** file.

CA may provide the certificate and signing certificate as certificate chain in PKCS 7 format (.p7b file) or PEM (.pem) file. If CA provides the PKCS 7 format, go to [Step 7, on page 111](#) to convert it to PEM format. If CA provides the PEM format, go to [Step 8, on page 111](#).

Step 7

Convert the PKCS 7 certificate chain to X509 certificate chain.

```
openssl pkcs7 -print_certs -in cert-chain.p7b -out cert-chain.pem
```

Step 8

Convert the X509 certificate chain and private key to PKCS 12 format

```
openssl pkcs12 -export -in cert-chain.pem -inkey dcnm.key -out dcnm.p12 -password pass
<<storepass-kwd>> -name sme
```

Note <<storepass-pwd>> is the password string generated while installing DCNM Server. This string is located in the <install_dir>/dcm/fm/conf/serverstore.properties directory. Fetch the **dcnm.fmserver.token** value for the **storepass-pwd**.

Note Ensure that the user provides either absolute path or relative path to the correct location of dcnm.key & dcnm.p12 files in the above command.

Step 9

Import the intermediate certificate, the root certificate, and the signed certificate in the same order.

```
./keytool -importkeystore -srckeystore dcnm.p12 -srcstoretype PKCS12 -destkeystore
<DCNM_install_root>/dcm/wildfly-14.0.1.Final/standalone/configuration/fmserver.jks -deststoretype
JKS -alias sme -srcstorepass <<storepass-pwd>> -deststorepass <<storepass-pwd>>
```

Note <<storepass-pwd>> is the password string generated while installing DCNM Server. This string is located in the <install_dir>/dcm/fm/conf/serverstore.properties directory. Fetch the **dcnm.fmserver.token** value for the **storepass-pwd**.

Note Ensure that the user provides either absolute path or relative path to the correct location of cert-chain.pem, dcnm.key, and dcnm.p12 files in the above command.

Step 10

Create the store for each server in the Federation setup using the following command from the Primary server:

```
keytool -importkeystore -srckeystore
/usr/local/cisco/dcm/wildfly-14.0.1.Final/standalone/configuration/fmserver.jks -srckeypass
<<storepass-pwd of primary>> -srcstorepass <<storepass-pwd of primary>> -srcstoretype JKS
-destkeystore /usr/local/cisco/dcm/wildfly-14.0.1.Final/standalone/configuration/fmserver2.jks
-destkeypass <<storepass-pwd-of-federation-server>> -deststorepass
<<storepass-pwd-of-federation-server>> -deststoretype JKS -alias sme
```

Step 11

Copy the new fmserver2.jks to the Federation server as **fmserver.jks** at <usr/local/cisco/dcm/wildfly-14.0.1.Final/standalone/configuration> directory on the Federation server.

- Step 12** Repeat Step [Step 10, on page 111](#) and [Step 11, on page 111](#) on every server in the Federation setup.
- Step 13** Start the DCNM service.
- Ensure that you start the primary server, second sever and the third server in the Federation setup in the sequential order.
- Step 14** To enable launching of SAN Client, copy the **fmtrust.jks** on server1 located at **/usr/local/cisco/dcm/fm/lib/fm/fmtrust.jks** to both second and third servers in the Federation setup.
- For further instructions, refer to [Launching SAN Client and Device Manager, on page 54](#).

Certificate Management for SAN OVA/ISO



Note This section to applicable only for DCNM OVA/ISO deployments.

From Release 11.2(1), Cisco DCNM allows new methods and new CLIs for installing, restoring after upgrade, and verifying certificates on the system.



Note From Release 11.3(1), you must use **sysadmin** role for certificate management.

Cisco DCNM stores two certificates:

- Self-signed certificate, for internal communication between the Cisco DCNM Server and various applications
- CA (Certificate Authority) Signed certificate, for communicating with the external world, such as Web UI.



Note Until you install a CA Signed certificate, Cisco DCNM retains a self-signed certificate for the communicating with the external network.

Best practices for Certificate Management

The following are the guidelines and best practices for Certificate Management in Cisco DCNM.

- Cisco DCNM provides CLI based utilities to display, install, restore, and export or import of certificates. These CLIs are available through SSH console, and only a **sysadmin** user can accomplish these tasks.
- When you install Cisco DCNM, a self-signed certificate is installed, by default. This certificate is used to communicate with the external world. After Cisco DCNM installation, you must install a CA-Signed certificate on the system.

- Generate a CSR on Cisco DCNM with a CN (common name). Provide a VIP FQDN (Virtual IP Address FQDN) as CN to install a CA Signed certificate. The FQDN is the fully qualified domain name for the management subnet VIP (VIP of eth0) interface that is used to access Cisco DCNM Web UI.
- If the CA Signed certificate was installed prior to upgrading the Cisco DCNM, then you must restore the CA Signed certificate after you upgrade the Cisco DCNM.



Note You need not take a backup of certificates when you perform inline upgrade or backup and restore.

Display Installed Certificates

You can view the details of the installed certificate by using the following command:

appmgr afw show-cert-details

In the following sample output for the **appmgr afw show-cert-details** command, **CERTIFICATE 1** represents the certificate offered to the external network and to the Web browsers. **CERTIFICATE 2** represents the internally used certificate.

```

dcnm# appmgr afw show-cert-details

****CERTIFICATE 1****
[Certificate available to web gateway. This certificate is offered to webclients]:
-----Web gateway certificate-----
Certificate:
  Data:
    Version: 3 (0x2)
    Serial Number: 4202 (0x106a)
    Signature Algorithm: sha256WithRSAEncryption
    Issuer: C=IN, ST=KA, L=BGL, O=xyz, OU=ABC, CN=<FQDN/IP>
    Validity
      Not Before: Jun  4 13:55:25 2019 GMT
      Not After : Jun  3 13:55:25 2020 GMT
    Subject: C=IN, ST=KA9, L=BGL9, O=XYZ123, OU=ABC123, CN=<FQDN/IP>
    Subject Public Key Info:
      Public Key Algorithm: rsaEncryption
      Public-Key: (2048 bit)
      Modulus:
        00:bb:52:1e:7f:24:d7:2e:24:62:5a:83:cc:e4:88:
-----Certificate output is truncated to first 15 lines-----

****CERTIFICATE 2****
[Certificate available in keystore(jks). CA signed certificate is installed here till DCNM
version 11.1.x]
If you have upgraded from DCNM version 11.1.x to later version please see installation guide
to restore
CA signed certificate to upgraded version.
-----Keystore certificate-----
alias = sme, storepass = <<storepass-pwd>>
Alias name: sme
Creation date: Oct 14, 2018
Entry type: PrivateKeyEntry
Certificate chain length: 2
Certificate[1]:
Owner: CN=localhost, OU=Data Center, O=Cisco Systems Inc, L=San Jose, ST=CA, C=US
Issuer: CN=dcnmca, OU=Data Center, O=Cisco Systems Inc, L=San Jose, ST=CA, C=US

```

```

Serial number: 62044620
Valid from: Sun Oct 14 20:39:39 PDT 2018 until: Fri Oct 13 20:39:39 PDT 2023
Certificate fingerprints:
    MD5:  E5:F8:AD:17:4D:43:2A:C9:EE:35:5F:BE:D8:22:7D:9C
    SHA1: 38:66:F1:CD:10:61:27:E7:43:85:10:41:3D:A3:4B:5C:C9:CC:17:5E
    SHA256:
E0:87:D8:34:71:18:FE:8C:AB:18:0B:D7:85:B1:91:A8:4B:75:A3:91:BA:90:83:46:72:87:FE:FE:FE:04:F0:E1
Signature algorithm name: SHA256withRSA
Subject Public Key Algorithm: 2048-bit RSA key
-----Certificate output is truncated to first 15 lines-----
dcnm#

```



Note <<storepass-pwd>> is the password string generated while installing DCNM Server. This string is located in the <install dir>/dcm/fm/conf/serverstore.properties directory. Fetch the **dcnm.fmserver.token** value for the **storepass-pwd**.

The Web UI refers to the **CERTIFICATE 1** after installation. If **CERTIFICATE 1** is not available, you must stop and restart all applications, using the following commands:



Note Ensure that you follow the same sequence of commands on the Cisco DCNM to troubleshoot this scenario.

On the Cisco DCNM Standalone appliance, run the following commands to stop and start all Cisco DCNM applications to troubleshoot **CERTIFICATE 1**:

```

dcnm# appmgr stop all /* stop all the applications running on Cisco DCNM */
dcnm# appmgr start all /* start all the applications running on Cisco DCNM */

```

Installing a CA Signed Certificate

We recommend that you install a CA Signed certificate as a standard security practice. The CA Signed certificates are recognized, and verified by the browser. You can also verify the CA Signed certificate manually.



Note The Certificate Authority can be an Enterprise Signing Authority, also.

Installing a CA Signed Certificate on Cisco DCNM Standalone Setup

To install a CA Signed certificate on the Cisco DCNM, perform the following steps.

Procedure

Step 1 Logon to the DCNM server via SSH terminal.

Step 2 Generate a CSR on the Cisco DCNM server using the **appmgr afw gen-csr** command:

Note CSR is unique to a Cisco DCNM, and only a corresponding CSR signed certificate must be installed on a given Cisco DCNM.

```

dcnm# appmgr afw gen-csr
Generating CSR...
..
...
-----
Country Name (2 letter code) [XX]:US
State or Province Name (full name) []:CA
Locality Name (eg, city) [Default City]:San Jose
Organization Name (eg, company) [Default Company Ltd]:Cisco
Organizational Unit Name (eg, section) []:DCBG
Common Name (eg, your name or your server's hostname) []:dcnmhost.cisco.com
Email Address []:dcnm@cisco.com

Please enter the following 'extra' attributes to be sent with your certificate request
A challenge password []: /* This field is not mandatory */
An optional company name []: /* This field is not mandatory */
...

A CSR file dcnmweb.csr is created in the /var/tmp/ directory.

***** CA certificate installation not completed yet. Please do followings. *****
CSR is generated and placed at /var/tmp/dcnmweb.csr.
Please download or copy the content to your certificate signing server.

```

Step 3 Send this CSR to your Certificate signing server.

Note The CA Signing server is local to your organization.

Step 4 Get the certificate signed by your Certificate Authority.

The Certificate Authority (CA) returns 3 certificates, namely, Primary, Intermediate (also known as Issuing/Subordinate), and Root certificates. Combine all the three certificates into one .pem file to import to DCNM.

Step 5 Copy the new CA Signed certificate to Cisco DCNM server.

Ensure that the certificate is located at /var/tmp directory on the Cisco DCNM Server.

Step 6 Install the CA Signed certificate on the Cisco DCNM by using the following commands:

Note We recommend that you run the following commands in the same sequence as shown below.

```

dcnm# appmgr stop all /* Stop all applications running on Cisco DCNM
dcnm# appmgr afw install-CA-signed-cert <CA-signed certificate directory>
/* CA-signed certificate with full or relative path */
Making the signed certificate available to web gateway...

```

CA signed certificate CA-signed-cert.pem is installed. Please start all applications as followings:

On standalone setup execute: 'appmgr start all'

Step 7 Restart all applications with the new certificate on Cisco DCNM using the **appmgr start all** command.

```
dcnm# appmgr start all
```

Step 8 Verify the newly installed CA Signed certificate using the **appmgr afw show-cert-details** command.

The system is now armed with the CA Signed certificate, which is verified at the browser.

Note CSR is unique to a Cisco DCNM, and only a corresponding CSR signed certificate must be installed on a given Cisco DCNM.

Restoring the certificates after an upgrade

This mechanism applies to Cisco DCNM Upgrade procedure using the inline upgrade process only. This procedure is not required for the backup and restore of data on the same version of the Cisco DCNM appliance.

Note that certificate restore is a disruptive mechanism; it requires you to stop and restart applications. Restore must be performed only when the upgraded system is stable, that is, you must be able to login to Cisco DCNM Web UI. On a Cisco DCNM Native HA setup, both the Active and Standby nodes must have established peer relationship.



Note A certificate needs to be restored only in following situations:

- if a CA signed certificate was installed on the system before upgrade, and,
- if you're upgrading from a version prior to 11.2(1) to version 11.2(1) or later.

After upgrading the Cisco DCNM, you must always verify the certificate before restoring to check if **CERTIFICATE 1** is the CA signed certificate. You must restore the certificates, if otherwise.

Verify the certificates using the **appmgr afw show-cert-details** as shown in the sample output below.

```

dcnm# appmgr afw show-cert-details
****CERTIFICATE 1****
[Certificate available to web gateway. This certificate is offered to webclients]:
-----Web gateway certificate-----
Certificate:
  Data:
    Version: 3 (0x2)
    Serial Number: 1575924977762797464 (0x15decf6aec378798)
    Signature Algorithm: sha256WithRSAEncryption
    Issuer: C=US, ST=CA, L=San Jose, O=Enterprise CA inc, OU=Data Center, CN=dcnm1.ca.com

    Validity
      Not Before: Dec  9 20:56:17 2019 GMT
      Not After : Dec  9 20:56:17 2024 GMT
    Subject: C=US, ST=CA, L=San Jose, O= Enterprise CA inc, OU=Data Center,
CN=dcnm1.ca.com
    Subject Public Key Info:
      Public Key Algorithm: rsaEncryption
      Public-Key: (2048 bit)
      Modulus:
        00:cf:6e:cd:c6:a9:30:08:df:92:98:38:49:9c:2a:
-----Certificate output is truncated to first 15 lines-----

****CERTIFICATE 2****
[Certificate available in keystore(jks). CA signed certificate is installed here till DCNM
version 11.1.x]
If you have upgraded from DCNM version 11.1.x to later version please see installation guide
to restore
CA signed certificate to upgraded version.
-----Keystore certificate-----

```

```

Alias name: sme
Creation date: Oct 14, 2018
Entry type: PrivateKeyEntry
Certificate chain length: 2
Certificate[1]:
Owner: CN=localhost, OU=Data Center, O=Cisco Systems Inc, L=San Jose, ST=CA, C=US
Issuer: CN=dcnmca, OU=Data Center, O=Cisco Systems Inc, L=San Jose, ST=CA, C=US
Serial number: 62044620
Valid from: Sun Oct 14 20:39:39 PDT 2018 until: Fri Oct 13 20:39:39 PDT 2023
Certificate fingerprints:
  SHA1: 38:66:F1:CD:10:61:27:E7:43:85:10:41:3D:A3:4B:5C:C9:CC:17:5E
  SHA256:
E0:87:D8:34:71:18:FE:8C:AB:18:0B:D7:85:B1:91:A8:4B:75:A3:91:BA:90:83:46:72:87:FE:FE:FE:04:F0:E1
Signature algorithm name: SHA256withRSA
Subject Public Key Algorithm: 2048-bit RSA key
Version: 3
-----Certificate output is truncated to first 15 lines-----
dcnm#

```

Restoring Certificates on Cisco DCNM Standalone setup after Upgrade

To restore the certificates after you upgrade the Cisco DCNM Standalone deployment to Release , perform the following:

Procedure

-
- Step 1** **Note** When you upgrade to Release , a backup of the CA Signed certificate is created.
- After you have successfully upgraded the Cisco DCNM Standalone appliance, logon to the DCNM server via SSH.
- Step 2** Stop all the applications using the following command:
- ```
appmgr stop all
```
- Step 3**    Restore the certificate by using the following command:
- ```
appmgr afw restore-CA-signed-cert
```
- Step 4** Enter **yes** to confirm to restore the previously installed certificate.
- Step 5** Start all the applications using the following command:
- ```
appmgr start all
```
- Step 6**    Verify the newly installed CA Signed certificate using the **appmgr afw show-cert-details** command.
- The system is now armed with the CA Signed certificate, which is verified at the browser.
- 

## Recovering and Restoring Previously Installed CA Signed Certificates

Installing, restoring, managing CA signed certificate is a time-consuming process as a third-party signing server is involved. This may also lead to omissions or mistakes which can result in installing wrong certificates. In such a scenario, we recommend that you restore the certificates that were installed prior to the latest install or upgrade.

