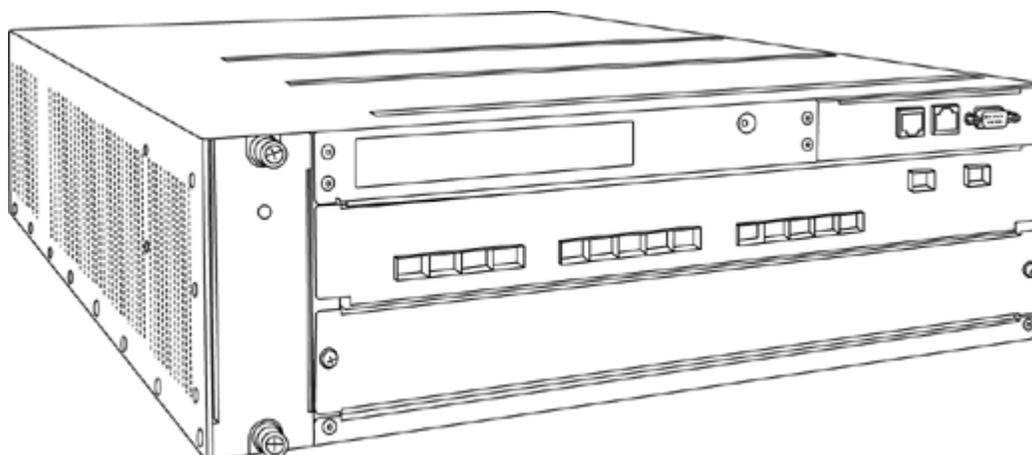


### Overview

The Cisco MDS 9216i brings the most flexible storage networking capability available in the fabric switch market today. Sharing a consistent architecture with the Cisco MDS 9500 Directors, the Cisco MDS 9216i integrates both Fibre Channel and IP Storage Services in a single system to allow maximum flexibility in user configurations. With fourteen 2-Gbps Fibre Channel ports, two Gigabit Ethernet IP Storage Services ports, a two port FCIP software license and the modular expansion slot can be used to connect an additional forty-eight ports of 4-Gbps Fibre Channel or even four 10-Gb Fibre Channel ports for Inter-Switch Links, the Cisco MDS 9216i is a comprehensive package, ideally suited for enterprise storage networks that require high performance SAN extension or cost-effective IP Storage connectivity for applications such as Business Continuity and iSCSI host attachment to Fibre Channel storage devices. The MPS 18/4 module along with the optional Cisco MDS 9200 Storage Media Encryption package can provide encryption for data at rest on storage tape media for added security to the SAN environment.



### Key Features and Benefits

- Integrated Fibre Channel and IP Storage Services in an optimized form factor:
  - Supports fourteen 2-Gbps Fibre Channel interfaces for high performance storage area network (SAN) connectivity and two Gigabit Ethernet ports for Fibre Channel over IP (FCIP) and Small Computer System Interface over IP (iSCSI) storage services.
- Industry's highest-performance Inter-Switch Links (ISLs):
  - Supports up to sixteen 2-Gbps or 4, 10-Gbps Fibre Channel links in a single PortChannel.
  - Links may span any port on any module within a chassis for added scalability and resilience.
  - Up to 3500 buffer-to-buffer credits can be assigned to a single Fibre Channel port to extend storage networks over unprecedented distances.
- Intelligent network services:
  - Uses virtual SAN (VSAN) technology for hardware-enforced, isolated environments within a single physical fabric.
  - Access control lists (ACLs) for hardware-based intelligent frame processing.
  - Advanced traffic-management features such as Fibre Channel Congestion Control (FCC) and fabric-wide quality of service (QoS) to facilitate migration from SAN islands to enterprise-wide storage networks.
- Comprehensive network security framework:
  - Supports RADIUS and TACACS+, Fibre Channel Security Protocol (FC-SP), Secure File Transfer Protocol (SFTP), Secure Shell (SSH), and Simple Network Management Protocol Version 3 (SNMPv3) implementing Advanced Encryption Standard (AES), VSANs, hardware-enforced zoning, ACLs, and per-VSAN role-based access control. Additionally, the Gigabit Ethernet ports offer IP security (IPsec) authentication, data integrity, and hardware-assisted data encryption for FCIP and iSCSI and key management.
- 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.

