Cisco MDS 9700 Series Supervisor 1E

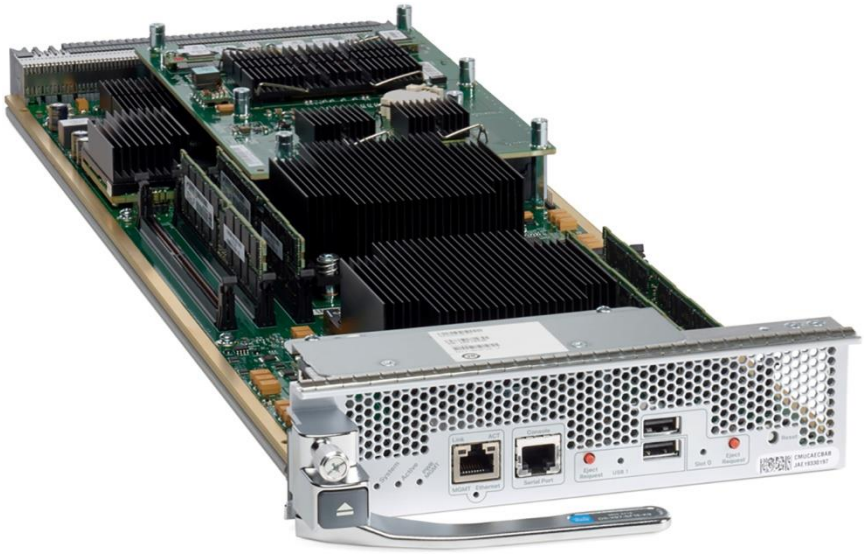
Product Overview

The Cisco® MDS 9700 Series Supervisor 1E for heavier workloads delivers the latest advanced switching technology with proven Cisco NX-OS Software to power a new generation of scalable and intelligent multilayer switching solutions for SANs.

Designed to integrate multiprotocol switching and routing, intelligent SAN services, and storage applications onto highly scalable SAN switching platforms, the Cisco MDS 9700 Series Supervisor 1E for heavier workloads enables intelligent, resilient, scalable, and secure high-performance multilayer SAN switching solutions. The Cisco MDS 9000 Family lowers the total cost of ownership (TCO) for storage networking by combining robust and flexible hardware architecture, multiple layers of network and storage intelligence, and compatibility with all Cisco MDS 9000 Family switching modules.

This powerful combination helps organizations build highly available, scalable storage networks with comprehensive security and unified management. The Cisco MDS 9700 Series Supervisor 1E is supported on the Cisco MDS 9718 Multilayer Director. Figure 1 shows the module.

Figure 1. Cisco MDS 9700 Series Supervisor 1E



Main Features and Benefits

The Cisco MDS 9700 Series Supervisor 1E offers numerous benefits.

Industry-Leading Scalability

The module is designed to meet the requirements of the largest data center storage environments and combines industry-leading scalability and performance, intelligent SAN services, nondisruptive software upgrades, stateful process restart and failover, and fully redundant operation for a new standard in director-class SAN switching.

Integrated Performance

The combination of the Cisco MDS 9700 Series Supervisor 1E and the Cisco MDS 9700 48-Port 16-Gbps Fibre Channel Switching Module and Cisco Fabric-1 crossbar switching modules enables up to 1.5 terabytes per second (Tbps) of Fibre Channel throughput between modules in each direction for each payload slot in the Cisco MDS 9718 director. This per-slot bandwidth is twice the bandwidth needed to support a 48-port 16-Gbps Fibre Channel module at full line rate. The Cisco MDS 9718 architecture, based on central arbitration and crossbar fabric, provides 16-Gbps line-rate, nonblocking, predictable performance across all traffic conditions for every port in the chassis.

High Availability

The Cisco MDS 9700 Series Supervisor 1E and the Cisco MDS 9700 Series Multilayer Directors were designed from the beginning for high availability. In addition to meeting the basic requirement of nondisruptive software upgrades, the MDS 9700 Series software architecture offers availability. The Cisco MDS 9700 Series Supervisor 1E has the unique ability to automatically restart failed processes, making it exceptionally robust. In the rare event that a supervisor module is reset, complete synchronization between the active and standby supervisor modules helps ensure stateful failover with no disruption of traffic.

The MDS 9700 Series provides the industry's first redundancy on all major hardware components, as detailed in Table 1.