To recover and restore the previously installed CA signed certificates, perform the following steps.

### Procedure

- Step 1** Logon to the DCNM server via SSH terminal.  
**Step 2** Navigate to the `/var/lib/dcnm/afw/apigateway/` directory.

```
dcnm# cd /var/lib/dcnm/afw/apigateway/
dcnm# ls -ltr /* View the contents of the folder
total 128
-rw----- 1 root root 1844 Nov 18 13:14 dcnmweb.key.2019-11-20T132939-08:00
-rw-r--r-- 1 root root 1532 Nov 18 13:14 dcnmweb.crt.2019-11-20T132939-08:00
-rw----- 1 root root 1844 Nov 20 10:15 dcnmweb.key.2019-11-20T132950-08:00
-rw-r--r-- 1 root root 1532 Nov 20 10:15 dcnmweb.crt.2019-11-20T132950-08:00
-rw----- 1 root root 1844 Dec 22 13:59 dcnmweb.key
-rw-r--r-- 1 root root 1532 Dec 22 13:59 dcnmweb.crt
.
..
...
```

**dcnmweb.key** and **dcnmweb.crt** are the key and certificate files that are installed on the system, currently. Similar filenames, with timestamp suffix, help you in identifying the key and certificate pairs installed prior to the recent upgrade or restore.

- Step 3** Stop all applications running on Cisco DCNM using **appmgr stop all** command.  
**Step 4** Take a backup of `dcnmweb.key` and `dcnmweb.crt` files.  
**Step 5** Identify the older key and certificate pair that you want to restore.  
**Step 6** Copy the key and certificate pair as **dcnmweb.key** and **dcnmweb.crt** (without timestamp suffix).  
**Step 7** Start all applications running on Cisco DCNM using **appmgr start all** command.  
**Step 8** Verify the details of the certificate using the **appmgr afw show-cert-details** command. CERTIFICATE 1 is the CA signed certificate.

**Note** If the CA signed certificate is not visible to Cisco DCNM Web UI, or if the DCNM Server sends any failure message, you must reboot the system.



## Verifying the installed certificate

While the installed certificate can be verified using the **appmgr afw show-cert-details** command, the web browser verifies if the certificate is effective or not. Cisco DCNM supports all standard browsers (Chrome, IE, Safari, Firefox). However, each browser display the certificate information differently.

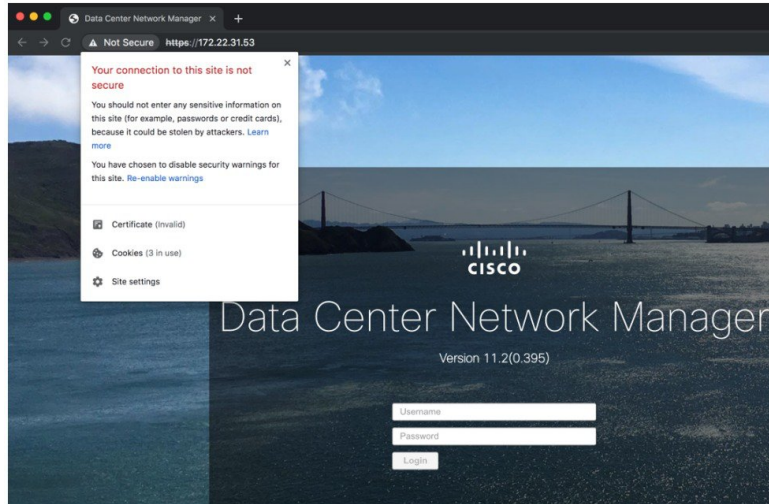
We recommend that you refer to the browser specific information on that browser provider website.

The following snippet is a sample from the Chrome Browser, Version 74.0.3729.169, to verify the certificate.

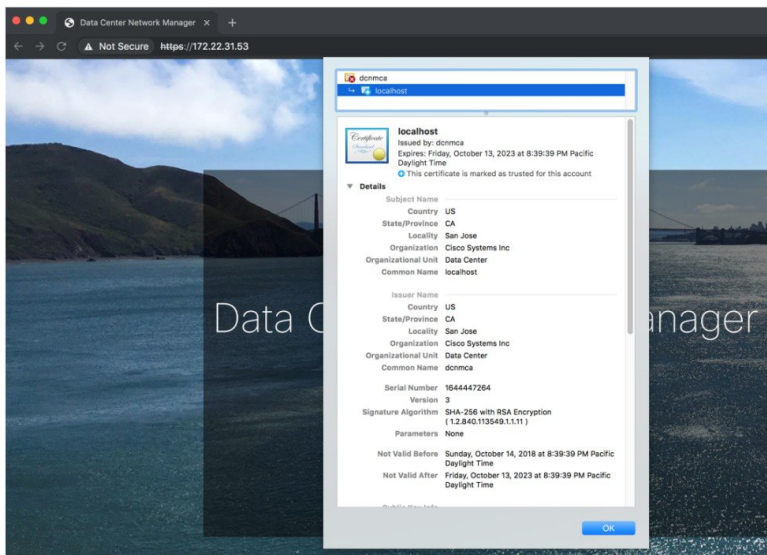
1. Enter URL **https://<dcnm-ip-address>** or **https://<FQDN>** in the address bar on the browser.  
 Press the **Return** key.

- Based on the type of certificate, the icon on the left of the URL field shows a lock icon [  ] or an alert icon [  ].

Click on the icon.



- On the card, click **Certificate** field.  
The information in the certificate is displayed.



The information that is displayed must match with the details as displayed on CERTIFICATE 1 when you view the certificate details using the `apmgr afw show-cert-details`.







## CHAPTER 10

# Secure Client Communications for Cisco DCNM Servers

---

This section describes how to configure HTTPS on Cisco Data Center Network Manager Servers.



---

**Note** You must enable SSL/HTTPS on the Cisco DCNM before you add a CA signed SSL certificate. Therefore, perform the procedure in the below mentioned order.

---

This section includes the following topics:

- [Secure Client Communications for Cisco DCNM Servers, on page 121](#)

## Secure Client Communications for Cisco DCNM Servers

This section describes how to configure HTTPS on Cisco Data Center Network Manager Servers.



---

**Note** You must enable SSL/HTTPS on the Cisco DCNM before you add a CA signed SSL certificate. Therefore, perform the procedure in the below mentioned order.

---

This section includes the following topics:

## Enabling SSL/HTTPS on Cisco DCNM in Federation on RHEL or Windows

To enable SSL/HTTPS on RHEL or Windows for Cisco DCNM in Federation, perform the following:

### Procedure

---

**Step 1** Configure the primary server with a self signed SSL certificate.

**Note** In a CA signed certificate, each server has their own certificate generated. Ensure that the certificate is signed by the signing certificate chain which is common for both the servers.

**Step 2** On the secondary server, perform one of the following:

- While executing the installer, choose HTTPS upfront and select to run in the HTTPs mode.
  - While silent installation, choose HTTPs while you execute the installer.
-



# CHAPTER 11

## Managing Utility Services After DCNM Deployment

This chapter describes how to verify and manage all of the utility services that provide DC3 (Programmable Fabric) central point of management functions after the DCNM is deployed.

**Table 6: Cisco DCNM Utility Services**

| Category           | Application                 | Username | Password                 | Protocol Implemented |
|--------------------|-----------------------------|----------|--------------------------|----------------------|
| Network Management | Data Center Network Manager | admin    | User choice <sup>1</sup> | Network Management   |

<sup>1</sup> User choice refers to the administration password entered by the user during the deployment.

This chapter contains the following sections:

- [Editing Network Properties Post DCNM Installation, on page 123](#)
- [Utility Services Details, on page 138](#)
- [Managing Applications and Utility Services , on page 139](#)
- [Updating the SFTP Server Address for IPv6, on page 142](#)

## Editing Network Properties Post DCNM Installation

The Cisco DCNM OVA or the ISO installation consists of 3 network interfaces:

- dcnm-mgmt network (eth0) interface

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

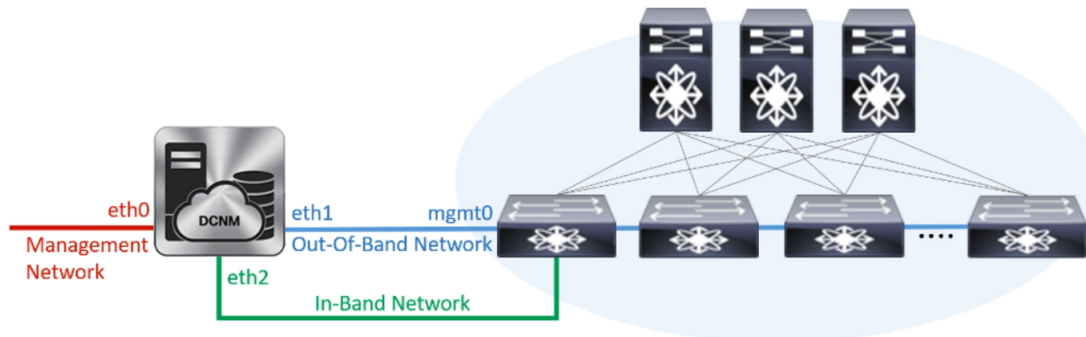
- enhanced-fabric-mgmt (eth1) interface

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

- enhanced-fabric-inband (eth2) interface

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

The following figure shows the network diagram for the Cisco DCNM Management interfaces.



During Cisco DCNM installation for your deployment type, you can configure these interfaces. However, from Cisco DCNM Release 11.2(1), you can edit and modify the network settings post installation.



**Note** We recommend that you use **appmgr** commands to update network properties. Do not restart network interfaces manually.

You can modify the parameters as explained in the following sections:

## Modifying Network Interfaces (eth0 and eth1) Post DCNM Installation

Along with the eth0 and eth1 IP address (IPv4 and/or IPv6), you can also modify the DNS and the NTP server configuration using the **appmgr update network-properties** command.

For step-by-step instructions on how to modify the network parameters using the **appmgr update network-properties** commands, see the following sections.

- [Modifying Network Properties on DCNM in Standalone Mode, on page 124](#)  
Sample Command Output for Modifying Network Parameters in the Cisco DCNM Standalone Setup, on page 125
- [Modifying Network Properties on DCNM in Native HA Mode, on page 126](#)  
Sample Command Output for Modifying Network Parameters in the Cisco DCNM Native HA Setup, on page 127

### Modifying Network Properties on DCNM in Standalone Mode

The following sample shows the output for the **appmgr update network-properties** command for a Cisco DCNM Standalone Appliance.



**Note** Execute the following commands on the DCNM Appliance console to avoid a premature session timeout.

1. Initiate a session on the console, using the following command:  
**appmgr update network-properties session start**
2. Update the Network Properties using the following command:  
**appmgr update network-properties set ipv4 {eth0|eth1}<ipv4-address> <network-mask> <gateway>**  
Enter the new IPv4 address for the Management (eth0) interface, along with the subnet mask and gateway IP addresses.
3. View and verify the changes by using the following command:  
**appmgr update network-properties session show {config | changes | diffs}**
4. After you validate the changes, apply the configuration using the following command:  
**appmgr update network-properties session apply**  
Wait for a few minutes before you can logon to the Cisco DCNM Web UI using the eth0 Management Network IP address.

### Sample Command Output for Modifying Network Parameters in the Cisco DCNM Standalone Setup

The following sample example shows how to modify the network parameters post installation for a Cisco DCNM Standalone setup.

```
dcnm# appmgr update network-properties session start

dcnm# appmgr update network-properties set ipv4 eth0 172.28.10.244 255.255.255.0 172.28.10.1
dcnm# appmgr update network-properties set ipv4 eth1 100.0.0.244 255.0.0.0

WARNING: fabric/poap configuration may need to be changed
manually after changes are applied.

dcnm# appmgr update network-properties session show changes
eth0 IPv4 addr 172.28.10.246/255.255.255.0 -> 172.28.10.244/255.255.255.0
eth1 IPv4 addr 1.0.0.246/255.0.0.0 -> 100.0.0.244/255.0.0.0

dcnm# appmgr update network-properties session apply

WARNING

Applications of both nodes of the DCNM HA system need to be stopped
for the changes to be applied properly.

PLEASE STOP ALL APPLICATIONS MANUALLY

Have applications been stopped? [y/n]: y
Applying changes
DELETE 1
Node left the swarm.
Server configuration file loaded: /usr/local/cisco/dcm/fm//conf/server.properties
log4j:WARN No appenders could be found for logger (fms.db).
log4j:WARN Please initialize the log4j system properly.
log4j:WARN See http://logging.apache.org/log4j/1.2/faq.html#noconfig for more info.
UPDATE 1
UPDATE 1
DELETE 1
```

```

server signaled
INFO : [ipv6_wait_tentative] Waiting for interface eth0 IPv6 address(es) to leave the
'tentative' state
INFO : [ipv6_wait_tentative] Waiting for interface eth0 IPv6 address(es) to leave the
'tentative' state

Please run 'appmgr start afw; appmgr start all' to restart your nodes.

dcnm# appmgr start afw; appmgr start all
Started AFW Server Processes
Started AFW Agent Processes
Started AFW Server Processes
Started AFW Agent Processes
Started applications managed by heartbeat..
Check the status using 'appmgr status all'
Starting High-Availability services: INFO: Resource is stopped
Done.

Warning: PID file not written; -detached was passed.
AMQP User Check
Started AFW Server Processes
Started AFW Agent Processes
dcnm#

```

### Modifying Network Properties on DCNM in Native HA Mode

The following sample shows output to modify the network parameters using the **appmgr update network-properties** command for a Cisco DCNM Native HA Appliance.



