



Cisco MDS 9500 Series Multilayer Directors: Redefining Data Center Scalability

Cisco MDS 9500 Series: Defining the Multilayer Director

The Cisco® MDS 9500 Series Multilayer Directors raise the standard for director-class switches. Providing industry-leading availability, scalability, security, and management, the Cisco MDS 9500 Series allows businesses to deploy the highest-performance SANs, with the lowest TCO in the industry. Layering a rich set of intelligent features onto a high-performance, protocol-independent switch fabric, the Cisco MDS 9500 Series addresses the stringent requirements of large data center storage environments. Available in 6-, 9-, and 13-slot configurations, the Cisco MDS 9500 Series supports 1-, 2-, 4-, 8-, and 10-Gbps Fibre Channel port speeds, up to 528 1/2/4/8-Gbps autosensing Fibre Channel ports in a single chassis, and up to 1584 Fibre Channel ports per rack. Cisco MDS 9500 Series

Multilayer Directors are also ready for integration of future high-speed standards, helping ensure continued investment protection.

Cisco NX-OS Software

Cisco NX-OS Software, included at no charge with every Cisco MDS 9000 Family multilayer SAN switch, is the underlying system software that powers the award-winning Cisco MDS 9000 Family. Cisco NX-OS provides unique features that help the Cisco MDS 9000 Family deliver low TCO and quick ROI. By providing an open, standards-based platform, Cisco NX-OS enables Intelligent fabric applications, such as Cisco MDS Storage Media Encryption (SME), FAIS-based network-hosted intelligent storage applications for heterogeneous volume management, point-in-time copy, data protection, and nondisruptive data migration; Fibre Channel write acceleration for high-performance

replication over long distances; and network-assisted applications such as SANTap, which enables customers to attach external appliances for storage applications (such as asynchronous replication and Cisco Discovery Protocol).

Cisco NX-OS provides virtual machine-optimized and blade server-optimized services that let IT managers dynamically respond to changing business needs in virtual environments. Cisco's commitment to standards will foster industrywide interoperability to give customers more flexibility in choosing the best solution for their business and IT requirements while reducing the total costs associated with managing their data. Cisco NX-OS also supports IPv6 as mandated by the U.S. Department of Defense, Japan, and China.



Switch Type	Cisco MDS 9513 Multilayer Director	Cisco MDS 9509 Multilayer Director	Cisco MDS 9506 Multilayer Director
Cisco Part Number	DS-C9513	DS-C9509	DS-C9506
Description	Modular, multilayer, multiprotocol, highly available, dual supervisor 2 modules, with 11 module slots (14RU)	Modular, multilayer, multiprotocol, highly available, dual supervisor modules, with 7 module slots (14RU)	Modular, multilayer, multiprotocol, highly available, dual supervisor modules, with 4 module slots (7RU)
Maximum Number of Ports	528	336	192
Target Group	SAN core, large enterprises, and service providers	SAN core, medium-sized to large enterprises, and service providers	SAN core, medium-sized to large enterprises, and service providers
Support Modules	<ul style="list-style-type: none"> IP services, Storage services and 2/4-Gbps Fibre Channel: 18/4-port multiservice modules and storage services module 4-Gbps Fibre Channel: 12, 24, and 48-port 4-Gbps Fibre Channel switching modules 	<ul style="list-style-type: none"> 8-Gbps Fibre Channel: 24, 48, and 4/44-port 8-Gbps Fibre Channel switching modules 10-Gbps Fibre Channel: 4-port 10-Gbps Fibre Channel switching module 	<ul style="list-style-type: none"> 8-Gbps Fibre Channel: 24, 48, and 4/44-port 8-Gbps Fibre Channel switching modules 10-Gbps Fibre Channel: 4-port 10-Gbps Fibre Channel switching module
Recommended Solutions	<ul style="list-style-type: none"> Data center SAN consolidation Business continuance Centralized SAN management Encryption of data at rest 	<ul style="list-style-type: none"> Data mobility and migration Advanced SAN security for compliance and regulation Centralized backup, recovery, and archive through intelligent fabric applications (network-hosted storage virtualization and network-assisted storage applications using Cisco SANTap) 	<ul style="list-style-type: none"> Data mobility and migration Advanced SAN security for compliance and regulation Centralized backup, recovery, and archive through intelligent fabric applications (network-hosted storage virtualization and network-assisted storage applications using Cisco SANTap)

Cisco MDS 9000 Family Software License Packages

In addition to the unique software features included in the base switch configuration such as integrated VSANs, an advanced security suite, advanced diagnostics and troubleshooting tools, and the comprehensive Cisco Fabric Manager, Cisco offers an advanced set of software features logically grouped in software license packages.