Table 1. Redundancy Details for Cisco MDS 9700 Series

Component	Redundancy
Supervisors	1+1 redundancy
Power supplies	Grid redundancy
Fabrics	N+1 redundancy

The Cisco MDS 9700 Series Supervisor 1E also provides Fabric Shortest Path First (FSPF)–based multipathing to help ensure high availability at the fabric level. With the intelligence to load-balance across up to 16 equal-cost paths, the module can dynamically reroute traffic in the event of a switch failure. The module in combination with the Cisco MDS 9718 Director provides exceptional high availability, helping ensure that solutions exceed the 99.999 percent uptime requirements of today's most demanding environments.

Lower Total Cost of Ownership

The Cisco MDS 9000 Family provides advanced management tools for overall low TCO. It supports Cisco virtual SAN (VSAN) technology for hardware-enforced, isolated environments within a single physical fabric for secure sharing of physical infrastructure, further decreasing TCO.

Comprehensive Security Framework

The Cisco MDS 9000 Family supports RADIUS and TACACS+, Fibre Channel Security Protocol (FC-SP)[1], Secure File Transfer Protocol (SFTP), Secure Shell (SSH) Protocol, and Simple Network Management Protocol Version 3 (SNMPv3) implementing Advanced Encryption Standard (AES), VSANs, hardware-enforced zoning, access control lists (ACLs), and per-VSAN role-based access control (RBAC).

Unified SAN Management

The Cisco MDS 9000 Family includes built-in storage network management, with all features available through a command-line interface (CLI) or Cisco Prime™ Data Center Network Manager (DCNM), a centralized management tool that simplifies management of multiple switches and fabrics. Integration with third-party storage management platforms allows transparent interaction with existing management tools.

Intelligent Network Services

VSAN technology, ACLs for hardware-based intelligent frame processing, and fabricwide quality of service (QoS) enable migration from SAN islands to enterprisewide storage networks.

- Integrated hardware-based VSANs and Inter-VSAN Routing (IVR): Integration of VSANs into port-level hardware allows any port in a system or fabric to be partitioned to any VSAN. Integrated hardware-based IVR provides line-rate routing between any ports in a system or fabric without the need for external routing appliances.
- Intelligent storage services: The Cisco MDS 9700 Series operates with intelligent service capabilities on other Cisco MDS 9000 Family platforms to provide services such as acceleration of storage applications for data replication and backup and data migration to hosts and targets attached to the Cisco MDS 9700 Series devices.
- Smart zoning: When the smart zoning feature is enabled, MDS 9700 Series fabrics provision the hardware access control entries specified by the zone set more efficiently, avoiding the superfluous entries that would allow servers (initiators) to talk to other servers or allow storage devices (targets) to talk to other storage devices. This feature makes larger zones with multiple initiators and multiple targets feasible without excessive consumption of hardware resources. Thus, smart zones can correspond to applications, application clusters, hypervisor clusters, or other data center entities, saving the time that administrators previously spent creating many small zones and enabling the automation of zoning tasks.

Advanced Diagnostics and Troubleshooting Tools

Management of large-scale storage networks requires proactive diagnostics, tools to verify connectivity and route latency, and mechanisms for capturing and analyzing traffic. The Cisco MDS 9000 Family integrates advanced, industry-leading analysis and debugging tools. The power-on self-test (POST) and online diagnostics provide proactive health monitoring. The Cisco MDS 9700 Series Supervisor 1E provides the integrated functions required to implement diagnostic capabilities such as Fibre Channel traceroute for identifying the exact path and timing of flows, and Cisco Switched Port Analyzer (SPAN) and Remote SPAN (RSPAN) to intelligently capture network traffic. After traffic has been captured, it can be analyzed with the Cisco Fabric Analyzer, an embedded Fibre Channel analyzer.

The module also allows collection and management of comprehensive port-based and flow-based statistics, enabling sophisticated performance analysis and service-level agreement (SLA) accounting. The integrated Cisco Call Home capability provides additional reliability and enables faster problem resolution and reduced service costs.

Starting with Cisco MDS 9000 NX-OS Software 6.2, the powerful Cisco Generic Online Diagnostics (GOLD) framework replaces the Cisco Online Health Management System (OHMS) diagnostic framework on the new MDS 9700 Series Multilayer Director chassis. The Generic Online Diagnostics framework is a suite of diagnostic facilities for verifying that hardware and internal data paths are operating as designed. Boot-time diagnostics, continuous monitoring, standby fabric loopback tests, and on-demand and scheduled tests are part of the diagnostics feature set. This industry-leading diagnostics subsystem enables the rapid fault isolation and continuous system monitoring critical in today's continuously operating environments. With the MDS 9700 Series, Cisco delivers a comprehensive tool set for troubleshooting and analyzing an organization’s storage network.