### Overview

- Open platform for network-hosted storage applications:
  - The Cisco MDS 9216i provides an open platform for hosting intelligent storage services such as network-based virtualization and replication.
  - Storage services modules can be installed in any Cisco MDS 9500 Series or Cisco MDS 9200 Series chassis to provide scalable, distributed application intelligence in the fabric.
- FCIP for remote SAN extension:
  - Simplifies data-protection and business continuance strategies by enabling backup, remote replication, and other disaster recovery services over WAN distances using open-standard FCIP tunneling.
  - Optimizes utilization of WAN resources for backup and replication by tunneling up to three virtual ISLs on a single Gigabit Ethernet port, and enabling hardware-based compression, FCIP Write Acceleration, and FCIP Tape Acceleration.
  - FCIP Services Software License is included for the 2 Gigabit Ethernet ports included with the MDS 9216i base unit.
- iSCSI for extension of SAN to Ethernet attached servers:
  - Extends the benefits of Fibre Channel SAN-based storage to Ethernet attached servers at a lower cost than possible using Fibre Channel interconnect alone.
- Hardware Assisted Encryption Security
  - On-board crypto processing engine supports secure IEEE standard Advanced Encryption Standard (AES) 256-bit algorithms to encrypt data transported over IP networks or to be stored on tape.
  - IPsec for Encrypted Data in Transit over IP networks
  - Storage Media Encryption of Data at Rest on tape - FIPS 140-2, level 2 certifications.

### Product Highlights

- 
- FCIP for remote SAN Extensions** Data distribution, data protection, and business continuance services are significant components of today's information-centric businesses. The ability to efficiently replicate critical data on a global scale not only ensures a higher level of data protection for valuable corporate information, but also increases utilization of backup resources and lowers total cost of storage ownership. The Cisco MDS 9216i uses the open-standard FCIP protocol to break the distance barrier of current Fibre Channel solutions and enable interconnection of SAN islands over extended distances.
- 
- Advanced FCIP Features to Facilitate Business Continuance and Disaster Recovery** The Cisco MDS 9216i is designed to support robust business continuance services using FCIP for remote connectivity in conjunction with a suite of advanced features, such as VSANs and Inter-VSAN Routing (IVR), hardware-assisted FCIP compression and encryption, FCIP Write Acceleration, and FCIP Tape Acceleration.
- 
- VSANs and IVR Enhance SAN Security and Stability** VSANs allow more efficient storage network utilization by creating hardware-based isolated environments within a single physical SAN fabric or switch. Each VSAN can be zoned as a typical SAN and maintains its own fabric services for added scalability and resilience. The Cisco MDS 9216i supports Inter-VSAN Routing (IVR), the industry's first routing functionality for Fibre Channel. IVR allows selective transfer of data traffic between specific initiators and targets on different VSANs while maintaining isolation of control traffic within each VSAN.
- 
- High Performance SAN Extension with Compression and FCIP Write Acceleration** The Cisco MDS 9216i supports hardware-based FCIP compression to maximize the effective WAN bandwidth of SAN extension solutions. The Cisco MDS 9216i achieves up to a 30:1 compression ratio, with typical ratios of 2:1 over a wide variety of data sources. The Cisco MDS 9216i also supports FCIP Write Acceleration, a feature that can significantly improve application performance when storage traffic is extended across distance. When FCIP Write Acceleration is enabled, WAN throughput is optimized by reducing the latency of command acknowledgements. Similarly, the Cisco MDS 9216i supports FCIP Tape Acceleration, which significantly improves throughput over WAN links for remote tape backup operations.
- 
- Advanced Traffic Management for High-Performance, Resilient Fabrics**
- Virtual Output Queuing ensures line rate performance on each port, independent of traffic pattern, by eliminating head-of-line blocking.
  - 255 buffer-to-buffer credits are assigned to each port for optimal bandwidth utilization across distance. When extended distances are required, up to 3500 credits can be allocated to a single port within a group of four Fibre Channel ports.
  - Port Channels allow users to aggregate up to 16 physical ISLs into a single logical bundle, providing optimized bandwidth utilization across all links. The bundle can consist of any port from any module in the chassis, ensuring that the bundle remains active even in the event of a module failure.
  - Fabric Shortest Path First (FSPF)-based multipathing provides the intelligence to load balance across up to 16 equal cost paths and, in the event of a switch failure, dynamically reroute traffic.
  - Quality of service can be used to manage bandwidth and control latency in order to prioritize critical traffic.
  - Fibre Channel Congestion Control (FCC), an end-to-end, feedback-based congestion control mechanism, augments the Fibre Channel buffer-to-buffer credit mechanism to provide enhanced traffic management.
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### Product Highlights

#### Industry's Most Advanced Diagnostics and Troubleshooting Tools

The Cisco MDS 9000 Family integrates the industry's most advanced analysis and diagnostic tools. Power-on self test (POST) and online diagnostics provide proactive health monitoring. The Cisco MDS 9216i implements diagnostic capabilities such as Fibre Channel Traceroute for detailing the exact path and timing of flows and Switched Port Analyzer (SPAN) to intelligently capture network traffic. Once traffic has been captured, it can then be analyzed with the Cisco Fabric Analyzer, an embedded Fibre Channel analyzer. Comprehensive port- and flow-based statistics facilitate sophisticated performance analysis and service-level agreement (SLA) accounting.