#### Note

- Execute the following commands on the DCNM Active and Standby node console to avoid premature session timeout.
- Ensure that you execute the commands in the same order as mentioned in the following steps.

1. Stop the DCNM Applications on the Standby node by using the following command:

```
appmgr stop all
```

Wait until all the applications stop on the Standby node before you go proceed.

2. Stop the DCNM Applications on the Active node by using the following command:

```
appmgr stop all
```

3. Initiate a session on the Cisco DCNM console of both the Active and Standby nodes by using the following command:

```
appmgr update network-properties session start
```

4. On the Active node, modify the network interface parameters by using the following commands:

- a. Configure the IP address for eth0 and eth1 address by using the following command:

```
appmgr update network-properties set ipv4 {eth0|eth1}<ipv4-address> <network-mask>
<gateway>
```

Enter the new IPv4 or IPv6 address for the eth1 interface, along with the subnet mask and gateway IP addresses.

- b. Configure the VIP IP address by using the following command:

```
appmgr update network-properties set ipv4 {vip0|vip1}<ipv4-address> <network-mask>
```

Enter the vip0 address for eth0 interface. Enter the vip1 address for eth1 interface.

- c. Configure the peer IP address by using the following command:

```
appmgr update network-properties set ipv4 {peer0|peer1}<ipv4-address>
```

Enter the eth0 address of the Standby node as peer0 address for Active node. Enter the eth1 address of the Standby node as peer1 address for Active node.

- d. View and validate the changes that you have made to the network parameters by using the following command:

```
appmgr update network-properties session show {config | changes | diffs}
```

View the changes that you have configured by using the following command:

5. On the Standby node, modify the network interface parameters using the commands described in [Step 4](#).

6. After you validate the changes, apply the configuration on the Active node by using the following command:

```
appmgr update network-properties session apply
```

Wait until the prompt returns, to confirm that the network parameters are updated.

7. After you validate the changes, apply the configuration on the Standby node by using the following command:

```
appmgr update network-properties session apply
```

8. Start all the applications on the Active node by using the following command:

```
appmgr start all
```




---

**Note** Wait until all the applications are running successfully on the Active node, before proceeding to the next step.

---

9. Start all the applications on the Standby node by using the following command:

```
appmgr start all
```

10. Establish peer trust key on the Active node by using the following command:

```
appmgr update ssh-peer-trust
```

11. Establish peer trust key on the Standby node by using the following command:

```
appmgr update ssh-peer-trust
```

### Sample Command Output for Modifying Network Parameters in the Cisco DCNM Native HA Setup

The following sample example shows how to modify the network parameters post installation for a Cisco DCNM Native HA setup.



**Note** For example, let us indicate Active and Standby appliances as **dcnm1** and **dcnm2** respectively.

```
[root@dcnm2]# appmgr stop all
Stopping AFW Applications...
Stopping AFW Server Processes
Stopping AFW Agent Processes
Stopped Application Framework...
Stopping High-Availability services: Done.

Stopping and halting node rabbit@dcnm2 ...
Note: Forwarding request to 'systemctl enable rabbitmq-server.service'.
Stopping AFW Applications...
Stopping AFW Server Processes
Stopping AFW Agent Processes
Stopped Application Framework...
[root@dcnm2]#

[root@dcnm1]# appmgr stop all
Stopping AFW Applications...
Stopping AFW Server Processes
Stopping AFW Agent Processes
Stopped Application Framework...
Stopping High-Availability services: Done.

Stopping and halting node rabbit@dcnm1 ...
Note: Forwarding request to 'systemctl enable rabbitmq-server.service'.
Stopping AFW Applications...
Stopping AFW Server Processes
Stopping AFW Agent Processes
Stopped Application Framework...
[root@dcnm1]#

[root@dcnm1]# appmgr update network-properties session start
[root@dcnm2]# appmgr update network-properties session start

[root@dcnm1]# appmgr update network-properties set ipv4 eth0 172.28.10.244 255.255.255.0
172.28.10.1
[root@dcnm1]# appmgr update network-properties set ipv4 eth1 100.0.0.244 255.0.0.0

WARNING: fabric/poap configuration may need to be changed
manually after changes are applied.

[root@dcnm1]# appmgr update network-properties set ipv4 vip0 172.28.10.238 255.255.255.0
[root@dcnm1]# appmgr update network-properties set ipv4 vip1 100.0.0.238 255.0.0.0
[root@dcnm1]# appmgr update network-properties set ipv4 peer0 172.28.10.245
[root@dcnm1]# appmgr update network-properties set ipv4 peer1 100.0.0.245
[root@dcnm1]# appmgr update network-properties session show changes

[root@dcnm2]# appmgr update network-properties set ipv4 eth0 172.28.10.245 255.255.255.0
172.28.10.1
[root@dcnm2]# appmgr update network-properties set ipv4 eth1 100.0.0.245 255.0.0.0

WARNING: fabric/poap configuration may need to be changed
manually after changes are applied.

[root@dcnm2]# appmgr update network-properties set ipv4 vip0 172.28.10.238 255.255.255.0
[root@dcnm2]# appmgr update network-properties set ipv4 vip1 100.0.0.238 255.0.0.0
[root@dcnm2]# appmgr update network-properties set ipv4 peer0 172.28.10.244
[root@dcnm2]# appmgr update network-properties set ipv4 peer1 100.0.0.244
[root@dcnm2]# appmgr update network-properties session show changes
```



```
[root@dcnm1]# appmgr update network-properties session show changes
eth0 IPv4 addr 172.28.10.246/255.255.255.0 -> 172.28.10.244/255.255.255.0
eth1 IPv4 addr 1.0.0.246/255.0.0.0 -> 100.0.0.244/255.0.0.0
eth0 VIP 172.28.10.248/24 -> 172.28.10.238/24
eth1 VIP 1.0.0.248/8 -> 100.0.0.238/8
Peer eth0 IP 172.28.10.247 -> 172.28.10.245
Peer eth1 IP 1.0.0.245 -> 100.0.0.245
```

```
[root@dcnm1]# appmgr update network-properties session show config
```

```
=====
Current configuration
=====
NTP Server 1.ntp.esl.cisco.com
eth0 IPv4 addr 172.28.10.246/255.255.255.0
eth0 IPv4 GW 172.28.10.1
eth0 DNS 171.70.168.183
eth0 IPv6 addr 2001:420:284:2004:4:112:210:20/112
eth0 IPv6 GW 2001:420:284:2004:4:112:210:1
eth1 IPv4 addr 1.0.0.246/255.0.0.0
eth1 IPv4 GW
eth1 DNS 1.0.0.246
eth1 IPv6 addr
eth2 IPv4 addr /
eth2 IPv4 GW
Peer eth0 IP 172.28.10.247
Peer eth1 IP 1.0.0.247
Peer eth2 IP
eth0 VIP 172.28.10.248/24
eth1 VIP 1.0.0.248/8
eth2 VIP /
eth0 VIPv6 /
eth1 VIPv6 /
```

```
=====
Session configuration
=====
NTP Server 1.ntp.esl.cisco.com
eth0 IPv4 addr 172.28.10.244/255.255.255.0
eth0 IPv4 GW 172.28.10.1
eth0 DNS 171.70.168.183
eth0 IPv6 addr 2001:420:284:2004:4:112:210:20/112
eth0 IPv6 GW 2001:420:284:2004:4:112:210:1
eth1 IPv4 addr 100.0.0.244/255.0.0.0
eth1 IPv4 GW
eth1 DNS 1.0.0.246
eth1 IPv6 addr
eth2 IPv4 addr /
eth2 IPv4 GW
Peer eth0 IP 172.28.10.245
Peer eth1 IP 100.0.0.245
Peer eth2 IP
eth0 VIP 172.28.10.238/24
eth1 VIP 100.0.0.238/8
eth2 VIP /
eth0 VIPv6 /
eth1 VIPv6 /
[root@dcnm1]#
```

```
[root@dcnm2]# appmgr update network-properties session show config
```

```
=====
Current configuration
=====
NTP Server 1.ntp.esl.cisco.com
eth0 IPv4 addr 172.28.10.247/255.255.255.0
eth0 IPv4 GW 172.28.10.1
eth0 DNS 171.70.168.183
eth0 IPv6 addr
eth0 IPv6 GW
eth1 IPv4 addr 1.0.0.247/255.0.0.0
```

```

eth1 IPv4 GW
eth1 DNS 1.0.0.247
eth1 IPv6 addr
eth2 IPv4 addr /
eth2 IPv4 GW
Peer eth0 IP 172.28.10.246
Peer eth1 IP 1.0.0.246
Peer eth2 IP
eth0 VIP 172.28.10.248/24
eth1 VIP 1.0.0.248/8
eth2 VIP /
eth0 VIPv6 /
eth1 VIPv6 /

===== Session configuration =====
NTP Server 1.ntp.esl.cisco.com
eth0 IPv4 addr 172.28.10.245/255.255.255.0
eth0 IPv4 GW 172.28.10.1
eth0 DNS 171.70.168.183
eth0 IPv6 addr
eth0 IPv6 GW
eth1 IPv4 addr 100.0.0.245/255.0.0.0
eth1 IPv4 GW
eth1 DNS 1.0.0.247
eth1 IPv6 addr
eth2 IPv4 addr /
eth2 IPv4 GW
Peer eth0 IP 172.28.10.244
Peer eth1 IP 100.0.0.244
Peer eth2 IP
eth0 VIP 172.28.10.238/24
eth1 VIP 100.0.0.238/8
eth2 VIP /
eth0 VIPv6 /
eth1 VIPv6 /
[root@dcnm2]#

[root@dcnm1]# appmgr update network-properties session apply

WARNING

Applications of both nodes of the DCNM HA system need to be stopped
for the changes to be applied properly.

PLEASE STOP ALL APPLICATIONS MANUALLY

Have applications been stopped? [y/n]: y
Applying changes
DELETE 1
Node left the swarm.
Server configuration file loaded: /usr/local/cisco/dcm/fm//conf/server.properties
log4j:WARN No appenders could be found for logger (fms.db).
log4j:WARN Please initialize the log4j system properly.
log4j:WARN See http://logging.apache.org/log4j/1.2/faq.html#noconfig for more info.
UPDATE 1
UPDATE 1
DELETE 1
server signaled
INFO : [ipv6_wait_tentative] Waiting for interface eth0 IPv6 address(es) to leave the
'tentative' state
INFO : [ipv6_wait_tentative] Waiting for interface eth0 IPv6 address(es) to leave the
'tentative' state

```

```

Please run 'appmgr start afw; appmgr start all' to restart your nodes.

Please run 'appmgr update ssh-peer-trust' on the peer node.

[root@dcnm1]#

[root@dcnm2]# appmgr update network-properties session apply

WARNING

Applications of both nodes of the DCNM HA system need to be stopped
for the changes to be applied properly.

PLEASE STOP ALL APPLICATIONS MANUALLY

Have applications been stopped? [y/n]: y
Applying changes
DELETE 1
Node left the swarm.
Server configuration file loaded: /usr/local/cisco/dcm/fm//conf/server.properties
log4j:WARN No appenders could be found for logger (fms.db).
log4j:WARN Please initialize the log4j system properly.
log4j:WARN See http://logging.apache.org/log4j/1.2/faq.html#noconfig for more info.
UPDATE 1
UPDATE 1
DELETE 1
afwnetplugin:0.1
server signaled

Please run 'appmgr start afw; appmgr start all' to restart your nodes.

Please run 'appmgr update ssh-peer-trust' on the peer node.

[root@dcnm2]#

[root@dcnm1]# appmgr start afw; appmgr start all
Started AFW Server Processes
Started AFW Agent Processes
Started AFW Server Processes
Started AFW Agent Processes
Started applications managed by heartbeat..
Check the status using 'appmgr status all'
Starting High-Availability services: INFO: Resource is stopped
Done.

Warning: PID file not written; -detached was passed.
AMQP User Check
Started AFW Server Processes
Started AFW Agent Processes
[root@dcnm1]#

Wait until dcnm1 becomes active again.

[root@dcnm2]# appmgr start afw; appmgr start all
Started AFW Server Processes
Started AFW Agent Processes
Started AFW Server Processes
Started AFW Agent Processes
Started applications managed by heartbeat..
Check the status using 'appmgr status all'
Starting High-Availability services: INFO: Resource is stopped

```

Done.

```
Warning: PID file not written; -detached was passed.
AMQP User Check
Started AFW Server Processes
Started AFW Agent Processes
[root@dcnm2]#
```

```
[root@dcnm1]# appmgr update ssh-peer-trust
/usr/bin/ssh-copy-id: INFO: Source of key(s) to be installed: "/root/.ssh/id_rsa.pub"
Number of key(s) added: 1
```

```
Now try logging into the machine, with: "ssh -o 'StrictHostKeyChecking=no' '172.28.10.245'"
and check to make sure that only the key(s) you wanted were added.
/usr/bin/ssh-copy-id: INFO: Source of key(s) to be installed: "/root/.ssh/id_rsa.pub"
Number of key(s) added: 1
```

```
Now try logging into the machine, with: "ssh -o 'StrictHostKeyChecking=no' '100.0.0.245'"
and check to make sure that only the key(s) you wanted were added.
/usr/bin/ssh-copy-id: INFO: Source of key(s) to be installed: "/root/.ssh/id_rsa.pub"
Number of key(s) added: 1
Now try logging into the machine, with: "ssh -o 'StrictHostKeyChecking=no'
'dcnm-247.cisco.com'"
and check to make sure that only the key(s) you wanted were added.
[root@dcnm1]#
```

```
[root@dcnm2]# appmgr update ssh-peer-trust
/usr/bin/ssh-copy-id: INFO: Source of key(s) to be installed: "/root/.ssh/id_rsa.pub"
Number of key(s) added: 1
```

```
Now try logging into the machine, with: "ssh -o 'StrictHostKeyChecking=no' '172.28.10.244'"
and check to make sure that only the key(s) you wanted were added.
/usr/bin/ssh-copy-id: INFO: Source of key(s) to be installed: "/root/.ssh/id_rsa.pub"
Number of key(s) added: 1
```

```
Now try logging into the machine, with: "ssh -o 'StrictHostKeyChecking=no' '100.0.0.244'"
and check to make sure that only the key(s) you wanted were added.
/usr/bin/ssh-copy-id: INFO: Source of key(s) to be installed: "/root/.ssh/id_rsa.pub"
Number of key(s) added: 1
```

```
Now try logging into the machine, with: "ssh -o 'StrictHostKeyChecking=no'
'dcnm-246.cisco.com'"
and check to make sure that only the key(s) you wanted were added.
[root@dcnm2]#
```

## Configuring Enhanced-Fabric-Inband Interface (eth2) Post DCNM Installation

During the DCNM installation, you can configure the In-Band Management interface. You must associate this network with the port group that corresponds to a fabric in-band connection. The In-Band Network provides reachability to the devices via the front-panel ports.




