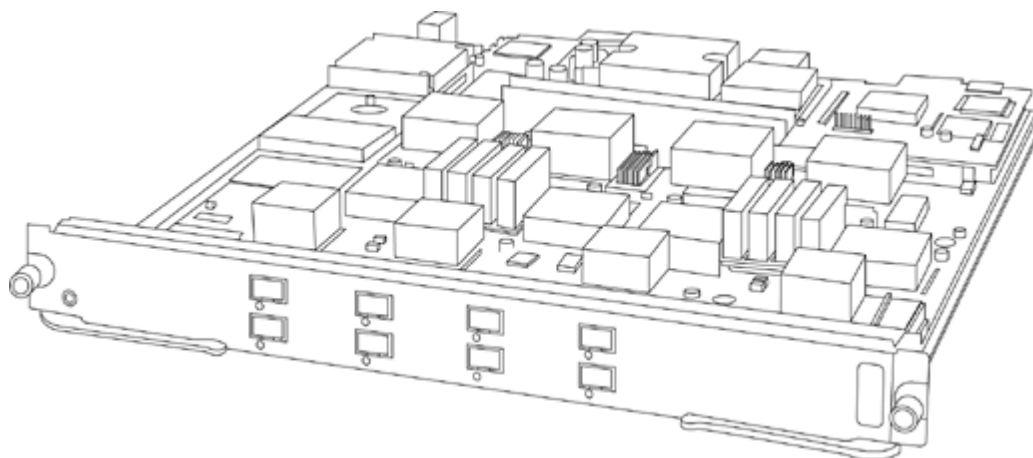


Overview

Companies investing in Fibre Channel SAN infrastructure have realized significant benefits in increased storage utilization and availability, simplified management, and more effective disaster recovery and business continuance strategies. Until now, however, SAN deployment and its resulting benefits have primarily been focused on mission-critical application islands within individual data centers. The difficulty and cost associated with migrating the large number of data center midrange servers to Fibre Channel in certain cases has made it impractical for IT managers to extend the benefits of SAN to mid-range applications. Using open-standard IP-based technology, the Cisco MDS 9000 Family IP Storage Services Module eliminates the barriers to SAN expansion, enabling businesses to extend the reach of their Fibre Channel SANs throughout the data center and between data centers. The dual functionality of the Cisco MDS 9000 Family IP Storage Services Module supports interconnection of remote SAN islands and extends SAN connectivity to IP-enabled servers using the FCIP and iSCSI protocols, respectively.



Models

HP MDS 9000 8 Port 1GE IP Storage Services Module

A7470A

Related Options

HP MDS 9500 8-prt FCIP Services Software LTU

A7469A

HP MDS 9200 8-prt FCIP Services Software LTU

A7474A

1 GB-E/2FC SW SFFPLG-LC (Short Wave optical module SFP, LC)

A7487A

1 GB-E/2FC LW SFFPLG-LC (Long Wave optical module SFP, LC)

A7488A

Key Features and Benefits

Overview

- **FCIP for Remote SAN Extension**

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 9000 Family IP Storage Services Module 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 Enable Business Continuance And Disaster Recovery**

The Cisco MDS 9000 Family IP Storage Services Module 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), FCIP compression, 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. VSANs allow the cost of SAN infrastructure to be shared among more users, while ensuring absolute segregation of traffic and retaining independent control of configuration on a VSAN-by-VSAN basis. With their integrated FCIP capability, the Cisco MDS 9000 Family IP Storage Services Module enables the extension of VSANs over dedicated or existing IP infrastructure.

The Cisco IP Storage Services Module supports Inter-VSAN Routing, 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. With IVR, data can transit VSAN boundaries while maintaining control plane isolation, thereby maintaining fabric stability and availability.

- **High Performance SAN Extension with Compression and FCIP Write Acceleration**

The Cisco MDS 9000 Family IP Storage Services Module supports FCIP compression to maximize the effective WAN bandwidth of SAN Extension solutions. The Cisco IP Storage Services Module achieves up to a 30:1 compression ratio, with typical ratios of 2:1 over a wide variety of data sources. The Cisco IP Storage Services Module is able to provide optimal levels of compressed throughput for implementations across low to intermediate-bandwidth links. The Cisco IP Storage Services Module 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 IP Storage Services Modules supports FCIP Tape Acceleration, which significantly improves throughput over WAN links for remote tape backup operations.