License Type	Enterprise	SAN Extension over IP	Storage Media Encryption	Mainframe Package	Fabric Manager Server	Storage Services Enabler
Description	The Enterprise package includes advanced traffic engineering and advanced security features for enterprise SANs.	The SAN Extension over IP package provides an integrated, cost-effective, and reliable business continuance solution that uses the existing IP infrastructure.	The SME feature for Cisco MDS 9000 Family switches encrypts data at rest on heterogeneous tape devices and virtual tape libraries.	The Mainframe package includes features required in mainframe environments. FICON, an architecture for high-speed connectivity between mainframe and I/O devices, is supported in Cisco NX-OS Software 1.3(4a) or later.	The Fabric Manager Server (FMS) package extends the features and functions in Cisco Fabric Manager by providing historical performance monitoring for network traffic hot-spot analysis, centralized management services, and advanced application integration.	When used with the Cisco MDS 9000 Storage Services Module (SSM), the Storage Services Enabler (SSE) package provides the underlying infrastructure and programmatic interface to enable intelligent fabric applications.
Features	Includes advanced traffic management (IVR, QoS, extended credits) and security features (switch-switch and host-switch authentication, LUN zoning, read-only zones, port security, VSAN-based access control, IPsec for iSCSI, and FCIP), IKE digital certificates, and fabric binding for Fibre Channel	Includes FCIP support, FCIP compression, IVR for FCIP, FCIP write acceleration, FCIP read/write tape acceleration, and SAN extension tuner	Securely encrypts data at rest on heterogeneous tape drives and in virtual tape libraries, integrates transparently into SAN as a transparent fabric service, requires no SAN rewiring or reconfiguration, offers high availability with clustering and failover capabilities, provides comprehensive key management with integration to enterprise key managers, and provides role-based managed using CLI and Cisco Fabric Manager	Includes VSAN for FICON and FCP intermixing, FICON Control Unit Protocol (CUP), fabric binding, switch cascading, IBM TotalStorage Virtual Tape Server, IBM TotalStorage Extended Remote Copy (XRC), FICON native mode and native mode channel-to-channel operation, Persistent FICON FCID assignment, port swapping for host channel cable connectors, and FICON tape acceleration	Includes Fibre Channel statistics monitoring, reporting and graphing; intelligent setup; performance database; management server; multiple fabric management; continuous health and event monitoring; common discovery; roaming user profiles; Cisco traffic analyzer integration; performance threshold, web client, Cisco FMS proxy services; data collection autoupdate; customized analytics, performance charts, and reporting; and filtering by user-defined groups	Includes network-hosted storage applications (such as storage virtualization for heterogeneous volume management, nondisruptive data migration, and heterogeneous data replication and snapshots) with FAIS-based intelligent storage API, SANTap for network-assisted storage applications, and secure erase



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To help ensure true investment protection, flexibility, and scalability for businesses of all sizes, all Cisco MDS 9000 Family modules are fully backward and forward compatible across Cisco MDS 9000 Family modular chassis (Cisco MDS 9500 Series Multilayer Directors and 9200 Series Multilayer Switches).



