

NX-OS 6.2(23) Release Notes

Contents of this file:

HPE C-series NX-OS 6.2(23) Release Notes

Cisco NX-OS 6.2(23) Release Notes

Release Notes

HPE C-series Fabric Switches
for NX-OS 6.2(23)

Table of Contents

- [Cisco MDS 9000 NX-OS Release Notes](#) **Error! Bookmark not defined.**3
- [NX-OS 5.x to NX-OS 6.x Migration](#)..... 8
- [Additional Mounting Requirements](#) 8
- [Serial Port](#)..... 9
- [Initial Installation Recommendations/Requirements](#)..... 9
- [HPE Specific Known Issues](#)..... 9

CISCO MDS 9000 NX-OS RELEASE NOTES

This is not a mandatory upgrade, although HPE recommends upgrading to this version because it incorporates changes that correct issues identified in previous versions. As part of the NX-OS 6.2(23) image updates provided by HPE, the *Cisco MDS 9000 Family Release Notes for Cisco MDS NX-OS Release 6.2(23)* have been included in the bundle. For a complete list and detailed description of features included in the NX-OS 6.2(23) release, refer to the Cisco release notes as appropriate.

As a part of NX-OS 6.2(23) image updates provided by HPE, Cisco Prime Data Center Network Manager (DCNM) Release 10.4(2) has been included in the bundle. Cisco Prime DCNM combines Cisco Fabric Manager, which previously managed SANs, and Cisco DCNM, which previously managed only LANs, into a unified product that can manage a converged data center fabric. As a part of the product merger in Cisco DCNM, the name Cisco DCNM for SAN replaces the name Cisco Fabric Manager. Cisco Prime DCNM Release 10.4(2) supports the Cisco Nexus product family and the Cisco MDS 9000 product family.

DCNM for SAN uses server-based licenses that will allow you to purchase a pool of DCNM for SAN licenses instead of a switch-based Fabric Manager Server (FMS) license. The installed base of existing FMS licenses are grandfathered into DCNM for SAN, which means that you do not have to purchase a new DCNM license to use the advanced features of DCNM for SAN if you have an existing FMS license. HPE's C-series Data Center Network Manager (DCNM) Package extends Cisco Prime Data Center Network Manager by providing historical performance data collection for network traffic hot-spot analysis, centralized management services and advanced application integration.

Detailed information about these new features is available in the *Cisco Prime DCNM Release Notes, Release 10.4*, and in the feature configuration guides for DCNM for SAN.

Note: For the latest supported HPE storage products, refer to the HPE Single Point of Connectivity Knowledge (SPOCK) website at www.hpe.com/storage/spock . You must sign up for an HPE Passport to be granted access.

NX-OS IMAGES AND MANAGEMENT SOFTWARE UPDATES

Customers can receive updates electronically through the HPE Support Center (HPESC) at <http://www.hpe.com/support>.

HPE Support Center works with HPE Passport, HPE's single-sign-in service spanning many websites at <http://www.hpe.com>. You must have an HPE Passport account in order to sign-in to the HPE Support Center. Refer to the following steps to begin using HPE Support Center to receive NX-OS image software updates:

Refer to the following steps to access NX-OS firmware updates and Release Notes:

- Go to <http://www.hpe.com>.
- Select **Support** from the drop-down menu in the top right corner of the home page.
- Under Product Support, click **HPE Support Center**.
- Enter your C-series switch (i.e. SN6010C) into the search box, and you will be presented with a list of models associated with this switch. Click on the link for your model.
- Click **Drivers & Software**.
- Select **Firmware (Entitlement required) Version: v6.2(23)**
- To read the Firmware Release Notes, click on the **Release Notes** link

Hardware Components

C-series Support Matrix with NX-OS 6.X

MDS Switch Model	Switch Description	Supported Switching Modules
HPE StoreFabric SN8500C 8-slot 16/32 Gb FC director (C8S71A) with Fabric-1 Module (C8S74A)	Director class switch which can accommodate eight switching modules	HPE StoreFabric SN8500C 48-port 16Gb FC Module (C8S70A) HPE StoreFabric C-series SN8500C 48-port FCoE Module (E7Y66A)
HPE StoreFabric SN8500C 4-slot 16/32 Gb FC director (K2Q18A) with Fabric-1 Module (K2Q19A)	Director class switch which can accommodate four switching modules	HPE StoreFabric SN8500C 48-port 16Gb FC Module (C8S70A) HPE StoreFabric C-series SN8500C 48-port FCoE Module (E7Y66A)
HPE StoreFabric SN6010C 16Gb FC switch (K2Q16A, K2Q17A)	Fabric switch offers 12 or 48 16Gb Fibre Channel ports	N/A
HPE SN8000C 13-Slot Supervisor 2A Fabric 2 Director Switch (AJ905C) HPE SN8000C 13-Slot Supervisor 2A Fabric 3 Director Switch (QW927A)	Director class switch which can accommodate eleven switching modules	HPE SN8000C 8Gb 32-Port Advanced Fibre Channel Module (QW924A) HPE SN8000C 8Gb 48-Port Advanced Fibre Channel Module (QW925A) 48-port 8-Gbps FC Host-Optimized Switching Module (AJ901B, AJ901A) 48-port 8-Gbps FC Performance Switching Module (AJ900B, AJ900A)
HPE SN8000C 9-Slot Supervisor 2A Director Switch (AE389C)	Director class switch which can accommodate seven switching modules	24-port 8-Gbps FC Switching Module (AJ899B, AJ899A) 18/4-port Multiservice Module (AG852B, AG852A) 4-port 10-Gbps FC Switching Module (AE386B, AE386A)
HPE SN8000C 6-Slot Supervisor 2A Director Switch (AE388C)	Director class switch which can accommodate four switching modules	
MDS 9222i (AG851B, AG851A)	Fabric switch with eighteen 4-Gbps FC ports, four IP ports, and accommodates one switching module	48-port 8-Gbps FC Host-Optimized Switching Module (AJ901B, AJ901A) 18/4-port Multiservice Module (AG852B, AG852A) 4-port 10-Gbps FC Switching Module (AE386B, AE386A)

MDS Switch Model	Switch Description	Supported Switching Modules
HPE StoreFabric SN6500C 16Gb FC/FCIP/FCOE Multi- service (E7Y64A)	Fabric switch offers up to 40 of 16Gbps FC ports, 2 of 1/10Gb IP, 8 of 10Gb FCoE ports.	N/A
SN6000C Fabric Switch (MDS 9148) (AW585A,AW586A)	Fabric switch with sixteen, thirty two, or forty eight 8- Gbps FC ports	N/A
MDS 8Gb Fabric Switch for HPE BladeSystem c- Class (AW563A,AW564A)	Fabric switch for HPE BladeSystem c-Class with eight 8-Gbps internal FC ports & four external 8- Gbps FC ports or sixteen 8- Gbps internal FC ports & eight external 8-Gbps FC ports.	N/A

NX-OS 6.2(23) Naming Convention

MDS 9000 Switch Model	Image Type	Image Name
HP StoreFabric SN8500C 8-slot 16Gb FC Director Switch	kickstart image	m9700-sf3ek9-kickstart-mz.6.2.23.bin
	system image	m9700-sf3ek9-mz.6.2.23.bin
HP StoreFabric SN8500C 4-slot 16Gb FC Director Switch	kickstart image	m9500-sf2ek9-kickstart-mz.6.2.23.bin
	system image	m9500-sf2ek9-mz.6.2.23.bin
HPE SN8000C 13-Slot Supervisor 2A Fabric 2 Director Switch	kickstart image	m9500-sf2ek9-kickstart-mz.6.2.23.bin
	system image	m9500-sf2ek9-mz.6.2.23.bin
HPE SN8000C 13-Slot Supervisor 2A Fabric 3 Director Switch	kickstart image	m9500-sf2ek9-kickstart-mz.6.2.23.bin
	system image	m9500-sf2ek9-mz.6.2.23.bin
HPE SN8000C 9-Slot Supervisor 2A Director Switch	kickstart image	m9500-sf2ek9-kickstart-mz.6.2.23.bin
	system image	m9500-sf2ek9-mz.6.2.23.bin
HPE SN8000C 6-Slot Supervisor 2A Director Switch	kickstart image	m9500-sf2ek9-kickstart-mz.6.2.23.bin
	system image	m9500-sf2ek9-mz.6.2.23.bin
Cisco MDS 9222i Multiservice Fabric Switch	kickstart image	m9200-s2ek9-kickstart-mz.6.2.23.bin
	system image	m9200-s2ek9-mz.6.2.23.bin
HPE StoreFabric SN6500C 16Gb FC/FCIP/FCOE Multi-service Switch (Cisco MDS 9250i)	kickstart image	m9250-s5ek9-kickstart-mz.6.2.23.bin
	system image	m9250-s5ek9-mz.6.2.23.bin
HPE StoreFabric SN6010C 16Gb FC Switch (Cisco MDS 9148S)	kickstart image	m9100-s5ek9-kickstart-mz.6.2.23.bin
	system image	m9100-s5ek9-mz.6.2.23.bin
HPE SN6000C Fabric Switch (Cisco MDS 9148 Fabric Switch)	kickstart image	m9100-s3ek9-kickstart-mz.6.2.23.bin
	system image	m9100-s3ek9-mz.6.2.23.bin
Cisco MDS 8Gb Fabric Switch for HPE Blade System c-Class	kickstart image	m9100-s3ek9-kickstart-mz.6.2.23.bin
	system image	m9100-s3ek9-mz.6.2.23.bin

Other Images	Image Type	Image Name
Data Center Network Manager (DCNM)	Windows 64-Bit installer	dcnm-installer-x64-windows.10.4.2.exe
Data Center Network Manager (DCNM)	Linux 64-Bit installer	dcnm-installer-x64-linux.10.4.2.bin

All C-series switches can be managed with the command-line interface (CLI) or Simple Network Management Protocol (SNMP). The graphical user interfaces (GUI) used to manage all C-series switches is Cisco Data Center Network Manager (DCNM) and Cisco Device Manager.

NX-OS 5.x TO NX-OS 6.x MIGRATION

MDS Switch Model	Supported with NX-OS 6.x	Recommendation
SN8000C	yes	Refer to C-series FC Switch stream on SPOCK for additional support information
MDS 9148	yes	Refer to C-series FC Switch stream on SPOCK for additional support information
MDS 9222i	yes	Refer to C-series FC Switch stream on SPOCK for additional support information
MDS 9124	no	Refer to C-series FC Switch stream on SPOCK for additional support information

ADDITIONAL MOUNTING REQUIREMENTS

C-series Fabric Switches can be installed in all HPE standard racks. Please note the following restrictions:

Side-Rail Rack-Mounted Options

All side-rail rack-mounted options must have a minimum of four (4) inch clearance distance above or below the switch chassis for the C-series SN8500C (MDS 9710) and SN8000C (MDS 9500) Series Multilayer Directors and MDS 9200 Series Multilayer Fabric Switches. Side-rail rack-mount options include HPE zero-U options, KVM switches and power distribution units (PDUs). The minimum distance between the top of the switch to the bottom of any side rail rack mounted option, or the bottom of the switch and the top of the side rail rack mounted option must be at least four (4) inches.

HPE Rack Cabinet Support

For standard HPE Rack Cabinets with closed side panels, you must have at least two-and-one-half inches (2.5 in.) (6.4 cm) of air space between the rack walls and the MDS 9200, 9700 and 9500 chassis air vents. For the SN8500C (MDS 9710) and SN8000C (MDS 9500) you must have at least four inches (4.0 in.) (10.16 cm) of air flow between the rack walls and the director. If the air space does not meet these minimum requirements, remove the rack side panels.

The HPE 10842 (800mm wide, 42U) Rack Cabinet is ideally used as a networking rack accommodating primarily switching equipment. It can also be used as a server/switch rack. The 10842 rack is a wider version of the 42U 9000 series rack at 800 mm/31.3 in width. This added width provides approximately eight additional inches of room outside of the internal mounting rails, which can be used for cabling.