#### Comprehensive Solution for Robust Network Security

The Cisco MDS 9216i offers an extensive security framework to protect highly sensitive data crossing today's enterprise networks. The Cisco MDS 9216i employs intelligent packet inspection at the port level, including the application of ACLs for hardware enforcement of zones, VSANs, and advanced Port Security features.

Extended zoning capabilities are enabled to ensure that LUNs are accessible only by specific hosts (LUN zoning), to limit SCSI read command for a certain zone (read-only zoning), and to restrict broadcasts to only the selected zones (broadcast zones). VSANs are used to achieve higher security and greater stability by providing complete isolation among devices that are connected to the same physical SAN. In addition, Fibre Channel Security Protocol (FC-SP) provides switch-switch and host switch Diffie-Hellman Challenge Handshake Authentication Protocol (DH-CHAP) authentication supporting RADIUS or TACACS+, to ensure that only authorized devices access protected storage networks. Finally, for both FCIP and iSCSI deployments, the comprehensive IPsec protocol suite delivers secure authentication, data integrity, and hardware-based encryption.

#### Ease of Management

The Cisco MDS 9216i presents a consistent, logical CLI. Adhering to the syntax of widely known Cisco IOS® Software CLI, the Cisco MDS 9000 Family CLI is easy to learn and delivers broad management capability. The Cisco MDS 9000 Family CLI is an extremely efficient and direct interface designed to provide optimal functionality to administrators in enterprise environments.

Cisco Fabric Manager is a responsive, easy-to-use Java application that simplifies management across multiple switches and fabrics. Cisco Fabric Manager enables administrators to perform vital tasks such as topology discovery, fabric configuration and verification, provisioning, monitoring, and fault resolution. All functions are available through a secure interface, enabling remote management from any location.

Cisco Fabric Manager may be used independently or in conjunction with the optional Cisco Fabric Manager Server and other HP management applications such as HP OpenView and HP Storage Essentials. Cisco MDS SAN-OS also provides an extensive API for integration with third-party and user developed management tools.

#### iSCSI for Cost Effective Extension of SAN Storage to Ethernet Attached Servers

Many IT managers have been hesitant to extend SAN access beyond their mission-critical applications to midrange data center applications because of the complexity and cost involved in upgrading large numbers of midrange servers to Fibre Channel. The Cisco MDS 9216i addresses these limitations by enabling IT organizations to extend their storage networks using cost-effective Ethernet infrastructure. All the benefits of SANs, including increased storage utilization, centralized backups, easier addition of incremental storage capacity, management simplification, and reduced overall total cost of ownership (TCO), can be extended to a new range of applications. Because the Cisco MDS 9216i is an integral component of the Cisco MDS 9000 Family, Ethernet attached servers will enjoy the same SAN scalability, availability, manageability, and intelligent services as those servers connected directly to a Fibre Channel SAN, while maintaining the cost and ease-of-use benefits of Ethernet and IP.

### Product Highlights

#### Product Family Models

- Cisco MDS 9513 Multilayer Director w/Dual Supervisor 2
  - Intelligent, multi-protocol 13-slot Director with up to 528 Auto-Sensing 4/2/1 Gb Fibre Channel ports
- Cisco MDS 9506 Multilayer Director
  - Intelligent, multi-protocol 6-slot Director with up to 192 Auto-Sensing 1/2/4/10 Gb Fibre Channel ports or 1Gb Ethernet ports
- Cisco MDS 9509 Multilayer Director:
  - Intelligent, multi-protocol 9-slot Director with up to 336 Auto-Sensing 1/2/4/10 Gb Fibre Channel ports or 1Gb Ethernet ports
- Cisco MDS 9222i Multilayer Fabric Switch
  - Intelligent, multi-protocol modular Fabric Switch with eighteen 4-Gb Fibre Channel ports, four 1Gb Ethernet ports, a four port FCIP software license and an open modular expansion slot with up to a forty-eight ports of 4-Gbps Fibre Channel or 10-Gb Fibre Channel ports for Inter-Switch Links
- Cisco MDS 9216 Multilayer Fabric Switch
  - Intelligent, multi-protocol modular Fabric Switch with sixteen 2Gb Fiber Channel ports and a modular expansion slot for a total maximum port capacity of up to 64 ports.
- Cisco MDS 9216A Multilayer Fabric Switch
  - Intelligent, multi-protocol modular Fabric Switch with sixteen 2Gb Fiber Channel ports and a modular expansion slot which can be used for 1/2/4/10 Gb Fibre Channel or 1 Gb Ethernet ports for a total maximum port capacity of up to 64 ports.
- Cisco MDS 9120 Multilayer Fabric Switch
  - Intelligent, Fibre Channel Fabric Switch with 20 Auto-Sensing 2/1 Gb Fibre Channel ports
- Cisco MDS 9140 Multilayer Fabric Switch
  - Intelligent, Fibre Channel Fabric Switch with 40 Auto-Sensing 2/1 Gb Fibre Channel ports
- Cisco MDS 9020 Fabric Switch
  - Fibre Channel Fabric Switch with 20 Auto-Sensing 4/2/1 Gb Fibre Channel ports

### Software Components, Standard

#### SAN-OS

Cisco MDS 9000 SAN-OS delivers numerous advanced storage networking capabilities for the Cisco MDS 9000 Family of Multilayer Intelligent Directors and Fabric Switches.

