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Cisco MDS 9000 Series Switches

Overview of Cisco Storage Networking Solutions

Cisco® MDS 9000 Series 32-Gbps Directors

Cisco Model	Cisco MDS 9718 multilayer director	Cisco MDS 9710 multilayer director	Cisco MDS 9706 multilayer director
Configuration	Chassis, dual Supervisor-1E Module, and up to 16 x 3000-Watt (W) power supplies	Chassis, dual Supervisor-1 Module, and up to 8 x 3000W power supplies	Chassis, dual Supervisor-1 Module, and up to 4 x 3000W power supplies
Maximum 2/4/8/10/16/32-Gbps Fibre Channel ports per chassis	768	384	192
Maximum 10-Gbps Fibre Channel over Ethernet (FCoE) ports per chassis	768	384	192
Maximum 40-Gbps FCoE ports per chassis	384	192	96
Maximum Fibre Channel over IP (FCIP) ports per chassis	128 x 1/10 Gigabit Ethernet 32 x 40 Gigabit Ethernet[1]	64 x 1/10 Gigabit Ethernet 16 x 40 Gigabit Ethernet[1]	32 x 1/10 Gigabit Ethernet 8 x 40 Gigabit Ethernet[1]
Port speed	2/4/8/10/16/32-Gbps Fibre Channel 10/40-Gbps FCoE 1/10/40-Gbps[1] FCIP		
Port modules and Cisco part numbers	48-port 4/8/16/32-Gbps Fibre Channel switching module	DS-X9648-1536K9	
	48-port 2/4/8/10/16-Gbps Fibre Channel switching module	DS-X9448-768K9	
	24-port 2/4/8/10/16-Gbps Fibre Channel, 8-port 1/10 Gigabit Ethernet for FCIP, and 2-port 40 Gigabit Ethernet[1] for FCIP	DS-X9334-K9	
	24-port 40-Gbps FCoE module	DS-X9824-960K9	
	48-port 10-Gbps FCoE module	DS-X9848-480K9	

[1] 40 Gigabit Ethernet ports on the 24/10-SAN extension module will be enabled in the future.

Cisco Model	Cisco MDS 9718 multilayer director	Cisco MDS 9710 multilayer director	Cisco MDS 9706 multilayer director
Licenses and Cisco part numbers	SAN Insights Package for MDS 9700 32G Directors		L–D–M97S–AXK9=
	Enterprise package license for 1 MDS9700 switch		M97ENTK9
	DCNM for SAN License for MDS 9700		DCNM–SAN–M97–K9
	Mainframe package license for 1 MDS 9700 Series Multilayer Director switch		M97FIC1K9
	IOA License for 24/10 Module (1x engine) on MDS 9700		M97IOA2410=
	IOA License Pack for 24/10 Module (2X engines) on MDS 9700		M97IOA24102X=
IBM Fibre Connection (FICON) certification	No	Yes	Yes
Expandability	16 module slots	8 module slots	4 module slots
Rack units	26	14	9
Chassis per rack	1	2	3
Crossbar switching fabric module	DS-X9718-FAB1	DS-X9710-FAB3 or DSX9710-FAB1	DS-X9706-FAB3 or DSX9706-FAB1
Supervisor	DS-X97-SF1E-K9	DS-X97-SF4-K9 or DS-X97-SF1-K9	DS-X97-SF4-K9 DS-X97-SF1-K9
Power supply	DS-CAC97-3KW AC PSU, DS-CDC97-3KW= DC PSU, DS-CHV-3.5KW HVDC PSU	DS-CAC97-3KW AC PSU, DS-CDC97-3KW= DC PSU, DS-CHV-3.5KW HVDC PSU	DS-CAC97-3KW AC PSU, DS-CDC97-3KW= DC PSU, DS-CHV-3.5KW HVDC PSU
Features	• Data center SAN consolidation		
	• Business continuance		
	• Centralized SAN management		
	• Advanced SAN security for compliance and regulation		
	• Centralized backup, recovery, and archiving through intelligent fabric applications		
	• Native switch–based programming and Representational State Transfer (REST) API support		

