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Cisco MDS 9148S 16G Multilayer Fabric Switch

Contents

Product Overview

The Cisco® MDS 9148S 16G Multilayer Fabric Switch (Figure 1) is the next generation of the highly reliable, flexible, and low-cost Cisco MDS 9100 Series switches. It combines high performance with exceptional flexibility and cost effectiveness. This powerful, compact one rack-unit (1RU) switch scales from 12 to 48 line-rate 16 Gbps Fibre Channel ports.

The Cisco MDS 9148S is excellent for:

- A standalone SAN in small departmental storage environments
- A top-of-the-rack switch in medium-sized redundant fabrics
- An edge switch in enterprise data center core-edge topologies

The Cisco MDS 9148S is powered by Cisco NX-OS and Cisco Prime™ Data Center Network Manager (DCNM) software. It delivers advanced storage networking features and functions with ease of management and compatibility with the entire Cisco MDS 9000 Family portfolio for reliable end-to-end connectivity.

Figure 1.
Cisco MDS 9148S 16G Multilayer Fabric Switch

High Performance and Flexibility at Low Cost

Up to 48 autosensing Fibre Channel ports are capable of speeds of 2, 4, 8, and 16 Gbps, with 16 Gbps of dedicated bandwidth for each port. The base switch model comes with 12 ports enabled, and can be upgraded as needed with the 12-port Cisco MDS 9148S On-Demand Port Activation license to support configurations of 24, 36, or 48 enabled ports. Only the Cisco MDS 9148S scales from 12 to 48 high-performance Fibre Channel ports in a single 1RU form factor. The 16-Gbps MDS 9148S is the first generation of NVMe ready Fibre Channel 1RU switches1 When deployed as a N-Port virtualization (NPV) node or as an N-Port ID Virtualization (NPIV) core connecting legacy Fibre channel switches or multi-protocol Nexus NPV switches, it provides a flexible and scalable option for host connectivity.

High-Availability Platform for Mission-Critical Deployments

In environments in which downtime is intolerable, the Cisco MDS 9148S offers In-Service Software Upgrades (ISSU). This means that Cisco NX-OS Software can be upgraded while the Fibre Channel ports carry traffic. The Cisco MDS 9148S includes dual redundant hot-swappable power supplies and fan trays, PortChannels for Inter-Switch Link (ISL) resiliency, and F-port channeling for resiliency on uplinks from a Cisco MDS 9148S operating in NPV mode. New hardware based slow port detection and recovery provide enhanced performance and monitoring capability.

Simplified Storage Management with Sophisticated Diagnostics

The Cisco MDS 9148S offers built-in storage network management and SAN plug-and-play capabilities. All features are available through a Command-Line Interface (CLI) or Cisco Prime DCNM for SAN Essentials

Edition, a centralized management tool. Cisco DCNM task-based wizards simplify management of single or multiple switches and fabrics. For virtual infrastructure, it manages the entire path: from the virtual machine and switch to the physical storage. The Cisco MDS 9148S also supports PowerOn Auto Provisioning (POAP) to automate software image upgrades and configuration file installation on newly deployed switches. Additionally, it provides intelligent diagnostics, protocol decoding, network analysis tools, and Cisco Call Home for added reliability, faster problem resolution, and reduced service costs.

Intelligent Network Services and Advanced Traffic Management

The Cisco MDS 9148S uses virtual SAN (VSAN) technology for hardware-enforced, isolated environments within a physical fabric. It offers access control lists (ACLs) for hardware-based, intelligent frame processing. Advanced traffic management features, such as fabricwide Quality of Service (QoS) and Inter-VSAN Routing (IVR), are included in the optional Cisco MDS 9000 Family Enterprise Package. QoS prioritizes application data traffic for better and more predictable network service. Zone-based QoS simplifies configuration and administration by using the familiar zoning concept. IVR facilitates resource sharing across VSANs without compromising scalability, reliability, availability, and network security.