Other Types of Cabinets

When the C-series SN8500C (MDS 9700) and SN8000C (MDS 9500) Family Multilayer Directors and MDS 9200 Family Multilayer Fabric Switches are installed in racks other than those mentioned above, including any open sided racks, the following guidelines must be followed to prevent overheating:

- Closed-sided racks must have at least two-and-one-half inches (2.5 in.) (6.4 cm) of air space between the walls and the MDS 9200, 9700 and 9500 chassis air vents. The SN8500C (MDS 9710) and SN8000C (MDS 9500) must have at least four inches (4.0 in.) (10.16 cm) of air flow between the rack walls and the director.
- Open-sided racks (for example, racks commonly used for telecommunications equipment), with switches installed side by side must have at least six inches (6 in.) (15.2 cm) of air space between two different switch chassis
- All rack types must have nothing to obstruct the cooling vents with side mounted options

Cabling

When cabling any C-series product, the front door on all HPE standard racks should be removed to allow for adequate cable space; this will ensure a safe bending radius on all fibre channel cables. This is especially pertinent in high port density (Director) installations. Please consult the relevant *Cisco Hardware Installation Guide* for further information.

Serial Port

You must use the serial interface to configure a switch IP address. Refer to the *Cisco MDS 9000 Family Configuration Guide* for instructions on how to connect the serial port to a host machine.

INITIAL INSTALLATION RECOMMENDATIONS/REQUIREMENTS

The C-series MDS 9000 Family of switches does not automatically allow SAN connectivity for the first-time, out-of-the box power up. For more comprehensive **initial setup information, please refer to the Cisco documentation found at <http://www.cisco.com>.**

Note: The setup dialog prompts for all of the necessary settings.

HPE SPECIFIC KNOWN ISSUES

Problem Description:

HPE Enterprise Virtual Array (EVA) P6000 is getting detected as “host” instead of “storage” in the DCNM, Device Type. At this instance LUNs which are presented from HPE Enterprise Virtual Array (EVA) P6000 will not be visible in the presented hosts. This issue is irrespective of host operating system.

Workaround: Changing the device type to “storage” in the Local full zone database of DCNM and rescanning the host system will resolve this issue.

1. Log into Data Center Network Manager
2. From Fabric, click Host Port tab
3. Select EVA P6000 Controller port WWN then mouse right click to select Device Attributes
4. Click on "Enclosures" tab
5. Change the “Device Type” for the desired device to "Storage" from the drop down.
6. Save changes by selecting the “Apply Changes” icon.

Problem Description:

Limitation of Smart Zoning when using inter switch link (ISL) between MDS switches and Nexus switches. When Smart Zoning is enabled in MDS switches, it will not allow Nexus switches to merge to fabric. It fails with a message “zone merge failure”. This message does not clearly show that the reason of ISL failure is because Smart Zoning is enabled on the MDS switches.

Workaround:

To connect a Nexus 5000 switch to an MDS switch fabric, Smart Zoning must not be enabled.

Problem Description: The SN1000E 16Gb Emulex HBA properties may display as “Unknown” vendor in Data Center Network Manager Host Ports list.

Workaround: Enabling the FDMI in Emulex driver by setting the driver parameter Enable FDMI to 1 will allow Data Center Network Manager to display the vendor name.

Problem Description: The HPE 81B/82B/41B/42B PCIe FC HBA may display as switches in Data Center Network Manager Switches list.

Workaround: Right click the entry in the switch list and select Purge then click refresh icon in the task bar.

Problem Description: Broadcom cards information is not available in DCNM version.

In the DCNM GUI information like Link Status, Vendor, Serial Number, Model, Firmware version, Driver version Information is not displayed.

This issue is cosmetic only, and as such does not affect switch functionality.

Problem Description: CN12000E and 556FLR HBA information is not available in DCNM.

In the DCNM GUI information like Link Status, Vendor, Serial Number, Model, Firmware version, Driver version Information is not displayed.

This issue is cosmetic only, and as such does not affect switch functionality.

Problem Description: 16Gb storage ports of 3 PAR arrays may not login to SN6500C Switch with default switch port mode "auto".

Workaround: Change the switch port mode to "F" to get the flogi.

Problem description: During DCNM install or upgrade, the server needs new tcp, udp port 5989 free during the process.

Workaround: DCNM uses 8080 port for installing, for freeing up this port user has to be run the mentioned commands in windows command line interface:

```
netstat -o -n -a | findstr 8080
```

By running this command we will get the process ID and kill the Process ID.

```
taskkill /F /PID 2544
```

SUCCESS: The process with PID 1092 has been terminated.

```
netstat -o -n -a | findstr 5989
```

```
TCP 0.0.0.0:5989 0.0.0.0 LISTENING 1092
```

```
taskkill /F /PID 1092
```

SUCCESS: The process with PID 1092 has been terminated.



Cisco MDS 9000 Series Release Notes for Cisco MDS NX-OS Release 6.2(23)

First Published: February, 2018

This document describes the caveats and limitations for switches in the Cisco MDS 9000 Series. Use this document in conjunction with documents listed in the [“Obtaining Documentation and Submitting a Service Request”](#) section on page 37.

Release notes are sometimes updated with new information on restrictions and caveats. Refer to the following website for the most recent version of the [Cisco MDS 9000 Series Release Notes](#).

Contents

This document includes the following:

- [Introduction, page 2](#)
- [Choosing Between Cisco MDS NX-OS Releases, page 2](#)
- [Components Supported, page 2](#)
- [Software Download Process, page 12](#)
- [Subscribing for Important Product Update Notifications, page 16](#)
- [Upgrading Your Cisco MDS NX-OS Software Image, page 17](#)
- [Downgrading Your Cisco MDS NX-OS Software Image, page 19](#)
- [New Hardware Features in Cisco MDS NX-OS Release 6.2\(23\), page 22](#)
- [New Software Features in Cisco MDS NX-OS Release 6.2\(23\), page 22](#)
- [Licensed Cisco NX-OS Software Packages, page 31](#)
- [Deprecated and Changed Features, page 33](#)
- [Limitations and Restrictions, page 33](#)
- [Caveats, page 35](#)
- [Related Documentation, page 36](#)
- [Obtaining Documentation and Submitting a Service Request, page 37](#)



Introduction

The Cisco MDS 9000 Series of Multilayer Directors and Fabric Switches provides industry-leading availability, scalability, security, and management, allowing you to deploy high-performance storage-area networks with lowest total cost of ownership. Layering a rich set of intelligent features onto a high-performance, protocol agnostic switch fabric, the Cisco MDS 9000 Series addresses the stringent requirements of large data center storage environments: uncompromising high availability, security, scalability, ease of management, and seamless integration of new technologies.

Cisco MDS 9000 NX-OS software powers the award-winning Cisco MDS 9000 Series Multilayer Switches. It is designed to create a strategic SAN platform with superior reliability, performance, scalability, and features. Formerly known as Cisco SAN-OS, Cisco MDS 9000 NX-OS software is fully interoperable with earlier Cisco SAN-OS versions and enhances hardware platform and module support.

Choosing Between Cisco MDS NX-OS Releases

Cisco uses MDS NX-OS release numbering to indicate when significant features or hardware support are added to the code. This allows older trains to provide stability and newer trains to focus new features and hardware.



Note Before upgrading Cisco MDS 9396S switch in Cisco N-Port Virtualizer (NPV) mode from Cisco MDS NX-OS Release 6.2(21) or earlier to Cisco MDS NX-OS Release 6.2(23), refer to the [CSCvd74861](#), [CSCvd74840](#), [CSCvh97251](#), and [CSCvi10304](#) defects.

- Cisco MDS NX-OS Release 6.2(x) - This release train provides general support for most Cisco MDS platforms except for newer platforms such as Cisco MDS 9718 Director, Cisco MDS 9132T, and so on.
- Cisco MDS NX-OS Release 8.1(x) - This release train marks the removal of Cisco MDS 9500 technology hardware support. It only supports the newer Cisco MDS 9700 technology hardware (these are systems with 16 and 32 Gbps Fibre Channel, 10 and 40 Gbps FCoE, and 10 Gbps IPS ports) and adds support for the Cisco MDS 48 Port 32 Gbps Fibre Channel Switching Module.
- Cisco MDS NX-OS Release 8.2(x) - This release train supports the same platforms as the 8.1(x) train as well as the Cisco MDS 9132T Fibre Channel Switch. It is based on Cisco MDS NX-OS Release 8.1(x).

Details about the new features and hardware supported by each Cisco MDS NX-OS release can be found in the [“New Hardware and Software Features” section on page 21](#) in this document.

Components Supported

[Table 1](#) lists the NX-OS software part numbers and hardware components supported by the Cisco MDS 9000 Series.

Table 1 Cisco MDS 9000 Series Supported Software and Hardware Components

Component	Part Number	Description	Applicable Product
Software	M97S3K9-6.2.23	MDS 9710, MDS 9706 ^a , NX-OS software	MDS 9700 Series
	M95S2K9-6.2.23	MDS 9500, NX-OS software	MDS 9500 Series
	M93S5K9-6.2.23	MDS 9396S ^b , NX-OS software	MDS 9396S Switch
	M92S5K9-6.2.23	MDS 9250i ^c NX-OS software	MDS 9250i Switch
	M92S2K9-6.2.23	MDS 9222i, NX-OS software	MDS 9222i Switch

Table 1 *Cisco MDS 9000 Series Supported Software and Hardware Components (Continued)*

Component	Part Number	Description	Applicable Product
	M91S5K9-6.2.23	MDS 9148S ^a , NX-OS software	MDS 9148S Switch
	M91S3K9-6.2.23	MDS 9148, NX-OS software	MDS 9148 Switch

Table 1 Cisco MDS 9000 Series Supported Software and Hardware Components (Continued)

Component	Part Number	Description	Applicable Product
Licenses	DCNM-SAN-M97-K9	Cisco Prime Data Center Network Manager	MDS 9700 Series
	M97ENTK9	Enterprise Package for one Cisco MDS 9700 Series Multilayer Director	MDS 9700 Series
	M97FIC1K9	Cisco MDS 9700 Mainframe Package license for one MDS 9700 Switches	MDS 9700 Series
	M9500SSE184K9z	Storage Services Enabler License for one MSM-18/4 module	MDS 9500 Series
	M9300ENT1K9	Cisco MDS 9300 Series Enterprise Package	MDS 9396S Switch
	DCNM-SAN-M93-K9	Cisco Prime Data Center Network Manager	MDS 9396S Switch
	M9200ENT1K9	Cisco MDS 9200 Series Enterprise Package	MDS 9200 Series
	DCNM-SAN-M92-K9	Cisco Prime Data Center Network Manager	MDS 9200 Series
	M9250IIOA	Cisco MDS 9250i I/O Accelerator Services package	MDS 9250i Switch
	M9250IDMMK9	Cisco MDS 9250i Data Mobility Manager package	MDS 9250i Switch
	M9250IDMMT6M	Cisco MDS 9250i DMM License - 6-month period	MDS 9250i Switch
	M9200FIC1K9	Cisco MDS 9200 Series Mainframe Package	MDS 9200 Series
	M9200XRC	Cisco MDS 9200 XRC Acceleration Package for IBM series z, spare	MDS 9200 Series
	M9222ISSE1K9	Storage Services Enabler License	MDS 9222i Switch
	M9200SSE184K9	Storage Services Enabler License for one MSM-18/4 module	MDS 9222i Switch
	M95DMM184K9	Data Mobility Manager License for one MSM-18/4 module	MDS 9500 Series
	M9222IDMMK9	Data Mobility Manager License for Cisco MDS 9222i	MDS 9222i Switch
	M92DMM184K9	Data Mobility Manager License for one MSM-18/4 module	MDS 9222i Switch
	M95DMM184TSK9	Data Mobility Manager for one MSM-18/4 module — Time limited to 180 days only	MDS 9500 Series
	M9222IDMMTSK9	Data Mobility Manager — Time limited to 180 days only	MDS 9222i Switch
	M92DMM184TSK9	Data Mobility Manager for one MSM-18/4 module — Time limited to 180 days only	MDS 9222i Switch
	M92SSESSNK9	Cisco Storage Services Enabler License for SSN-16 (1 engine)	MDS 9222i Switch
	M95SSESSNK9	Cisco Storage Services Enabler License for SSN-16 (1 engine)	MDS 9500 Series
	M92SMESSNK9	Cisco Storage Media Encryption License for SSN-16 (1 engine)	MDS 9222i Switch

Table 1 *Cisco MDS 9000 Series Supported Software and Hardware Components (Continued)*