#### Cisco Fabric Manager

Cisco Fabric Manager is a responsive, easy-to-use Java application that simplifies management across multiple switches and fabrics. Cisco Fabric Manager enables administrators to perform vital tasks such as topology discovery, fabric configuration and verification, LUN security, monitoring, and fault resolution. All functions are available through a secure interface, which enables remote management from any location. Cisco Fabric Manager may be used independently or in conjunction with third-party management applications. Cisco provides an extensive API for integration with third-party and user developed management tools.

### Software Components, Optional

#### Cisco Fabric Manager Server Package

The "Standard" Cisco Fabric Manager software that is included at no charge with the MDS family switches provides basic switch configuration and troubleshooting capabilities. The Cisco Fabric Manager Server (FMS) Package extends Cisco Fabric Manager by providing historical performance data collection for network traffic hot-spot analysis, centralized management services and advanced application integration.

### Product Highlights

**Cisco Enterprise Package** Cisco MDS switches have a set of advanced traffic engineering and advanced security features that are recommended for all Enterprise SANs. These features are bundled together in a management application called the Cisco MDS 9000 Enterprise Package.

**Cisco MDS 9000 Family SME Package** Cisco MDS 9000 Family SME Package allows encryption of storage media (data at rest). Strong, standard IEEE AES-256 encryption for heterogeneous tape devices and VTLs as well as tape data compression are provided as a distributed fabric service.

**Cisco MDS 9000 Family Mainframe Package** The Cisco MDS 9000 Family Mainframe Package is a comprehensive collection of features required for using the Cisco MDS 9200 Series switches in mainframe storage networks, including FICON protocol and CUP management, switch cascading, fabric binding, and intermixing.

### Service and Support, HP Care Pack, and Warranty Information

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#### Warranty

(1-1-1) Hardware Warranty; 1-year parts; 1-year on-site (8x5, next business day response) and 1-year labor.

**NOTE:** The hardware warranty covers firmware and embedded non-saleable software. For extended hardware installation and maintenance information, click the links below:

<http://h18005.www1.hp.com/services/carepaq/us/install/>

<http://h18005.www1.hp.com/services/carepaq/us/hardware/>.

**NOTE:** Certain restrictions and exclusions apply. Consult the Customer Support Center for details.

Hardware or Software product installation is not included in the warranty, but is available and highly recommended.

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#### HP Service & Warranty Support

HP Service & Warranty Support Additional Warranty protection and/or HP Installation packages can be purchased.

**NOTE:** Certain restrictions and exclusions apply. Consult the Customer Support Center for details. HP provides a one-year, hardware limited warranty, fully supported by a worldwide network of resellers and service providers.

In addition, available service offerings include a full range of HP Care Pack packaged hardware and software services:

- Installation
- Extended coverage hours and enhanced response times
- System management and performance services

For more information on warranty and support options, please visit our Web site at:

<http://www.hp.com/hps/tech/storage/supp/>.

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#### Software Product Services

Software Warranty - HP warrants only that the software media will be free of physical defects for a period of ninety (90) days from delivery.

**EXCLUSIVE REMEDY** -The entire liability of HP and its suppliers and your exclusive remedy for software that does not conform to this Limited Warranty shall be the repair or replacement of the defective media. This warranty and remedy are subject to your returning the defective media during the warranty period to HP in the country in which you obtained the software.

**NOTE:** Certain restrictions and exclusions apply. Consult the Customer Support Center for details.

Hardware or Software product installation is not included in the warranty, but is available and highly recommended.

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#### HP Care Pack Services Warranty Upgrade Options

Service offerings include a full range of Customer HP Care Pack services for both hardware and software services:

- Response - Upgrade on-site response from next business day to same day 4-hours
- Coverage - Extend hours of coverage from 5 days x 9 hours to 7 days x 24 hours
- Duration - Select duration of coverage for a period of 1, 3, or 5 years

Additional Warranty protection and/or HP Installation packages can be purchased.