Comprehensive Network Security Framework

An extensive set of innovative and powerful security features and functions is available with the optional Cisco MDS 9000 Family Enterprise Package. It offers fabricwide, per-VSAN role-based Authentication, Authorization, and Accounting (AAA) services using RADIUS, Lightweight Directory Access Protocol (LDAP), Microsoft Active Directory (AD), and TACACS+. It also deploys VSAN fabric isolation, intelligent, port-level packet inspection, Fibre Channel Security Protocol (FC-SP) host-to-switch and switch-to-switch authentication, Secure File Transfer Protocol (SFTP), Secure Shell Version 2 (SSHv2), and Simple Network Management Protocol Version 3 (SNMPv3) implementing Advanced Encryption Standard (AES). Other security features include control-plane security, hardware-enforced zoning, broadcast zones, and management access. The Cisco MDS 9148S is FIPS 140-2 compliant as mandated by the U.S. federal government.

Table 1 summarizes the main features and benefits of the Cisco MDS 9148S.

Table 1. Features and Benefits

Feature	Benefit
Common software across all platforms	Reduce Total Cost of Ownership (TCO) by using Cisco NX-OS and Cisco Prime DCNM for consistent provisioning, management, and diagnostic capabilities across the fabric.
PowerOn Auto Provisioning	Automate deployment and upgrade of software images.
Smart zoning	Reduce consumption of hardware resources and administrative time needed to create and manage zones.
Intelligent diagnostics/Hardware based slow port detection	Enhance reliability, speed problem resolution, and reduce service costs by using Fibre Channel ping and traceroute to identify exact path and timing of flows, as well as Cisco Switched Port Analyzer (SPAN) and Remote SPAN (RSPAN) and Cisco Fabric Analyzer to capture and analyze network traffic.
Virtual output queuing	Help ensure line-rate performance on each port by eliminating head-of-line blocking.
High-performance ISLs	Optimize bandwidth utilization by aggregating up to 16 physical ISLs into a single logical PortChannel bundle with multipath load balancing.

Feature	Benefit
In-Service Software Upgrades	Reduce downtime for planned maintenance and software upgrades.

Platform Compatibility

For detailed information about hardware and software compatibility as well as product interoperability, see https://www.cisco.com/c/en/us/td/docs/switches/datacenter/mds9000/interoperability/matrix/intmatrx.pdf.

Licensing

Table 2 describes optional licenses that can be purchased to enable additional features and capabilities on the Cisco MDS 9148S.

Table 2.   Optional Licenses

Product	Licenses
Cisco MDS 9000 Family Enterprise Package	Includes advanced traffic-engineering and network security features such as IVR, QoS and zone-based QoS, Fibre Channel Security Protocol (FC-SP), port security, VSAN-based access control, and fabric binding for open systems. Licensed per switch for all the ports on the switch.
Cisco Prime DCNM for SAN Advanced Edition for Cisco MDS 9100 Series	Includes advanced management capabilities such as vCenter integration, performance trending, advanced provisioning, backup, and dashboards. Licensed per switch for all the ports on the switch. License is hosted on a server.
Cisco MDS 9148S 12-port On-Demand Activation	Enables 12 additional Fibre Channel ports (up to 48 total ports on the switch).

Product Specifications

Table 3 lists technical specifications for the Cisco MDS 9148S.