Component	Part Number	Description	Applicable Product
	M95SMESSNK9	Cisco Storage Media Encryption License for SSN-16 (1 engine)	MDS 9500 Series
	M92IOASSN	Cisco I/O Accelerator License for SSN-16 (1 engine)	MDS 9222i Switch
	M95IOASSN	Cisco I/O Accelerator License for SSN-16 (1 engine)	MDS 9500 Series
	M92IOA184	Cisco I/O Accelerator License for MSM-18/4	MDS 9222i Switch
	M95IOA184	Cisco I/O Accelerator License for MSM-18/4	MDS 9500 Series
	M9222IIOA	Cisco I/O Accelerator License for Cisco MDS 9222i base switch	MDS 9222i Switch
	M92EXTSSNK9	Cisco SAN Extension License for SSN-16 (1 engine)	MDS 9222i Switch
	M95EXTSSNK9	Cisco SAN Extension License for SSN-16 (1 engine)	MDS 9500 Series
	M9200XRC	Cisco XRC Acceleration	MDS 9200 Series
	M9500XRC	Cisco XRC Acceleration	MDS 9500 Series

Table 1 Cisco MDS 9000 Series Supported Software and Hardware Components (Continued)

Component	Part Number	Description	Applicable Product
Chassis	DS-C9710	Cisco MDS 9710 Multilayer Director (10-slot multilayer director with 2 half-width slots for Supervisor modules, with 8 slots available for switching modules — SFPs sold separately)	MDS 9710 Switch
	DS-C9706	Cisco MDS 9706 Multilayer Director (6-slot multilayer director with 2 half-width slots for Supervisor modules, with 4 slots available for switching modules — SFPs sold separately)	MDS 9706 Switch
	DS-C9513	Cisco MDS 9513 Multilayer Director (13-slot multilayer director with 2 slots for Supervisor modules, with 11 slots available for switching modules — SFPs sold separately)	MDS 9513 Switch
	DS-C9509	Cisco MDS 9509 Multilayer Director (9-slot multilayer director with 2 slots for Supervisor modules, with 7 slots available for switching modules — SFPs sold separately)	MDS 9509 Switch
	DS-C9506	Cisco MDS 9506 Multilayer Director (6-slot multilayer director with 2 slots for Supervisor modules, with 4 slots available for switching modules — SFPs sold separately)	MDS 9506 Switch
	DS-C9396S-K9	Cisco MDS 9396S 96-Port Multilayer Fabric Switch (2RU fixed-configuration multilayer fabric switch with 96 16-Gbps Fibre Channel ports)	MDS 9396S Switch
	DS-C9250I-K9	The Cisco MDS 9250i offers up to forty 16-Gbps Fibre Channel ports, two 10 Gigabit Ethernet IP storage services ports, and eight 10 Gigabit Ethernet Fibre Channel over Ethernet (FCoE) ports in a fixed two-rack-unit (2RU) form factor.	MDS 9250i Switch
	DS-C9222i-K9	Cisco MDS 9222i Multilayer Fabric Switch (3-rack-unit (3RU) semimodular multilayer fabric switch with 18 4-Gbps Fibre Channel ports, 4 Gigabit Ethernet ports, and a modular expansion slot for Cisco MDS 9000 Series Switching and Services modules)	MDS 9222i Switch
	DS-C9148S-K9	Cisco MDS 9148S 48-Port Multilayer Fabric Switch (1RU fixed-configuration multilayer fabric switch with 48 16-Gbps Fibre Channel ports)	MDS 9148S Switch
	DS-C9148-K9	Cisco MDS 9148 48-Port Multilayer Fabric Switch (1RU fixed-configuration multilayer fabric switch with 48 8-Gbps Fibre Channel ports)	MDS 9148 Switch
Supervisor Modules	DS-X97-SF1-K9	Cisco MDS 9700 Series Supervisor-1 Module	MDS 9700 Series
	DS-X9530-SF2-K9	Cisco MDS 9500 Series Supervisor-2 Module	MDS 9500 Series
	DS-X9530-SF2A-K9	Cisco MDS 9500 Series Supervisor-2A Module	MDS 9500 Series

Table 1 Cisco MDS 9000 Series Supported Software and Hardware Components (Continued)

Component	Part Number	Description	Applicable Product
Switching Modules	DS-X9448-768K9	Cisco MDS 9000 48-port 16-Gbps Fibre Channel Switching Module with SFP LC connectors	MDS 9700 Series
	DS-X9848-480K9	Cisco MDS 48-Port 10-Gigabit Fibre Channel over Ethernet (FCoE) Module with SFP LC connectors	MDS 9700 Series
	DS-X9112 ^d	Cisco MDS 9000 12-port 4-Gbps Fibre Channel Switching Module with SFP LC connectors	MDS 9500 Series MDS 9200 Series
	DS-X9148 ^a	Cisco MDS 9000 48-port 4-Gbps Fibre Channel Switching Module with SFP LC	MDS 9500 Series MDS 9200 Series
	DS-X9704	Cisco MDS 9000 Series 4-Port 10-Gbps Fibre Channel Switching Module with SFP LC	MDS 9500 Series MDS 9200 Series
	DS-X9224-96K9	Cisco MDS 9000 24-Port 8-Gbps Fibre Channel Switching Module with SFP and SFP+ LC connectors	MDS 9500 Series
	DS-X9248-96K9	Cisco MDS 9000 48-Port 8-Gbps Fibre Channel Switching Module with SFP and SFP+ LC connectors	MDS 9500 Series
	DS-X9248-48K9	Cisco MDS 9000 4/44-Port Host-Optimized 8-Gbps Fibre Channel Switching Module with SFP and SFP+ LC connectors	MDS 9500 Series MDS 9222i Switch
	DS-X9708-K9	Cisco MDS 9000 8-port 10-Gbps Fibre Channel over Ethernet (FCoE) Module	MDS 9500 Series
	DS-X9232-256K9	Cisco MDS 9000 32-port 8-Gbps Advanced Fibre Channel Switching Module	MDS 9500 Series
	DS-X9248-256K9	Cisco MDS 9000 48-port 8-Gbps Advanced Fibre Channel Switching Module	MDS 9500 Series
Services Modules	DS-X9316-SSNK9	Cisco MDS 9000 Series 16-Port Storage Services Node (SSN-16) — 16 fixed 1-Gbps Ethernet ports, plus 4 service engines that support 16-Gigabit Ethernet IP storage services ports.	MDS 9500 Series MDS 9222i Switch
	DS-X9304-18K9	Cisco MDS 9000 18/4-Port Multiservice Module (MSM-18/4) — 18-port, 4-Gbps Fibre Channel plus 4-port Gigabit Ethernet IP services and switching module with SFP LC connectors	MDS 9500 Series MDS 9200 Series
External crossbar module	DS-X9710-FAB1	Cisco MDS 9710 Crossbar Switching Fabric 1 Module	MDS 9710 Switch
	DS-X9706-FAB1	Cisco MDS 9706 Crossbar Switching Fabric 1 Module	MDS 9706 Switch
	DS-13SLT-FAB2	Cisco MDS 9513 Switching Fabric 2 Module	MDS 9513 Switch
	DS-13SLT-FAB3	Cisco MDS 9513 Switching Fabric 3 Module	MDS 9513 Switch

Table 1 Cisco MDS 9000 Series Supported Software and Hardware Components (Continued)

Component	Part Number	Description	Applicable Product
Power Supplies	DS-CAC-300W	300W AC power supply	MDS 9148 Switch
	DS-C48-300AC	300W AC power supply	MDS 9148 Switch
	DS-C48S-300AC	300W AC power supply	MDS 9148S Switch
	DS-CAC-845W	845W AC power supply	MDS9200 Series
	DS-C50I-300AC	300W AC power supply	MDS 9250i Switch
	DS-CAC-1200W-E	1200W AC power supply	MDS 9396S Switch
	DS-CAC-1200W	1200W AC power supply	MDS 9396S Switch
	DS-CAC-3000W	3000W AC power supply	MDS 9509 Switch
	DS-CAC-2500W	2500W AC power supply	MDS 9509 Switch
	DS-CDC-2500W	2500W DC power supply	MDS 9509 Switch
	DS-CAC-6000W	6000W AC power supply	MDS 9513 Switch
	DS-CAC-1900W	1900W AC power supply	MDS 9506 Switch
	DS-CAC97-3KW	3000W AC power supply	MDS 9700 Series
	DS-CDC97-3KW	3000W DC power supply	MDS 9700 Series
DS-CHV-3.5KW ^e	3500W High Voltage DC power supply	MDS 9700 Series	
CompactFlash	MEM-MDS-FLD512M	External 512-MB CompactFlash memory for supervisor module	MDS 9500 Series
Smart Card Reader	DS-SCR-K9	Storage Media Encryption (SME) Smart Card Reader	MDS 9000 Series
Smart Card	DS-SC-K9	SME Smart Card	MDS 9000 Series

a. This switch supports Cisco MDS NX-OS Release supports Release 6.2(9) and later.

b. This switch supports Cisco MDS NX-OS Release supports Release 6.2(13a) and later.

c. This switch supports Cisco MDS NX-OS Release supports Release 6.2(5) and later.

d. This product has reached End of Support as of February 28, 2015.

e. This product is supported from Cisco MDS NX-OS Release 6.2(19) onwards.

Table 2 lists the part numbers and optical components supported by the Cisco MDS 9000 Series.



Note For the latest information about supported transceivers (SFPs), see the [Cisco MDS 9000 Series Pluggable Transceivers](#) data sheet.

Table 2 Cisco MDS 9000 Series Supported Optics and Transceivers

Component	Part Number	Description	Applicable Product
Optics	SFP-10G-SR / DS-SFP-10GE-SR	10GBASE-SR SFP+ Module	MDS 9700 Series, MDS 9500 Series, 8-port 10-Gbps FCoE Module (DS-X9708-K9), MDS 9250i, MDS 9396S
	SFP-10G-LR / DS-SFP-10GE-LR	10GBASE-LR SFP+ Module	MDS 9700 Series, MDS 9500 Series, 8-port 10-Gbps FCoE Module (DS-X9708-K9), MDS 9250i, MDS 9396S
	SFP-10G-ER	10GBASE-ER SFP+ Module	MDS 9700 Series, MDS 9500 Series, 8-port 10-Gbps FCoE Module (DS-X9708-K9), MDS 9250i, MDS 9396S
	SFP-H10GB-CU1M	10GBASE-CU SFP+ cable 1 meter	MDS 9700 Series, DS-X9848-480K9, MDS 9500 Series, 8-port 10-Gbps FCoE Module (DS-X9708-K9), MDS 9250i
	SFP-H10GB-CU3M	10GBASE-CU SFP+ cable 3 meter	MDS 9700 Series, DS-X9848-480K9, MDS 9500 Series, 8-port 10-Gbps FCoE Module (DS-X9708-K9), MDS 9250i
	SFP-H10GB-CU5M	10GBASE-CU SFP+ cable 5 meter	MDS 9700 Series, DS-X9848-480K9, MDS 9500 Series, 8-port 10-Gbps FCoE Module (DS-X9708-K9), MDS 9250i
	SFP-H10GB-ACU7M	10GBASE-CU SFP+ active copper cable 7 meter	MDS 9700 Series, DS-X9848-480K9, MDS 9500 Series, 8-port 10-Gbps FCoE Module (DS-X9708-K9), MDS 9250i
	SFP-H10GB-ACU10M	10GBASE-CU SFP+ active copper cable 10 meter	MDS 9700 Series, DS-X9848-480K9, MDS 9500 Series, 8-port 10-Gbps FCoE Module (DS-X9708-K9), MDS 9250i
	DS-16G-ER-Dxxx	Smart Optics DWDM 16G LWL SFP	MDS 9700 Series (DS-X9448-768K9), MDS 9148S, MDS 9250i, MDS 9396S
	DS-16G-ER	Smart Optics 16G LWL SFP	MDS 9700 Series (DS-X9448-768K9), MDS 9148S, MDS 9250i, MDS 9396S
	DS-16G-ER-Cxx	Smart Optics CWDM 16G LWL SFP	MDS 9700 Series (DS-X9448-768K9), MDS 9148S, MDS 9250i, MDS 9396S

Table 2 Cisco MDS 9000 Series Supported Optics and Transceivers (Continued)