Multiprotocol Intelligence

The multilayer architecture of the Cisco MDS 9700 Series enables a consistent feature set over a protocol-independent switch fabric. The Cisco MDS 9700 Series transparently integrates Fibre Channel, Fibre Channel over Ethernet (FCoE), and IBM Fibre Connection (FICON).

- 2/4/8-Gbps, 4/8/16-Gbps, and 10-Gbps Fibre Channel and 10 Gigabit Ethernet: The Cisco MDS 9700 Series supports both 2/4/8/16-Gbps and 10-Gbps ports on the Cisco MDS 9700 48-Port 16-Gbps Fibre Channel switching module. The MDS 9700 Series also supports 10 Gigabit Ethernet clocked optics carrying 10-Gbps Fibre Channel traffic.
- FICON: The Cisco MDS 9700 Series supports deployment in IBM System z FICON and Linux environments.
- Multihop FCoE: The Cisco MDS 9700 Series supports multihop FCoE, extending connectivity from FCoE and Fibre Channel fabrics to FCoE and Fibre Channel storage devices.
- USB ports: Two USB 2.0 ports are provided on the front panel for simplified configuration-file uploading and downloading using common USB memory-stick products.

Product Specifications

Table 2 lists the specifications of the Cisco MDS 9700 Series Supervisor 1E.

Table 2. Cisco MDS 9700 Series Supervisor 1E Module Specifications

Item	Cisco MDS 9700 Series Supervisor 1E Module
Processor	Intel® Xeon® processor
Number of cores	2 quad cores
Speed	2.13 GHz
Kernel	64-bit
Cisco NX-OS release	Cisco NX-OS Software Release 7.3 or later
Memory	32 GB (DDR3) NVRAM 2-MB battery backup
Connectivity management processor (CMP)	Not supported
Flash memory	USB flash memory
Removable storage	2 external USB memory slots: • Slot 0 • USB 1

Table 3 lists the product specifications for the Cisco MDS 9700 Series Supervisor 1E Module.

Table 3. Cisco MDS 9700 Series Supervisor 1E Module Product Specifications

Feature	Description
Product compatibility	Cisco MDS 9718 Multilayer Director
Software compatibility	Cisco MDS SAN-OS Software Release 7.3 or later
Interfaces	• 1 RS-232 RJ-45 console port • 1 10/100/1000 Ethernet management port • 2 USB 2.0 ports
Indicators	• Supervisor ID LED • Supervisor status LED • System status LED • Active supervisor LED • Power management LED • 10/100/1000 management port activity LED • Log flash-memory activity LED • Slot 0 activity LED
Switching bandwidth	• Front-panel Fibre Channel system bandwidth: ◦ Up to 48 Tbps in a single Cisco MDS 9718 chassis • Up to 768 2/4/8-Gbps, 4/8/16-Gbps, or 10-Gbps full line-rate autosensing Fibre Channel ports or 10-Gbps FCoE or 368 40-Gbps FCOE in a single Cisco MDS 9718 chassis
Protocols	• Fibre Channel standards • 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) • 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)

Feature	Description
	• 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) • 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 • Class of Service: Class 2, Class 3, and Class F • Fibre Channel standard port types: E, F, FL, and B • Fibre Channel enhanced port types: SD, ST, and TE
Chassis slot configuration	• 2 Cisco MDS 9700 Series Supervisor 1E Modules required per system to provide redundancy
Features and Functions	
Fabric services	• Name server • Registered State Change Notification (RSCN) • Login services • Fabric configuration server (FCS) • Broadcast • In-order delivery
Advanced functions	• VSAN • IVR • Port Channel with multipath load balancing • QoS: flow based and zone based • N-Port ID virtualization
Diagnostics and troubleshooting tools	• POST diagnostics • Online diagnostics • Internal port loopbacks • SPAN and RSPAN • Fibre Channel traceroute • Fibre Channel ping • Fibre Channel debug • Cisco Fabric Analyzer • Syslog • Online system health • Port-level statistics • Real-Time Protocol (RTP) debug

