

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 elevate 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-slot, 9-slot, and 13-slot configurations, the Cisco MDS 9500 Series supports 1-Gbps, 2-Gbps, 4-Gbps, and 10-Gbps Fibre Channel port speeds, up to 528 1/2/4-Gbps autosensing Fibre Channel ports in a single chassis, and up to 1584 Fibre Channel ports per rack. And with up to 2.2 Tbps of fully redundant system bandwidth, Cisco MDS 9500 Series multilayer directors deliver maximum system performance, even in the event of a crossbar failure. Cisco MDS 9500 Series multilayer directors are also ready for integration of future high-speed standards, helping ensure continued investment protection.

Cisco MDS SAN-OS Software

The Cisco® MDS 9000 Family SAN-OS, included at no charge with every Cisco MDS 9000 Multilayer SAN Switch*, is the underlying system software that powers the award-winning Cisco MDS 9000 Family. SAN-OS provides many unique features that help the Cisco MDS 9000 Family deliver low total cost of ownership (TCO) and a quick return on investment (ROI). By providing an open, standards based platform, SAN-OS enables Intelligent Fabric Applications, such as Cisco MDS Storage Media Encryption (SME), Cisco MDS Data Mobility Manager (DMM), FAIS-based network-hosted intelligent storage applications for heterogeneous volume management, point-in-time copy, data protection, and nondisruptive data migration; network accelerated applications for serverless backup and FC Write Acceleration for highperformance replication over long-distances; and network-assisted applications such as SANTap, that enables customers to attach external appliances for storage applications (such as asynchronous replication and CDP).

Cisco's commitment to standards will foster industry-wide interoperability to provide customers more flexibility in choosing the best solution for their business/IT requirements while driving down the total costs associated with managing their data. Cisco MDS 9000 SAN-OS also supports IPv6 as mandated by US Department of Defense (DoD), Japan, and China. Cisco SAN-OS release 3.0(1) provides IPv6 support for FCIP, iSCSI, and management traffic routed in-band and out-of-band.



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, eleven module slots (14RU)	Modular, Multilayer, Multiprotocol, Highly Available, Dual Supervisor modules, seven module slots (14RU)	Modular, Multilayer, Multiprotocol, Highly Available, Dual Supervisor modules, four module slots (7RU)
Maximum Ports	528	336	192
Target Group	SAN Core, Large Enterprise, Service Provider	SAN Core, Medium to Large Enterprise, Service Provider	SAN Core, Medium to Large Enterprise, Service Provider
Support Modules	• IP Services and 2-Gbps FC: 18/4-port Multiservice Modules, 14/2-port Multiprotocol Service Module, 8-port IP Storage Services Modules, Storage Services Module • 4-Gbps FC: 12, 24, and 48-port 4-Gbps Fibre Channel Switching Modules • 10-Gbps FC: 4-port 10-Gbps Fibre Channel Switching Module		
Recommended Solutions	• Data Center SAN Consolidation • Business Continuity • Centralized SAN Management • Encryption of Data-at-Rest • Data Mobility and Migration • Advanced SAN Security for Compliance and Regulation • Centralized Backup, Recovery & Archive through Intelligent Fabric Applications (Network-Hosted Storage Virtualization; Network-Accelerated Serverless Backup; Network Assisted storage applications using Cisco SANTap protocol)		

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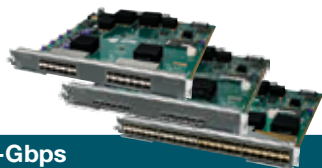
Cisco MDS 9000 Family Software License Packages

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 License Package	SAN Extension over IP	Storage Media Encryption (SME)	Data Mobility Manager (DMM)	Mainframe Package	Fabric Manager Server (FMS)	Storage Services Enabler (SSE)
Description	Cisco MDS 9000 Family Enterprise package includes advanced traffic engineering and advanced security features for enterprise SANs.	Cisco MDS 9000 Family SAN Extension over IP package provides an integrated, cost-effective, and reliable business continuance solution that uses the existing IP infrastructure.	The Cisco Storage Media Encryption feature for Cisco MDS 9000 family switches encrypts data at rest on heterogeneous tape devices and virtual tape libraries.	This license is required to enable Cisco's MDS-based data migration feature. The license is available in 2 flavors. A permanent license that does not have any expiration period is only available to end user customers that want to use this feature for their own data mobility needs and do not plan to sell services using this product. Service provider customers expecting to sell services based on DMM must purchase the 180-day license.	This package includes features required in mainframe environments. FICON, an architecture for high-speed connectivity between mainframe and I/O devices, is supported in Software version 1.3(4a) or later.	Cisco Fabric Manager Server (FMS) package extends the features and functionality 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 Cisco MDS 9000 Storage Services Enabler (SSE) package provides the underlying infrastructure and program-matic interface to enable intelligent fabric applications.
Features	Includes advanced traffic mgmt (Inter-VSAN Routing, 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.	FCIP Protocol Support, FCIP Compression, Inter-VSAN Routing for FCIP, FCIP Write Acceleration, FCIP Read/Write Tape Acceleration, SAN Extension Tuner.	Securely encrypts data at rest on heterogeneous tape drives and virtual tape libraries, integrates seamlessly into SAN as a transparent fabric service, requires no SAN rewiring or reconfiguration, offers high availability with clustering and fail-over capabilities, provides comprehensive key management with integration to enterprise key managers, sure role-based managed using CLI and Cisco Fabric Manager	Transparent insertion of service—MDS customers can turn on this service and proceed to move data from one Array to another without any disruption to Host Applications. Other capabilities include ability to schedule the cutover to the new array (point at which old array is phased out) and rate control of administrative traffic. A follow on release will include support for migration across large geographical distances and the ability to securely erase LUNs.	VSAN for FICON and FCP inter-mixing, 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.	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, FMS Proxy Services, Data collection auto-update, Customized analytics, performance charts, and reporting; and filtering by user defined groups.	Network-Accelerated Serverless Backup, Network-hosted storage applications (such as storage virtualization for heterogeneous volume management, non-disruptive data migration, and heterogeneous data replication and snapshots) with FAIS-based Intelligent Storage API, SANTap Protocol for network-assisted storage applications.