Component	Part Number	Description	Applicable Product
	DS-8G-ZR-Dxxx	Smart Optics DWDM 8G LWL SFP	MDS 9700 Series (DS-X9448-768K9), MDS 9148S, MDS 9250i, MDS 9396S
	DS-8G-ZR	Smart Optics 8G LWLSFP	MDS 9700 Series (DS-X9448-768K9), MDS 9148S, MDS 9250i, MDS 9396S
	DS-8G-ZR-Cxx	Smart Optics CWDM 8G LWL SFP	MDS 9700 Series (DS-X9448-768K9), MDS 9148S, MDS 9250i, MDS 9396S
LC-type fiber-optic SFP	DS-SFP-FC16G-SW	SFP+ optics (LC type) for 16-Gbps Fibre Channel for shortwave mode	MDS 9700 Series, 48-port 16-Gbps Fibre Channel Switching Module (DS-X9448-768K9), MDS 9250i, MDS 9148S, MDS 9396S
	DS-SFP-FC16G-LW	SFP+ optics (LC type) for 16-Gbps Fibre Channel for longwave mode (10km reach)	MDS 9700 Series, 48-port 16-Gbps Fibre Channel Switching Module (DS-X9448-768K9), MDS 9250i, MDS 9148S, MDS 9396S
	DS-SFP-FC16GELW=	SFP+ optics (LC type) for 16-Gbps Fibre channel for longwave mode; (25km reach).	48-port 16-Gbps Fibre Channel Switching Module (DS-X9448-768K9), MDS 9250i, MDS 9148S, MDS 9396S
	DS-SFP-FC10G-SW	SFP+ optics (LC type) for 10-Gbps Fibre Channel for shortwave mode	48-port 16-Gbps Fibre Channel Switching Module (DS-X9448-768K9), 32-port 8-Gbps Advanced Fibre Channel Module (DS-X9232-256K9), 48-port 8-Gbps Advanced Fibre Channel Module (DS-X9248-256-K9), MDS 9396S
	DS-SFP-FC10G-LW	SFP+ optics (LC type) for 10-Gbps Fibre Channel for longwave mode (10km reach)	48-port 16-Gbps Fibre Channel Switching Module (DS-X9448-768K9), 32-port 8-Gbps Advanced Fibre Channel Module (DS-X9232-256K9), 48-port 8-Gbps Advanced Fibre Channel Module (DS-X9248-256-K9), MDS 9396S
	DS-SFP-FC8G-ER	SFP+ optics (LC type) for 2-, 4-, or 8-Gbps Fibre Channel for extended reach (40 km reach)	MDS DS-X9200 Series switching modules, 48-port 16-Gbps Fibre Channel Switching Module (DS-X9448-768K9) MDS 9148 MDS 9250i, MDS 9148S, MDS 9396S
	DS-SFP-FC8G-SW	SFP+ optics (LC type) for 2-, 4-, or 8-Gbps Fibre Channel for shortwave mode	MDS 9700 Series, MDS 9500 Series, MDS DS-X9200 Series switching modules, MDS 9250i, MDS 9148, MDS 9148S, MDS 9396S
	DS-SFP-FC8G-LW	SFP+ optics (LC type) for 2-, 4-, or 8-Gbps Fibre Channel for longwave mode; supports distances up to 10 km	MDS 9700 Series, MDS 9500 Series, MDS DS-X9200 Series switching modules, MDS 9250i, MDS 9148, MDS 9148S, MDS 9396S

Table 2 Cisco MDS 9000 Series Supported Optics and Transceivers (Continued)

Component	Part Number	Description	Applicable Product
	DS-SFP-FC4G-SW	SFP optics (LC type) for 1-, 2-, or 4-Gbps Fibre Channel for shortwave mode	MDS 9134, MDS 9148, MDS 9222i, DS-X9100, and DS-X9200 Series switching modules
	DS-SFP-FC4G-MR	SFP optics (LC type) for 1-, 2-, or 4-Gbps Fibre Channel for longwave mode; supports distances up to 4 km	MDS 9134, MDS 9222i, DS-X9100, and DS-X9200 Series switching modules
	DS-SFP-FC4G-LW	SFP optics (LC type) for 1-, 2-, or 4-Gbps Fibre Channel for longwave mode; supports distances up to 10 km	MDS 9134, MDS 9222i, DS-X9100, and DS-X9200 Series switching modules
	DS-SFP-FCGE-SW	SFP optics (LC type) for 1-Gbps Ethernet and 1- or 2-Gbps Fibre Channel for shortwave mode; not for use in 4-Gbps-capable ports	DS-X9316-SSNK9, DS-X9304-18K9, MDS 9222i, MDS 9250i
	DS-SFP-FCGE-LW	SFP optics (LC type) for 1-Gbps Ethernet and 1- or 2-Gbps Fibre Channel for longwave mode; not for use in 4-Gbps-capable ports	DS-X9316-SSNK9, DS-X9304-18K9, MDS 9222i, MDS 9250i
	DS-SFP-GE-T	SFP (RJ-45 connector) for Gigabit Ethernet over copper	DS-X9316-SSNK9, DS-X9304-18K9, MDS 9222i, MDS 9250i
Cisco Coarse Wavelength-Division Multiplexing (CWDM)	DS-CWDM-xxxx	CWDM Gigabit Ethernet and 1- or 2-Gbps Fibre Channel SFP LC type, where product number xxxx = 1470, 1490, 1510, 1530, 1550, 1570, 1590, or 1610 nm	MDS 9000 Series
	DS-CWDM4Gxxxx	CWDM 4-Gbps Fibre Channel SFP LC type, where product number xxxx = 1470, 1490, 1510, 1530, 1550, 1570, 1590, or 1610 nm	MDS 9000 Series
	CWDM8G1490	1490 nm CWDM 2/4/8-Gbps Fibre Channel SFP+	DS-X9200 Series switching modules, MDS 9700 Series, 48-port 16-Gbps Fibre Channel Switching Module (DS-X9448-768K9), MDS 9148, MDS 9250i, MDS 9148S, MDS 9396S

Table 2 Cisco MDS 9000 Series Supported Optics and Transceivers (Continued)

Component	Part Number	Description	Applicable Product
Dense Wavelength-Division Multiplexing (DWDM)	DWDM-X2-xx.xx	DWDM X2 SC optics for 10-Gbps Fibre Channel connectivity to an existing Ethernet DWDM infrastructure, with 15xx.xx nm wavelength, where xx.xx = 60.61, 59.79, 58.98, 58.17, 56.55, 55.75, 54.94, 54.13, 52.52, 51.72, 50.92, 50.12, 48.51, 47.72, 46.92, 46.12, 44.53, 43.73, 42.94, 42.14, 40.56, 39.77, 38.98, 38.19, 36.61, 35.82, 35.04, 34.25, 32.68, 31.90, 31.12, or 30.33	MDS 9500 Series MDS 9200 Series
	DWDM-SFP-xxxx	DWDM Gigabit Ethernet and 1- or 2-Gbps Fibre Channel SFP LC type, where product number xxxx = 3033, 3112, 3190, 3268, 3425, 3504, 3582, 3661, 3819, 3898, 3977, 4056, 4214, 4294, 4373, 4453, 4612, 4692, 4772, 4851, 5012, 5092, 5172, 5252, 5413, 5494, 5575, 5655, 5817, 5898, 5979, or 6061nm	MDS 9000 Series
	DWDM-SFP10G-xx.xx	10GBASE-DWDM SFP+	DS-X9848-480K9, MDS 9250i ^a
Add/Drop Multiplexer (ADM)	DS-CWDMOADM4A	4-channel CWDM optical ADM (OADM) module (Cisco CWDM 1470, 1490, 1510, or 1530 NM Add/Drop Module)	MDS 9000 Series
	DS-CWDMOADM4B	4-channel CWDM OADM module (Cisco CWDM 1550, 1570, 1590, or 1610 NM Add/Drop Module)	MDS 9000 Series
	DS-CWDM-MUX8A	ADM for 8 CWDM wavelengths	MDS 9000 Series
CWDM Multiplexer Chassis	DS-CWDMCHASSIS	2-slot chassis for CWDM ADMs	MDS 9000 Series

a. Supported in both FCoE and FCIP ports.

Software Download Process

Use the software download procedure to upgrade to a later version, or downgrade to an earlier version, of an operating system. This section describes the software download process for the Cisco MDS NX-OS software and includes the following topics:

- [Determining the Software Version, page 13](#)
- [Determining Software Version Compatibility, page 13](#)
- [Downloading Software, page 13](#)
- [Selecting the Software Image for a Cisco MDS 9148 Switch, page 14](#)

- [Selecting the Software Image for a Cisco MDS 9148S Switch, page 14](#)
- [Selecting the Software Image for a Cisco MDS 9222i Switch, page 14](#)
- [Selecting the Software Image for a Cisco MDS 9250i Switch, page 15](#)
- [Selecting the Software Image for a Cisco MDS 9396S Switch, page 15](#)
- [Selecting the Software Image for a Cisco MDS 9500 Series Switch, page 15](#)
- [Selecting the Software Image for a Cisco MDS 9700 Series Switch, page 15](#)
- [NPE Software Images, page 16](#)

Determining the Software Version

To determine the version of Cisco MDS NX-OS or SAN-OS software currently running on a Cisco MDS 9000 Series switch using the CLI, log in to the switch and enter the **show version EXEC** command.

To determine the version of Cisco MDS NX-OS or SAN-OS software currently running on a Cisco MDS 9000 Series switch using Cisco DCNM for SAN, view the Switches tab in the Information pane, locate the switch using the IP address, logical name, or WWN, and check its version in the Release column.

Determining Software Version Compatibility

[Table 3](#) lists the software versions that are compatible in a mixed SAN environment, the minimum software versions that are supported, and the versions that have been tested. We recommend that you use the latest software release supported by your vendor for all Cisco MDS 9000 Series products.

Table 3 *Software Release Compatibility*

Cisco NX-OS Software	Minimum NX-OS	Tested NX-OS
NX-OS Release 6.2(23)	NX-OS Release 6.2(1) and later	NX-OS Release 6.2(1) and later
	NX-OS Release 5.2(1) and later	NX-OS Release 5.2(1) and later
	NX-OS Release 5.0(1a) and later	NX-OS Release 5.0(1a) and later

Downloading Software

The Cisco MDS NX-OS software is designed for mission-critical high-availability environments. To realize the benefits of nondisruptive upgrades on the Cisco MDS 9700 Directors, Cisco MDS 9500 Directors, we highly recommend that you install dual supervisor modules.

To download the latest Cisco MDS NX-OS software, access the Software Center at this URL:

<https://www.cisco.com/cisco/software/navigator.html>

See the following sections in this release notes for details on how you can nondisruptively upgrade your Cisco MDS 9000 switch. Using the **install all** command from the CLI, or using Cisco DCNM for SAN to perform the downgrade, enables the compatibility check. The check indicates if the upgrade can happen nondisruptively or disruptively depending on the current configuration of your switch and the reason.

```
Compatibility check is done:
Module bootable          Impact  Install-type  Reason
-----
```


1	yes	non-disruptive	rolling	
2	yes	disruptive	rolling	Hitless upgrade is not supported
3	yes	disruptive	rolling	Hitless upgrade is not supported
4	yes	non-disruptive	rolling	
5	yes	non-disruptive	reset	
6	yes	non-disruptive	reset	

The **show incompatibility system bootflash:**system image filename command determines which additional features need to be disabled.



Note

If you would like to request a copy of the source code under the terms of either GPL or LGPL, please send an e-mail to mds-software-disclosure@cisco.com.

Selecting the Software Image for a Cisco MDS 9148 Switch

The system and kickstart image that you use for a Cisco MDS 9148 switch is shown in [Table 4](#).

Table 4 *Software Images for Cisco MDS 9148 Switches*

Cisco MDS 9148 Switch	Naming Convention
Cisco MDS 9148, Cisco MDS 8Gb Fabric Switch for HP c- Class BladeSystem	Filename begins with m9100-s3ek9

Selecting the Software Image for a Cisco MDS 9148S Switch

The system and kickstart image that you use for a Cisco MDS 9148S switch is shown in [Table 5](#).

Table 5 *Software Images for Cisco MDS 9148S Switches*

Cisco MDS 9148S Switch	Naming Convention
Cisco MDS 9148S	Filename begins with m9100-s5ek9

Selecting the Software Image for a Cisco MDS 9222i Switch

The system and kickstart image that you use for a Cisco MDS 9222i switch is shown in [Table 6](#).