**NOTE:** Certain restrictions and exclusions apply. Consult the HP Customer Support Center for details.

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### Service and Support, HP Care Pack, and Warranty Information

**HP Care Pack Information** HP Care Pack is defined as an upgrade to the product warranty attribute, available for a specific duration and hours of coverage.

- HP Care Pack is not available for less than the product's warranty duration.
- HP Care Pack is available for sale anytime during the warranty period for most products, but the commencement date will be the same as the Warranty Start Date (delivery date to end user customer). Proof of purchase may be required.
- HP Care Pack services are prepaid.

For additional HP Care Pack (hardware & software) information, as well as orderable part numbers, please refer to the URL listed below:

<http://h18005.www1.hp.com/services/carepaq/index.html>

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### Additional Services

Installation service; SAN Solution service; SAN-Environmental Support service; SAN Architecture service; Proactive 24.

For more information on these and other service options, please contact any of our worldwide sales offices or visit our Web site at: <http://www.hp.com/hps/support>.

### Family Information

	Cisco MDS 9513 w/Dual Supervisor 2	Cisco MDS 9509 w/Dual Supervisor 2	Cisco MDS 9506 w/Dual Supervisor 2	Cisco MDS 9222i	Cisco MDS 9216A	Cisco MDS 9124	Cisco MDS 9124e Fabric Switch for HP c-Class BladeSystem
<b>Introduction Date</b>	May 2006	May 2006	May 2006	November 2007	Dec 2005	March 2007	March 2007
<b>Switch Type</b>	Multilayer Director	Multilayer Director	Multilayer Director	Multilayer Fabric Switch	Multilayer Fabric Switch	Fabric Switch	Embedded Switch
<b>Maximum ports</b>	528 Fibre Channel, 58 IP ports	336 Fibre Channel, 50 IP ports	192 Fibre Channel, 26 IP ports	18 fixed auto-sensing 4/2/1-Gbps Fibre Channel ports, 4 1-Gb Ethernet ports	64 FC, up to 16 FC and 8 IP ports	Up to 24 Fibre Channel ports	Up to 24 Fibre Channel ports
<b>Number of slots per chassis</b>	Thirteen	Nine	Six		Two	N/A, Fixed FRU	NA

### Configuration Information

#### Step 1 – Base Configuration

Select one:

Model	Model Description	Part Number
Cisco MDS 9216i w/0 1Gb Ethernet SFP Fabric Switch	Cisco MDS 9216i <b>NOTE:</b> Chassis ships with one modular expansion slot. Includes 14 Fibre Channel ports fully populated with short wave SFPs (A7428A). The 1 Gb Ethernet ports are not populated with SFPs (A7487A), RJ-45 10/100 Ethernet management port, RJ-45 console port, and DB-9 COM port; also includes software image, 2-port FCIP Software License, dual power supplies, power cords, fan modules, and 19-inch mounting rack kit.	AE390A

#### Step 2 - Options

Model Description	Quantity	Part Number
<b>Fibre Channel Port Expansion Modules</b>		
2 Gb Optical Transceiver, Small Form Factor Pluggable, Short Wave (used on A7464A, A7465A, AE378A, A7559A and AE391A, 2 Gb FC Modules)*	Spares, Included with 2 Gb FC Port Modules	A7428A
2 Gb Optical Transceiver, Small Form Factor Pluggable, Long Wave (used on A7464A, A7465A, AE378A, A7559A and AE391A, 2 Gb FC Modules)*	46 Max	A7429A
Cisco MDS 9000 32-port Storage Services Module, includes 32 short wave SFPs (A7428A)	1 Max	AE378A
Cisco MDS 9200 Storage Services Module Application Enabler License To Use. (Required for Network Hosted Applications which use SAN Tap and ISAPI services on Storage Services Module)	1 Max	T4318A
Cisco MDS 9000 12-port, 4 Gb Fibre Channel module, DOES NOT include SFPs	1 Max	AE383A
Cisco MDS 9000 24-port, 4 Gb Fibre Channel module, DOES NOT include SFPs	1 Max	AE384A
Cisco MDS 9000 48-port, 4 Gb Fibre Channel module, DOES NOT include SFPs	1 Max	AE385A
Cisco MDS 9000 4Gb Fibre Channel SFP, 4 Pack, 500m Short Wave Transceiver	SFPs not included with 4Gb 12, 24 and 48 port modules	AE379A
Cisco MDS 9000 4Gb Fibre Channel SFP, 4km Transceiver		AE494A
Cisco MDS 9000 4Gb Fibre Channel SFP, Long Wave Transceiver	48 Max	AE380A
Cisco MDS 9000 4-port, 10 Gb Fibre Channel Module (DOES NOT include SFPs)	1 Max	AE386A
Cisco MDS 9000 10 Gb FC SFP, Short Wave Transceiver	4 Max	AE381A
Cisco MDS 9000 10 Gb FC SFP, Long Wave Transceiver	4 Max	AE456A
<b>FCIP &amp; iSCSI Expansion Modules</b>		
MDS 9000 8 Port IP Storage Services Module, SFPs not included	1 Max	A7470A
MDS 9200 FCIP Services Software License - 8 port <b>NOTE:</b> FCIP software licenses are required for FCIP operation.	1 per A7470A	A7474A
MDS 9000 4 Port IP Storage Services Module, SFPs not included	1 Max	A7562A
MDS 9200 FCIP Services Software License - 4 port <b>NOTE:</b> FCIP software licenses are required for FCIP operation.	1 per A7562A	T3695A