---

**Note** If you need to modify the already configured in-band network (eth2 interface), execute the **ifconfig eth2 0.0.0.0** command and run the **appmgr setup inband** command again.

---



**Note** You cannot use Endpoint Locator and Telemetry features if the eth2 interface is not configured.

To configure the eth2 interface for the in-band management network, use the **appmgr setup inband** command.

The following example shows a sample output for the **appmgr setup inband** command for a Cisco DCNM Standalone Appliance.

```
[root@dcnm]# appmgr setup inband
Configuring Interface for InBand Connectivity...
Please enter the information as prompted:
InBand Physical IP [e.g. 2.2.2.69]: 2.0.0.250
InBand Network Mask [e.g. 255.255.255.0]: 255.0.0.0
InBand Gateway [e.g. 2.2.2.1]: 2.0.0.1
Validating Inputs ...

You have entered these values..
PIP=2.0.0.250
NETMASK=255.0.0.0
GATEWAY=2.0.0.1

Press 'y' to continue configuration, 'n' to discontinue [y] y
{"ResponseType":0,"Response":"Refreshed"}
{"ResponseType":0,"Response":{"AfwServerEnabled":true,"AfwServerReady":true,"InbandSubnet":"2.0.0.0/8",
"InbandGateway":"2.0.0.1","OutbandSubnet":"0.0.0.0/8","OutbandGateway":"0.0.0.0","UnclusteredMode":true}}

Done.
[root@dcnm]#
```

The following example shows a sample output for the **appmgr setup inband** command for a Cisco DCNM Native HA Appliance.

On Cisco DCNM Primary appliance:

```
[root@dcnm-primary]# appmgr setup inband
Configuring Interface for InBand Connectivity...
Please enter the information as prompted:
InBand Physical IP [e.g. 2.2.2.69]: 2.0.0.244
InBand Network Mask [e.g. 255.255.255.0]: 255.0.0.0
InBand Gateway [e.g. 2.2.2.1]: 2.0.0.1
InBand Virtual IP for HA setup [e.g. 2.2.2.60]: 2.0.0.243
InBand Virtual Network Mask [mandatory for HA setup] [e.g. 255.255.255.0]: 255.0.0.0
Peer Inband IP [mandatory for HA setup] [e.g. 2.2.2.59]: 2.0.0.244
Validating Inputs ...

You have entered these values..
PIP=2.0.0.244
NETMASK=255.0.0.0
GATEWAY=2.0.0.1
VIP=2.0.0.243
VIP_NETMASK=255.0.0.0
PEER_ETH2=2.0.0.244

Press 'y' to continue configuration, 'n' to discontinue [y] y

Done.
[root@dcnm-primary]#
```

On Cisco DCNM Secondary appliance:

```
[root@dcnm-secondary]# appmgr setup inband
Configuring Interface for InBand Connectivity...
Please enter the information as prompted:
InBand Physical IP [e.g. 2.2.2.69]: 2.0.0.245
InBand Network Mask [e.g. 255.255.255.0]: 255.0.0.0
InBand Gateway [e.g. 2.2.2.1]: 2.0.0.1
InBand Virtual IP for HA setup [e.g. 2.2.2.60]: 2.0.0.243
InBand Virtual Network Mask [mandatory for HA setup] [e.g. 255.255.255.0]: 255.0.0.0
Peer Inband IP [mandatory for HA setup] [e.g. 2.2.2.59]: 2.0.0.244
Validating Inputs ...

You have entered these values..
PIP=2.0.0.245
NETMASK=255.0.0.0
GATEWAY=2.0.0.1
VIP=2.0.0.243
VIP_NETMASK=255.0.0.0
PEER_ETH2=2.0.0.244

Press 'y' to continue configuration, 'n' to discontinue [y] y
HA Role is Active {"ResponseType":0,"Response":"Refreshed"}
Done.

[root@dcnm-secondary]#
```

## Modifying Network Properties on DCNM in Standalone Mode



**Note** Execute the following commands on the DCNM Appliance console to avoid a premature session timeout.

To change the Network Properties on Cisco DCNM Standalone setup, perform the following steps:

### Procedure

- 
- Step 1** Initiate a session on the console, using the following command:
- ```
appmgr update network-properties session start
```
- Step 2** Update the Network Properties using the following command:
- ```
appmgr update network-properties set ipv4 {eth0|eth1|eth2}<ipv4-address> <network-mask> <gateway>
```
- Step 3** View and verify the changes by using the following command:
- ```
appmgr update network-properties session show {config | changes | diffs}
```
- Step 4** After you validate the changes, apply the configuration using the following command:
- ```
appmgr update network-properties session apply
```
- Wait for a few minutes before you can logon to the Cisco DCNM Web UI using the eth0 Management Network IP address.
-

### Sample Command Output for Modifying Network Parameters in the Cisco DCNM Standalone Setup

The following sample example shows how to modify the network parameters post installation for a Cisco DCNM Standalone setup.

```

dcnm# appmgr update network-properties session start

dcnm# appmgr update network-properties set ipv4 eth0 172.28.10.244 255.255.255.0 172.28.10.1
dcnm# appmgr update network-properties set ipv4 eth1 100.0.0.244 255.0.0.0
dcnm# appmgr update network-properties set ipv4 eth2 2.0.0.251 255.0.0.0 2.0.0.1

WARNING: fabric/poap configuration may need to be changed
manually after changes are applied.

dcnm# appmgr update network-properties session show changes
eth0 IPv4 addr 172.28.10.246/255.255.255.0 -> 172.28.10.244/255.255.255.0
eth1 IPv4 addr 1.0.0.246/255.0.0.0 -> 100.0.0.244/255.0.0.0
eth2 IPv4 addr 10.0.0.246/255.0.0.0 -> 2.0.0.251/255.0.0.0 2.0.0.1

dcnm# appmgr update network-properties session apply

WARNING

Applications of both nodes of the DCNM HA system need to be stopped
for the changes to be applied properly.

PLEASE STOP ALL APPLICATIONS MANUALLY

Have applications been stopped? [y/n]: y
Applying changes
DELETE 1
Node left the swarm.
Server configuration file loaded: /usr/local/cisco/dcm/fm//conf/server.properties
log4j:WARN No appenders could be found for logger (fms.db).
log4j:WARN Please initialize the log4j system properly.
log4j:WARN See http://logging.apache.org/log4j/1.2/faq.html#noconfig for more info.
UPDATE 1
UPDATE 1
DELETE 1
server signaled
INFO : [ipv6_wait_tentative] Waiting for interface eth0 IPv6 address(es) to leave the
'tentative' state
INFO : [ipv6_wait_tentative] Waiting for interface eth0 IPv6 address(es) to leave the
'tentative' state

Please run 'appmgr start afw; appmgr start all' to restart your nodes.

dcnm# appmgr start afw; appmgr start all
Started AFW Server Processes
Started AFW Agent Processes
Started AFW Server Processes
Started AFW Agent Processes
Started applications managed by heartbeat..
Check the status using 'appmgr status all'
Starting High-Availability services: INFO: Resource is stopped
Done.

Warning: PID file not written; -detached was passed.

```

```
AMQP User Check
Started AFW Server Processes
Started AFW Agent Processes
dcnm#
```

## Changing the DCNM Server Password on Standalone Setup

The password to access Cisco DCNM Web UI is configured while installing the Cisco DCNM for your deployment type. However, you can modify this password post installation also, if required.

To change the password post installation, perform the following steps:

### Procedure

- 
- Step 1** Stop the applications using the **appmgr stop all** command.
- Wait until all the applications stop running.
- Step 2** Change the password for the management interface by using the **appmgr change\_pwd ssh {root|poap|sysadmin}[password]** command.
- Ensure that the new password adheres to the following password requirements. If you do not comply with the requirements, the DCNM application might not function properly:
- It must be at least 8 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: <SPACE> " & \$ % ' ^ = < > ; : ` \ | / , . \*
- Step 3** Start the application using the **appmgr start all** command.
- 

### Example

```
dcnm# appmgr stop all

dcnm# appmgr change_pwd ssh root <<new-password>>
dcnm# appmgr change_pwd ssh poap <<new-password>>
dcnm# appmgr change_pwd ssh sysadmin <<new-password>>

dcnm# appmgr start all
```

## Changing the DCNM Server Password on Native HA Setup

The password to access Cisco DCNM Web UI is configured while installing the Cisco DCNM for your deployment type. However, you can modify this password post installation also, if required.

To change the password post installation, perform the following steps:



## Procedure

- Step 1** Stop all the applications on the Standby appliance using the **appmgr stop all** command.  
Ensure that all the applications have stopped using the **appmgr status all** command.
- Step 2** Stop all the applications on the Active appliance using the **appmgr stop all** command.  
Ensure that all the applications have stopped using the **appmgr status all** command.
- Step 3** Change the password for the management interface by using the **appmgr change\_pwd ssh {root|poap|sysadmin}[password]** command, on both Active and Standby nodes.

**Note** You provide the same password for both the nodes at the prompt.

Ensure that the new password adheres to the following password requirements. If you do not comply with the requirements, the DCNM application might not function properly:

- It must be at least 8 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: <SPACE> " & \$ % ' ^ = < > ; : ` \ | / , . \*`

- Step 4** Start the applications on the Active appliance, using the **appmgr start all** command.  
Ensure that all the applications have started using the **appmgr status all** command.
- Step 5** Start the applications on the Standby appliance, using the **appmgr start all** command.  
Ensure that all the applications have started using the **appmgr status all** command.

## Example

Let us consider Active and standby as dcnm1 and dcnm2, respectively.

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

dcnm1# appmgr change_pwd ssh root <<new-password>>
dcnm1# appmgr change_pwd ssh poap <<new-password>>
dcnm1# appmgr change_pwd ssh sysadmin <<new-password>>

dcnm2# appmgr change_pwd ssh root <<new-password>>
dcnm2# appmgr change_pwd ssh poap <<new-password>>
dcnm2# appmgr change_pwd ssh sysadmin <<new-password>>

dcnm1# appmgr start all
dcnm2# appmgr start all
```

## Changing the DCNM Database Password on Standalone Setup

To change the Postgres database password on Cisco DCNM Standalone setup, perform the following steps:

## Procedure

---

- Step 1** Stop all the applications using the **appmgr stop all** command.  
Ensure that all the applications have stopped using the **appmgr status all** command.
- Step 2** Change the Postgres password by using the **appmgr change\_pwd db** command.  
Provide the new password at the prompt.
- Step 3** Start the application using the **appmgr start all** command.  
Ensure that all the applications have started using the **appmgr status all** command.
- 

## Example

```
dcnm# appmgr stop all
dcnm# appmgr change_pwd db <<new-password>>
dcnm# appmgr start all
```

# Utility Services Details

This section describes the details of all the utility services within the functions they provide in Cisco DCNM. The functions are as follows:

## Network Management

The data center network management function is provided by the Cisco Data Center Network Manager (DCNM) server. Cisco DCNM provides the setup, visualization, management, and monitoring of the data center infrastructure. Cisco DCNM can be accessed from your browser: `http://<<hostname/IP address>>`.




---

**Note** For more information about Cisco DCNM, see <http://cisco.com/go/dcnm>.

---

## Orchestration

### RabbitMQ

RabbitMQ is the message broker that provides the Advanced Messaging Queuing Protocol (AMQP). The RabbitMQ message broker sends events from the vCloud Director/vShield Manager to the Python script for parsing. You can configure this protocol by using certain CLI commands from the Secure Shell (SSH) console of the firmware.



**Note** You need to stop and restart AMQP on both DCNM's server in HA within 30 seconds, otherwise AMQP may not start. For more information about RabbitMQ, go to <https://www.rabbitmq.com/documentation.html>.

After upgrade, enable RabbitMQ management service stop the service and start the services using the following commands:

```
dcnm# appmgr stop amqp
dcnm# appmgr start amqp
```

If AMQP is not running, the memory space must be exhausted that is indicated in the file `/var/log/rabbitmq/erl_crash.dump`.

## Device Power On Auto Provisioning

Power On Auto Provisioning (POAP) occurs when a switch boots without any startup configuration. It is accomplished by two components that were installed:

- DHCP Server

The DHCP server parcels out IP addresses to switches in the fabric and points to the location of the POAP database, which provides the Python script and associates the devices with images and configurations.

During the Cisco DCNM installation, you define the IP Address for the inside fabric management address or OOB management network and the subnets associated with the Cisco Programmable Fabric management.



**Note** You should always configure DHCP through Cisco DCNM web UI by choosing: **Configure > POAP > DHCP Scopes**. Editing the `/etc/dhcp/dhcp.conf` file from an SSH terminal might lead to unexpected behavior.

- Repositories

The TFTP server hosts boot scripts that are used for POAP.

The SCP server downloads the database files, configuration files, and the software images.

## Managing Applications and Utility Services

You can manage the applications and utility services for Cisco Programmable Fabric in the Cisco DCNM through commands in an SSH terminal.

Enter the **appmgr** command from the SSH terminal by using the following credentials:

- Username: **root**
- Password: **Administrative password provided during deployment**



**Note** For your reference, context sensitive help is available for the **appmgr** command. Use the **appmgr** command to display help.

Use the **appmgr tech\_support** command to produce a dump of the log files. You can then provide this information to the TAC team for troubleshooting and analysis of your setup.



**Note** This section does not describe commands for Network Services using Cisco Prime Network Services Controller.

This section includes the following:

## Verifying the Application and Utility Services Status after Deployment

After you deploy the OVA/ISO file, you can determine the status of various applications and utility services that were deployed in the file. You can use the **appmgr status** command in an SSH session to perform this procedure.



**Note** Context-sensitive help is available for the **appmgr status** command. Use the **appmgr status ?** command to display help.

### Procedure

- Step 1** Open up an SSH session:
- a) Enter the **ssh root DCNM network IP address** command.
  - b) Enter the administrative password to login.

**Step 2** Check the status by using the following command:

**appmgr status all**

**Example:**

```
DCNM Status
PID USER PR NI VIRT RES SHR S %CPU %MEM TIME+ COMMAND
=== ===== == == ===== == == = ===== ===== ===== =====
1891 root 20 0 2635m 815m 15m S 0.0 21.3 1:32.09 java

LDAP Status
PID USER PR NI VIRT RES SHR S %CPU %MEM TIME+ COMMAND
=== ===== == == ===== == == = ===== ===== ===== =====
1470 ldap 20 0 692m 12m 4508 S 0.0 0.3 0:00.02 slapd

AMQP Status
PID USER PR NI VIRT RES SHR S %CPU %MEM TIME+ COMMAND
=== ===== == == ===== == == = ===== ===== ===== =====
1504 root 20 0 52068 772 268 S 0.0 0.0 0:00.00 rabbitmq

TFTP Status
PID USER PR NI VIRT RES SHR S %CPU %MEM TIME+ COMMAND
=== ===== == == ===== == == = ===== ===== ===== =====
```

```

====
1493 root 20 0 22088 1012 780 S 0.0 0.0 0:00.00 xinetd

DHCP Status
PID USER PR NI VIRT RES SHR S %CPU %MEM TIME+ COMMAND
====
1668 dhcpd 20 0 46356 3724 408 S 0.0 0.0 0:05.23 dhcp

```

## Stopping, Starting, and Resetting Utility Services

Use the following CLI commands for stopping, starting, and resetting utility services:

- To stop an application, use the **appmgr stop** command.