Table 6 *Software Images for a Cisco MDS 9222i Switch*

Cisco MDS 9222i Switch	Naming Convention
Cisco MDS 9222i	Filename begins with m9200-s2ek9

Selecting the Software Image for a Cisco MDS 9250i Switch

The system and kickstart image that you use for a Cisco MDS 9250i switch is shown in [Table 7](#).

Table 7 *Software Images for a Cisco MDS 9250i Switch*

Cisco MDS 9250i Switch	Naming Convention
Cisco MDS 9250i	Filename begins with m9250-s5ek9

Selecting the Software Image for a Cisco MDS 9396S Switch

The system and kickstart image that you use for a Cisco MDS 9396S switch is shown in [Table 8](#).

Table 8 *Software Images for a Cisco MDS 9396S Switch*

Cisco MDS 9396S Switch	Naming Convention
MDS 9396S	Filename begins with m9300-s1ek9

Selecting the Software Image for a Cisco MDS 9500 Series Switch

The system and kickstart image that you use for a Cisco MDS 9500 Series switch with a Supervisor-2 or Supervisor-2A module is shown in [Table 9](#). The Supervisor 1 module is not supported from NX-OS Release 4.2(1) and later releases.

Table 9 *Software Images for Cisco MDS 9500 Series Switches*

Cisco MDS 9500 Series Switch Type	Naming Convention
Cisco MDS 9513, 9509, and 9506	Filename begins with m9500-sf2ek9

Use the **show module** command to display the type of supervisor module in the switch. The following is sample output from the **show module** command on a Supervisor-2 module:

```
switch# show module
Mod  Ports  Module-Type                Model                Status
---  ---
7    0      Supervisor/Fabric-2        DS-X9530-SF2-K9     active *
8    0      Supervisor/Fabric-2        DS-X9530-SF2-K9     ha-standby
```

Selecting the Software Image for a Cisco MDS 9700 Series Switch

The system and kickstart image that you use for a Cisco MDS 9700 Series switch is shown in [Table 10](#).

Table 10 *Software Images for Cisco MDS 9700 Series Switch*

Cisco MDS 9710 Switch	Naming Convention
Cisco MDS 9710 and 9706	Filename begins with m9700-sf3ek9

NPE Software Images

No payload encryption (NPE) images are available with Cisco MDS NX-OS Release 6.2(23) software. The NPE images are intended for countries who have import restrictions on products that encrypt payload data.

To differentiate an NPE image from the standard software image, the letters 'npe' are included in the image name as follows:

- m9100-s3ek9-kickstart-mz-npe.6.2.23.bin
- m9100-s3ek9-mz-npe.6.2.23.bin
- m9100-s5ek9-kickstart-mz-npe.6.2.23.bin
- m9100-s5ek9-mz-npe.6.2.23.bin
- m9200-s2ek9-kickstart-mz-npe.6.2.23.bin
- m9200-s2ek9-mz-npe.6.2.23.bin
- m9250-s5ek9-kickstart-mz-npe.6.2.23.bin
- m9250-s5ek9-mz-npe.6.2.23.bin
- m9300-s1ek9-kickstart-mz-npe.6.2.23.bin
- m9300-s1ek9-mz-npe.6.2.23.bin
- m9500-sf2ek9-kickstart-mz-npe.6.2.23.bin
- m9500-sf2ek9-mz-npe.6.2.23.bin
- m9700-sf3ek9-kickstart-mz-npe.6.2.23.bin
- m9700-sf3ek9-mz-npe.6.2.23.bin

When downloading software, ensure that you select the correct software images for you Cisco MDS 9000 Series switch. Nondisruptive software upgrades or downgrades between NPE images and non-NPE images are not supported.

Subscribing for Important Product Update Notifications

Cisco provides a subscription service to notify you of important events related to Cisco MDS software and hardware for the following categories:

- End-of-Sale and End-of-Life Announcements
- Field Notices
- Security Advisories
- Software Updates [New, Certified, Software Advisories, Deferred, Obsoleted]
- Known Bugs

We recommend that you at least subscribe to the Field Notices, Security Advisories, and Software Updates [New, Certified, Software Advisories, Deferred, Obsoleted] categories, if not all categories, so that you can receive notifications about any critical product issues.

To subscribe to a category for receiving notifications of important updates:

1. Go to <https://www.cisco.com/>, and log in to your account.
 2. Click **Support**.
 3. Under the **Support Resources** category, click **Cisco Notification Service**.
 4. On the **Cisco Notification Service** page, click **Add Notification**.
-

5. Under the **Topic Type** menu, click the **Alert-centric** option and then click **Continue**.
6. Under the **Topic** menu, choose a category and then click **Continue**.
7. Under the **Sub-Topic(s)** menu, type “mds nx-os” in the search box and then click **MDS 9000 NX-OS and SAN-OS Software** option from the list.
8. Under the **Finish** menu, click **Finish**.



Note You must renew your notification subscriptions annually.

Upgrading Your Cisco MDS NX-OS Software Image

This section lists the guidelines recommended for upgrading your Cisco MDS NX-OS software image and includes the following topics:

- [General Upgrading Guidelines, page 17](#)
- [Nondisruptive Upgrade Paths, page 19](#)



Note Before you begin the upgrade process, review the list of chassis and modules that Cisco MDS NX-OS Release 6.2(23) supports. See the “[Components Supported](#)” section on page 2.

For detailed instructions for performing a software upgrade using Cisco DCNM, see the [Cisco DCNM Installation and Licensing Guide, Release 6.x](#).

General Upgrading Guidelines

Follow these general guidelines before performing a software upgrade:

- Review the nondisruptive upgrade path to Release 6.2(23) in [Table 11](#).
- Prior to upgrading any Cisco MDS 9706 and Cisco MDS 9710 switches to Cisco MDS NX-OS Release 6.2(23), the switches should be checked if they are affected by [CSCvg05230](#).
This defect manifests as a corrupt IPv6 address with a zero length mask (/0) on the mgmt0 interface. The actual IPv6 address itself is not important but if it has a /0 mask then it is invalid. This invalid IPv6 address cannot be removed by normal configuration. Refer to the following example:

```
show interface mgmt0
```

```
.  
.
.
```

```
:::10.1.2.255/0
```

If a switch is found to be affected, there are specific steps that must be taken after upgrading to Cisco MDS NX-OS Release 6.2(23). For information on these specific steps, see the **Resolution Summary** section in [CSCvg05230](#).

- In Cisco MDS 9500 and Cisco MDS 9700 switches, install and configure the dual supervisor modules before the upgrade.
- Issue the **show install all impact upgrade-image** CLI command to determine if your upgrade will be nondisruptive.
- Be aware that some features impact whether an upgrade is disruptive or nondisruptive:
 - **Fibre Channel Ports:** Fibre Channel ports can be nondisruptively upgraded without affecting traffic on the ports. See [Table 11](#) for the nondisruptive upgrade path for all NX-OS and SAN-OS releases.

- **Gigabit Ethernet Ports:** Traffic on GigabitEthernet/IPStorage ports is disrupted during an upgrade or downgrade. This includes the Gigabit Ethernet ports on the MSM-18/4 module, the MDS 9222i switch, the MDS 9000 16-Port Storage Services Node (SSN-16), and the IPStorage ports in MDS 9250i. Those nodes that are members of VSANs traversing an FCIP ISL are impacted, and a fabric reconfiguration occurs. iSCSI initiators connected to the Gigabit Ethernet ports lose connectivity to iSCSI targets while the upgrade is in progress.



Note • In addition to these guidelines, you may want to review the information in the “[Limitations and Restrictions](#)” section prior to a software upgrade to determine if a feature may possibly behave differently following the upgrade.

- In Cisco MDS 9700 switches, upgrading to releases that do not support the High Voltage DC (HVDC) PSU will not work or upgrading will be prevented if the High Voltage DC (HVDC) PSU is installed.
- Before upgrading Cisco MDS 9396S switch in Cisco N-Port Virtualizer (NPV) mode from Cisco MDS NX-OS Release 6.2(21) or earlier to Cisco MDS NX-OS Release 6.2(23), refer to the [CSCvd74861](#), [CSCvd74840](#), [CSCvh97251](#), and [CSCvi10304](#) defects.

Nondisruptive Upgrade Paths

Use [Table 11](#) to determine your nondisruptive upgrade path to Cisco MDS NX-OS Release 6.2(23). Find the image release number you are currently using in the “Current Release” column of the table and follow the steps in the order specified to perform the upgrade.



Note

The software upgrade information in [Table 11](#) applies only to Fibre Channel switching traffic. Upgrading system software disrupts IP traffic and intelligent services traffic.

Table 11 **Nondisruptive Upgrade Path to Cisco MDS NX-OS Release 6.2(23)**

Current Release	Nondisruptive Upgrade Path and Ordered Upgrade Steps
NX-OS:	
All 6.2(x) releases	Upgrade directly to NX-OS Release 6.2(23)
All 5.2(x) releases	Upgrade directly to NX-OS Release 6.2(23)
All 5.0(x) releases	<ol style="list-style-type: none">1. Upgrade to NX-OS Release 5.2(8h).2. Upgrade to NX-OS Release 6.2(23)

Downgrading Your Cisco MDS NX-OS Software Image

This section lists the guidelines recommended for downgrading your Cisco MDS NX-OS software image and includes the following topics:

- [General Downgrading Guidelines, page 19](#)

General Downgrading Guidelines

Follow these general guidelines before you perform a software downgrade:

- Issue the system **no acl-adjacency-sharing** EXEC command to disable ACL adjacency usage on Generation 2 modules (Generation 2 modules or switches can have one or more ports in port groups that share common resources such as bandwidth and buffer credits.). If this command fails, reduce the number of zones, IVR zones, TE ports, or a combination of these in the system and issue the command again.
- Disable all features not supported by the downgrade release. Use the **show incompatibility system downgrade-image** command to determine what you need to disable.
- Use the **show install all impact downgrade-image** command to determine if your downgrade will be nondisruptive.
- Be aware that some features impact whether a downgrade is disruptive or nondisruptive:
 - **Fibre Channel Ports:** Fibre Channel ports can be nondisruptively downgraded without affecting traffic on the ports. See [Table 12](#) for the nondisruptive downgrade path for all SAN-OS releases.
 - **Gigabit Ethernet Ports:** Traffic on GigabitEthernet/IPStorage ports is disrupted during a downgrade. This includes the Gigabit Ethernet ports on the MSM-18/4 module, the MDS 9222i switch, the MDS 9000 16-Port Storage Services Node (SSN-16), and the IPStorage ports in MDS 9250i. Those nodes that are members of VSANs traversing an FCIP ISL are impacted, and a fabric reconfiguration occurs. iSCSI initiators connected to the Gigabit Ethernet ports lose connectivity to iSCSI targets while the downgrade is in progress.

Use [Table 12](#) to determine the nondisruptive downgrade path from Cisco NX-OS Release 6.2(23). Find the NX-OS or SAN-OS image that you want to downgrade to in the To NX-OS or SAN-OS Release column of the table and follow the steps in the order specified to perform the downgrade.



Note The software downgrade information in [Table 12](#) applies only to Fibre Channel switching traffic. Downgrading system software disrupts IP and intelligent services traffic.

- Downgrading from the Cisco MDS NX-OS Release 6.2(23) to Cisco MDS NX-OS Release 6.2(5a), 6.2(5), 6.2(3), or 6.2(1) on a Cisco MDS 9700 Series Director with 48-port 10-Gigabit FCoE module or VSAN configurations require additional steps that must be performed before downgrading. For more information, see the [Cisco MDS 9000 NX-OS Software Upgrade and Downgrade Guide, Release 6.2\(x\)](#).

ISSD Guidelines for Cisco MDS 9148, 9222i, and 9500 Switches

Refer to the [“General Downgrading Guidelines”](#) section on page 19.

ISSD Guidelines for Cisco MDS 9396S Switches

- Downgrading from the Cisco MDS NX-OS Release 6.2(23) to Cisco MDS NX-OS Release 6.2(13) is not supported on the Cisco MDS 9396S Multilayer Fabric Switch. The minimum recommended image for Cisco MDS 9396S Multilayer Fabric Switch is 6.2(13a).
- Downgrading from Cisco MDS NX-OS Release 6.2(23) to releases lower than Cisco MDS NX-OS Release 6.2(15) is not supported on a Cisco MDS 9396S Switch which has DS-CAC-1200W power supply units and DS-C96S-FAN-I port side intake fan trays installed.