Feature	Description
Network security	• VSANs • ACLs • Per-VSAN RBAC • Fibre Channel zoning ◦ N-Port World Wide Name (WWN) ◦ N-Port FC-ID ◦ Fx-Port WWN ◦ Fx-Port WWN and interface index ◦ Fx-Port domain ID and interface index ◦ Fx-Port domain ID and port number ◦ Logical Unit Number (LUN) ◦ Read -only ◦ Broadcast • FC-SP[1] ◦ DH-CHAP switch-switch authentication ◦ DH-CHAP host-switch authentication • Port security and fabric binding • Management access ◦ SSHv2 implementing AES ◦ SNMPv3 implementing AES ◦ SFTP • Cisco TrustSec® [1] Fibre Channel link encryption
Serviceability	• Configuration file management • Nondisruptive software upgrades for Fibre Channel interfaces • Cisco Call Home • Power-management LEDs • Port beaconing • System LED • SNMP traps for alerts • Network boot
Reliability and availability	• Hot-swappable module • Active-active redundancy • Stateful process restart • Stateful, nondisruptive supervisor failover • Online, nondisruptive software upgrades • Virtual Routing Redundancy Protocol (VRRP) for management • Per-VSAN fabric services • Power management • Thermal management • Fabric-based multipathing
Network management	• Access methods through Cisco MDS 9700 Series Supervisor 1E ◦ Out-of-band 10/100/1000 Ethernet port ◦ RS-232 serial console port ◦ In-band IP over Fibre Channel • Access methods through MDS 9700 Series Fibre Channel switching module ◦ In-band FICON control unit port (CUP) over any System Z FICON channel • Access protocols ◦ CLI using console and Ethernet ports ◦ SNMPv3 -using Ethernet port and in-band IP over Fibre Channel access ◦ FICON CUP • Distributed Device Alias service • Network security ◦ Per-VSAN RBAC using RADIUS- and TACACS+-based authentication, authorization, and accounting (AAA) functions ◦ SFTP

Feature	Description
	◦ SSHv2 implementing AES ◦ SNMPv3 implementing AES • Management applications ◦ Cisco MDS 9000 Family CLI ◦ Cisco Prime DCNM GUI
Programming interface	• REST API based Cisco NX-API • Scriptable CLI • Cisco Prime DCNM web services API • Cisco Prime DCNM GUI
Environmental	• Temperature, ambient operating: 32 to 104°F (0 to 40°C) • Temperature, ambient nonoperating and storage: -40 to 158°F (-40 to 70°C) • Relative humidity, ambient (noncondensing) operating: 10 to 90% • Relative humidity, ambient (noncondensing) nonoperating and storage: 10 to 95% • Altitude, operating: -197 to 6500 ft (-60 to 2000m)
Physical dimensions	• H x W x D: 2.04 x 7.94 x 21.85 in. (5.18 x 20.17 x 55.5 cm)
Weight	• 8.5 lb (3.86 kg)
Approvals and compliance	• Safety compliance ◦ CE Marking ◦ UL 60950 ◦ CAN/CSA-C22.2 No. 60950 ◦ EN 60950 ◦ IEC 60950 ◦ 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

Ordering Information

Table 4 provides ordering information for the Cisco MDS 9700 Series Supervisor 1E Module.

Table 4. Cisco MDS 9700 Series Supervisor 1E Module Ordering Information

Part Number	Product Description
Cisco MDS 9718 Series Component	
DS-C9718	MDS 9718 Chassis, No Power Supplies, Fans Included
DS-X97-SF1E-K9	Cisco MDS 9700 Series Supervisor 1E
Licensed Software	
M97ENTK9	Enterprise package license for 1 MDS9700 switch
DCNM-SAN-M97-K9	DCNM for SAN License for MDS 9700
M97FIC1K9	Mainframe package license for 1 MDS9700 switch

Part Number	Product Description
Spare Component	
DS-C9718=	MDS 9718 Chassis, Spare, No Power Supplies, Fans Included
DS-X97-SF1E-K9=	MDS 9700 Series Supervisor-1E
Licensed Software	
M97ENTK9=	Enterprise package license for 1 MDS9700 switch
L-M97ENTK9=	E-delivery Enterprise package license for 1 MDS9700 switch
DCNM-SAN-M97-K9=	DCNM for SAN License for MDS 9700
L-DCNM-S-M97-K9=	E-delivery DCNM for SAN Package Advanced Edition for MDS 9700
M97FIC1K9=	Mainframe package license for 1 MDS9700 switch
L-M97FIC1K9=	E-delivery Mainframe package license for 1 MDS9700 switch

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For More Information

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Printed in USA C78-736317-00 01/16