

## CISCO MDS 9000 FAMILY SAN-OS RELEASE 1.3(4)

Use this publication for the Cisco® MDS 9500 Series multilayer directors, and Cisco MDS 9200 and MDS 9100 Series multilayer fabric switches that run Cisco MDS 9000 Family SAN-OS Release 1.3(4). Descriptions provided are for hardware features supported (Table 1), software features available (Table 2), and software ordering information (Table 3).

### HARDWARE SUPPORTED

**Table 1** Software Release 1.3(4) Hardware Features

Hardware Feature	Description
Cisco MDS 9509 Multilayer Director (DS-C9509)	A 9-slot multilayer director. The modular chassis requires two slots for supervisor engine modules with seven slots available for switching modules. The supervisor engine module consists of a control engine and an integrated crossbar.
Cisco MDS 9506 Multilayer Director (DS-C9506)	A 6-slot multilayer director. The modular chassis requires two slots for supervisor engine modules with four slots available for switching modules. The supervisor engine module consists of a control engine and an integrated crossbar.
Cisco MDS 9216 Multilayer Fabric Switch (DS-C9216-K9)	A 3-RU semi-modular fabric switch with sixteen 1/ 2-Gbps auto-sensing Fibre Channel ports and an optional switching module or IP Storage Services (IPS) module.
Cisco MDS 9140 Multilayer Fabric Switch (DS-C9140-K9)	A 1-RU fixed-configuration fabric switch with forty 1/ 2-Gbps auto-sensing Fibre Channel ports.
Cisco MDS 9120 Multilayer Fabric Switch (DS-C9120-K9)	A 1-RU fixed-configuration fabric switch with twenty 1/ 2-Gbps auto-sensing Fibre Channel ports.
MDS 9500 Supervisor/Fabric-I, Module (DS-X9530-SF1-K9)	Supervisor engine module for the Cisco MDS 9500 Series.
16-port 1/ 2-Gbps Auto-Sensing Fibre Channel Switching Module, SFP/LC (DS-X9016)	16-port 1/ 2-Gbps auto-sensing Fibre Channel switching module with Small Form-Factor Pluggable (SFP)/LC connectors for the Cisco MDS 9216 and Cisco MDS 9500 Series.
32-port 1/ 2-Gbps Auto-Sensing Fibre Channel Switching Module, SFP/LC (DS-X9032)	32-port 1/ 2-Gbps auto-sensing Fibre Channel switching module with SFP/LC connectors for the Cisco MDS 9216 and Cisco MDS 9500 Series.
DS-X9308-SMIP	8-port Gigabit Ethernet IP Storage Services module for the Cisco MDS 9216 and Cisco MDS 9500 Series.
DS-X9304-SMIP	4-port Gigabit Ethernet IP Storage Services module for the Cisco MDS 9216 and Cisco MDS 9500 Series.

**Table 1** Software Release 1.3(4) Hardware Features (Continued)

Hardware Feature	Description
<b>DS-X9032-SMV</b>	Advanced Services Module for VERITAS with 32-port 1/ 2-Gbps auto-sensing SFP/LC connectors for the Cisco MDS 9216 and Cisco MDS 9500 Series.
<b>DS-X9560-SMC</b>	Caching Services Module for the Cisco MDS 9216 and Cisco MDS 9500 Series.
<b>1/ 2-Gbps Auto-Sensing SFP/LC Interface, ShortWave (DS-SFP-FC-2G-SW)</b>	SFP (LC type) for 1/ 2-Gbps Fibre Channel for ShortWave mode for the Cisco MDS 9000 Family.
<b>1/ 2-Gbps Auto-Sensing SFP/LC Interface, LongWave (DS-SFP-FC-2G-LW)</b>	SFP (LC type) for 1/ 2-Gbps Fibre Channel for LongWave mode for the Cisco MDS 9000 Family.
<b>1-Gbps Ethernet and 1/2-Gbps Fibre Channel-ShortWave SFP/LC Interface (DS-SFP-FCGE-SW)</b>	SFP (LC type) for 1-Gbps Ethernet and 1/ 2-Gbps Fibre Channel for ShortWave mode for the Cisco MDS 9000 Family.
<b>1-Gbps Ethernet and 1/ 2-Gbps Fibre Channel-LongWave SFP/LC Interface (DS-SFP-FCGE-LW)</b>	SFP (LC type) for 1-Gbps Ethernet and 1/ 2-Gbps Fibre Channel for LongWave mode for the Cisco MDS 9000 Family.
<b>Coarse Wavelength-Division Multiplexing (CWDM) Gigabit Ethernet and 1/ 2-Gbps Fibre Channel SFP/LC Interface (CWDM-SFP-xxxx-2G)</b>	xxxx nm CWDM Gigabit Ethernet and 1/ 2-Gbps Fibre Channel SFP/LC. Where xxxx = 1470 nm, 1490 nm, 1510 nm, 1530 nm, 1550 nm, 1570 nm, 1590 nm, 1610 nm for the Cisco MDS 9000 Family.
<b>Four-Wavelength Add/Drop Multiplexer (CWDM-MUX-4)</b>	Add/drop multiplexer for four CWDM wavelengths.
<b>Eight-Wavelength Add/Drop Multiplexer (CWDM-MUX-8)</b>	Add/drop multiplexer for eight CWDM wavelengths.
<b>CWDM Multiplexer Chassis (CWDM-CHASSIS-2)</b>	Two slot chassis for CWDM add/drop multiplexers.
<b>300WAC Power Supply (DS-CAC-300W)</b>	AC power supply for Cisco MDS 9100 Series.
<b>845WAC Power Supply (DS-CAC-845W)</b>	AC power supply for the Cisco MDS 9216.
<b>2500WAC Power Supply (DS-CAC-2500W)</b>	AC power supply for the Cisco MDS 9509.
<b>2500WDC Power Supply (DS-CDC-2500W)</b>	DC power supply for Cisco MDS 9509.
<b>4000WAC Power Supply (DS-CAC-4000W-US)</b>	AC power supply for Cisco MDS 9509, for use in the United States (cable attached).
<b>4000WAC Power Supply (DS-CAC-4000W-INT)</b>	AC power supply for Cisco MDS 9509, international (cable attached).
<b>1900WAC Power Supply (DS-CAC-1900W)</b>	AC power supply for the Cisco MDS 9506.
<b>1900WDC Power Supply (DS-CDC-1900W)</b>	DC power supply for the Cisco MDS 9506.
<b>512 MB Compact Flash (MEM-MDS-FLD512M)</b>	Cisco MDS 9500 external 512 MB compact Flash for supervisor engine module.
<b>Port Analyzer Adapter (DS-PAA-2, DS-PAA)</b>	Cisco MDS 9000 Port Analyzer Adapter for troubleshooting and analysis of Fibre Channel traffic.