Table 3.   Product Specifications

Feature	Description
Protocols	- FC-PH, Revision 4.3 (ANSI INCITS 230-1994) - FC-PH, Amendment 1 (ANSI INCITS 230-1994/AM1-1996) - FC-PH, Amendment 2 (ANSI INCITS 230-1994/AM2-1999) - FC-PH-2, Revision 7.4 (ANSI INCITS 297-1997) - FC-PH-3, Revision 9.4 (ANSI INCITS 303-1998) - FC-PI, Revision 13 (ANSI INCITS 352-2002) - FC-PI-2, Revision 10 (ANSI INCITS 404-2006) - FC-PI-3, Revision 4 (ANSI INCITS 460-2011) - FC-PI-4, Revision 8 (ANSI INCITS 450-2008) - FC-PI-5, Revision 6 (ANSI INCITS 479-2011) - FC-FS, Revision 1.9 (ANSI INCITS 373-2003) - FC-FS-2, Revision 1.01 (ANSI INCITS 424-2007)

Feature	Description
	● FC-FS-2, Amendment 1 (ANSI INCITS 424-2007/AM1-2007)
	● FC-FS-3, Revision 1.11 (ANSI INCITS 470-2011)
	● FC-LS, Revision 1.62 (ANSI INCITS 433-2007)
	● FC-LS-2, Revision 2.21 (ANSI INCITS 477-2011)
	● FC-SW-2, Revision 5.3 (ANSI INCITS 355-2001)
	● FC-SW-3, Revision 6.6 (ANSI INCITS 384-2004)
	● FC-SW-4, Revision 7.5 (ANSI INCITS 418-2006)
	● FC-SW-5, Revision 8.5 (ANSI INCITS 461-2010)
	● FC-GS-3, Revision 7.01 (ANSI INCITS 348-2001)
	● FC-GS-4, Revision 7.91 (ANSI INCITS 387-2004)
	● FC-GS-5, Revision 8.51 (ANSI INCITS 427-2007)
	● FC-GS-6, Revision 9.4 (ANSI INCITS 463-2010)
	● FCP, Revision 12 (ANSI INCITS 269-1996)
	● FCP-2, Revision 8 (ANSI INCITS 350-2003)
	● FCP-3, Revision 4 (ANSI INCITS 416-2006)
	● FCP-4, Revision 2b (ANSI INCITS 481-2011)
	● FC-SB-2, Revision 2.1 (ANSI INCITS 349-2001)
	● FC-SB-3, Revision 1.6 (ANSI INCITS 374-2003)
	● FC-SB-3, Amendment 1 (ANSI INCITS 374-2003/AM1-2007)
	● FC-SB-4, Revision 3.0 (ANSI INCITS 466-2011)
	● FC-SB-5, Revision 2.00 (ANSI INCITS 485-2014)
	● FC-BB-6, Revision 2.00 (ANSI INCITS 509-2014)
	● FC-BB-2, Revision 6.0 (ANSI INCITS 372-2003)
	● FC-BB-3, Revision 6.8 (ANSI INCITS 414-2006)
	● FC-BB-4, Revision 2.7 (ANSI INCITS 419-2008)
	● FC-BB-5, Revision 2.0 (ANSI INCITS 462-2010)
	● FC-VI, Revision 1.84 (ANSI INCITS 357-2002)
	● FC-SP, Revision 1.8 (ANSI INCITS 426-2007)
	● FC-SP-2, Revision 2.71 (ANSI INCITS 496-2012)
	● FAIS, Revision 1.03 (ANSI INCITS 432-2007)
	● FAIS-2, Revision 2.23 (ANSI INCITS 449-2008)
	● FC-IFR, Revision 1.06 (ANSI INCITS 475-2011)
	● FC-FLA, Revision 2.7 (INCITS TR-20-1998)
	● FC-PLDA, Revision 2.1 (INCITS TR-19-1998)
	● FC-Tape, Revision 1.17 (INCITS TR-24-1999)
	● FC-MI, Revision 1.92 (INCITS TR-30-2002)
	● FC-MI-2, Revision 2.6 (INCITS TR-39-2005)
	● FC-MI-3, Revision 1.03 (INCITS TR-48-2012)
	● FC-DA, Revision 3.1 (INCITS TR-36-2004)
	● FC-DA-2, Revision 1.06 (INCITS TR-49-2012)
	● FC-MSQS, Revision 3.2 (INCITS TR-46-2011)
	● Fibre Channel classes of service: Class 2, Class 3, and Class F
	● Fibre Channel standard port types: E, F and FL
	● Fibre Channel enhanced port types: SD, ST, and TE
	● FC-NVMe
	● In-band management using IP over Fibre Channel (RFC 2625)
	● IPv6, IPv4, and Address Resolution Protocol (ARP) over Fibre Channel (RFC 4338)
	● Extensive IETF-standards-based TCP/IP, SNMPv3, and remote monitoring (RMON) MIBs