### Configuration Information

MDS 9000 Multiprotocol Services Module w/0 1 Gb Ethernet SFPs. 14 short wave, 2 Gb FC SFPs are included.	1 Max	AE391A
MDS 9200 FCIP Services Software License - 2 Port <b>NOTE:</b> The 2 port FCIP software license is only required for FCIP operation with optional MDS 9000 Family Multiprotocol Services Module.	1 per A7559A	T3678A
1 GB Ethernet & 1-2 GB short wave SFP, LC*		A7487A
1 GB Ethernet & 1-2 GB long wave SFP, LC*		A7488A
Cisco MDS 9000 1Gb Ethernet SFP, Copper Transceiver*	10 Max	AE382A
HP MDS 9000 18+4 w/0 SFP Module (does not support AE382A Copper Transceiver)	4 Max	AG852A
HP MDS 9500 MPS 18/4 FCIP Module LTU, required for FCIP operation with AG852A		T5413A
* 1 GB Ethernet SFPs required for 4 port and 8 port IP services modules, Multiprotocol Services Module and the embedded Ethernet ports on MDS 9216i Fabric Switch. Choose from optical or copper above. 2 Gb Fibre Channel ports on the MDS 9000 port modules may be configured to accept either Short Wave SFP or Long Wave SFP optic transceivers. When ordering the MDS 9000 port cards A7464A, A7465A, AE378A, A7559A and AE391A, all available ports are shipped with the short wave SFP optic transceivers included. Long Wave SFPs must be ordered separately. SFPs for all 1 Gb Ethernet ports must also be ordered separately. Copper Ethernet transceivers are used for very short distances less than 100 meters and are used with standard Category 5 Ethernet wiring. HP MDS 9000 18+4 w/0 SFP Module does not support AE382A Copper Transceiver.		
MDS 9000 10Gb Fibre Channel 2X Extended Range Transceiver		AG861A
MDS 9000 10Gb Fibre Channel 2X Copper Transceiver		AG870A
Cisco MDS 9000 10Gb Ethernet X2 Short Range Transceiver		AG871A
Cisco MDS 9000 Encryption Key Manager Smart Card Reader		AG872A
Cisco MDS 9000 Encryption Key Manager Smart Card		AG873A
Cisco MDS 9000 15 Meter Cable for 10Gb Copper Short Range X2 Transceivers		AG876A
Cisco MDS 9000 1 Meter Cable for 10Gb Copper Short Range X2 Transceivers		AG877A
HP StorageWorks CWDM 4-port Multiplexer A		AG878A
HP StorageWorks CWDM 4-port Multiplexer B		AG879A
HP StorageWorks CWDM 8-port Multiplexer		AG880A
HP StorageWorks CWDM Multiplexer Chassis		AG881A
HP 2m Single-Mode LC/LC Fibre Channel Cable Used for CWDM solution	1 Pack	AK345A
HP 5m Single-Mode LC/LC Fibre Channel Cable Used for CWDM solution	1 Pack	AK346A
<b>Optional Software Licenses</b>		
HP MDS 9200 FabMgr Sv -1 MDS 9200 swt LTU		A7513A
HP MDS 9200 Enterprise Package license for 1 MDS 9200 switch, Required for Inter-VSAN routing, QoS management, IPsec security, LUN zoning and individual port security	Required for each Switch	A7516A
Cisco MDS 9200 Mainframe FICON Software License To Use. XP Array configurations only & HP Services Installation and Startup Statement of Work, HA546A1, is required	Required for each Switch used for FICON Plus prerequisite HP C&I Service	T4409A
Cisco MDS 9200 Storage Media Encryption package for one MPS 18/4 Module LTU		T5418A