```

dcnm# appmgr stop dhcp
Shutting down dhcpd: [OK]

```

- To start an application, use the **appmgr start** command.

```

dcnm# appmgr start amqp
Starting vsftpd for amqp: [OK]

```

- To restart an application use the **appmgr restart** command.

```

appmgr restart tftp
Restarting TFTP...
Stopping xinetd: [OK]
Starting xinetd: [OK]

```



**Note** From Cisco DCNM Release 7.1.x, when you stop an application by using the **appmgr stop *app\_name*** command, the application will not start during successive reboots.

For example, if DHCP is stopped by using the **appmgr stop dhcp** command, and the OS is rebooted, the DHCP application will still be down after the OS is up and running.

To start again, use the command **appmgr start dhcp**. The DHCP application will be started after reboots also. This is to ensure that when an environment uses an application that is not packaged as part of the virtual appliance (like CPNR instead of DHCP), the application locally packaged with the virtual appliance will not interfere with its function after any OS reboots.



**Note** When a DCNM appliance (ISO/OVA) is deployed, the Cisco SMIS component will not get started by default. However, this component can be managed using the appmgr CLI: **appmgr start/stop dcnm-smis**  
**appmgr start/stop dcnm** will start or stop only the DCNM web component.

## Updating the SFTP Server Address for IPv6

After deploying the DCNM OVA/ISO successfully with EFM IPv4 and IPv6, by default the SFTP address is pointed to IPv4 only. You need to change the IPv6 address manually in the following two places:

- In the DCNM Web Client, choose **Administration > Server Properties** and then update the below fields to IPv6 and click the **Apply Changes** button.

```

GENERAL>xFTP CREDENTIAL

xFTP server's ip address for copying switch files:
server.FileServerAddress
```

- Log in to the DCNM through ssh and update the SFTP address with IPv6 manually in the server.properties file (/usr/local/cisco/dcm/fm/conf/server.properties).

```
xFTP server's ip address for copying switch files:
server.FileServerAddress=2001:420:5446:2006::224:19
```



## CHAPTER 12

# Setup Authentication via TACACS+ Server

- [Setup SSH Authentication via TACACS+ Server, on page 143](#)

## Setup SSH Authentication via TACACS+ Server

From Release 11.5(1), DCNM provides **appmgr** command to set up authentication for ssh access via TACACS+. For SSH access to DCNM, the credentials are sent to previously configured TACACS+ server, to determine if access is allowed. In case of success, SSH access to DCNM is allowed. When the TACACS+ server is not reachable, the system reverts to local authentication.

DCNM permits SSH access for the following three users—**sysadmin**, **poap**, **root**. The **sysadmin** user has general SSH access to DCNM. SSH access to the **root** user is disabled by default. However, the DCNM Primary and Secondary servers communicate with each other through SSH, using the **root** user with passwordless access, for Native HA setup and maintenance. The **poap** user is employed for SSH/SCP access of information between the DCNM and NX-OS switches. This is typically used for functions such as POAP, and Image management. When you enable TACACS+ authentication for SSH access on the DCNM, you must create three users (**sysadmin**, **poap**, **root**) on the Remote AAA server, and enable TACACS+. Later, any SSH access to the DCNM is authenticated and the TACACS+ server audit logs track all SSH access to DCNM.

Remote authentication is supported only for SSH sessions. The **su** command always uses local authentication. Log in from DCNM console always uses local authentication, to prevent users from system lock-out.



---

**Note** For a DCNM Setup in Cluster mode, you must enable and configure remote authentication on all nodes, namely, Primary, Secondary, and all Compute nodes.

---

### Removing Remote Authentication

To remove remote authentication, use the following command:

```
appmgr remote-auth set none
```



---

**Note** The **appmgr remote-auth set** command always replaces the old configuration with the new one.

---

## Configuring Remote Authentication using TACACS+

To configure remote authentication using TACACS+, use the following command:

```
appmgr remote-auth set tacacs [auth {pap | chap | ascii }] {server <address> <secret> }
```

Where,

- **auth** defines the Authentication type. If omitted, the default is PAP. ASCII and MSCHAP are also supported.
- **address** is the address of a server. The server address can be hostname, IPv4 address or IPv6 address format. You can also specify a port number. For example: **my.tac.server.com:2049**

The IPv6 address must a fully qualified IPv6 format as per RFC2732. The IPv6 address must be enclosed in [ ] or the feature won't function properly.

For example:

- [2001:420:1201:2::a] – *correct*
- 2001:420:1201:2::a – *incorrect*
- **secret** is the secret shared between DCNM and the TACACS+ server. Secrets with spaces aren't allowed/supported.

## Enabling or Disabling Remote Authentication

To enable or disable remote authentication, use the following command.

```
appmgr remote-auth { enable | disable }
```

## Viewing Remote Authentication Password

To view the remote authentication password, use the following command:

```
appmgr remote-auth show
```

Sample output:

```
dcnm# appmgr remote-auth show
Remote Authentication is DISABLED

dcnm# appmgr remote-auth show
Remote Authentication is ENABLED
Protocol: tacacs+
Server: 172.28.11.77, secret: *****
Authentication type: ascii
dcnm#
```

By default, shared secrets aren't displayed in clear-text unless [-S or --show-secret] keyword is used.

## Examples

1. Configure and enable 172.28.11.77 as remote authentication server with cisco123 as shared secret.

```
dcnm# appmgr remote-auth set tacacs server 172.28.11.77 cisco123
dcnm# appmgr remote-auth enable
```

2. Configure 172.28.11.77 as remote authentication server with cisco 123 as share secret using MSCHAP as authentication type.



```
dcnm# appmgr remote-auth set tacacs auth mschap 172.28.11.77 cisco123
dcnm# appmgr remote-auth enable
```

3. Configure three servers with different shared secrets.

```
dcnm# appmgr remote-auth set tacacs server tac1.cisco.com:2049 cisco123 server
tac2.cisco.com Cisco_123 server tac3.cisco.com Cisco_123
dcnm# appmgr remote-auth enable
```

4. Disable and removes authentication configuration.

```
dcnm# appmgr remote-auth set tacacs none
```

5. Disable remote-authentication without removing the configuration.

```
dcnm# appmgr remote-auth disable
```

6. Enable current remote-authentication configuration.

```
dcnm# appmgr remote-auth enable
```

### Remote authentication & POAP

When remote authentication is enabled, the local password of **poap** user must be the same as the password on TACACS server; POAP fails otherwise.

To synchronize local poap password, after setting or changing the password on the TACACS server, use the following command:

```
appmgr change_pwd ssh poap
```

In Cisco DCNM Native HA setup, execute this command on the Primary node only.

### Remote authentication in DCNM Native HA setup

For scenarios in which a standalone DCNM needs to be converted to a native HA setup, ensure that remote authentication if enabled, should be disabled prior to adding a secondary HA node, and before running **appmgr update ssh-peer-trust** command.





## CHAPTER 13

# Installing Software Maintenance Update

- [Software Maintenance Update \(SMU\) version 11.5\(2\) on Cisco DCNM 11.5\(1\)](#), on page 147

## Software Maintenance Update (SMU) version 11.5(2) on Cisco DCNM 11.5(1)

Cisco DCNM Release 11.5(2) offers a Software Maintenance Update (SMU) that can be applied only on top of the DCNM Release 11.5(1) for the OVA/ISO/Appliance form factor. DCNM Release 11.5(2) also offers Cisco SAN Deployment on Windows and Linux.

Install the SMU for SAN OVA/ISO only if you've deployed IBM SAN16C-R 8977-R16 in your network. For all other supported hardware, we recommend that you deploy Cisco DCNM Release 11.5(1).



---

**Note** SMU version 11.5(2) is supported with Cisco DCNM Release 11.5(1) only.

---



---

**Note** Only a **root** user must install the SMU version 11.5(2) on Cisco DCNM Release 11.5(1).

---

For information about SMU version 11.5(2), refer to [Cisco DCNM Release Notes, Release 11.5\(2\)](#).

## Installing SMU version 11.5(2) on Cisco DCNM 11.5(1)

Cisco DCNM SAN Deployment using Windows and Linux installers supports IBM Switch (IBM SAN16C-R 8977-R16). To enable this support with DCNM SAN OVA/ISO deployment, install Software Maintenance Update (SMU) version 11.5(2) on the base installation of Cisco DCNM Release 11.5(1). For all other supported hardware, we recommend that you deploy Cisco DCNM Release 11.5(1).

To apply the Software Maintenance Update (SMU) on Cisco DCNM SAN OVA/ISO installation in Standalone deployment mode, perform the following steps:

### Before you begin

- Ensure that Cisco DCNM 11.5.(1) appliance is operational.

- Take a backup of the application data using the **appmgr backup** command.

```
dcnm# appmgr backup
```

Copy the backup file to a safe location outside the DCNM server.

- If Cisco DCNM appliance is installed in VMware environment, ensure that you take a snapshot of the virtual machine. For instructions, refer to [VMware Snapshot Support for Cisco DCNM](#).
- Ensure that you plan for a maintenance window to install SMU version 11.5(2).

## Procedure

---

### Step 1

Download the SMU file.

- Go to the following site: <http://software.cisco.com/download/>.

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

- In the Latest Releases list, choose Release 11.5(2).
- Locate **DCNM 11.5(2) Maintenance Update for VMWare, KVM, Bare-metal, and Appliance servers** file, and click **Download** icon.
- Save the **dcnm-va-patch.11.5.2.iso.zip** file to your directory that is easy to find when you start to apply the SMU.

### Step 2

Unzip the **dcnm-va-patch.11.5.2.iso.zip** file and upload the file to the **/root/** folder of the DCNM setup.

### Step 3

Log on to the Cisco DCNM appliance using SSH as a **sysadmin** user.

Run the **su** command to enable **root** user.

```
dcnm# su
Enter the root password:
[root@dcnm]#
```

### Step 4

Run the following command to create a screen session.

```
[root@dcnm]# screen
```

This creates a session which allows you to execute the commands. The commands continue to run even when the window is not visible or if you get disconnected.

### Step 5

Create a folder named **iso** using the **mkdir -p /mnt/iso** command.

```
[root@dcnm]# mkdir -p /mnt/iso
```

### Step 6

Mount the DCNM SMU version 11.5(2) file in the **/mnt/iso** folder.

```
[root@dcnm]# mount -o loop dcnm-va-patch.11.5.2.iso /mnt/iso
```

### Step 7

Navigate to **/scripts/** directory.

```
[root@dcnm]# cd /mnt/iso/packaged-files/scripts/
```

### Step 8

Run the **./inline-upgrade.sh** script.

```
[root@dcnm]# ./inline-upgrade.sh
```

**Note** After the SMU is installed successfully, the DCNM process restarts. This results in a momentary loss of access to the DCNM Web UI.

**Step 9** Ensure the DCNM application is functional, by using the **appmgr status all** command.

```
[root@dcnm]# appmgr status all
```

**Step 10** Terminate the **screen** session, by using the **exit** command.

```
[root@dcnm]# exit
```

**Step 11** Unmount the **dcnm-va-patch.11.5.2.iso** file from the DCNM setup.

**Note** You must terminate the **screen** session before unmounting the SMU file.

```
[root@dcnm]# umount /mnt/iso
```

---

### What to do next

Log on to the DCNM Web UI with appropriate credentials. The version shows 11.5(2) on the login screen.



---

**Note** If you try to install the maintenance update again, a note appears stating that the patch is already applied on the Cisco DCNM.

---





## CHAPTER 14

# Installing Software Maintenance Update for log4j2 Vulnerability

---

- [Installing Software Maintenance Update on Cisco DCNM Windows and Linux Deployment](#), on page 151
- [Installing Software Maintenance Update on Cisco DCNM OVA/ISO Deployment](#), on page 154

## Installing Software Maintenance Update on Cisco DCNM Windows and Linux Deployment

This section provides instructions to install Software Maintenance Update (SMU) on Cisco Windows and Linux deployments Release 11.5(1) to address **CVE-2021-45046** and **CVE-2021-44228** issue. Note that **CVE-2021-45105** has a lower severity and not used in DCNM with default configuration, and therefore it is not addressed here.



---

**Note** Only a **root** or **admin** user can install the SMU on the Cisco DCNM setup.

---

This section contains the following topics:

### Installing the SMU on Cisco DCNM Windows Appliance

To install the SMU on Cisco DCNM Windows appliance, perform the following:

#### Before you begin

- Take a backup of the Cisco DCNM application. Copy the backup file to a safe location outside the DCNM server.
- If Cisco DCNM appliance is installed in VMware environment, ensure that you take VM snapshots for all nodes. For instructions, refer to *VMware Snapshot Support* section in your [Cisco DCNM Release Notes](#).
- Ensure that you plan for a maintenance window to install SMU.
- Ensure that Cisco DCNM 11.5(1) is up and running.




---

**Note** Only a **root** user can install the SMU on the Cisco DCNM Release 11.5(1) appliance

---

## Procedure

---

### Step 1

Download the SMU file.

a) Go to the following site: <https://software.cisco.com/download/>.

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

b) In the Latest Releases list, choose Release 11.5(1).

c) Locate **DCNM 11.5(1) Maintenance Update for Windows and Linux Servers to address CVE-2021-45046 and CVE-2021-44228** and click Download icon.

Save the `dcnm-win-linux-patch.11.5.1.zip` file to your directory that is easy to find when you start to apply the maintenance update (patch).

### Step 2

Upload the file to the `C:\Users\\Desktop\` folder in the DCNM setup.

### Step 3

Log on to Cisco DCNM using SSH as a **Administrator** user.

### Step 4

Unzip the `dcnm-win-linux-patch.11.5.1.zip` file in `c:\Users\\Desktop\` directory.

### Step 5

Open **Command prompt** and run as **Administrator**.

### Step 6

Change directory to `/patch` using `c:\Users\\Desktop\patch` command.

### Step 7

Apply the patch.

