Cisco MDS 9500 Series Supervisor-2A Module

Product Overview

The Cisco® MDS 9500 Series Supervisor-2A Module delivers advanced switching technology with proven Cisco NX-OS Software to power a new generation of scalable and intelligent multilayer switching solutions for storage area networks (SANs).

Designed to integrate multiprotocol switching and routing, intelligent SAN services, and storage applications onto highly scalable SAN switching platforms, the Cisco MDS 9500 Series Supervisor-2A Module enables intelligent, resilient, scalable, and secure high-performance multilayer SAN switching solutions. In addition to providing the same capabilities as the Cisco MDS 9500 Series Supervisor-2 Module, the Cisco MDS 9500 Series Supervisor-2A Module supports deployment of Fibre Channel over Ethernet (FCoE) in the Cisco MDS 9500 Multilayer Director chassis. The Cisco MDS 9000 Family lowers the total cost of ownership (TCO) for storage networking by combining a 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. Figure 1 shows the Cisco MDS 9500 Series Supervisor-2A Module.

Figure 1. Cisco MDS 9500 Series Supervisor-2A Module

Key Features and Benefits

The Cisco MDS 9500 Series Supervisor-2A Module offers the following benefits:

- **New standard for director-class switching**—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. Supporting up to 528 Fibre Channel ports in a single chassis, 1584 Fibre Channel ports in a single rack, and 1.4 terabits per second (Tbps) of internal system bandwidth when combined with a Cisco MDS 9506 or MDS 9509 Multilayer Director chassis or up to 2.2 Tbps of internal system bandwidth when installed in the Cisco MDS 9513 Multilayer Director chassis. The Cisco MDS 9500 Series Supervisor-2A Module is designed to meet the requirements of even the largest data center storage environments.
- **Flexibility and investment protection**—Supports all generations of Cisco MDS 9000 Family switching modules, helping ensure compatibility and providing outstanding investment protection.

- **Total cost of ownership (TCO)-driven design**—Offers advanced management tools for overall lowest 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.
- **Multiprotocol and multitransport architecture**—The multilayer architecture of the Cisco MDS 9000 Family enables a consistent feature set over a protocol-independent switch fabric. The Cisco MDS 9500 Series Supervisor-2A Module transparently integrates Fibre Channel, IBM Fiber Connection (FICON), FCoE, Small Computer System Interface over IP (iSCSI), and Fibre Channel over IP (FCIP) in one system.
- **Intelligent network services**—Provides integrated support for VSAN technology, access control lists (ACLs) for hardware-based intelligent frame processing, and advanced traffic management features such as fabric-wide quality of service (QoS) to enable migration from SAN islands to enterprise-wide storage networks.
- **Open platform for intelligent storage applications**—Provides the intelligent services necessary for hosting and/or accelerating storage applications such as network-hosted volume management, data migration and backup.
- **Integrated hardware-based VSANs and Inter-VSAN Routing (IVR)**—Enables deployment of large-scale multisite and heterogeneous SAN topologies. Integration into port-level hardware allows any port in a system or fabric to be partitioned into 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.
- **FICON services**—Supports 1, 2, 4, 8 and 10-Gbps FICON environments, including cascaded FICON fabrics, VSAN-enabled intermix of mainframe and open systems environments, and N_Port ID Virtualization for mainframe Linux partitions. Control Unit Port (CUP) support enables in-band management of Cisco MDS 9000 Family switches from the mainframe management console.
- **Comprehensive security framework**—Supports RADIUS and TACACS+, Fibre Channel Security Protocol (FC-SP), Secure File Transfer Protocol (SFTP), Secure Shell (SSH) Protocol, and Simple Network Management Protocol Version 3 (SNMPv3) implementing Encryption Standard (AES), VSANs, hardware-enforced zoning, ACLs, and per-VSAN role-based access control.
- **Sophisticated diagnostics**—Provides intelligent diagnostics, protocol decoding, and network analysis tools as well as integrated call-home capability for added reliability, faster problem resolution, and reduced service costs.
- **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 Fabric Manager, a centralized management tool that simplifies management of multiple switches and fabrics. Integration with third party storage management platforms allows seamless interaction with existing management tools.

Integrated Performance

The Cisco MDS 9500 Series Supervisor-2A Module combines an intelligent control module and high-performance crossbar switch fabric in a single unit. The module provides industry-leading availability, scalability, security, and flexibility, and it maintains full compatibility with the Cisco MDS 9506 and MDS 9509 chassis, switching modules, and intelligent services modules. When combined with the Cisco MDS 9513 chassis, densities of up to 528 ports can be achieved.

High Availability

The Cisco MDS 9500 Series Supervisor-2A Module and MDS 9500 Series Multilayer Directors were designed from the beginning for high availability. Beyond meeting the basic requirements of nondisruptive software upgrades and redundancy of all critical hardware components, the Cisco MDS 9500 Series software architecture offers outstanding availability. The Cisco MDS 9500 Series Supervisor-2A Module 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 Cisco MDS 9500 Series Supervisor-2A Module 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 Cisco MDS 9500 Series Supervisor-2A Module combined with Cisco MDS 9500 Series Multilayer Directors takes high availability to a new level, helping provide solutions that exceed the 99.999 percent uptime requirements of today's most demanding environments.