### Course Wave Division Multiplexer Solution



### Configuration Information

4 Wavelength Add/Drop Mux, w/Chassis	2Gb only LC/SC	A7483A
8 Wavelength Mux/Demux, w/Chassis	2Gb only LC/SC	A7484A
1470 NM CWDM 2Gb FC SFP ( works only with A7483A and A7484A multiplexers)		A7475A
1490 NM CWDM 2Gb FC SFP ( works only with A7483A and A7484A multiplexers)		A7476A
1510 NM CWDM 2Gb FC SFP ( works only with A7483A and A7484A multiplexers)		A7477A
1530 NM CWDM 2Gb FC SFP ( works only with A7483A and A7484A multiplexers)		A7478A
1550 NM CWDM 2Gb FC SFP ( works only with A7483A and A7484A multiplexers)		A7479A
1570 NM CWDM 2Gb FC SFP ( works only with A7483A and A7484A multiplexers)		A7480A
1590 NM CWDM 2Gb FC SFP ( works only with A7483A and A7484A multiplexers)		A7481A
1610 NM CWDM 2Gb FC SFP ( works only with A7483A and A7484A multiplexers)		A7482A
Fibre Cable LC/SC 1 Meter ( works only with A7483A and A7484A multiplexers)		A7485A
Fibre Cable LC/SC 5 Meter ( works only with A7483A and A7484A multiplexers)		A7486A
MDS 9000 1470 NM CWDM 4Gb FC SFP Transceiver		AG853A
MDS 9000 1490 NM CWDM 4Gb FC SFP Transceiver		AG854A
MDS 9000 1510 NM CWDM 4Gb FC SFP Transceiver		AG855A
MDS 9000 1530 NM CWDM 4Gb FC SFP Transceiver		AG856A
MDS 9000 1550 NM CWDM 4Gb FC SFP Transceiver		AG857A
MDS 9000 1570 NM CWDM 4Gb FC SFP Transceiver		AG858A
MDS 9000 1590 NM CWDM 4Gb FC SFP Transceiver		AG859A
MDS 9000 1610 NM CWDM 4Gb FC SFP Transceiver		AG860A
<b>Dense Wave Division Multiplexer solution</b>		
MDS 9000 3661 NM DWDM 2Gb SFP Transceiver		AG862A
MDS 9000 3582 NM DWDM 2Gb SFP Transceiver		AG863A
MDS 9000 3504 NM DWDM 2Gb SFP Transceiver		AG864A
MDS 9000 3425 NM DWDM 2Gb SFP Transceiver		AG865A
MDS 9000 3268 NM DWDM 2Gb SFP Transceiver		AG866A
MDS 9000 3190 NM DWDM 2Gb SFP Transceiver		AG867A
MDS 9000 3112 NM DWDM 2Gb SFP Transceiver		AG868A
MDS 9000 3033 NM DWDM 2Gb SFP Transceiver		AG869A

### Installation Service

Cisco MDS 9216i Installation Service

HA113A1#5D2

### Configuration Information

#### Accessories

##### Optical Cables

##### Part Number

##### (LC-LC for between two 2 Gb devices)

2 m LC-LC Multi-Mode Fibre Channel Cable	221692-B21
5 m LC-LC Multi-Mode Fibre Channel Cable	221692-B22
15 m LC-LC Multi-Mode Fibre Channel Cable	221692-B23
30 m LC-LC Multi-Mode Fibre Channel Cable	221692-B26
50 m LC-LC Multi-Mode Fibre Channel Cable	221692-B27

##### (LC-SC for between a 1 Gb and a 2 Gb device)

FC Cable LC/SC 1 Meter	A7485A
FC Cable LC/SC 5 Meter	A7486A
2 m LC-SC Multi-Mode Fibre Channel Cable	221691-B21
5 m LC-SC Multi-Mode Fibre Channel Cable	221691-B22
15 m LC-SC Multi-Mode Fibre Channel Cable	221691-B23
30 m LC-SC Multi-Mode Fibre Channel Cable	221691-B26
50 m LC-SC Multi-Mode Fibre Channel Cable	221691-B27

### Technical Specifications

O/S Support MDS SAN-OS Release 1.3(2) or later

Fibre Channel 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-FS, Revision 1.9 (ANSI/INCITS 373-2003) [the final revision is 1.9, not 1.7]
- 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-SW-2, Revision 5.3 (ANSI/INCITS 355-2001)
- FC-SW-3, Rev. 6.6 (ANSI/INCITS 384-2004)
- FC-GS-3, Revision 7.01 (ANSI/INCITS 348-2001)
- FC-GS-4, Rev. 7.91 (ANSI/INCITS 387-2004)
- FC-BB, Revision 4.7 (ANSI/INCITS 342-2001)
- FC-BB-2, Rev. 6.0 (ANSI/INCITS 372-2003)
- FCP, Revision 12 (ANSI/INCITS 269-1996)
- FCP-2, Revision 8 (ANSI/INCITS 350-2003)
- FC-SB-2, Revision 2.1 (ANSI/INCITS 349-2001)
- FC-SB-3, Revision 1.6 (ANSI/INCITS 374-2003)
- FC-VI, Revision 1.84 (ANSI/INCITS 357-2002)
- 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-SP, Revision 1.6
- FC-DA, Revision 3.1
- IP over Fibre Channel (RFC 2625)
- Extensive IETF-standards based TCP/IP, SNMPv3, and Remote Monitoring (RMON) MIBs
- Class of Service:
  - Class 2
  - Class 3
  - Class F
- Fibre Channel standard port types:
  - E
  - F
  - FL
  - B
- Fibre Channel enhanced port types:
  - SD
  - ST
  - TE
  - TL