```
c:\Users\\Desktop\patch> patch.bat
Enter DCNM root directory [C:\Program Files\Cisco Systems\dcn]:
c:\Users\\Desktop\patch

"Backing up dcm.ear ..."
 1 file(s) copied.
 1 file(s) copied.

"Stopping DCNM service..."
The Cisco DCNM SAN Server service was stopped successfully.

Waiting for 0 seconds, press CTRL+C to quit ...

"Applying patch..."
Initializing, please wait...
Patching DCNM server, please wait...

"Stopping Elasticsearch..."
The Elasticsearch 6.8.3 (elasticsearch-service-x64-683) service is stopping..
The Elasticsearch 6.8.3 (elasticsearch-service-x64-683) service was stopped successfully.

Waiting for 0 seconds, press CTRL+C to quit ...
 1 file(s) copied.
 1 file(s) copied.
 1 file(s) copied.

"Starting Elasticsearch..."
The Elasticsearch 6.8.3 (elasticsearch-service-x64-683) service is starting..
```



```
The Elasticsearch 6.8.3 (elasticsearch-service-x64-683) service was started successfully.

Waiting for 0 seconds, press CTRL+C to quit ...

"Starting DCNM server..."
The Cisco DCNM SAN Server service is starting.
The Cisco DCNM SAN Server service was started successfully.
```

---

## Installing the SMU on Cisco DCNM Linux Appliance

To install the SMU on Cisco DCNM Linux appliance, perform the following:

### Before you begin

- Take a backup of the Cisco DCNM application. Copy the backup file to a safe location outside the DCNM server.
- If Cisco DCNM appliance is installed in VMware environment, ensure that you take VM snapshots for all nodes. For instructions, refer to *VMware Snapshot Support* section in your [Cisco DCNM Release Notes](#).
- Ensure that you plan for a maintenance window to install SMU.
- Ensure that Cisco DCNM 11.5(1) is up and running.



---

**Note** Only a **root** user can install the SMU on the Cisco DCNM Release 11.5(1) appliance

---

### Procedure

---

- Step 1** Download the SMU file.
- a) Go to the following site: <https://software.cisco.com/download/>.  
A list of the latest release software for Cisco DCNM available for download is displayed.
  - b) In the Latest Releases list, choose Release 11.5(1).
  - c) Locate **DCNM 11.5(1) Maintenance Update for Windows and Linux Servers to address CVE-2021-45046 and CVE-2021-44228** and click Download icon.

Save the `dcnm-win-linux-patch.11.5.1.zip` file to your directory that is easy to find when you start to apply the maintenance update (patch).

- Step 2** Upload the file to the `/root/` folder in the DCNM setup.
- Step 3** Log on to Cisco DCNM using SSH as a **root** user.
- Step 4** Unzip the `dcnm-win-linux-patch.11.5.1.zip` file in `/root/` directory.
- Step 5** Change directory to `/patch`.

```
[root@dcnm]# cd patch
```

**Step 6** Apply the patch.

```
[root@dcnm]# ./patch.sh
Please enter DCNM install directory. Press Enter to select default.
[Default:/usr/local/cisco/dcm]:
DCNM Home Dir: /usr/local/cisco/dcm
Backing up dcm.ear and SanAnalytics.war...
Stopping DCNM service...
Stopping FMServer (via systemctl): [OK]
Applying patch...
Patching ear file, please wait...
Patching war file, please wait...
Stopping Elasticsearch...
Stopping elasticsearch (via systemctl): [OK]
Starting Elasticsearch...
Starting elasticsearch (via systemctl): [OK]
Starting DCNM server...
Starting FMServer (via systemctl): [OK]
```

## Installing Software Maintenance Update on Cisco DCNM OVA/ISO Deployment

Cisco DCNM provides a Software Maintenance Update (SMU) to address the **CVE-2021-45046** and **CVE-2021-44228** issue in Release 11.5(x). This SMU installation is supported with Release 11.5(1), 11.5(2), and 11.5(3) for your deployment.

This section contains the following topics:

### Installing SMU on Cisco DCNM 11.5(x) Standalone Deployment

This section provides instructions to install Software Maintenance Update (SMU) on Cisco DCNM OVA/ISO appliance to address **CVE-2021-45046** and **CVE-2021-44228** issue. Note that CVE-2021-45105 has a lower severity and not used in DCNM with default configuration, and therefore it is not addressed here.

To apply the Software Maintenance Update (SMU) on Cisco DCNM OVA/ISO in Standalone deployment mode, perform the following steps:

#### Before you begin

- Take a backup of the application data using the **appmgr backup** command on the DCNM appliance.  

```
dcnm# appmgr backup
```

Copy the backup file to a safe location outside the DCNM server.
- If Cisco DCNM appliance is installed in VMware environment, ensure that you take VM snapshots for all nodes. For instructions, refer to *VMware Snapshot Support* section in your [Cisco DCNM Release Notes](#).
- Ensure that you plan for a maintenance window to install SMU.
- Ensure that Cisco DCNM 11.5(x) is up and running.

This SMU installation is supported with Release 11.5(1), 11.5(2), and 11.5(3) for your deployment.



---

**Note** Only a **root** user can install the SMU on the Cisco DCNM Release 11.5(x) appliance

---

## Procedure

---

- Step 1** Download the SMU file.
- Go to the following site: <https://software.cisco.com/download/>.  
A list of the latest release software for Cisco DCNM available for download is displayed.
  - In the Latest Releases list, choose Release 11.5(x).  
This SMU installation is supported with Release 11.5(1), 11.5(2), and 11.5(3) for your deployment.
  - Locate **DCNM 11.5.x Maintenance Update for VMWare, KVM, Bare-metal, and Appliance servers to address log4j2 CVE-2021-45046 and CVE-2021-44228** file and click **Download** icon.
  - Save the **dcnm-va-patch.11.5.x-p1.iso.zip** file to your directory that is easy to find when you start to apply the SMU.
- Step 2** Unzip the **dcnm-va-patch.11.5.x-p1.iso.zip** file and upload the file to the `/root/` folder in the DCNM node.
- Step 3** Log on to the Cisco DCNM appliance using SSH as a **sysadmin** user.
- Run the **su** command to enable **root** user.
- ```
dcnm# su
Enter the root password:
[root@dcnm]#
```
- Step 4** Run the following command to create a screen session.
- ```
[root@dcnm]# screen
```
- This creates a session which allows you to execute the commands. The commands continue to run even when the window is not visible or if you get disconnected.
- Step 5** Create a folder named **iso** using the **mkdir /mnt/iso** command.
- ```
[root@dcnm1]# mkdir -p /mnt/iso
```
- Step 6** Mount the DCNM 11.5(x) SMU file in the `/mnt/iso` folder.
- ```
[root@dcnm]# mount -o loop dcnm-va-patch.11.5.x-p1.iso /mnt/iso
```
- Step 7** Navigate to `/scripts/` directory.
- ```
[root@dcnm]# cd /mnt/iso/packaged-files/scripts/
```
- Step 8** Run the `./inline-upgrade.sh` script.
- ```
[root@dcnm]# ./inline-upgrade.sh
```
- The progress is displayed on the screen. When the installation of SMU is complete, a successful message appears.

**Note** After the SMU is installed successfully, the DCNM process restarts. This results in a momentary loss of access to the DCNM Web UI.

**Step 9** Ensure the DCNM application is functional, by using the **appmgr status all** command.

```
[root@dcnm]# appmgr status all
```

**Step 10** Terminate the **screen** session, by using the **exit** command.

```
[root@dcnm]# exit
```

**Step 11** Unmount the **dcnm-va-patch.11.5.x-p1.iso** file from the DCNM setup.

**Note** You must terminate the **screen** session before unmounting the SMU file.

```
[root@dcnm]# umount /mnt/iso
```

## Sample Output of Commands to address Log4j vulnerability

The following is a sample output while installing the SMU on Cisco DCNM Release 11.5(x).

This SMU installation is supported with Release 11.5(1), 11.5(2), and 11.5(3) for your deployment.

### Sample Output to Install SMU in DCNM Standalone Deployment

This SMU installation is supported with Release 11.5(1), 11.5(2), and 11.5(3) for your deployment.

```
[root@dcnm]# ./inline-upgrade.sh
```

```
=====
===== Inline Upgrade to DCNM 11.5(x)-p1 =====
=====
```

```
Upgrading from version: 11.5(x)
Upgrading from install option: LAN Fabric
System type: Standalone
Compute only: No
```

```
Do you want to continue and perform the inline upgrade to 11.5(x)-p1? [y/n]: y
```

```
==== Fri Dec 17 11:26:51 PST 2021 - Task checkAfwStatus started ====
==== Fri Dec 17 11:26:51 PST 2021 - Task checkAfwStatus finished ====
==== Fri Dec 17 11:26:51 PST 2021 - Task updateAfwApps started ====
==== Fri Dec 17 11:26:51 PST 2021 - Updating AFW applications ====
Pausing Services that need to be patched
```

```
Deleted Containers:
```

```
992d06574c57882cf1a86bf7c19414055c6f501073a262b9e97cee0a75718a55
324f8ecfc34223f9d71abb86a807af54a720b40121aa8f38f6aa2dccbc233071
f7fe8656838af352d0d128163b1e9e4dcca9e5b73ea3a0956e4199e867f69a34
ab0f0dd90b98dacca8e01c944c6b07390bad8cd8247cf8cdf7629503bd01d252
52d0d5ad7edf990424b43c57d95ba836191fa913e556e6c1b75a65f171de6be6
4daf92fd8ba5445a81913df573343c0d6617b436330d103b8abf631a477c9b91
786768ab289596fbfb3904b1115a14717057bc83a06e555aa1abb76abb4c3a9e
1f5f52c42e532b4be9cfff0eb22844824d969c6838436b98251236efdf4f85f57
b780eff0776d9dfa752ef28446dcafffccfffac6ac20a2b41738ac23e6d060ed3
756097c7bd5028ee5eafc74c7fb90eae20104b1584f2611ea1b3089340d0011c
```

```
Total reclaimed space: 1.418MB
pauseAfwApp: calling PUT with {pause}
```

```

pauseAfwApp: value of Wait: false

HTTP/1.1 200 OK
Date : Fri, 17 Dec 2021 19:26:52 GMT
Content-Length : 99
Content-Type : text/plain; charset=utf-8
{
 "ResponseType": 0,
 "Response": "Application is Paused for elasticsearch_Cisco_afw. Check for status"
}
pauseAfwApp: calling PUT with {pause}
pauseAfwApp: value of Wait: false

HTTP/1.1 200 OK
Content-Length : 96
Content-Type : text/plain; charset=utf-8
Date : Fri, 17 Dec 2021 19:27:12 GMT
{
 "ResponseType": 0,
 "Response": "Application is Paused for watchtower_Cisco_afw. Check for status"
}
pauseAfwApp: calling PUT with {pause}
pauseAfwApp: value of Wait: false

HTTP/1.1 200 OK
Date : Fri, 17 Dec 2021 19:27:32 GMT
Content-Length : 91
Content-Type : text/plain; charset=utf-8
{
 "ResponseType": 0,
 "Response": "Application is Paused for eplui_Cisco_afw. Check for status"
}
pauseAfwApp: calling PUT with {pause}
pauseAfwApp: value of Wait: false

HTTP/1.1 200 OK
Date : Fri, 17 Dec 2021 19:27:52 GMT
Content-Length : 100
Content-Type : text/plain; charset=utf-8
{
 "ResponseType": 0,
 "Response": "Application is Paused for elasticsearch_Cisco_afw. Check for status"
}
Now Removing Images from Runtime
Untagged: 127.0.0.1:5001/dcnmelastic:6.8.3_11.5.2
Untagged:
127.0.0.1:5001/dcnmelastic@sha256:a872d49e3b5a0fc58ec9c1e8d8908c62604258cbfb1a02ac418227ed7f928128
Untagged: 127.0.0.1:5000/dcnmelastic:6.8.3_11.5.2
Untagged:
127.0.0.1:5000/dcnmelastic@sha256:a872d49e3b5a0fc58ec9c1e8d8908c62604258cbfb1a02ac418227ed7f928128
Untagged: dcnmelastic:6.8.3_11.5.2
Deleted: sha256:0173109c0612f48ed4165de7e5fa96f2243fe48756405bd0a0b4f12279785db1
Deleted: sha256:8d0b16f607caee532685643cf21550079881b67db9edf7d54a50ba4dec673c45
Deleted: sha256:63f9d6a3667c56f4a64d986b13b0059353fb983495b34f840b6a38c63e39938c
Deleted: sha256:af6e5eed783b56a675c53698ad4d374a7722218ebf706ad9891785b4ec2a537
Deleted: sha256:37dab1fa0ee831d1979104edd0ea820a1b3de3fe818aa75200021f868b221998
Deleted: sha256:cf1569581d9385a63ebd156e15dc795ab82de8d0a27fc5a3205dac339b591ee5
Deleted: sha256:3d293d026d9a7552a3630a75500d860083763a558191e1f28ebb6344c985b09d
Deleted: sha256:b285cfcb6bcb0850c0121d404c51ef0a333380cf332b3b776e75b45a94c2e8a7
Deleted: sha256:6e43279655973e51749e6c13dbf63733802071fff665927375f9f98827857b548
Deleted: sha256:544fc6ed24eef6449d95305179600648f339c0adbcbcbf93cc4f9e402122c53
Deleted: sha256:6810a2c88653fe864294296c70a5a657caa0f638689ff58f13493acc532f5c77
Untagged: 127.0.0.1:5001/elasticsearch:1.3
Untagged:

```

## Sample Output of Commands to address Log4j vulnerability