Scalability

The Cisco MDS 9500 Series Supervisor-2A Module can supply up to 1.4 Tbps of nonblocking performance to Cisco MDS 9500 Series Multilayer Directors. Its robust switching performance enables the Cisco MDS 9500 Series to provide 1-, 2-, 4-, 8-, and 10-Gbps Fibre Channel port densities. When installed in a Cisco MDS 9513 Multilayer Director chassis, the Cisco MDS 9500 Series Supervisor-2A Module works in conjunction with the two crossbar modules to provide 2.2 Tbps of fully redundant system bandwidth, helping ensure high scalability in any SAN environment.

Multiprotocol Intelligence

The crossbar switching architecture of the Cisco MDS 9500 Series Supervisor-2A Module enables multilayer and multiprotocol functionality, allowing the Cisco MDS 9500 Series to transparently integrate multiple transport protocols for maximum flexibility. With support for Fibre Channel, FICON, FCoE, iSCSI, and FCIP, the Cisco MDS 9500 Series is a robust multiprotocol platform designed for deployment of cost-optimized storage networks. Users can implement up to 10-Gbps Fibre Channel, FICON for high-performance applications, FCoE for Unified Fabric, iSCSI over Ethernet for cost-effective connectivity to shared storage pools, and FCIP for connectivity between data centers.

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. Power-on self-test (POST) and online diagnostics provide proactive health monitoring. The Cisco MDS 9500 Series Supervisor-2A Module provides the integrated functions required to implement diagnostic capabilities such as Fibre Channel traceroute for detailing the exact path and timing of flows and 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 Cisco MDS 9500 Series Supervisor-2A Module enables collection and management of comprehensive port-based and flow-based statistics, enabling sophisticated performance analysis and service-level agreement (SLA) accounting. In addition, integrated Call Home capability is provided for added reliability, faster problem resolution, and reduced service costs. With the Cisco MDS 9500 Series, Cisco delivers a comprehensive toolset for troubleshooting and analyzing an organization's storage network.

Product Specifications

Table 1 lists the product specifications for the Cisco MDS 9500 Series Supervisor-2A Module.

Table 1. Product Specifications

Feature	Description
Product Compatibility	Cisco MDS 9500 Series directors
Software Compatibility	Cisco MDS SAN-OS Release 3.x or later

Feature	Description
Interfaces	• (1) RS-232 RJ-45 console port • (1) 10/100/1000 Ethernet management port • (1) DB-9 COM port • (1) Compact Flash interface • (2) USB 2.0 port
Indicators	• Status LED • System LED • Power management LED • Active/standby LED
Switching Bandwidth	• 700 Gbps per Cisco MDS 9500 Series Supervisor-2A Module (1.4 Tbps when both Supervisor-2A modules present) • 1.1 Tbps when combined with the Cisco MDS 9513 Crossbar Module (2.2 Tbps when both Crossbar modules present)
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 3 (ANSI INCITS 460-2010) ◦ FC-PI-4, Revision 8 (ANSI INCITS 450-2009) ◦ 10GFC, Revision 4.0 (ANSI INCITS 364-2003) ◦ 10GFC, Amendment 1 (ANSI INCITS 364-2003/AM1-2007) ◦ 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 1.0 (ANSI INCITS 470-2010) ◦ FC-LS, Revision 1.62 (ANSI INCITS 433-2007) ◦ FC-LS-2, Revision 2.13 ◦ FC-AL, Revision 4.5 (ANSI INCITS 272-1996) ◦ FC-AL-2, Revision 7.0 (ANSI INCITS 332-1999) ◦ FC-AL-2, Amendment 1 (ANSI INCITS 332-1999/AM1-2003) ◦ FC-AL-2, Amendment 2 (ANSI INCITS 332-1999/AM2-2006) ◦ 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) ◦ FC-BB, Revision 4.7 (ANSI INCITS 342-2001) ◦ 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) ◦ 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 1 ◦ 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 466-2010) ◦ FC-VI, Revision 1.84 (ANSI INCITS 357-2002) ◦ FC-SP, Revision 1.8 (ANSI INCITS 426-2007) ◦ FAIS, Revision 1.03 (ANSI INCITS 432-2007)

Feature	Description
	◦ FAIS-2, Revision 2.23 (ANSI INCITS 449-2008) ◦ 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-DA, Revision 3.1 (INCITS TR-36-2004) ◦ FC-DA-2, Revision 1.04 ◦ IP over Fibre Channel (RFC 2625) ◦ IPv6, IPv4 and ARP over Fibre Channel (RFC 4338)
Cards/Ports/Slots	Two Cisco MDS 9500 Series Supervisor-2A modules required per system
Features and Functions	
Fabric Services	• Name server • Registered State Change Notification (RSCN) • Login services • Fabric Configuration Server (FCS) • Public loop • Broadcast • In-order delivery
Advanced Functionality	• VSAN • IVR • PortChannel with Multipath Load Balancing • QoS—flow-based, 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 Debug
Network Security	• VSANs • ACLs • Per-VSAN role-based access control • Fibre Channel Zoning ◦ N_Port 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 ◦ LUN ◦ Read-only ◦ Broadcast • FC-SP ◦ DH-CHAP switch-switch authentication ◦ DH-CHAP host-switch authentication • Port Security and Fabric Binding • Management access ◦ SSHv2 implementing AES ◦ SNMPv3 implementing AES ◦ SFTP • Link Level Encryption