Together, FCIP Compression, FCIP Write Acceleration, and FCIP Tape Acceleration enable optimal performance of business continuance services.

- **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 9000 Family IP Storage Services Module addresses these limitations by enabling IT organizations to extend their storage networks using cost-effective Ethernet infrastructure. All the benefits of SAN, 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 IP Storage Services Module 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 using Fibre Channel, while maintaining the cost and ease-of-use benefits of Ethernet and IP.

- **Transparent and Proxy Initiator Operation**

The Cisco MDS 9000 Family IP Storage Services Module provides transparent mapping of SCSI I/O operations between iSCSI and Fibre Channel domains. When Ethernet attached servers are added to a Cisco MDS 9000 Family storage network, they are presented to the Fibre Channel storage devices as native Fibre Channel hosts. Conversely, Fibre Channel storage devices are presented as iSCSI targets to the iSCSI hosts. This transparent access preserves correct operation of storage tools, such as zoning managers, which require visibility of all hosts.

Additionally, hosts have access to consistent SAN services independent of the transport they use to attach to the SAN. As iSCSI hosts are added to the SAN, they are added to the appropriate VSAN, Fibre Channel Name Server, Zone Server, and Cisco MDS 9000 Family management infrastructure.

Overview

Benefits of IP Storage Services Module

CONTROLLABLE:

- Manageable: provides embedded Fabric Manager support and integration with CiscoWorks RME.
- Serviceable: delivers embedded diagnostics (Fibre Channel ping, traceroute and protocol analyzer).

RESILIENT:

- High Reliability: hot swappable components.
- Secure: supports VSANs, hardware-enforced zoning, role-based access control, FC-SP.

EXTENSIBLE:

- Flexible: Virtual SANs (VSANs) for consolidation of isolated SAN islands on a single physical fabric.
- Interoperable: offers compatibility with a broad range of HP servers and operating systems, as well as disk and tape storage devices.

Product Family Models Supported:

- Cisco MDS 9216 Multilayer Fabric Switch - Intelligent, multi-protocol modular Fabric Switch with up to 48 auto-sensing 2/1 Gb Fibre Channel ports or 16 ports of Fibre Channel connectivity with 8 ports of 1Gb Ethernet.
- Cisco MDS 9216A Multilayer Fabric Switch - Intelligent, multi-protocol modular Fabric Switch with up to 64 auto-sensing 2/1 Gb Fibre Channel ports or 16 ports of Fibre Channel connectivity with 8 ports of 1Gb Ethernet.
- Cisco MDS 9216i Multilayer Fabric Switch - With fourteen 2-Gbps Fibre Channel ports, two Gigabit Ethernet IP Storage Services ports, and a modular expansion slot which can accommodate up to 48 additional FC ports or other MDS 9000 modules in various port count configurations, the Cisco MDS 9216i is ideally suited for enterprise storage networks that require high performance SAN extension or cost-effective IP Storage connectivity.
- Cisco MDS 9506 Multilayer Director - Intelligent, multi-protocol, modular, 6 slot Director switch with up to 128 auto-sensing 4/2/1 Gb Fibre Channel ports.
- Cisco MDS 9509 Multilayer Director - Intelligent, multi-protocol, modular, 9 slot Director switch with up to 224 auto-sensing 4/2/1 Gb Fibre Channel ports.
- Cisco MDS 9513 Multilayer Director - Intelligent, multi-protocol, modular, 13 slot Director switch with up to 528 auto-sensing 4/2/1 Gb Fibre Channel ports.

Configuration Support

Please refer to the SAN design guide at the following URL: <http://h18000.www1.hp.com/products/storageworks/san/>

Product Highlights

Multiprotocol Connectivity To Cisco MDS 9500 and 9200 Series Switches

Integral switch component which provides up to 8 ports of multiprotocol connectivity for 1Gb Ethernet to 4/2/1-Gb Fibre Channel ports allowing IP connections using FCIP and iSCSI.

Integration with Cisco MDS 9000 Family Switching Services

The IP Storage Services Modules integrate seamlessly into the Cisco MDS 9000 Family of Multilayer Directors and Fabric Switches. Traffic can be routed between any IP storage port and any other port on a Cisco MDS 9000 Family switch. The Cisco MDS 9000 Family IP Storage Services Module supports the full range of services available on other MDS 9000 Family Switching Modules including VSANs, security, and traffic management.