ISSD Guidelines for Cisco MDS 9250i Switches

- Downgrading from Cisco MDS NX-OS Release 6.2(23) to releases lower than Cisco MDS NX-OS Release 6.2(15) is not supported on a Cisco MDS 9250i Switch which has only one online PSU.
- Downgrading from Cisco MDS NX-OS Release 6.2(23) to releases lower than Cisco MDS NX-OS Release 6.2(15) on a Cisco MDS 9250i Switch with two online PSUs results in loss of N:N grid redundancy. The switch will run in non-redundant mode.
- Downgrading from Cisco MDS NX-OS Release 6.2(23) to releases lower than Cisco MDS NX-OS Release 6.2(15) on a Cisco MDS 9250i Switch with three online PSUs results in loss of N:N grid redundancy. The switch will run in N+1 power redundant mode.

ISSD Guidelines for Cisco MDS 9700 Switches

Downgrade to releases that do not support the High Voltage DC (HVDC) PSU will not work or the downgrade will be prevented if the High Voltage DC (HVDC) PSU is installed.

Table 12 *Nondisruptive Downgrade Path from NX-OS Release 6.2(23)*

To NX-OS or SAN-OS Release	Nondisruptive Downgrade Path and Ordered Downgrade Steps
NX-OS:	
All 6.2(x) releases	Downgrade directly from NX-OS Release 6.2(23)
All 5.2(x) releases	Downgrade directly from NX-OS Release 6.2(23)
All 5.0(x) releases	<ol style="list-style-type: none">1. Downgrade from NX-OS Release 6.2(23)2. Downgrade to NX-OS Release 5.2(8h)3. Downgrade to NX-OS Release 5.0(8a)
All 4.2(x) and 4.1(x) releases	<ol style="list-style-type: none">1. Downgrade from NX-OS Release 6.2(23)2. Downgrade to NX-OS Release 5.2(8h)3. Downgrade to NX-OS Release 5.0(8a)4. Downgrade to NX-OS Release 4.2(x) or 4.1(x)

New Hardware and Software Features

- [New Hardware Features in Cisco MDS NX-OS Release 6.2\(23\)](#)
- [New Software Features in Cisco MDS NX-OS Release 6.2\(23\)](#)
- [New Hardware Features in Cisco MDS NX-OS Release 6.2\(23\)](#)
- [New Software Features in Cisco MDS NX-OS Release 6.2\(21\)](#)
- [New Hardware Features in Cisco MDS NX-OS Release 6.2\(19\)](#)
- [New Software Features in Cisco MDS NX-OS Release 6.2\(19\)](#)
- [New Hardware Features in Cisco MDS NX-OS Release 6.2\(17\)](#)
- [New Software Features in Cisco MDS NX-OS Release 6.2\(17\)](#)
- [New Hardware Features in Cisco MDS NX-OS Release 6.2\(15\)](#)
- [New Software Features in Cisco MDS NX-OS Release 6.2\(15\)](#)
- [New Hardware Features in Cisco MDS NX-OS Release 6.2\(13\)](#)
- [New Software Features in Cisco MDS NX-OS Release 6.2\(13\)](#)
- [New Hardware Features in Cisco MDS NX-OS Release 6.2\(11\)](#)
- [New Software Features in Cisco MDS NX-OS Release 6.2\(11\)](#)
- [New Hardware Features in Cisco MDS NX-OS Release 6.2\(9\)](#)
- [New Software Features in Cisco MDS NX-OS Release 6.2\(9\)](#)
- [New Hardware Features in Cisco MDS NX-OS Release 6.2\(7\)](#)
- [New Software Features in Cisco MDS NX-OS Release 6.2\(7\)](#)

- [New Hardware Features in Cisco MDS NX-OS Release 6.2\(5\)](#)
- [New Software Features in Cisco MDS NX-OS Release 6.2\(5\)](#)
- [New Hardware Features in Cisco MDS NX-OS Release 6.2\(3\)](#)
- [New Software Features in Cisco MDS NX-OS Release 6.2\(3\)](#)
- [New Hardware Features in Cisco MDS NX-OS Release 6.2\(1\)](#)
- [New Software Features in Cisco MDS NX-OS Release 6.2\(1\)](#)

New Hardware Features in Cisco MDS NX-OS Release 6.2(23)

There are no new hardware features in Cisco MDS NX-OS Release 6.2(23).

New Software Features in Cisco MDS NX-OS Release 6.2(23)

There are no new software features in Cisco MDS NX-OS Release 6.2(23).

New Hardware Features in Cisco MDS NX-OS Release 6.2(21)

There are no new hardware features in Cisco MDS NX-OS Release 6.2(21).

New Software Features in Cisco MDS NX-OS Release 6.2(21)

There are no new software features in Cisco MDS NX-OS Release 6.2(21).

New Hardware Features in Cisco MDS NX-OS Release 6.2(19)

This section lists the new hardware chassis and features introduced in the Cisco MDS NX-OS Release 6.2(19):

High Voltage Power Supply Unit in Cisco MDS 9700 Series Directors

Support for a High Voltage power supply unit (DS-CHV-3.5KW) is introduced for the Cisco MDS 9706 and 9710 Director switches. The power supply module can deliver up to 3500 W of output power at high-voltage AC and DC (100 to 277 VAC and 200 to 380 VDC) inputs. For more information about this feature, see the [Cisco MDS 9700 Series Hardware Installation Guide](#).

New SFPs Support

Support for third-party SFPs is introduced for Cisco MDS 9396s, MDS 9250i, MDS 9148s, and MDS 9700 Series switches: For more information, see the [Interoperability Matrix for Cisco Nexus and MDS 9000](#).

New Software Features in Cisco MDS NX-OS Release 6.2(19)

SHA-2 Encryption and Fingerprint Hashing Support

- New user accounts will have passwords encrypted with SHA-2 by default.
- SHA-2 fingerprint hashing is supported only on Cisco MDS 9148S, MDS 9396S, MDS 9250i, and MDS 9700 Series switches.

For more information about this feature, see the “Configuring Users and Common Roles” chapter in the [Cisco MDS 9000 Series NX-OS Security Configuration Guide](#).

New Hardware Features in Cisco MDS NX-OS Release 6.2(17)

There are no new hardware features introduced in Cisco MDS NX-OS Release 6.2(17).

New Software Features in Cisco MDS NX-OS Release 6.2(17)

This section briefly describes the new software features introduced in Cisco MDS NX-OS Release 6.2(17).

Health Monitoring Enhancements

Starting from Cisco MDS NX-OS Release 6.2(17), testing of the standby supervisor power management bus on Cisco MDS 9700 series switches is available. For detailed information about this feature, see the “Configuring Generic Online Diagnostics” chapter in the [Cisco MDS 9000 Series NX-OS System Management Configuration Guide](#).

FCIP Enhancements

The `tcp maximum-bandwidth-kbps` command’s limitation of limiting only the IP Storage port traffic and not the FCIP port traffic was added. For detailed information about this feature, see the “T Commands” chapter in the [Cisco MDS 9000 Series Command Reference](#).

Port Monitor Enhancements

- New 'state-change' counter added. This counter increments for each port transition between up and down.
- The 'check interval' is now supported on the Cisco MDS 9250i Multiservice Fabric Switch.

For detailed information about these enhancements, see the [Cisco MDS 9000 Series NX-OS Interfaces Configuration Guide](#).

Command-Line Interface (CLI) Command Changes

- `counter` (changed)
- `monitor counter` (changed)

New Hardware Features in Cisco MDS NX-OS Release 6.2(15)

This section lists the new hardware chassis and features introduced in the Cisco MDS NX-OS Release 6.2(15).

Cisco MDS 9250i Power Redundancy Enhancements

Support for grid redundancy is available with two online PSUs on a Cisco MDS 9250i Multiservice Fabric Switch. For detailed information about this feature, see the “Cisco MDS 9250i Multiservice Fabric Switch Overview” chapter in the [Cisco MDS 9250i Multiservice Fabric Switch Hardware Installation Guide](#).

Cisco MDS 9396S Switch Enhancements

The following new components have been introduced on the Cisco MDS 9396S Switch:

- Power Supply—Supports both portside-intake airflow and portside-exhaust airflow. Only this PSU should be used with the portside-intake fan module.
- Fan module—Supports portside-intake airflow.

For detailed information about this feature, see the “Product Overview” chapter in the [Cisco MDS 9396S Multilayer Fabric Switch Hardware Installation Guide](#).

New Software Features in Cisco MDS NX-OS Release 6.2(15)

This section lists the new software features introduced in Cisco MDS NX-OS Release 6.2(15).

Port Monitor Rapid Notification Enhancement

The following two enhancements have been added to the port monitor feature:

- An optional warning threshold to allow syslog notification at a lower event threshold than the alert threshold.
- A 'check interval' parameter is supported on Cisco MDS 9706 and MDS 9710 switches to allow warnings and alerts to be triggered before the full poll interval expires.

For detailed information about this enhancement, see the “Configuring Interfaces” chapter in the [Cisco MDS 9000 Series NX-OS Interfaces Configuration Guide](#).

Command-Line Interface (CLI) Command Changes

- **counter** (changed)
- **port-monitor check-interval** (changed)

New Hardware Features in Cisco MDS NX-OS Release 6.2(13)

This section lists the new hardware chassis and features introduced in the Cisco MDS NX-OS Release 6.2(13).

Cisco MDS 9396S Multilayer Fabric Switch

The Cisco MDS 9396S Multilayer Fabric Switch (DS-C9396S-48EK9) is a next generation multilayer Intelligent Services-oriented fabric switch. With powerful, compact, two rack-unit (2RU) form factors, it has an integrated 96-port Fibre Channel functionality. All Fibre Channel ports are capable of line rate at 2, 4, 8, 10, 16 Gbps.

New Software Features in Cisco MDS NX-OS Release 6.2(13)

This section lists the new software features introduced in Cisco MDS NX-OS Release 6.2(13).

FCIP Configuration Guidelines to Maximize Performance on a Cisco MDS 9250i Switch

For detailed configuration information about this feature, see the “Configuring FCIP” chapter in the [Cisco MDS 9000 Series NX-OS IP Services Configuration Guide](#).

Configurable Link Speed on 10 Gbps IP Storage Interfaces

For detailed configuration information about this feature, see the “Configuring IP Storage Services” chapter in the [Cisco MDS 9000 Series NX-OS IP Services Configuration Guide](#).

Slow Drain Detection Enhancements

For detailed configuration information about this feature, see the “Configuring Interfaces” chapter in the [Cisco MDS 9000 Series NX-OS Interfaces Configuration Guide](#).

Internal CRC Detection and Isolation

For detailed configuration information about this feature, see the “High Availability Overview” chapter in the [Cisco MDS 9000 Series NX-OS High Availability and Redundancy Configuration Guide](#).

Cisco TrustSec Fibre Channel Link Encryption

For detailed configuration information about this feature, see the “Configuring Cisco TrustSec Fibre Channel Link Encryption” chapter in the [Cisco MDS 9000 Series NX-OS Security Configuration Guide](#).

Zoneset Activation Confirmation Control

For detailed configuration information about this feature, see the “Configuring and Managing Zones” chapter in the [Cisco MDS 9000 Series NX-OS Fabric Configuration Guide](#).

Command-Line Interface (CLI) Command Changes

- **counter tx-slowport-count** (new)
- **counter tx-slowport-oper-delay** (new)
- **counter txwait** (new)
- **monitor counter tx-slowport-count** (new)
- **monitor counter tx-slowport-oper-delay** (new)
- **monitor counter txwait** (new)
- **switchport speed** (new)
- **tcp maximum-bandwidth-kbps** (changed)
- **tcp maximum-bandwidth-mbps** (changed)

- `zoneset overwrite-control vsan` (new)

New Hardware Features in Cisco MDS NX-OS Release 6.2(11)

Copper 10G SFP Support for IPS/FCIP Ports on Cisco MDS 9250i

Introduces support for Copper 10G SFP (Twinax) on Cisco MDS 9250i IPS/FCIP ports.

For detailed information about this feature, see the [Cisco MDS 9000 Series Pluggable Transceivers Data Sheet](#).

New Software Features in Cisco MDS NX-OS Release 6.2(11)

This section briefly describes the new software features introduced in Cisco MDS NX-OS Release 6.2(11).