Cisco MDS 9000 Series 32-Gbps Fabric Switches

Cisco Model	Cisco MDS 9132T 32G Multilayer Fabric Switch	Cisco MDS 9148T 32G Multilayer Fabric Switch	Cisco MDS 9396T 32G Multilayer Fabric Switch
Configuration	Semi-modular 1RU chassis; configurable to 8, 16, 24 or 32 ports enabled	Fixed 1RU chassis; configurable to 24, 32, 40 or 48 ports enabled	Semi-modular 2RU chassis; configurable to 48, 64, 80 or 96 ports enabled
Ports	• 16 X 4/8/16/32-Gbps Fibre channel (line rate) base switch • 16X 4/8/16/32-Gbps Fibre channel (line rate) expansion module	• 48 X 4/8/16/32-Gbps Fibre channel (line rate) fixed switch	• 96 X 4/8/16/32-Gbps Fibre channel (line rate) semi-modular switch
Port speed	4/8/16/32-Gbps Fibre Channel	4/8/16/32-Gbps Fibre Channel	4/8/16/32-Gbps Fibre Channel
License keys	L-D-M91S-AXK9= M9100ENT1K9 DCNM-SAN-M91-K9 DCNM-S-M91XK9=	L-D-M91S-AXK9=[2] M9100ENT1K9 DCNM-SAN-M91-K9 DCNM-S-M91XK9=	M9300ENT1K9 DCNM-SAN-M93-K9 DCNM-SAN-M93X-K9 M93ENTDCNMX-K9 M93ENTDCNM-K9
Features	• Modular high availability • Autozone capable • Integrated SAN Telemetry • FC-NVMe ready • Slow drain detection and link isolation • Sophisticated Diagnostics • Virtual Machine awareness • Up to 8270 Buffer-to-Buffer (B2B) credits per port (up to 612-km native 32-Gbps Fibre Channel SAN extension capability) • Native on-switch REST API and PYTHON interpreter • FC Link encryption • 16-member port channel • Power-On Auto Provisioning (POAP) and intelligent diagnostics • Cisco In-Service Software Upgrade (ISSU) and dual redundant hot- swappable power supplies for high availability • High-performance ISLs with multipath load balancing • Smart zoning and VOQ • Anti-counterfeit technology		

[2] Feature available in a future software upgrade. Feature available for the MDS 9132T switch.

Cisco MDS 9000 Series 16-Gbps Fabric Switches

Cisco Model	Cisco MDS 9148S 16G Multilayer Fabric Switch	Cisco MDS 9396S 16G Multilayer Fabric Switch	Cisco MDS 9250i 16G Multiservice Fabric Switch
Configuration	Fixed 1-Rack-Unit (1RU) chassis; configurable to 12, 24, 36, or 48 ports enabled	Fixed 2RU chassis; configurable to 48, 60, 72, 84, or 96 ports enabled	Fixed 2RU chassis; configurable to 20 or 40 Fibre Channel ports enabled
Ports	48 x 2/4/8/16- Gbps Fibre Channel (line rate)	96 x 2/4/8/10/16- Gbps Fibre Channel (line rate)	• 20 x 2/4/8/16-Gbps Fibre Channel (line rate) with option to expand to 40 • 8 x 10 Gigabit Ethernet for FCoE • 2 x 1/10 Gigabit Ethernet for FCIP and Small Computer System Interface over IP (Internet Small Computer Systems Interface) gateway
Port speed	2/4/8/16-Gbps Fibre Channel	2/4/8/16-Gbps Fibre Channel and 10-Gbps Fibre Channel nonautosensing	2/4/8/10/16-Gbps Fibre Channel, 10 Gigabit FCoE, and 1/10 Gigabit Ethernet FCIP and Internet Small Computer Systems Interface gateway
License keys	M9100ENT1K9 DCNM-SAN-M91-K9	M9300ENT1K9 DCNM-SAN-M93-K9 DCNM-SAN-M93X-K9 M93ENTDCNMX-K9 M93ENTDCNM-K9	M9200ENT1K9 DCNM-SAN-M92-K9 M9250IIOA M9250IDMMK9 M9250IDMMT6M M9200FIC1K9 M9200XRC