Feature	Description
Ports	• Fixed configuration with 48 ports of 16-Gbps Fibre Channel • Available in a 12-port configurable base or as a bundle with all 48 ports enabled • Enable incremental ports on the 12-port base model, with the 12-port On-Demand Activation license
Security	• VSAN fabric isolation • Hardware zoning by Access Control Lists (ACLs) • Fibre Channel Security Protocol (FC-SP) switch-to-switch authentication • FC-SP host-to-switch authentication • Role-based access control (RBAC) using RADIUS, TACACS+, or Lightweight Directory Access Protocol (LDAP) authentication, authorization, and accounting (AAA) functions • Secure FTP (SFTP) • Secure Shell Protocol Version 2 (SSHv2) • Simple Network Management Protocol Version 3 (SNMPv3) implementing Advanced Encryption Standard (AES) • Control-plane security
Performance	• Port speed: 2/4/8/16-Gbps autosensing with 16 Gbps of dedicated bandwidth per port • Buffer credits: Up to 256 for a group of 4 ports, with a default of 64 buffer credits per port and a maximum of 253 buffer credits for a single port in the group • PortChannel: Up to 16 physical links
Reliability and availability	• ISSU • Hot-swappable, dual redundant power supplies • Hot-swappable fan tray with integrated temperature and power management • Hot-swappable SFP+ optics • Passive backplane • Stateful process restart • Any port configuration for PortChannels • Fabric-based multipathing • Per-VSAN fabric services • Port tracking • VRRP for management connections • Online diagnostics

Network management	• Access methods
	  ◦ Out-of-band 10/100/1000 Ethernet port
	  ◦ RS-232 serial console port
	  ◦ USB
	• Access protocols
	  ◦ CLI using the console and Ethernet ports
	  ◦ SNMPv3 using the Ethernet port and in-band IP over Fibre Channel access
	  ◦ Storage Networking Industry Association (SNIA) Storage Management Initiative Specification (SMI-S)
	• Distributed device alias service
	• Network security
	  ◦ Per-VSAN RBAC using RADIUS and TACACS+-based Authentication, Authorization, and Accounting (AAA) functions
	  ◦ SFTP
	  ◦ SSHv2 implementing AES
	  ◦ SNMPv3 implementing AES
	• Management applications
	  ◦ Cisco MDS 9000 Family CLI