FC Scale Monitoring

Syslog messages are generated when any of the scalability metrics listed below are exceeded. The default thresholds are overridable with Embedded Event Manager policies.

- Logins per port, line-card, switch and fabric
- Zone database size, number of zone sets, zones, and zone members
- FCNS database

For detailed information about this feature, see the [Cisco MDS 9000 Series NX-OS System Management Configuration Guide](#) and [Cisco MDS NX-OS Release 6.2 Configuration Limits](#).

FC Domain Scale

The maximum number of domains per fabric is increased to 80. All nodes in the fabric are required to run Cisco MDS NX-OS Release 6.2(11) or higher to exceed the old domain limit of 60.

For detailed information about this feature, see the [Cisco MDS NX-OS Release 6.2 Configuration Limits](#) and [Cisco MDS 9000 Series NX-OS Security Configuration Guide](#).

Configurable GOLD Actions

The Generic Online Diagnostic System (GOLD) leverages called Embedded Event Manager (EEM) to detect and handle failure conditions. The default EEM policies variously generate CallHome alerts, syslogs, OBFL, and exception logs. Overriding the default policies to include corrective or recovery actions is now supported.

For detailed information about this feature, see the “Configuring Generic Online Diagnostics” and “Configuring Embedded Event Manager” chapters in the [Cisco MDS 9000 Series NX-OS System Management Configuration Guide](#).

Increase in Configuration Limits for Features in Cisco MDS 9500 Series Supervisor-2A Module

The following features have increased configuration limits in Cisco MDS 9500 Series Supervisor-2A Module:

- Total number of zones per switch—10400
- Total number of zone members per switch—20800

- Total number of FCNS members per switch—13000

For detailed information about these enhancements, see the [Cisco MDS NX-OS Release 6.2 Configuration Limits](#).

Command-Line Interface (CLI) Command Changes

- **event zone** (new)
- **event fcns** (new)
- **event flogi** (new)

New Hardware Features in Cisco MDS NX-OS Release 6.2(9)

This section briefly describes the new hardware features introduced in Cisco NX-OS Release 6.2(9).

Cisco MDS 9706 Director

The Cisco MDS 9706 (DS-C9706) supports up to 192 ports in a 6-slot modular chassis, with up to 768 ports in a single rack. You can configure ports as Fibre Channel (2/4/8-Gbps, 4/8/16-Gbps, or 10-Gbps), FCoE (10-Gbps), or a mix of both Fibre Channel and FCoE. The Cisco MDS 9706 supports the same Fibre Channel and FCoE switching modules as the Cisco MDS 9710 director for a high degree of system commonality.

For detailed information about the Cisco MDS 9706 Director, see the [Cisco MDS 9700 Series Hardware Installation Guide](#).

Cisco MDS 9148S Multilayer Fabric Switch

The Cisco MDS 9148S Multilayer Fabric Switch (DS-C9148S48PK9) is the next generation of the highly reliable and flexible Cisco MDS 9100 Series switches. It combines high performance with exceptional flexibility and cost-effectiveness. A powerful compact one rack-unit (1RU) form factor can scale from 12 to 48 line-rate 16 Gbps Fibre Channel ports.

For detailed information about the Cisco MDS 9148S Multilayer Fabric Switch, see the [Cisco MDS 9148S Hardware Installation Guide](#).

New Software Features in Cisco MDS NX-OS Release 6.2(9)

This section briefly describes the new software features introduced in Cisco NX-OS Release 6.2(9).

- Confirm Commit Device Alias
- Confirm Commit Zone
- FC and FCoE scale enhancements
- FCoE long-distance
- Fibre Channel Common Transport (FC-CT) Management Security
- Poweron Auto Provisioning (POAP) support for Cisco MDS 9148, 9148s, 9250i, and 9396s Multilayer Fabric Switches and Cisco MDS 9700 and MDS 9500 Multilayer Director-class switches.
- Logging of excessive 'transmit wait' events to the slow drain detection capabilities for Cisco MDS 9700 Series, MDS 9250i, and MDS 9148S switches.
- TrustSec link-encryption for Cisco MDS 9700 Series

Role Name Length

Cisco MDS NX-OS Release 6.2(9b) introduces support for longer role names than previous releases. The maximum characters for role name length is increased from 16 to 64 characters. For more information on Configuring Users and Common Roles, see [Cisco MDS 9000 Series NX-OS Security Configuration Guide](#).

Command-Line Interface (CLI) Command Changes

- **confirm commit device alias** (new)
- **confirm commit zone** (new)
- **fc-management enable** (new)
- **fc-management database vsan** (new)
- **fcroute** (deprecated)
- **fcns bulk-notify** (deprecated)
- **hardware ejector enable** (changed)
- **logging level poap** (new)
- **priority-flow-control long-distance** (changed)
- **role name max-length** (changed)
- **system timeout no-credit-drop** (new)
- **show fc-management database** (new)
- **show logging level poap** (new)
- **show process creditmon credit-loss-events** (new)
- **show process creditmon slowport-monitor-events** (new)
- **show system internal eth-qos port-node interface** (new)
- **show tech-support fc-management** (new)
- **system timeout slowport-monitor** (new)

New Hardware Features in Cisco MDS NX-OS Release 6.2(7)

This section briefly describes the new hardware introduced in Cisco NX-OS Release 6.2(7). For detailed information about the new hardware, see the [Cisco MDS 9250i Hardware Installation Guide](#).

Cisco MDS 48-Port 10-Gigabit Fibre Channel over Ethernet Module Ethernet Module

The Cisco MDS 48-Port 10-Gigabit Fibre Channel over Ethernet Module (DS-X9848-480K9) is designed for the Cisco MDS 9710 Directors. The Cisco MDS 9710 Director supports up to eight 10 Gigabit Ethernet modules. These modules are hot-swappable and they support 10-Gigabit Ethernet ports in SFP+ form factor.

The Cisco MDS 48-Port 10-Gigabit Ethernet module delivers integrated Fibre Channel over Ethernet (FCoE), simplifies the network infrastructure and helps reduce costs. The FCoE module allows you to extend the existing Fibre Channel SANs by using FCoE. The Cisco MDS 48-Port 10-Gigabit Ethernet module supports connectivity to FCoE switching platforms and to FCoE devices. This module also supports connectivity to FCoE initiators and targets that only send FCoE traffic.

New Software Features in Cisco MDS NX-OS Release 6.2(7)

This section briefly describes the new software features introduced in Cisco NX-OS Release 6.2(7).

- Enhanced the scalability for zones, maximum devices in the fabric and maximum devices in the switch.
- Forward Error Correction (FEC) for 16-Gbps ISL links
- Enhanced scalability for simultaneous FLOGIs for Cisco MDS 9500 Series switches
- Restriction of the number of NPIV logins to not exceed the configuration limits in for Cisco MDS 9500 Series switches

Command-Line Interface (CLI) Command Changes

- **fcns bulk-notify** (new)
- **rscn coalesce swrscn vsan** (new)
- **switchport max-mpiv-limit** (new)
- **switchport trunk-max-mpiv-limit** (new)
- **switchport fec** (new)
- **system port pacer mode F interface-login-threshold** (new)
- **show fabric switch information vsan** (new)

New Hardware Features in Cisco MDS NX-OS Release 6.2(5)

This section briefly describes the new hardware introduced in Cisco NX-OS Release 6.2(5). For detailed information about the new hardware, see the [Cisco MDS 9250i Hardware Installation Guide](#).

Cisco MDS 9250i Multiservice Fabric Switch

The Cisco MDS 9250i Multiservice Fabric Switch (DS-C9250I-K9) is an optimized platform for deploying high-performance SAN extension solutions, distributed intelligent fabric services, and cost-effective multiprotocol connectivity for both open systems and mainframe environments.

The Cisco MDS 9250i switch is an ideal solution for local office and remote branch-office SANs and also in large-scale SANs operating the Cisco MDS 9700 and 9500 Series Multilayer director platforms.

The Cisco MDS 9250i switch offers 40 autosensing 2-, 4-, 8-, and 16-Gbps line-rate Fibre Channel ports, eight 10-Gigabit Ethernet Fibre Channel over Ethernet (FCoE) ports, and two 10-Gigabit Ethernet IP storage services ports in a fixed two-rack-unit (2RU) form factor.

New Software Features in Cisco MDS NX-OS Release 6.2(5)

This section briefly describes the new software features introduced in Cisco NX-OS Release 6.2(5).

- DMM support for Cisco MDS 9250i switch
 - FCIP support for Cisco MDS 9250i switch
 - FCR support for Cisco MDS 9250i switch
 - IOA support for Cisco MDS 9250i switch
-

Command-Line Interface (CLI) Command Changes

- **ioa-ping** (new)
- **pathtrace** (new)
- **show ioa cluster flows** (changed)
- **tcp-connections** (new)
- **show ioa cluster** (changed)

New Hardware Features in Cisco MDS NX-OS Release 6.2(3)

There are no new hardware features in Cisco MDS NX-OS Release 6.2(3).

New Software Features in Cisco MDS NX-OS Release 6.2(3)

This section briefly describes the new software features introduced in Cisco NX-OS Release 6.2(3).

- Cisco MDS Data Mobility Manager (DMM) supports logical unit numbers (LUN) sizes that are larger than 2 terabyte. The supported number of sessions per DMM job is more than 255. For more information, see the [Cisco MDS 9000 Series Data Mobility Manager Configuration Guide](#).
- FC-Redirect (FCR) support for Cisco MDS 9710 Director. For more information on IOA, see the [Cisco MDS 9000 Series I/O Accelerator Configuration Guide](#). For more information on SME, see the [Cisco MDS 9000 Series Storage Media Encryption Configuration Guide](#).

Command-Line Interface (CLI) Command Changes

- **hardware ejector enable** (new)
- **show fcdomain vsan** (changed)
- **show interface counters performance** (deprecated)

New Hardware Features in Cisco MDS NX-OS Release 6.2(1)

This section briefly describes the new hardware introduced in Cisco NX-OS Release 6.2(1). For detailed information about the new hardware, see the [Cisco MDS 9710 Hardware Installation Guide](#).

This section includes the following topics:

- [Cisco MDS 9710 Director, page 30](#)
- [Cisco MDS 9000 48-Port, 16-Gbps Fibre Channel Switching Module, page 31](#)

Cisco MDS 9710 Director

The Cisco MDS 9710 Director is a high-performance SAN switch that is designed to meet the requirements of enterprise data center storage environments. The Cisco MDS 9710 Director has a ten-slot chassis that supports up to eight 48-port, 16-Gbps switching modules, two supervisor modules, up to six fabric modules, three fan trays, and up to eight power supplies. Airflow is front-to-back in the Cisco MDS 9710 chassis.

Cisco MDS 9000 48-Port, 16-Gbps Fibre Channel Switching Module

Up to eight Cisco MDS 9000 48-Port 16-Gbps Fibre Channel switching modules can be used in the Cisco MDS 9710 Director. These modules are hot-swappable and compatible with 2-, 4-, 8-, 16- and 10-Gbps interfaces, and they support hot-swappable Enhanced Small Form-Factor Pluggable (SFP+) transceivers.

The Fibre Channel switching module has 12 4-port port groups. Each port group is capable of a speed of 64-Gbps in each direction simultaneously. Ports on this switching module support expansion port (E port), fabric port (F port), fabric loop port (FL port), SPAN destination port (SD port), and (TE port) port mode.

- Individual ports can be configured with Cisco 16-Gbps, 8-Gbps or 10-Gbps shortwave or longwave SFP+ transceivers. Each port supports 500 buffer credits with no additional licensing required. With the Cisco Enterprise Package, up to 4095 buffer credits can be allocated to an individual port.

New Software Features in Cisco MDS NX-OS Release 6.2(1)

This section briefly describes the new software features introduced in Cisco NX-OS Release 6.2(1).

- **Generic Online Diagnostics**

Starting with Cisco NX-OS Release 6.2(1), the Cisco MDS 9000 Series supports the generic online diagnostics (GOLD) feature. With online diagnostics, you can test and verify the hardware functionality of a device while the device is connected to a live network. In particular, the online diagnostics help you verify that hardware and internal data paths are operating as designed so that you can rapidly isolate faults.

For more information about this feature, see the [Cisco MDS 9000 System Management Configuration Guide](#).

- **Enhancement to map LDAP/AD users to Cisco NX-OS roles and allow both local and remote users to use SSH or Telnet.**

For more information about this feature, see the [Cisco MDS 9000 Security Configuration Guide](#).