```

127.0.0.1:5001/elasticsearch@sha256:bf0293e69d144bbf2dbd4192f59884fb596629bb6b1b09522a75bd599b2461b2
Untagged: 127.0.0.1:5000/elasticsearch:1.3
Untagged:
127.0.0.1:5000/elasticsearch@sha256:bf0293e69d144bbf2dbd4192f59884fb596629bb6b1b09522a75bd599b2461b2
Untagged: elasticsearch:1.3
Deleted: sha256:c6cd18e3bcc36ab60a3d741e8fa6ec166ec53de742cd959fbef572b2d6e75fdb
Deleted: sha256:be5892dd6be6e671d8dbf07949d2559cdd43ccc537a0cb4f18ee4b74f634238c
Deleted: sha256:e0f9a768f8fc9a173f00b6babcb017789713195b566f97470d9501bbbbb8e74
Deleted: sha256:213b03f962fe9b6df0da77ccabe174c74ccb790d084a25f7221076f45958ced9
Deleted: sha256:1ef5822648e60b2be83c8641db64375be04ecb6f5acd66a142919e14f8af3b4d
Untagged: 127.0.0.1:5001/watchtower:2.1
Untagged:
127.0.0.1:5001/watchtower@sha256:793aee652b615cd3161c8dd9c60eb89b6afd684fc89c6518f84ff71563bee99e
Untagged: 127.0.0.1:5000/watchtower:2.1
Untagged:
127.0.0.1:5000/watchtower@sha256:793aee652b615cd3161c8dd9c60eb89b6afd684fc89c6518f84ff71563bee99e
Untagged: watchtower:2.1
Deleted: sha256:b44bcfbcd001b7c85a2028e813ef6919e316d6af37732a092151639d1c3d2b45
Deleted: sha256:3d30de4d2f50296af6affe5baa20e58a91b84abab65f89cb379ac78308c47b1e
Deleted: sha256:a066f951d571bcead85b9a6530b14a7b82cca834a174c28de1bc037bb80a2edd
Deleted: sha256:cf95f9ed8314cec412869a95a1a50b7b7d04f29bbc5b8a3d149a424ca6c83e49
Untagged: 127.0.0.1:5001/eplui:2.2
Untagged:
127.0.0.1:5001/eplui@sha256:af90fd9362f9244ed03bdd13318f6123817a7be64e089c42f5094fd570ebb03d
Untagged: 127.0.0.1:5000/eplui:2.2
Untagged:
127.0.0.1:5000/eplui@sha256:af90fd9362f9244ed03bdd13318f6123817a7be64e089c42f5094fd570ebb03d
Untagged: eplui:2.2
Deleted: sha256:5cca4a674f345d289c814ae0a3f24ec9aac76937046beb4273b51cc29c4b6408
Deleted: sha256:d6886b2e02aaf7ebf7cfd0423bedffbd27905d12f81d0908d4ab02b2e9973cc1
Deleted: sha256:301f9eb3ba05164dbd29cab2c93dad24e5e1fea3cf2abd2f1585c25df6a75c34
Deleted: sha256:0af470c810372aa3ecee7f4f5b6cddb0dc857ef371d658668bb43fb2e50f2ef
Checking and starting a writable registry
Error response from daemon: no such image: AfwAppRegistry: invalid reference format:
repository name must be lowercase
f11dc4cb9677d2cb7e0fe215050f69fdbb60ed583762f3867290c8ae4a712b2a
Achieved Pause state for all services, Now Patching services
Loading Images into the writable registry
Loaded image: eplui:2.2
Loaded image: dcnmelastic:6.8.3_11.5.2
Loaded image: elasticsearch:1.3
Loaded image: watchtower:2.1
The push refers to a repository [127.0.0.1:5000/dcnmelastic]
97da84f99ba3: Preparing
a0bb674f2b12: Preparing
1d07ed4e39fa: Preparing
8d8a48fd5741: Preparing
b14eb3458281: Preparing
f13999d3b63e: Preparing
dlc75bcbeb10: Preparing
f51f8d284b3b: Preparing
617b86abcd6d: Preparing
d3071a656898: Preparing
0bcab5b3cf37: Preparing
5d50c3ca45af: Preparing
9785ac5771f5: Preparing
dlc75bcbeb10: Waiting
d3071a656898: Waiting
f51f8d284b3b: Waiting
5d50c3ca45af: Waiting
617b86abcd6d: Waiting
fbb373121c59: Preparing
7b9f72883f99: Preparing
9785ac5771f5: Waiting

```

```
fb373121c59: Waiting
5fb2dee77c93: Preparing
bc2717dd2942: Preparing
7b9f72883f99: Waiting
5fb2dee77c93: Waiting
bc2717dd2942: Waiting
0bcab5b3cf37: Waiting
1d07ed4e39fa: Pushed
97da84f99ba3: Pushed
a0bb674f2b12: Pushed
8d8a48fd5741: Pushed
b14eb3458281: Pushed
dlc75bcbeb10: Pushed
fl3999d3b63e: Pushed
f51f8d284b3b: Pushed
617b86abcd6d: Pushed
d3071a656898: Layer already exists
0bcab5b3cf37: Layer already exists
5d50c3ca45af: Layer already exists
fb373121c59: Layer already exists
9785ac5771f5: Layer already exists
7b9f72883f99: Layer already exists
5fb2dee77c93: Layer already exists
bc2717dd2942: Layer already exists
6.8.3_11.5.2: digest: sha256:0e407eefbc956a3e4c5b1705ab3add29c883e63da1b84d8e89f2345fe2fc557f
 size: 3882
The push refers to a repository [127.0.0.1:5000/elasticsearch]
e9e60715acea: Preparing
83082b3681a8: Preparing
ec805d3c2de0: Preparing
fa8a90cb6518: Preparing
5d50c3ca45af: Preparing
9785ac5771f5: Preparing
fb373121c59: Preparing
7b9f72883f99: Preparing
5fb2dee77c93: Preparing
bc2717dd2942: Preparing
fb373121c59: Waiting
7b9f72883f99: Waiting
5fb2dee77c93: Waiting
bc2717dd2942: Waiting
9785ac5771f5: Waiting
5d50c3ca45af: Layer already exists
9785ac5771f5: Layer already exists
fb373121c59: Layer already exists
fa8a90cb6518: Pushed
5fb2dee77c93: Layer already exists
bc2717dd2942: Layer already exists
e9e60715acea: Pushed
83082b3681a8: Pushed
7b9f72883f99: Layer already exists
ec805d3c2de0: Pushed
1.3: digest: sha256:ece5bb0b46547a166907f38f4958e40fd5202bf015728ea89dda2af342d28727 size:
 2422
The push refers to a repository [127.0.0.1:5000/watchtower]
7bb58c00bab0: Preparing
69c967d71211: Preparing
ea7268754985: Preparing
5d50c3ca45af: Preparing
9785ac5771f5: Preparing
fb373121c59: Preparing
7b9f72883f99: Preparing
5fb2dee77c93: Preparing
bc2717dd2942: Preparing
```

## Sample Output of Commands to address Log4j vulnerability

```

7b9f72883f99: Waiting
5fb2dee77c93: Waiting
bc2717dd2942: Waiting
fbb373121c59: Waiting
5d50c3ca45af: Layer already exists
9785ac5771f5: Layer already exists
7b9f72883f99: Layer already exists
fbb373121c59: Layer already exists
5fb2dee77c93: Layer already exists
bc2717dd2942: Layer already exists
7bb58c00bab0: Pushed
ea7268754985: Pushed
69c967d71211: Pushed
2.1: digest: sha256:2aeded0fa00d3c92c4e78a5339eb116e27b0ac5fbed36c241fd26676a6642d91 size:
 2214
The push refers to a repository [127.0.0.1:5000/eplui]
4d33a08042c4: Preparing
a6480cd96594: Preparing
53cebfe822f4: Preparing
5d50c3ca45af: Preparing
9785ac5771f5: Preparing
fbb373121c59: Preparing
7b9f72883f99: Preparing
5fb2dee77c93: Preparing
bc2717dd2942: Preparing
7b9f72883f99: Waiting
fbb373121c59: Waiting
5fb2dee77c93: Waiting
9785ac5771f5: Layer already exists
5d50c3ca45af: Layer already exists
fbb373121c59: Layer already exists
4d33a08042c4: Pushed
53cebfe822f4: Pushed
7b9f72883f99: Layer already exists
bc2717dd2942: Layer already exists
5fb2dee77c93: Layer already exists
a6480cd96594: Pushed
2.2: digest: sha256:6a6b2266bb21bbcb88cd2fc3f01c7127d2793b663026ffa88d0665eb82f8d354 size:
 2214
AfwAppRegistry
Loaded images, now unpausing services
pauseAfwApp: calling PUT with {unpause}

HTTP/1.1 200 OK
Date : Fri, 17 Dec 2021 19:30:22 GMT
Content-Length : 100
Content-Type : text/plain; charset=utf-8
{
 "ResponseType": 0,
 "Response": "Application is Running for elasticsearch_Cisco_afw. Check for status"
}
pauseAfwApp: calling PUT with {unpause}

HTTP/1.1 200 OK
Date : Fri, 17 Dec 2021 19:30:43 GMT
Content-Length : 97
Content-Type : text/plain; charset=utf-8
{
 "ResponseType": 0,
 "Response": "Application is Running for watchtower_Cisco_afw. Check for status"
}
pauseAfwApp: calling PUT with {unpause}

HTTP/1.1 200 OK

```



```

Date : Fri, 17 Dec 2021 19:31:04 GMT
Content-Length : 92
Content-Type : text/plain; charset=utf-8
{
 "ResponseType": 0,
 "Response": "Application is Running for eplui_Cisco_afw. Check for status"
}
pauseAfwApp: calling PUT with {unpause}

HTTP/1.1 200 OK
Date : Fri, 17 Dec 2021 19:31:25 GMT
Content-Length : 101
Content-Type : text/plain; charset=utf-8
{
 "ResponseType": 0,
 "Response": "Application is Running for elasticservice_Cisco_afw. Check for status"
}
Nothing to Patch in NI Base image is not installed here
==== Fri Dec 17 11:30:45 PST 2021 - Task updateAfwApps finished ====
==== Fri Dec 17 11:30:45 PST 2021 - Task disableAppsOnStandby started ====

Stopping HA apps on Standby node
Stopping AFW Applications...
Stopping AFW Server Processes
Stopping AFW Agent Processes
Stopped Application Framework...
Stopping High-Availability services: Done.

==== Fri Dec 17 11:31:45 PST 2021 - Task disableAppsOnStandby finished ====

==== Fri Dec 17 11:31:45 PST 2021 - Task stopDcnmServer started ====
==== Fri Dec 17 11:31:45 PST 2021 - Trying to upgrade your DCNM, so stopping the dcnm to
proceed... ====
Stopping FMServer (via systemctl): [OK]
==== Fri Dec 17 11:32:20 PST 2021 - Task stopDcnmServer finished ====
==== Fri Dec 17 11:32:20 PST 2021 - Task updatePackagedFiles started ====
==== Fri Dec 17 11:32:20 PST 2021 - Updating packaged-files ====
==== Fri Dec 17 11:32:20 PST 2021 - Task updatePackagedFiles finished ====
==== Fri Dec 17 11:32:20 PST 2021 - Task updateFmServer started ====
==== Fri Dec 17 11:32:20 PST 2021 - Updating FMServer ====
==== Fri Dec 17 11:32:20 PST 2021 - Backing up dcm.ear ====
==== Fri Dec 17 11:32:21 PST 2021 - Applying patch... ====
Patching ear file, please wait...
Patching war file, please wait...
==== Fri Dec 17 11:32:30 PST 2021 - Task updateFmServer finished ====
==== Fri Dec 17 11:32:30 PST 2021 - Task updatePatchList started ====
==== Fri Dec 17 11:32:30 PST 2021 - Task updatePatchList finished ====
==== Fri Dec 17 11:32:30 PST 2021 - Task startDcnmServer started ====
Started AFW Server Processes
Started AFW Agent Processes
Started applications managed by heartbeat..
Check the status using 'appmgr status all'
Starting High-Availability services: INFO: Resource is stopped
Done.

==== Fri Dec 17 11:33:23 PST 2021 - Task startDcnmServer finished ====
==== Fri Dec 17 11:33:23 PST 2021 - Task completeUpgrade started ====

Inline upgrade of this Standalone DCNM node is complete.

==== Sat Dec 17 11:33:23 PST 2021 - Task completeUpgrade finished ====

```

## Scanning for Log4j2 Vulnerabilities

Download a scanner (such as logpresso) from <https://github.com/logpresso/CVE-2021-44228-Scanner>.



### Warning

Use this utility only to scan for vulnerabilities. DO NOT use it to fix anything in the system.



### Caution

After installing the SMU, ensure that the DCNM Web UI is up and running. Also, ensure that all the processes are up and running, by using the **appmgr status all** command. Ensure that the **Applications > Compute** shows all nodes in **Joined** state.

Before running the scan again, clear the old docker images that are no longer used, by using the following command:

If **docker ps -a** shows many containers in Exited state, then first run the following:

#### **docker container prune**

WARNING! This will remove all stopped containers.

Are you sure you want to continue? [y/N] y

Deleted Containers:

```
33d2a44706663870d062b7ee8b4aba18ea94ea6fdc285b6ba1d133334f226d73
9fba3140120f7fbc41993a97d0bc6bec254ffed638da1445e3a91fb04614cba6
67d4cd575d1febdec54fe161d716334908eb18d1a9a5d053a8f21ed1e3089d8c
4b8f2463cf899341fd5a028078a3d6b98790807db1ba6f6ece13a5a0a7783749
5b066b6eb334986d0cb0442249218d8582936439f8c8b3a3c81426ab81beaac3
14b965917498dcaaaa3e586d0d65e702d884c3cef7e425e60215a192cbff9945
359ab2ca568d10c42e406fec6a6f7499637936080b0ca109e307c51ca9431532
a18a752de7208d3802989f9209893140cac404cf33dcdf5cb362ebdbbde4e04
519e0e7654ecff8601f868c2a55fd1507a9ce52d137c33c79067fe3d7f834048
03e0c0ccaa35e2b4d07c6afae90c758f3db5ea639528afcc550a26e9c1ef1b43
Total reclaimed space: 155.4MB
```

If there are no containers in Exited state, then you can directly run the **docker image prune** to clean up the old images, as follows:

#### **docker image prune -a**

WARNING! This will remove all images without at least one container associated to them.

Are you sure you want to continue? [y/N] y

Deleted Images:

```
untagged: 127.0.0.1:5001/eplui:2.1
untagged:
127.0.0.1:5001/eplui@sha256:6b788e837561f5b56378d9872885abd078105b6e18f17f8b28ff7d58106288ed
deleted: sha256:9a9bb56bcf9e5807e25743522e7cc3b7946ca39b875418b5f85894b383443276
deleted: sha256:d09c3547766a3130d2e48d85d5c33304fd912abbcc0fd8f6d877ca4a5a7513d8
deleted: sha256:19acc971e6674459c817bd011ed8e5969bc4f47f3f733fe9ffb617227d5081e0
deleted: sha256:5f5a7996ee7ba7d79772caa9a24f95cceb8463bab030c7ed8f534b14eda099db
untagged: 127.0.0.1:5001/elasticsearch:1.1
untagged:
127.0.0.1:5001/elasticsearch@sha256:b7b7a082aa225301e92c55ab93647a7f4e5b49e28152733075995a6b237aa798
deleted: sha256:f9078f534739f1367d9a67187f14f4c32cc9fc904c8fd6579564c848b06f9185
deleted: sha256:f0e44e2f9afc9e180056d5bc6fceed743c2d2e4936a71ae8feb2c5e317ccea25
deleted: sha256:0cab6e9119a4779b58e3f8a2ab48ec892db599ca53a784a63ed2d03aa422a87e
deleted: sha256:60546313de31095f5363f479ea12b74ff02375f96cb5ab5ba23e85027f3be2c4
deleted: sha256:c9d22e3ec2ce60122c9da1d8e8bafb18dd9b61db39c3e8e8ad70be6ec907c48c
untagged: dcnmelastic:6.8.3_11.4.1
deleted: sha256:9e6493318e1189b662683cb288532e9b3177464684e9c17f06ebcd1a6bd3c317
deleted: sha256:f1b3c86a97ad0767ffcc89c31b73d34643a2bb838e317c82f00167bb8cfeb270e
deleted: sha256:19c89e64341aff41ec5508ebb2b73107fee9581d71d78b0787279817dd14facc
```