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Ensuring true investment protection, flexibility, and scalability for businesses of all sizes, ALL Cisco MDS 9000 modules are fully backward and forward compatible across Cisco MDS 9000 modular chassis' (Cisco MDS 9500 and 9200 series)



Switching Modules	4-Gbps FC Modules	18 FC/4GE Multiservice Modules	4-Port 10-Gbps FC Module	Storage Services Module (SSM)	8-Port GE IP Storage Services Module	14 FC/2GE Multiprotocol Services Module
Cisco Part Number	- 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	- DS-X9304-18K9 MDS 9000 18/4-port Multiservice Module - DS-X9304-18FK9 MDS 9000 18/4-port Multiservice FIPS Module	DS-X9704 MDS 9000 4-port 10 Gbps FC Module	DS-X9032-SSM MDS 9000 32-port 1/2-Gbps FC Storage Services Module	DS-X9308-SMIP MDS 9000 8-port 1GE IP Storage Services Module	DS-X9302-14K9 MDS 9000 2-port GE and 14-port FC Module
Advanced Features	- 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), 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 - CUP management interface	18 FC ports - Port speed: 1/2/4-Gbps FC autosensing, optionally configurable 4 IP Storage Services ports - IP Storage Services: - FCIP - FCIP Tape Acceleration - FCIP Tape Read/Write Acceleration - iSCSI - Internet Storage Name Server (iSNS) - iSCSI Network Boot Protocol (iNBP) - Performance: - Port speed: 1-Gbps Ethernet - IP storage services ports per chassis: up to 88 ports per chassis - IP storage services ports per rack: Up to 172 ports per 42U rack - FCIP tunnels: up to 3 per port - EtherChannel: Up to 2 1-Gbps ports - Cisco Storage Media Encryption (SME) - Buffer credits: 16 per port (shared-mode ports), up to 250 per port (dedicated-mode ports), 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 - CUP management interface	- Port speed: 10-Gbps - Buffer credits: 16 per port (shared-mode ports), up to 750 per port (dedicated-mode ports), 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 - CUP management interface	32-port 1/2-Gbps Fibre Channel switching - Fibre Channel Write Acceleration (FC-WA) and Small Computer System Interface (SCSI) flow-statistics monitoring - Network-Accelerated Serverless Backup with standards-based Extended Copy - Cisco Data Mobility Manager (DMM) - Network-Assisted Applications with the SANTap protocol - Capable of delivering network-hosted Applications	- IP Storage Services: - FCIP - iSCSI - Internet Storage Name Server (iSNS) - iSCSI Network Boot Protocol (iNBP) - Performance: - Port speed: 1-Gbps Ethernet - IP storage services ports per chassis: up to 88 ports per chassis - IP storage services ports per rack: Up to 172 ports per 42U rack - FCIP tunnels: up to 3 per port - EtherChannel: Up to 2 1-Gbps ports - FICON: - FC-SB-3 compliant - Cascaded FICON fabrics - Intermix of FICON and Fibre Channel FCP traffic - CUP management interface	14 FC ports - Port speed: 1/2-Gbps FC auto-sensing, optionally configurable 2 IP Storage Services ports - IP Storage Services: - FCIP - FCIP Tape Acceleration - FCIP Tape Read/Write - iSCSI - Internet Storage Name Server (iSNS) - iSCSI Network Boot Protocol (iNBP) - Performance: - Port speed: 1-Gbps Ethernet - IP storage services ports per chassis: up to 22 ports per chassis - IP storage services ports per rack: Up to 44 ports per 42U rack - FCIP tunnels: up to 3 per port - EtherChannel: Up to 2 1-Gbps ports - FICON: - FC-SB-3 compliant - Cascaded FICON fabrics - Intermix of FICON and Fibre Channel FCP traffic - CUP management interface
SFP Optics Supported	2-Gbps—CWDM, DWDM, SW, LW, LC SFP 4-Gbps— CWDM, SW, MW, LW, LC SFP	2-Gbps—CWDM, DWDM, SW, LW, LC SFP 4-Gbps— CWDM, SW, MW, LW, LC SFP - GE, GE Copper	10-Gbps—SR, LR, ER X2 to 40km 10-Gbps Ethernet SR	2-Gbps—CWDM, DWDM, SW, LW, LC SFP	GE, GE Copper	2-Gbps—CWDM, DWDM, SW, LW, LC SFP - GE, GE Copper

Industry Recognition for Cisco MDS 9000 FAMILY Solutions