Feature	Description
	◦ Cisco Prime DCNM
Programming interfaces	• Scriptable CLI • Cisco Prime DCNM web services API
Physical dimensions (HxWxD)	• Dimensions (H x W x D): 1.72 x 17.16 x 16.34 in. (4.37 x 43.59 x 41.50 cm), 1RU • Rack-mountable in standard 19-inch Electronic Industries Alliance [EIA] rack • Weight of fully configured chassis: 19.84 lb (9 kg)
Power	• Power supply: 300W AC (2 per switch) • Power cord: Notched C15 socket connector connecting to C16 plug on power supply • AC input characteristics • 100 to 240V AC (10% range) • 50 to 60 Hz (nominal) • Airflow: back to front (toward ports) • 200 linear feet per minute (LFM) through system fan assembly • Cisco recommends maintaining a minimum air space of 2.5 in. (6.4 cm) between walls and chassis air vents and a minimum horizontal separation of 6 in. (15.2 cm) between two chassis to prevent overheating
Temperature range	• Temperature, ambient operating: 32 to 104°F (0 to 40°C) • Temperature, ambient non-operating and storage: -40 to 158°F (-40 to 70°C) • Relative humidity, ambient (noncondensing) operating: 10 to 90% • Relative humidity, ambient (noncondensing) non-operating and storage: 10 to 95% • Altitude, operating: -197 to 6500 ft (-60 to 2000m)
Approvals and compliance	• Safety compliance • CE Marking • UL 60950 • CAN/CSA-C22.2 No. 60950 • EN 60950 • IEC 60950 • TS 001 • AS/NZS 3260 • IEC60825 • EN60825 • 21 CFR 1040 • EMC compliance • FCC Part 15 (CFR 47) Class A • ICES-003 Class A • EN 55022 Class A • CISPR 22 Class A • AS/NZS 3548 Class A • VCCI Class A • EN 55024 • EN 50082-1 • EN 61000-6-1 • EN 61000-3-2 • EN 61000-3-3

Feature	Description
Fabric services	- Name server - Registered State Change Notification (RSCN) - Login services - Fabric Configuration Server (FCS) - Public loop - Broadcast - In-order delivery
Advanced functions	- VSAN - IVR - PortChannel with multipath load balancing - Flow-based and zone-based QoS
Supported Cisco optics, media, and transmission distances	For detailed information about all supported transceivers, see Cisco MDS 9000 Family pluggable transceivers.

System Requirements

Table 4 lists system requirements for the Cisco MDS 9148S.

Table 4.   System Requirements

Software	Requirements
Software	Cisco MDS 9000 NX-OS Software Release 6.2(9) or later supporting Cisco MDS 9148S and Cisco Prime DCNM

Warranty Information

Find warranty information on Cisco.com at the Product Warranties page.

Ordering Information

Table 5 indicates all part numbers and associated configurable options for the Cisco MDS 9148S. To place an order, visit the [Cisco Ordering Home Page](#). To download software, visit the [Cisco Platform Suite](#)

Table 5. Ordering Information

Product Name	Part Number
Base Model Options (See Note 2)	
Cisco MDS 9148S 16G Multilayer Fabric Switch with 12 enabled ports	DS-C9148S-12PK9
Cisco MDS 9148S 16G Multilayer Fabric Switch with 48 enabled ports	DS-C9148S-48PK9
Cisco MDS 9148S 16G Multilayer Fabric Switch with 12 enabled ports and 12 x 16G SW SFP+	DS-C9148S-D12PSK9
Cisco MDS 9148S 16G Multilayer Fabric Switch with 48 enabled ports and 48 x 16G SW SFP+	DS-C9148S-D48PSK9
Cisco MDS 9148S 16G Multilayer Fabric Switch with 12 enabled ports and 12 x 8G SW SFP+	DS-C9148S-D12P8K9
Cisco MDS 9148S 16G Multilayer Fabric Switch with 48 enabled ports and 48 x 8G SW SFP+	DS-C9148S-D48P8K9
Component Spares	
Cisco MDS 9148S 16G Multilayer Fabric Switch with 12 enabled ports, spare	DS-C9148S-K9=
Cisco MDS 9148S AC Power Supply, spare	DS-C48S-300AC=
Cisco MDS 9148S Fan Tray, spare	DS-C48S-FAN=
Configure-to-Order Port License Options (See Note 2)	
Cisco MDS 9148S 12-port On-Demand Activation license	M9148S-PL12
Cisco MDS 9148S 12-port On-Demand Activation license with 12 x 16G SW SFP+	M9148S-DPL12PSG
Cisco MDS 9148S 12-port On-Demand Activation license with 12 x 8G SW SFP+	M9148S-DPL12P8G
Spare Port Licenses (See Note 1 and Note 2)	
Cisco MDS 9148S 12-port On-Demand Activation license, spare	M9148S-PL12=
Cisco MDS 9148S 12-port On-Demand Activation license with 12 x 16G SW SFP+, spare	M9148S-DPL12PSG=
Cisco MDS 9148S 12-port On-Demand Activation license with 12 x 8G SW SFP+, spare	M9148S-DPL12P8G=
Cisco MDS 9148S 12-port On-Demand Activation license, eDelivery	L-M9148S-PL12=
Cisco MDS 9148S 12-port On-Demand Activation Smart license, spare	M9148S-PL12-SL=