```

deleted: sha256:907f6e93fa619661d70a65dc3fd12d0257e3d7afb0ced3961620fa419c5dd792
deleted: sha256:044e562105291191158e417ae9d33dd16022a881562114a970d1fad116e8e5a
deleted: sha256:48c418ce6e32de81f4171ae073e79b04b3c227afe5f4013e6a0bd5932eee3853
deleted: sha256:7b6c7e6083bfff94f1b9acd4f83acec0f4cdc0685efda47fb6a9735fb0c3ec65
deleted: sha256:59908c99dea86854472cb0d7b64236e4a903f815d652845f56ec30204a12f550
deleted: sha256:11124a752156a4ec945d79172f11be3f025c96f1989886dff9b0b3608303dc3e
untagged: kibana:2.0
deleted: sha256:ea95ed7a67f68301e64e46653af6864cb6e18e496e725432505595936b560f26
deleted: sha256:b153b99c46885f4cd2b05173f1b5481bda9f10c39130e5cbb38b7cd18884508
deleted: sha256:02033d4e0a299ba71df33ceaff68959d74d4a62fc0be69b689a01e6322f8e64c
deleted: sha256:9ed6d76808f43ff63909ba38cdda9430109b4848c4cb5b7e8db63e9a9f5e9f7e
deleted: sha256:c4ca19d8d6603e6020c28b9eefba5fe056bab61099a7c15a1b0793281601ea54
deleted: sha256:eac1498f3113436c89751c285e6d52c13edfa05810abce2dc042c9750f4b64b6
deleted: sha256:5f265142267b87373fafa5ccff18c1d7f2c7ce8b25ad870263dba4a9ff3a8540
deleted: sha256:f98eb78bb8712f2786ef0580037d916d4ff0d3bf398900f093c94301cad4d705
deleted: sha256:6262d3d4d32bb0a107cfac0c58c563426fdc657116c903e36334a452a4818d68
deleted: sha256:045f4e8b3ed31fb7d27aa34e59cfd2e8aa5b24d9cde5b84de18635a5b7f3765
deleted: sha256:af643141c457d060c8c88f4b3901d8404bab5b93abdcbal5050666de50765e2
untagged: watchtower:2.1
deleted: sha256:0a54bd9e96a8483fdb76042b7906909aa1f3fd4deb513a5a7194a8aaf86af7dc
deleted: sha256:f8f11cb198e25e36212a5650d5b8fbcc9f4a515afe91e6d4e678d71c60d6040d
deleted: sha256:224ec704095b7d5d185a405f0e468bc015d6cb9c50cd3ab4ca9de092763ddc5a
deleted: sha256:45268517a253b8f483eedfa7f9f2641361d3f40d5e6f235f179ee3f583ebfc38
untagged: compliance:4.0.0
deleted: sha256:d6750c132fb5e9059f86d0d6b1f54bebd0f00d0b84ab9688813526bd63c6ced8
deleted: sha256:4d10e42b5db7aafabef673b889c6916e79c9f1cf6a5411304b02e158dfac0cbc
deleted: sha256:7ffadb4dd9f304c2d5314f66461d351622fe72e6c2a043942e0cd7fcc8aa2b66
deleted: sha256:516e697bbb7ff9ec971280964b9383fa22cc72ced415362720903ad5281c0852
deleted: sha256:0ef534a6e063d02b7bc5f1ff0a0053478502a8bc76f88cd2ddd58b8225c80a4
deleted: sha256:4a7f56d08ea1e6fcdad2d9fd2b37c85eee0e963c9d8c6275997a4028171a15c07
deleted: sha256:544c874de2ace981da4bd06ee33cd8a00d03059b598cc4a02fc4ab9b57610133
deleted: sha256:5f0a9421371e6f218eaf9788eccfc987d40cc7c66291536465f271cf0abdcd04
deleted: sha256:c1968f6e62beccbad147b8f8d0a239b4d308133ee0bc77cd4ee9cfc941f29e50
deleted: sha256:aa9e87a76c7b54bb7dba91db45a84a23542bf647751fe1211764f1395f97ec6f
Total reclaimed space: 794.1MB

```

After that, the log4j scanner tool can be run. A sample post patch run output is depicted below:

### CLI snap of a sample result - CVE-2021-44228 Vulnerability Scanner 2.3.6 (2021-12-20)

```

[root@dcnm]# ./log4j2-scan /
Logpresso CVE-2021-44228 Vulnerability Scanner 2.3.6 (2021-12-20)
Scanning directory: /, ./log4j2-scan, / (without devtmpfs, tmpfs, shm)
Running scan (10s): scanned 4653 directories, 41925 files, last visit:
/usr/local/cisco/dcm/fm/download
[*] Found CVE-2021-45105 (log4j 2.x) vulnerability in
/usr/local/cisco/dcm/wildfly-14.0.1.Final/standalone/sandeployments/dcm.ear
(lib/log4j-core-2.16.0.jar), log4j 2.16.0
Running scan (26s): scanned 6980 directories, 62226 files, last visit:
/usr/local/cisco/dcm/wildfly-14.0.1.Final/standalone/sandeployments
[*] Found CVE-2021-45105 (log4j 2.x) vulnerability in
/usr/local/cisco/dcm/wildfly-14.0.1.Final/standalone/tmpfs/depoyent/depoyent84889c30at/log4j-core-2.16.0.jar-f0e55fd46297f/log4j-core-2.16.0.jar,
log4j 2.16.0
Running scan (36s): scanned 9856 directories, 90359 files, last visit:
/usr/local/cisco/dcm/wildfly-14.0.1.Final/modules/system/layers/base/org/infinispan/main
[*] Found CVE-2021-45105 (log4j 2.x) vulnerability in
/root/patched-files/pmn/pmn-telemetry.jar, log4j 2.16.0
[*] Found CVE-2021-44228 (log4j 2.x) vulnerability in /root/patch-11.4.1-p2.backup/dcm.ear
(lib/log4j-core-2.8.2.jar), log4j 2.8.2
Running scan (52s): scanned 24714 directories, 141807 files, last visit:
/root/patch-11.4.1-p2.backup
[*] Found CVE-2021-45105 (log4j 2.x) vulnerability in
/tmp/.inline-upgrade.16121/fmserver-patch/log4j-core-2.16.0.jar, log4j 2.16.0
[*] Found CVE-2021-45105 (log4j 2.x) vulnerability in
/tmp/.inline-upgrade.16121/fmserver-patch/dcm.ear (lib/log4j-core-2.16.0.jar), log4j 2.16.0

```

```

Running scan (62s): scanned 30813 directories, 183000 files, last visit:
/usr/share/elasticsearch/modules/lang-groovy
Running scan (72s): scanned 34709 directories, 216946 files, last visit:
/usr/local/cisco/dcm/smis/client/lib
[*] Found CVE-2021-45105 (log4j 2.x) vulnerability in
/usr/local/cisco/dcm/wildfly-14.0.1.Final/standalone/sandeployments/dcm.ear
(lib/log4j-core-2.16.0.jar), log4j 2.16.0
Running scan (88s): scanned 36975 directories, 231284 files, last visit:
/usr/local/cisco/dcm/wildfly-14.0.1.Final/standalone/sandeployments
[*] Found CVE-2021-45105 (log4j 2.x) vulnerability in
/usr/local/cisco/dcm/wildfly-14.0.1.Final/standalone/tmp/dfs/deployer/deployments/148896330ct/log4j-core-2.16.0.jar-f0655d16299f/log4j-core-2.16.0.jar,
log4j 2.16.0
Running scan (98s): scanned 39835 directories, 259398 files, last visit:
/usr/local/cisco/dcm/wildfly-14.0.1.Final/modules/system/layers/base/org/bouncycastle/main
[*] Found CVE-2021-45105 (log4j 2.x) vulnerability in
/root/packaged-files/pmn/pmn-telemetry.jar, log4j 2.16.0
[*] Found CVE-2021-44228 (log4j 2.x) vulnerability in /root/patch-11.4.1-p2.backup/dcm.ear
(lib/log4j-core-2.8.2.jar), log4j 2.8.2
Running scan (114s): scanned 54709 directories, 310865 files, last visit:
/root/patch-11.4.1-p2.backup
[*] Found CVE-2021-45105 (log4j 2.x) vulnerability in
/tmp/.inline-upgrade.16121/fmserver-patch/log4j-core-2.16.0.jar, log4j 2.16.0
[*] Found CVE-2021-45105 (log4j 2.x) vulnerability in
/tmp/.inline-upgrade.16121/fmserver-patch/dcm.ear (lib/log4j-core-2.16.0.jar), log4j 2.16.0
Scanned 59990 directories and 338115 files
Found 12 vulnerable files
Found 0 potentially vulnerable files
Found 0 mitigated files
Completed in 124.16 seconds

```




---

**Note** Installing SMU on Cisco DCNM addresses CVE-2021-44228 and CVE-2021-45046. As CVE-2021-45105 is lower severity, and refers to an issue with a configuration which is not used in Cisco DCNM with the default shipping configuration. Therefore, CVE-2021-45105 is not addressed in this SMU installation.

---

The backup contains original unaltered files which are still vulnerable. They are not used, but are retained as a reference. If you choose to delete, no functionality will be impacted. There are few files which are inside of container filesystem layers. These files record the changes to the container filesystems and are not a concern until they do not appear in the “merged” container files. These files are not available to processes at run-time. There are no vulnerable files in the merged resultant container filesystems.

This SMU installation is supported with Release 11.5(1), 11.5(2), and 11.5(3) for your deployment.

Refer to [Upgrading DCNM Release 11.5\(x\) from Previous Versions, on page 165](#) for instructions to install SMU on other DCNM releases. You can upgrade to DCNM Releases through multiple hops from Release 11.0 or later. The log4j2 scanner flags few stale docker/overlay related file system issues. Ensure that you validate the SMU installation. For more information, see [Validating of SMU Installation, on page 165](#).




---

**Note** After DCNM HA failover, the log4j2 scan may show some vulnerabilities. This is due to the old docker image package bundle in the Standby server, which is not available for use at run-time for any process. If the CVE reports are still seen, execute the **docker image prune -a** command. This results in clearing the stale entries on the Standby node. After clearing stale entries, there will be no issues during further DCNM HA failovers. If the scan report still shows some CVE errors, we recommend that you contact Cisco TAC.

---

## Validating of SMU Installation

This SMU installation is supported with Release 11.5(1), 11.5(2), and 11.5(3) for your deployment.

To validate that the patch has been successfully applied on Cisco DCNM appliances, check the contents of the file located at `/root/package-files/properties/dcnm-version.txt`. If the patch is successfully applied, an extra line is included in the `dcnm-version.txt` as shown below:

```
PATCH_LIST=X
```

where,

**X** is the number of patches installed on your Cisco DCNM appliance.




---

**Note** After the SMU is installed, the **Health Monitor** application (previously known as **Watchtower**) will not display any old or new data.

---

## Upgrading DCNM Release 11.5(x) from Previous Versions

When upgrading from an older DCNM 11.x version to 11.5(x) or higher, post upgrade and patch application, the log4j scanner may show more vulnerabilities related to findings in the `/var/lib/docker/overlay` file system. A sample output of a system upgraded from DCNM 11.2(1) to 11.5(1) is shown below after installing the SMU. The sample output shows multiple vulnerabilities all in the `docker/overlay` file system. The two vulnerabilities seen for `docker/overlay2` filesystem for `elasticsearch` doesn't cause any issues.

This SMU installation is supported with Release 11.5(1), 11.5(2), and 11.5(3) for your deployment.

```
./log4j2-scan /
Logpresso CVE-2021-44228 Vulnerability Scanner 2.2.0 (2021-12-18)
Scanning directory: / (without devtmpfs, tmpfs, shm)
[*] Found CVE-2021-44228 (log4j 2.x) vulnerability in
/var/lib/docker/overlay/2a7db7cebfc3ac7ca67206122b55e813ea19801593c433b5fd730c69d0a1b69/root/
usr/share/elasticsearch/lib/log4j-core-2.9.1.jar, log4j 2.9.1
[*] Found CVE-2021-44228 (log4j 2.x) vulnerability in /var/lib/docker/overlay/2811b1325950ad4c
438cdd1b2631adb0a1adfa0b49e474279f3499cfd2e49ad3/root/usr/share/elasticsearch/lib/log4j-core-2.9.1.jar,
log4j 2.9.1
[*] Found CVE-2021-44228 (log4j 2.x) vulnerability in
/var/lib/docker/overlay/8b6416f75366e50688
1755714e39a6f23e581bb5886386eaab935f5d8ed923ad/root/usr/share/elasticsearch/lib/log4j-core-2.9.1.jar,
log4j 2.9.1
.
..
...
Running scan (95s): scanned 223603 directories, 1965175 files, last visit:
/tmp/.inline-upgrade.11270/fmserver-patch
Running scan (107s): scanned 236660 directories, 2034298 files, last visit:
/usr/local/cisco/dcm/
wildfly-14.0.1.Final/standalone/sandeployments
[*] Found CVE-2021-44228 (log4j 2.x) vulnerability in /root/patch-11.5.1-p1.backup/dcm.ear
(lib/
log4j-core-2.8.2.jar), log4j 2.8.2
Running scan (117s): scanned 243726 directories, 2095783 files, last visit:
/root/patch-11.5.1-p1.backup
Scanned 243914 directories and 2096444 files
Found 29 vulnerable files
Found 0 potentially vulnerable files
```

```
Found 0 mitigated files
Completed in 117.36 seconds
```

From DCNM release 11.3(1), the Application Framework uses the overlay2 file system for docker. You can verify by using the following command:

```
docker info | grep overlay2
Storage Driver: overlay2 /* above command must display this output*/
```

If the output of the above command indicates docker is using **overlay2**, the directory **/var/lib/docker/overlay** is not used, and therefore, the errors reported by scanner are remnants, and not used by any running service on the DCNM. To cleanup these remnants, please do the following on the node where errors are reported.

Remove the remnants on the node where additional vulnerabilities are reported by using the following command:

```
rm -rf /var/lib/docker/overlay
```



---

**Caution**

Ensure that you execute the above command correctly. If overlay2 is deleted accidentally, the DCNM services will not be operational.

---

Run the log4j scanner. The displayed output shows that all the vulnerabilities related to **/var/lib/docker/overlay** are removed.