## SOFTWARE FEATURES

**Table 2** Software Version 1.3(4) Features

Software Feature	Description
<b>Host/Switch Authentication</b>	Fibre Channel Security Protocol (FC-SP) using Diffie-Hellman Challenge Handshake Authentication Protocol (DH-CHAP) provides switch-switch and host-switch authentication.
<b>Fabric Binding</b>	The fabric-binding feature ensures Inter-Switch Links (ISLs) are only enabled between switches specified in the binding configuration
<b>TACACS+ Support</b>	TACACS+ is supported in addition to RADIUS for user authentication, authorization, and accounting (AAA).
<b>Domain/Port-Based Zoning</b>	Zones can be configured based on domain ID and physical ports, providing the benefits of zoning physical ports with the added flexibility of not having to reconfigure zones when a switch is replaced.
<b>Inter-VSAN Routing</b>	Fibre Channel data traffic can be transported between specific initiators and targets on different virtual storage area networks (VSANs) with Inter-VSAN Routing without merging VSANs into a single logical fabric. Fibre Channel control traffic does not flow between VSANs, nor can initiators access resources aside from the ones designated with Inter-VSAN Routing.
<b>VSAN-based in-order Delivery</b>	In-order delivery of packets can be enabled on a per VSAN basis, rather than only for an entire switch.
<b>Quality of Service (QoS)</b>	Four QoS levels are available; one level with highest priority for Fibre Channel control traffic, and three levels for Fibre Channel data traffic service differentiation.
<b>FCIP Compression</b>	Fibre Channel Interface Protocol (FCIP) compression uses the Lempel-Zif-Stac (LZS) compression algorithm to achieve a 2:1 compression ratio over a wide variety of data sources, delivering data rates of up to 100 Mbps compressed, or 200 Mbps uncompressed, per Gigabit Ethernet port on IPS modules.
<b>Proxy iSCSI Initiator</b>	When multiple hosts are assigned to the same Small Computer System Interface over IP (iSCSI) target ports on IPS modules, the Proxy iSCSI Initiator feature simplifies configuration by reducing the number of separate times back-end tasks, such as Fibre Channel zoning and storage device configuration, must be performed.
<b>FCIP Write Acceleration</b>	FCIP Write Acceleration maximizes WAN throughput by minimizing the impact of WAN latency for command to transfer ready acknowledgement.
<b>iSNS Client</b>	iSCSI targets presented by IPS modules and Fibre Channel device state change notifications are registered with external Internet Storage Name Service (iSNS) servers.
<b>SPAN for IP Services</b>	Switched Port Analyzer (SPAN) sources may include IPS module Fibre Channel traffic in addition to Fibre Channel ports.
<b>Auto-Trespass</b>	The IPS module Auto-Trespass feature enables high-availability iSCSI connections to Redundant Array of Independent Disks (RAID) subsystems, independent of host software. Trespass commands can be issued automatically when an IPS module detects failures on active paths.