Cisco Model	Cisco MDS 9148S 16G Multilayer Fabric Switch	Cisco MDS 9396S 16G Multilayer Fabric Switch	Cisco MDS 9250i 16G Multiservice Fabric Switch
Features	• Power-On Auto Provisioning (POAP) and intelligent diagnostics • Role-based Authentication, Authorization, and Accounting (AAA) services to support regulatory requirements • High-performance Inter-Switch Links (ISLs) with multipath load balancing • Smart zoning and Virtual Output Queuing (VOQ) • Hardware-based slow-port detection and recovery • Native on-switch REST API • 16-member port channel	• POAP and intelligent diagnostics • Role-based AAA services to support regulatory requirements • High-performance ISLs with multipath load balancing • Smart zoning and VOQ • Hardware-based slow-port detection and recovery • Native on-switch REST API • 16-member port channel • Up to 4095 Buffer-to-Buffer (B2B) credits per port (up to 512-km native Fibre Channel SAN extension capability)	• SAN consolidation and convergence with integrated multiprotocol support for Fibre Channel, FCoE, FCIP, Internet Small Computer Systems Interface, and FICON • Optimized for performance, power, and space, with 40 line- rate 16-Gbps Fibre Channel ports and 10 x 10-Gbps Ethernet ports • Remote SAN extension with high-performance FCIP for remote replication and other disaster-recovery services • Intelligent fabric services, such as the Cisco I/O Accelerator (IOA) and Data Mobility Manager (DMM) • Flexibility for future growth and capacity expansion • Native on-switch REST API • 16-member port channel • Smart zoning and VOQ

Cisco MDS 9000 Series Software License Packages

Licensed package	Description	Features
SAN Insights	This package includes features that enable On-board SAN Telemetry, SAN Insights DCNM visualization and SAN Telemetry Streaming to 3rd Party tools for Visualization	On-board SAN Telemetry: • Point in time views on a per switch basis with end-to-end metrics • DCNM provides visualizations SAN Insights: • DCNM visualization with historical data • Topology Views, end-to-end metrics, port level metrics, etc… SAN Telemetry Streaming: • Streams data out of the switches to any platform using industry standard formats • Enables 3rd party applications to leverage telemetry data
Enterprise license	This package includes advanced traffic engineering and advanced security features for enterprise SANs.	Advanced traffic management • Inter-VSAN Routing (IVR) • Quality of Service (QoS) • Extended buffer-to-buffer credits Security • Switch-to-switch and host-to-switch authentication • Port security • VSAN-based access control • IP Security (IPsec) for Internet Small Computer Systems Interface and FCIP • Internet Key Exchange (IKE) digital certificates • Fabric binding for Fibre Channel

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Licensed package	Description	Features
Cisco Data Center Network Manager (DCNM) license	Data Center Network Manager is designed to help customers efficiently implement and manage next-generation virtualized data centers. It provides timely management support for data center hardware platforms and Cisco NX-OS Software innovations.	SAN management • Virtual machine–aware path management • Monitoring and troubleshooting • Single-pane management • Scalability: Federation and VSAN • Scoping LAN management • Network virtualization through creation of Virtual Device Contexts (VDCs) • Full automation of virtual-Port-Channel (vPC) operations • Cisco FabricPath
Cisco I/O Accelerator (IOA) license	IOA provides a fabric-based service to accelerate SCSI disk write and tape read and write I/O operations across Metropolitan Area Network (MAN) and WAN links. The IOA feature is a highly available service with clustering capability that increases reliability, performance, scalability, and application stability.	• Accelerate disk write and tape read and write operations over FC and FCIP • Compression for Fibre Channel links • Transparent insertion of fabric service • Clustered IOA service engines with load balancing and failover • Port-channel flexibility across multiple slots within a chassis
Mainframe license	This package includes features required in mainframe environments. FICON is an architecture for high-speed connectivity between mainframe and I/O devices.	• VSAN for FICON and Fibre Channel Protocol (FCP) intermode channel-to-channel operations • 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 mixing operation • Persistent FICON FCID assignment • Port swapping for host channel cable connectors • FICON tape acceleration