Command-Line Interface (CLI) Command Changes

- **clear snmp counters** (new)
- **dmm module job** (changed)
- **show dmm job** (deprecated)
- **show dmm job-id** (new)
- **show interface** (changed)
- **show topology isl** (new)

Information about the modified CLI commands can be found in the [Cisco MDS 9000 Command Reference](#).

Licensed Cisco NX-OS Software Packages

Most Cisco MDS 9000 Series software features are included in the standard package. However, some features are logically grouped into add-on packages that must be licensed separately, such as the Cisco MDS 9000 Enterprise package, SAN Extension over IP package, Mainframe package, and Data Mobility Manager package. On-demand ports activation licenses are also available for the Cisco MDS 9250i Multiservice Fabric Switch, Cisco MDS 9148 48-Port Multilayer Fabric Switch, Cisco MDS 9148S 48-Port Multilayer Fabric Switch, the Cisco MDS 8-Gb Fabric Switch for HP c-Class Blade System, and the Cisco MDS 9396S 96-Port Multilayer Fabric Switch.



Note A license is not required to use the Cisco MDS 9000 8-port 10-Gbps Fibre Channel over Ethernet (FCoE) module (DS-X9708-K9) and the Cisco MDS 48-Port 10-Gigabit Fibre Channel over Ethernet Module (DS-X9848-480K9).

Additional information about licensed Cisco NX-OS software packages is available at this URL:

<http://www.cisco.com/c/en/us/products/storage-networking/mds-9000-software-licensing/datasheet-listing.html>

Enterprise Package

The standard software package that is bundled at no charge with the Cisco MDS 9000 Series switches includes the base set of features that Cisco believes are required by most customers for building a SAN. The Cisco MDS 9000 Series also has a set of advanced features that are recommended for all enterprise SANs. These features are bundled together in the Cisco MDS 9000 Enterprise package. Refer to the [Cisco MDS 9000 Enterprise Package Fact Sheet](#) for more information.

SAN Extension over IP Package

The Cisco MDS 9000 SAN Extension over IP package allows the customer to use FCIP to extend SANs over wide distances on IP networks using the Cisco MDS 9000 Series IP storage services. Refer to the [Cisco MDS 9000 SAN Extension Over IP Package](#) for more information.

Data Mobility Manager Package

The Cisco MDS 9000 Data Mobility Manager package enables data migration between heterogeneous disk arrays without introducing a virtualization layer or rewiring or reconfiguring SANs. Cisco DMM allows concurrent migration between multiple LUNs of unequal size. Rate-adjusted migration, data verification, dual Fibre Channel fabric support, and management using Cisco DCNM for SAN provide a complete solution that greatly simplifies and eliminates most downtime associated with data migration. Refer to the [Cisco MDS 9000 Data Mobility Manager License - Fact Sheet](#) for more information. The Data Mobility Manager package is for use only with Cisco MDS 9000 Series switches.

On-Demand Port Activation License

On-demand ports allow customers to benefit from Cisco NX-OS Software features while initially purchasing only a small number of activated ports on the Cisco MDS 9250i Multiservice Fabric Switch, MDS 9148S 48-Port Multilayer Fabric Switch, MDS 9148 48-Port Multilayer Fabric Switch, the Cisco MDS 8-Gb Fabric Switch for HP c-Class Blade System, and the Cisco MDS 9396S Multilayer Fabric Switch. As needed, customers can expand switch connectivity by licensing additional ports.

I/O Accelerator Package

The Cisco I/O Accelerator (IOA) package activates IOA on the Cisco MDS 9222i fabric switch, the Cisco MDS 9000 18/4 Multiservice Module (MSM-18/4), and on the SSN-16 module. The IOA package is licensed per service engine and is tied to the chassis. The number of licenses required is equal to the number of service engines on which the intelligent fabric application is used. The SSN-16 requires a separate license for each engine on which you want to run IOA. Each SSN-16 engine that you configure for IOA checks out a license from the pool managed at the chassis level. SSN-16 IOA licenses are available as single licenses.

XRC Acceleration License

The Cisco Extended Remote Copy (XRC) acceleration license activates FICON XRC acceleration on the Cisco MDS 9222i switch, the Cisco MDS 9250i switch, and the SSN-16 or MSM-18/4 in the Cisco MDS 9500 Series directors. One license per chassis is required. You must install the Mainframe Package and the SAN Extension over FCIP Package before you install the XRC acceleration license. The Mainframe Package enables the underlying FICON support, and the FCIP license or licenses enable the underlying FCIP support.

Deprecated and Changed Features

Zoning Features

LUN zoning, read-only zones, and broadcast zones are no longer supported. These features affect the following hardware:

- Cisco MDS 9250i Multiservice Fabric Switch
- Cisco MDS 9396S Multilayer Fabric Switch
- Cisco MDS 9000 8-port 10-Gbps Fibre Channel over Ethernet (FCoE) Module
- Cisco MDS 9000 48-port 8-Gbps Advanced Fibre Channel Switching Module
- Cisco MDS 9000 32-port 8-Gbps Advanced Fibre Channel Switching Module
- Cisco MDS 9000 48-port 16-Gbps Fibre Channel Switching Module
- Cisco MDS 9700 48-port 16-Gbps Fibre Channel Module

You cannot bring up these modules if these features are already configured. You should completely remove all configurations that include these features before you attempt to bring up these modules. In addition, you cannot configure these features after you bring up these modules.

Limitations and Restrictions

This section lists the limitations and restrictions. The following limitations are described:

- [Cisco MDS NX-OS Release 6.2\(23\), page 33](#)
- [Connecting an NPIV Enabled Cisco MDS 9396S Multilayer Fabric Switch to an NPV Switch, page 34](#)
- [ASCII File Can Be Copied to the Startup Configuration, page 34](#)
- [Fibre Channel Security Protocol \(FC-SP\) Support, page 34](#)
- [Install Module Command Changes, page 34](#)
- [IOA Scaling Support on Supervisor-2 Module, page 34](#)

Cisco MDS NX-OS Release 6.2(23)

Cisco DCNM Compatibility with Cisco MDS NX-OS Release 6.2(23)

The recommended DCNM version for Cisco MDS NX-OS Release 6.2(23) is Cisco DCNM, Release 10.x or later. For more information on the DCNM releases that are compatible with the MDS releases, see the [Cisco DCNM Compatibility Matrix](#).

Cisco DCNM Compatibility with Cisco MDS NX-OS Release 6.2(13)

When **snmp-server globalEnforcePriv** is enabled on the switch, Cisco Prime DCNM support for Cisco MDS NX-OS Release 6.2(13) starts from Cisco Prime DCNM Release 7.2(1). Using releases earlier than Cisco Prime DCNM Release 7.2(1) with Cisco MDS NX-OS Release 6.2(13) displays a warning on the console. See [CSCun41202](#) for the workaround.

Connecting an NPIV Enabled Cisco MDS 9396S Multilayer Fabric Switch to an NPV Switch

When trunking is enabled on the NPV ports of any MDS switch (released before the Cisco MDS 9396S Multilayer Fabric Switch) that runs on an MDS NX-OS release earlier than 6.2(13), and you connect an NPIV-enabled Cisco MDS 9396S Multilayer Fabric Switch, use only ports fc1/1 through fc1/63.



Note Trunking failure can occur in both non-portChannel (individual physical NP uplinks) and portChannel NP uplinks. To avoid trunking failure, ensure that you upgrade the NPV switch to Cisco MDS NX-OS Release 6.2(13) or above.

ASCII File Can Be Copied to the Startup Configuration

The **copy bootflash:running-config.ascii startup-config** command that was deprecated in an earlier Cisco NX-OS release is enabled from Cisco NX-OS Release 6.2(1).

Fibre Channel Security Protocol (FC-SP) Support

From Cisco MDS NX-OS Release 6.2(9) onwards, the FC-SP feature is supported on Cisco MDS 9700 Series.

Install Module Command Changes

The **install module *module-number* bios** command is not supported on the Cisco MDS 9710 switch in Cisco NX-OS Release 6.2(1) and later releases. Use the **install all** command to upgrade the BIOS during a software upgrade.

The **install module *module-number* bios** command continues to be supported in Cisco NX-OS Release 6.2(1) on Cisco MDS 9500 Series switches.

IOA Scaling Support on Supervisor-2 Module

From Cisco MDS NX-OS Release 6.2(9) onwards, I/O Accelerator (IOA) scaling is supported only on the Supervisor-2A module and is not supported on the Supervisor-2 module.

Caveats

Resolved Caveats

Table 13 *Resolved Caveats in Cisco MDS NX-OS Release 6.2(23)*

Identifier	Description
CSCux20090	Unable to attach module on MDS fabric switch.
CSCva20758	ISSU - TSH Gdb to upg Gdb Lead to SNMP Crash on MDS 9513.
CSCvb26079	port-monitor does not alert sync-loss when port is flapping continuously.
CSCvd43653	Clock jitter causes rare random frame drops when aggressive frame timeout is configured.
CSCvd74840	OXID based traffic load balancing not working on MDS 9396S in NPV mode on NP Port-channel uplink.
CSCvd74861	MDS 9396S - NPV - Traffic stopped on NP uplink Port-channel members after port flap from core to NPV.
CSCvf14690	Need show tech-support slowdrain for 9148S/9250i NPV.
CSCvg05230	ISSU/D fails with bootflash busy err; seg fault mounting bootflash (not mounted) in 6.x train.
CSCvg44681	DS-X9448: sac_usd service crashes randomly and module powers down.
CSCvh30932	IP access list corruption after NX-OS upgrade.
CSCvh97251	Hosts connected to MDS 9396S in NPV mode are unable to PLOGI to targets after port flap after ISSU.
CSCvh99074	'show tech-support' subcommand on a fully loaded MDS 9700 fails and exits.

Open Caveats

Table 14 *Open Caveats in Cisco MDS NX-OS Release 6.2(23)*

Identifier	Description
CSCvc48910	error seen "no matching key exchange method found" when DM opens session for cli execution.
CSCvd46535	SCP or SFTP configuration for 'ips cores' ignored.
CSCvd49500	MDS 9396S Fan hardware PID not accurate.
CSCvi10304	Hosts connected to MDS in NPV mode unable to PLOGI to targets after ISSU if flex-attach configured.
CSCvi51088	During ISSU, installation fails. Return code 0x40930039 (aborting due to failed upgrade).

Related Documentation

The documentation set for the Cisco MDS 9000 Series includes the documents listed in this section. To find a document online, access the following URL:

http://www.cisco.com/en/US/products/ps5989/tsd_products_support_series_home.html

The documentation set for Cisco Prime Data Center Network Manager is available from the following URL:

http://www.cisco.com/en/US/products/ps9369/tsd_products_support_series_home.html

Release Notes

<http://www.cisco.com/c/en/us/support/storage-networking/mds-9000-nx-os-san-os-software/products-release-notes-list.html>

Regulatory Compliance and Safety Information

<http://www.cisco.com/c/en/us/td/docs/switches/datacenter/mds9000/hw/regulatory/compliance/RCSI.html>

Compatibility Information

<http://www.cisco.com/c/en/us/support/storage-networking/mds-9000-nx-os-san-os-software/products-device-support-tables-list.html>

Installation and Upgrade

<http://www.cisco.com/c/en/us/support/storage-networking/mds-9000-nx-os-san-os-software/products-installation-guides-list.html>

Configuration Guides

<http://www.cisco.com/c/en/us/support/storage-networking/mds-9000-nx-os-san-os-software/products-installation-and-configuration-guides-list.html>

Command-Line Interface

<http://www.cisco.com/c/en/us/support/storage-networking/mds-9000-nx-os-san-os-software/products-command-reference-list.html>

Troubleshooting and Reference

<http://www.cisco.com/c/en/us/support/storage-networking/mds-9000-nx-os-san-os-software/tsd-products-support-troubleshoot-and-alerts.html>

Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, submitting a service request, and gathering additional information, see the monthly *What's New in Cisco Product Documentation*, which also lists all new and revised Cisco technical documentation, at:

<http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html>

Subscribe to the *What's New in Cisco Product Documentation* as a Really Simple Syndication (RSS) feed and set content to be delivered directly to your desktop using a reader application. The RSS feeds are a free service and Cisco currently supports RSS version 2.0.

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