Product Name	Part Number
Configure-to-Order Optics Options (See Note 2)	
Cisco MDS 4/8/16-Gbps Fibre Channel SW SFP+, LC	DS-SFP-FC16G-SW
Cisco MDS 2/4/8-Gbps Fibre Channel SW SFP+, LC	DS-SFP-FC8G-SW
Spare Optics (See Note 2)	
Cisco MDS 4/8/16-Gbps Fibre Channel SW SFP+, LC, spare	DS-SFP-FC16G-SW=
Cisco MDS 4/8/16-Gbps Fibre Channel LW SFP+, LC, spare	DS-SFP-FC16G-LW=
Cisco MDS 2/4/8-Gbps Fibre Channel SW SFP+, LC, spare	DS-SFP-FC8G-SW=
Cisco MDS 2/4/8-Gbps Fibre Channel LW SFP+, LC, spare	DS-SFP-FC8G-LW=
Cisco MDS 2/4/8-Gbps Fibre Channel Extended Reach SFP+, LC, spare	DS-SFP-FC8G-ER=
Cisco MDS 2/4/8-Gbps CWDM Long Distance SFP, LC, spare	DS-CWDM8Gxxxx=
Configure-to-Order Accessory Kit Options	
Cisco MDS 9148S Accessory Kit for Cisco	DS-9148S-KIT-CSCO
Cisco MDS 9148S Accessory Kit for EMC	DS-9148S-KIT-EM
Cisco MDS 9148S Accessory Kit for HDS	DS-9148S-KIT-HDS
Cisco MDS 9148S Accessory Kit for IBM	DS-9148S-KIT-IBM
Cisco MDS 9148S Accessory Kit for HP	DS-9148S-KIT-HP
Accessory Kit Spare	
Cisco MDS 9148S Accessory Kit, spare	DS-9148S-KIT-CSCO=
Configure-to-Order Power Cord Options	
Power Cord, 250VAC 10A IRAM 2073 Plug, Argentina	CAB-9K10A-AR
Power Cord, 250VAC 10A 3112 Plug, Australia	CAB-9K10A-AU
Power Cord, 250VAC 10A GB1002 Plug, China	CAB-9K10A-CH
Power Cord, 250VAC 10A CEE 7/7 Plug, EU	CAB-9K10A-EU
Power Cord, 250VAC 10A SI16S3 Plug, Israel	CAB-9K10A-ISR
Power Cord, 250VAC 10A CEI 23-16/VII Plug, Italy	CAB-9K10A-IT
Power Cord, 125VAC 13A KSC8305 Plug, Korea	CAB-9K10A-KOR
Power Cord, 250VAC 10A SABS 164/1 Plug, South Africa	CAB-9K10A-SA