Switching Modules	8-Gbps Fibre Channel Modules	4-Gbps Fibre Channel Modules	18 Fibre Channel and 4 Gigabit Ethernet Multiservice Module	4-Port 10-Gbps Fibre Channel Module	SSM
Cisco Part Number	<ul style="list-style-type: none"> DS-X9224-96K9 MDS 9000 24-port 8-Gbps FC Module DS-X9248-96K9 MDS 9000 48-port 8-Gbps FC Module DS-X9248-48K9 MDS 9000 4/44-port 8-Gbps FC Module 	<ul style="list-style-type: none"> DS-X9112 MDS 9000 12-port 1/2/4/ Gbps FC Module DS-X9124 MDS 9000 24-port 1/2/4/ Gbps FC Module DS-X9148 MDS 9000 48-port 1/2/4/ Gbps FC Module 	<ul style="list-style-type: none"> DS-X9304-18K9 MDS 9000 18/4-port Multiservice Module 	<ul style="list-style-type: none"> DS-X9704 MDS 9000 4-port 10 Gbps FC Module 	<ul style="list-style-type: none"> DS-X9032-SSM MDS 9000 32-port 1/2-Gbps FC Storage Services Module
Advanced Features	<ul style="list-style-type: none"> Port speed: 1/2/4/8-Gbps autosensing, optionally configurable Buffer credits: 16 per port (shared-mode ports), up to 500 per port (dedicated-mode ports), and up to 4095 on an individual port (dedicated-mode ports with optional Enterprise Package license activated) PortChannel: Up to 16 ports Cisco TrustSec Fibre Channel Link-Level Encryption FICON: FC-SB-3 compliant—cascaded FICON fabrics, intermix of FICON and Fibre Channel FCP traffic, and CUP management interface 	<ul style="list-style-type: none"> Port speed: 1/2/4/ Gbps autosensing, optionally configurable Buffer credits: 16 per port (shared-mode ports), up to 250 per port (dedicated-mode ports), and up to 4095 on an individual port (dedicated-mode ports with optional Enterprise Package license activated) PortChannel: Up to 16 ports FICON: FC-SB-3 compliant—cascaded FICON fabrics, intermix of FICON and Fibre Channel FCP traffic, and CUP management interface 	<ul style="list-style-type: none"> 18 FC ports Port speed: 1/2/4-Gbps FC autosensing, optionally configurable 4 Gigabit Ethernet IP storage services ports IP storage services: FCIP, FCIP tape acceleration, FCIP tape read-write acceleration, iSCSI, Internet Storage Name Server (iSNS), and iSCSI Network Boot Protocol (iNBP) Performance: <ul style="list-style-type: none"> Port speed: 1-Gbps Ethernet IP storage services ports per chassis: Up to 44 ports per chassis IP storage services ports per rack: Up to 132 ports per 42-unit rack FCIP tunnels: Up to 3 per port Cisco SME Buffer credits: 16 per port (shared-mode ports), up to 250 per port (dedicated-mode ports), and up to 4095 on an individual port (dedicated-mode ports with optional Enterprise Package license activated) PortChannel: Up to 16 ports FICON: FC-SB-3 compliant, cascaded FICON fabrics, intermix of FICON and Fibre Channel FCP traffic, and CUP management interface 	<ul style="list-style-type: none"> Port speed: 10-Gbps Buffer credits: 16 per port (shared-mode ports), up to 750 per port (dedicated-mode ports), and up to 4095 on an individual port (dedicated-mode ports with optional Enterprise Package license activated) PortChannel: Up to 16 ports FICON: FC-SB-3 compliant, cascaded FICON fabrics, intermix of FICON and Fibre Channel FCP traffic, and CUP management interface 	<ul style="list-style-type: none"> 32-port 1/2-Gbps Fibre Channel switching Fibre Channel write acceleration and SCSI flow-statistics monitoring Network-assisted applications with the SANTap protocol Capable of delivering network-hosted applications Secure erase
SFP Optics Supported	<ul style="list-style-type: none"> 8 Gbps: SW and LW SFP 4 Gbps: CWDM, SW, MW, and LW LC SFP 2 Gbps: CWDM and DWDM SFP 	<ul style="list-style-type: none"> 4Gbps: CWDM, SW, MW, LW, and LC SFP 2 Gbps: CWDM, DWDM, SW, LW, and LC SFP 	<ul style="list-style-type: none"> 4 Gbps: CWDM, SW, MW, LW, and LC SFP 2 Gbps: CWDM, DWDM, and LC SFP Gigabit Ethernet and Gigabit Ethernet copper 	<ul style="list-style-type: none"> 10 Gbps: SR, LR, and ER X2 to 40 km 10 Gbps: Ethernet SR 	<ul style="list-style-type: none"> 2 Gbps: CWDM, DWDM, SW, LW, and LC SFP

Industry Recognition for Cisco MDS 9000 FAMILY Solutions