Features and functions

- Fabric services
- Name server
- Internet Storage Name Server (iSNS)
- Registered State Change Notification (RSCN)
- Login services

### Technical Specifications

- Fabric Configuration Server (FCS)
- Private loop
- Public loop
- Translative loop
- Broadcast
- In-order delivery
- Advanced Functionality
- VSANs
- Inter-VSAN Routing
- PortChannel with Multipath Load Balancing
- QoS-flow-based, zone-based
- Fibre Channel Congestion Control
- Extended Buffer-To-Buffer Credits
- Diagnostics and troubleshooting tools
- Power-on-self-test (POST) diagnostics
- Online diagnostics
- Internal port loopbacks
- SPAN and Remote SPAN
- 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
- Access Control Lists
- 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
- iSCSI zoning
- iSCSI name
- IP address
- Fibre Channel Security Protocol (FC-SP)
- DH-CHAP switch-switch authentication
- DH-CHAP host-switch authentication
- Port Security and Fabric Binding
- IPSec for FCIP and iSCSI
- IKEv1 and IKEv2
- Management access
- SSH v2 implementing AES
- SNMPv3 implementing AES
- SFTP

### Technical Specifications

- Serviceability
- Configuration file management
- Nondisruptive software upgrades for Fibre Channel interfaces
- Call Home
- Power-management LEDs
- Port beaconing
- System LED
- SNMP traps for alerts
- Network boot

### Performance

- Port speed: 2/1-Gbps auto-sensing, optionally configurable
- Buffer credits: Up to 255 per port
- Ports per chassis:
  - 16 to 48 2/1-Gbps Fibre Channel ports, up to eight 1-Gbps Ethernet ports
- Ports per rack:
  - Up to 672
- Port Channel:
  - Up to sixteen 2-Gbps ports

### Reliability and Availability

- Hot-swappable, 1+1 redundant power supplies
- Hot-swappable fan tray with integrated temperature and power management
- Hot-swappable SFP optics
- Hot-swappable switching module
- Stateful process restart
- Any module, any port configuration for PortChannels
- Fabric-based multipathing
- Per-VSAN fabric services
- Passive backplane
- Online diagnostics

### Cards, ports, slots

Base: 14 fixed auto-sensing 2/1-Gbps Fibre Channel ports, 2 Gb Ethernet ports  
Expansion: 1 empty expansion slot

### Network Management

- Access methods
- Out-of-band 10/100 Ethernet port
- RS-232 serial console port
- In-band IP-over-Fibre Channel
- DB-9 COM port
- Access protocols
- CLI-via console and Ethernet ports
- SNMPv3-via Ethernet port and in-band IP-over-Fibre Channel access
- Distributed Device Alias service
- Network security
- Per-VSAN role-based access control using RADIUS and TACACS+ based authentication, authorization, and accounting (AAA) functions
- SFTP
- SSH v2 implementing AES
- SNMPv3 implementing AES
- Management applications
- Cisco MDS 9000 Family CLI
- Cisco Fabric Manager
- Cisco Device Manager
- CiscoWorks 2000 Resource Manager Essentials

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### Technical Specifications

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### Programming Interfaces

- Scriptable CLI
- Fabric Manager GUI
- Device Manager GUI

### 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 (FR 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

### Power and Cooling

- Power supply (845W AC)
  - AC input characteristics
    - 100 to 240 VAC (10% range)
    - 50-60Hz (nominal)
- Airflow:
  - 200 linear feet per minute (lfm) through system fan assembly
  - Cisco recommends that you maintain a minimum air space of 6 inches (16 cm) between walls and the chassis air vents and a minimum separation of 12 inches (30.5 cm) between two chassis to prevent overheating.

### Technical Specifications

<b>Environmental</b>	Temperature, ambient operating	32° to 104° F (0° to 40° C)
	Temperature, ambient non-operating and storage	40°F to 158° F (-40°C to 75° C)
	Relative humidity, ambient (non-condensing) operating	10 to 90%
	Relative humidity, ambient (non-condensing) non-operating and storage	10 to 95%
	Altitude, operating	-197 to 6500 feet (-60 to 2000 meter)
<b>Dimensions (HxWxD)</b>	5.25 x 17.32 x 22.66 in (13.34 x 43.99 x 57.56 cm) 3 Rack Units (RU) All units rack mountable in standard 19 inch EIA rack	

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