Product Name	Part Number
Power Cord, 250VAC 10A, Straight C15, MP232 Plug, SWITZ	CAB-9K10A-SW
Power Cord, 125VAC 15A CNS10917-2, Taiwan	CAB-9K10A-TWN
Power Cord, 250VAC 10A BS1363 Plug (13 A fuse), UK	CAB-9K10A-UK
Power Cord, 125VAC 13A NEMA 5-15 Plug, North America	CAB-9K12A-NA
Power Cord, 250VAC 10A, Brazil	CAB-250V-10A-BR
Cabinet Jumper Power Cord, 250 VAC 13A, C14-C15 Connectors	CAB-C15-CBN
Spare Power Cords	
Power Cord, 250VAC 10A IRAM 2073 Plug, Argentina, spare	CAB-9K10A-AR=
Power Cord, 250VAC 10A 3112 Plug, Australia, spare	CAB-9K10A-AU=
Power Cord, 250VAC 10A GB1002 Plug, China, spare	CAB-9K10A-CH=
Power Cord, 250VAC 10A CEE 7/7 Plug, EU, spare	CAB-9K10A-EU=
Power Cord, 250VAC 10A SI16S3 Plug, Israel, spare	CAB-9K10A-ISR=
Power Cord, 250VAC 10A CEI 23-16/VII Plug, Italy, spare	CAB-9K10A-IT=
Power Cord, 125VAC 13A KSC8305 Plug, Korea, spare	CAB-9K10A-KOR=
Power Cord, 250VAC 10A SABS 164/1 Plug, South Africa, spare	CAB-9K10A-SA=
Power Cord, 250VAC 10A, Straight C15, MP232 Plug, SWITZ, spare	CAB-9K10A-SW=
Power Cord, 125VAC 15A CNS10917-2, Taiwan, spare	CAB-9K10A-TWN=
Power Cord, 250VAC 10A BS1363 Plug (13 A fuse), UK, spare	CAB-9K10A-UK=
Power Cord, 125VAC 13A NEMA 5-15 Plug, North America, spare	CAB-9K12A-NA=
Power Cord, 250VAC 10A, Brazil, spare	CAB-250V-10A-BR=
Cabinet Jumper Power Cord, 250 VAC 13A, C14-C15 Connectors, spare	CAB-C15-CBN=
Configure-to-Order Advanced Software Package Options (See Note 3)	
Cisco MDS Enterprise Package for one MDS 9100 Series Switch	M9100ENT1K9
Cisco Prime DCNM for SAN Advanced Edition for MDS 9100	DCNM-SAN-M91-K9
Spare Advanced Software Packages (See Note 1 and Note 3)	
Cisco MDS Enterprise Package for one MDS 9100 Series Switch, spare	M9100ENT1K9=
Cisco MDS Enterprise Package for one MDS 9100 Series Switch, eDelivery	L-M9100ENT1K9=

Product Name	Part Number
Cisco Prime DCNM for SAN Advanced Edition for MDS 9100, spare	DCNM-SAN-M91-K9=
Cisco Prime DCNM for SAN Advanced Edition for MDS 9100, eDelivery	L-DCNM-S-M91-K9=

Note: Spare licenses are delivered uninstalled. A product authorization key (PAK) is sent (either physically or electronically) for customer license key file obtainment and installation. For more information on obtaining and installing licenses, see
https://www.cisco.com/en/US/docs/storage/san_switches/mds9000/sw/rel_2_x/san-os/configuration/guide/lic.html.

Note: For detailed information about all supported transceivers, see Cisco MDS 9000 Family pluggable transceivers. Bundled and configure-to-order optical transceivers are shipped installed in the port cages on the unit. Spares ship separately.

Note: For detailed information about the optional Cisco MDS Enterprise Package, see
https://www.cisco.com/c/en/us/products/collateral/storage-networking/mds-9000-software-licensing/product_data_sheet09186a00801ca6ac.html; for Cisco Prime DCNM, see
https://www.cisco.com/go/dcnm. Advanced Software Packages are delivered uninstalled. A PAK is sent (either physically or electronically) for customer license key file obtainment and installation.

Cisco Services

Cisco Services make networks, applications, and the people who use them work better together.

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For More Information

For more information about the Cisco MDS 9148S 16G Multilayer Fabric Switch, visit
https://www.cisco.com/c/en/us/products/storage-networking/mds-9148s-16g-multilayer-fabric-switch/index.html or contact your local account representative.

[1] Requires NX-OS software version 8.2(1) or higher.

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