Feature	Description
	◦ SSHv2 implementing AES
FICON	• FC-SB-3 compliant • Cascaded FICON fabrics • Intermix of FICON and Fibre Channel FCP traffic • CUP management interface
Serviceability	• Configuration file management • Call Home • Power-management LEDs • Port beaconing • System LED • SNMP traps for alerts • Network boot
Cisco MDS 9000 Family Interoperability	• Interoperable with all Cisco MDS 9500 Series chassis—must be installed in pairs • Interoperable with all Cisco MDS 9000 Family switching and intelligent services modules
Reliability/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 9500 Series Supervisor Module ◦ Out-of-band 10/100/1000 Ethernet port ◦ RS-232 serial console port ◦ In-band IP over Fibre Channel ◦ DB-9 COM port • Access methods through Cisco MDS 9500 Series Fibre Channel Switching Module ◦ In-band FICON CUP over Fibre Channel • Access protocols ◦ CLI by console and Ethernet ports ◦ SNMPv3 by Ethernet port and in-band IP over Fibre Channel access ◦ Storage Networking Industry Association (SNIA) Storage Management Initiative Specification (SMI-S) ◦ FICON CUP • Distributed Device Alias service • Network security ◦ Per-VSAN role-based access control using RADIUS-based and TACACS+-based authentication, authorization, and accounting (AAA) functions ◦ SFTP ◦ SSHv2 implementing AES ◦ SNMPv3 implementing AES • Management applications ◦ Cisco MDS 9000 Family CLI ◦ Cisco Fabric Manager ◦ Cisco Device Manager • CiscoWorks Resource Manager Essentials (RME) and Device Fault Manager (DFM)
Programming Interfaces	• Scriptable CLI • Fabric Manager GUI • Device Manager GUI
Environmental	• Temperature, ambient operating: 32 to 104°F (0 to 40°C) • Temperature, ambient nonoperating and storage: –40 to 167°F (–40 to 75°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 2000 m)

Feature	Description
Physical Dimensions	• Dimensions (H x W x D): 1.75 x 14.4 x 16 in (3.0 x 35.6 x 40.6 cm) ◦ Occupies one supervisor slot in a Cisco MDS 9500 Series chassis • Weight: 7.25 lb (2.90 kg)
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

Ordering Information

Table 2 provides ordering information for the Cisco MDS 9500 Series Supervisor-2A Module.

Table 2. Ordering Information

Part Number	Product Description
DS-X9530-SF2AK9	Cisco MDS 9500 Series Supervisor-2A Module
M9500ENT1K9	Enterprise package license for 1 MDS 9500 switch
M9500FIC1K9	MDS 9500 Mainframe Package license for 1 MDS 9500 switch
M9500FMS1K9	MDS 9500 Fabric Manager Server license for 1 MDS 9500 switch
M9500EXT1AK9	SAN Extension Over IP package for one 18/4-Port Multiservice Module in Cisco MDS 9500 Series
M9500SME1MK9	Storage Media Encryption package for one MPS 18/4-port
Spare Components	
DS-X9530-SF2AK9=	Cisco MDS 9500 Series Supervisor-2A Module, spare
M9500ENT1K9=	Enterprise package license for 1 MDS 9500 switch, spare
M9500FIC1K9=	MDS 9500 Mainframe Package license for 1 MDS 9500 switch, spare
M9500FMS1K9=	MDS 9500 Fabric Manager Server license for 1 MDS 9500 switch, spare
M95IOA184=	Cisco I/O Accelerator License for MSM-18/4 on MDS 9500, spare
M95IOASSN=	Cisco I/O Accelerator License (1 engine) for SSN-16 on MDS 9500, Spare
M9500EXT12K9=	MDS 9500, MPS-14/2, San Extension Over IP Lic, 1 Count, spare
M9500EXT1AK9=	SAN Extension Over IP package for one MSM-18/4 in Cisco MDS 9500 Series, spare
M95EXTSSNK9=	SAN Extension License (1 engine) for the SSN-16 module in MDS 9500, spare
M9500XRC=	MDS 9500 XRC Acceleration for IBM, spare
M9500SME1MK9=	Storage Media Encryption package for one MSM 18/4-port for Cisco MDS 9500, spare
M95SMESSNK9=	Cisco Storage Media Encryption License (1 engine) for SSN-16 on MDS 9500, spare

Part Number	Product Description
M9500SSE1EK9=	Storage Services Enabler for EMC: 1 ASM on 1 MDS9500, spare
M9500SSE184K9=	Storage Services Enabler for 18/4 on MDS 9500, spare
M95DMM184K9=	MDS 9500 Data Mobility Manager (DMM) License for one 18/4, spare

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