**Table 2** Software Version 1.3(4) Features (Continued)

Software Feature	Description
<b>FICON with CUP</b>	IBM Fiber Connection (FICON) Protocol is supported, with control unit port (CUP) capability for in-band management from IBM S/390 or z/900 processors. Intermixing with FICON VSANs and switch cascading are also supported.
<b>Buffer-to-Buffer Credit Monitoring</b>	Buffer-to-Buffer credit values can be viewed and graphed with Cisco Fabric Manager to see trends for long-distance SAN extensions performance tuning.
<b>Fibre Channel Port Rate Limiting</b>	Fibre Channel port rate limiting for the Cisco MDS 9100 Series controls the amount of bandwidth available to individual Fibre Channel ports within groups of four host-optimized ports.
<b>Per-VSAN Timers</b>	Separate Fibre Channel timers are provided for every VSAN, allowing values to be optimized for specific capabilities like VSANs over FCIP.
<b>Call-Home Enhancements</b>	Call-Home enhancements include: customized/user-defined destination profiles, grouping Call-Home alerts, and configuring destination profiles to receive events from specific alert groups or priority levels.
<b>Online Diagnostics</b>	Periodic diagnostic tests are run to verify that supervisor engine modules, switching modules, and interconnections are functioning properly. These online diagnostics do not adversely affect normal Fibre Channel operations.
<b>Port Quiescence</b>	An administrative action can be performed to drain Fibre Channel traffic from a link before removing it from a Port Channel.
<b>Cisco Fabric Manager Enhancements</b>	A TFTP server, syslog server, and iSCSI wizard have been added to Cisco Fabric Manager.
<b>Cisco Fabric Manager Server</b>	The Cisco Fabric Manager Server package provides historical performance monitoring for network traffic hot-spot analysis, advanced application integration, and multiple fabric, centralized management services extensions for Cisco Fabric Manager.
<b>FDMI Support</b>	Fabric Device Management Interface (FDMI) makes Fibre Channel host bus adapter (HBA) manufacture, model, serial number, firmware version, and host operating system name and version accessible through in-band communications; proprietary host agents are not required.
<b>XML-CIM Management Interface</b>	An embedded agent that complies with the Common Information Model standard and Storage Management Initiative Specification 1.0 (SMI-S) provides an Extensible Markup Language interface. Switch, fabric, and zoning profiles are supported.
<b>License Manager</b>	Licenses for Cisco MDS 9000 Family add-on packages can be transferred, viewed, and removed through both the SAN-OS CLI and Cisco Fabric Manager.

**Table 2** Software Version 1.3(4) Features (Continued)

Software Feature	Description
<b>License Packages</b>	<p>The licensed packages add advanced functionality to the base Cisco SAN-OS and Cisco MDS 9000 Family management software.</p> <p>In Cisco SAN-OS 1.3(1), the Enterprise package and SAN Extension-over-IP package provide additional features. The Mainframe package and Fabric Manager Server package are new licensed packages.</p> <p><b>Enterprise package additional features:</b></p> <ul style="list-style-type: none"><li>• Host/Switch Authentication</li><li>• Quality of Service (QoS)</li><li>• Inter-VSAN Routing</li></ul> <p><b>SAN Extension over IP package additional features:</b></p> <ul style="list-style-type: none"><li>• FCIP Compression</li><li>• FCIP Write Acceleration</li></ul> <p><b>Mainframe package (New)</b></p> <ul style="list-style-type: none"><li>• FICON with CUP</li><li>• FICON VSANs and Intermixing</li><li>• Switch Cascading and Fabric Binding</li></ul> <p><b>Fabric Manager Server package (New)</b></p> <ul style="list-style-type: none"><li>• Historical Performance Monitoring</li><li>• Centralized Management Services</li></ul>
<b>Management Information Bases (MIBs)</b>	<p><b>This release supports the following additional MIBs:</b></p> <p>CISCO-SVC-INTERFACE-MIB CISCO-FICON-MIB CISCO-FCSP-MIB CISCO-FEATURE_CONTROL-MIB CISCO-IVR-MIB CISCO-FDMI-MIB</p> <p><b>This release supports the following updated MIBs:</b></p> <p>CISCO-SECURE_SHELL-MIB CISCO-FC-ROUTE-MIB</p>

## ORDERABLE SOFTWARE IMAGES

Table 3 lists the software images and applicable ordering information for the Cisco MDS 9500 Series multilayer directors, and Cisco MDS 9200 and 9100 Series multilayer fabric switches.

**Table 3** Software Ordering Information

Orderable Product Number	Description
<b>M95S1K9-1.3.4</b>	Cisco MDS 9500 Supervisor/Fabric-I, Enterprise Software, Version 1.3.4
<b>M92S1K9-1.3.4</b>	Cisco MDS 9216 Enterprise Software, Version 1.3.4
<b>M91S1K9-1.3.4</b>	Cisco MDS 9100 Enterprise Software, Version 1.3.4

For more detailed information concerning this software release, refer to the Cisco MDS 9000 Family release notes at:

[http://www.cisco.com/en/US/products/hw/ps4159/ps4358/prod\\_release\\_notes\\_list.html](http://www.cisco.com/en/US/products/hw/ps4159/ps4358/prod_release_notes_list.html)

For more information about the Cisco MDS 9000 Family, refer to the product literature at:

[http://www.cisco.com/en/US/products/hw/ps4159/ps4358/prod\\_literature.html](http://www.cisco.com/en/US/products/hw/ps4159/ps4358/prod_literature.html)

**Note:** For more details on licensed packages, see the overviews listed with the product literature.



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