Flexible Configuration

The Cisco 8-port IP Storage Services Module supports, eight hot-swappable, Small Form-Factor Pluggable (SFP), LC Gigabit Ethernet interfaces. Modules can be configured with short-wave and long-wave SFPs. Additionally, all ports are configurable for both FCIP and iSCSI. Ports configured for FCIP operation can be further configured to support up to three virtual ISL connections.

Scaling Remote Connectivity with FCIP

One of the key advantages of FCIP for remote connectivity is its ability to extend distances. But, distance at the expense of performance is an unacceptable tradeoff for IT organizations that demand full utilization of expensive WAN bandwidth. The IP Storage Services Module implements TCP Extensions for High Performance (RFC 1323) that allow for efficient full-bandwidth operation over greatly increased distances relative to standard TCP.

Transparent Operation

The Cisco MDS 9000 Family IP Storage Services Modules provide transparent mapping of SCSI input/output operations between iSCSI and Fibre Channel domains. When IP-attached servers are added to a Cisco MDS 9000 Family storage network, they are presented to the Fibre Channel storage devices as native-Fibre Channel hosts. Conversely, Fibre Channel storage devices are presented as iSCSI targets to the iSCSI hosts. This transparent access preserves correct operation of storage tools, such as zoning managers, which require visibility of all hosts. Also, hosts have access to consistent SAN services independent of the transport they use to attach to the SAN. As iSCSI hosts are added to the SAN, they are added to the appropriate VSAN, Fibre Channel Name Server, Zone Server, and Cisco MDS 9000 Family management infrastructure.

Virtual SANs (VSANs)

VSANs are Hardware-enforced, isolated environments within a single physical fabric for secure sharing of physical infrastructure. VSANs allow the cost of SAN infrastructure to be shared among more users, while assuring absolute segregation, security of traffic, and retaining independent control of configuration on a VSAN-by-VSAN basis.

Comprehensive Security Framework

Supports role-based access control, VSANs, hardware-enforced zoning, FC-SP, ACLs, RADIUS authentication, SNMPv3, SSH, and SFTP.

Product Highlights

Software Components

Integrated Management Integrated storage network management with all features available via CLI or Cisco Fabric Manager. This centralized management simplifies management of multiple switches and multiprotocol fabric environments. Also provides integration with HP Storage Essentials and Cisco Resource Manager Essentials (RME).

Interoperability Offers compatibility with a broad range of HP servers and operating systems, as well as disk and tape storage devices; see current compatibility matrix.

Serviceability Hot-swappable switching modules provides shorter mean time to repair.

Software Components

FCIP Services Software FCIP Services Software License is required for each IP module using this feature.

iSCSI Services Software Right to use this feature is included with the IP module hardware. Feature is embedded in SAN-OS.

SAN-OS Includes Cisco Fabric Manager software.

Product Service Options 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>.

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. Saleable software carries its own warranty.

HP's Limited Software Warranty; 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.

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

Product Highlights

Warranty and support options

The basic hardware warranty service can be enhanced and/or HP Installation services can be purchased.

Support options with various response time and durations are available, including:

- Warranty upgrade to 3-3-3
- Various support response times (same/next day, 24x7)
- various support coverage periods (M - F, 24x7, 1 yr, 3 yr)
- 6-hr Call-To-Repair

To ensure you receive assistance on your software, support options include:

- Software support coverage periods (13x5, 24x7, 1 yr, 3 yr)
- License to Use and SW Updates (1 yr, 3 yr)

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

Options Available

HP MDS 9500 FCIP Services Software License - 8 port	HP MDS 9000 8 Port FCIP Services SW LTU	A7469A
HP MDS 9200 FCIP Services Software License - 8 Port	HP MDS 9200 8 Port FCIP Services SW LTU	A7474A
HP MDS 9500 4-prt FCIP Services SW LTU	FCIP Services Software License To Use for MDS 9000 Family 4 Port IP Storage Services Module with MDS 9509, MDS 9506 Directors	T3694A
HP MDS 9200 4-prt FCIP Services Software LTU	FCIP Services Software License To Use for MDS 9000 Family 4 Port IP Storage Services Module with MDS 9216A or MDS 9216i Multilayer switches	T3695A
Short Wave Transceiver	1GB-Ethernet to 1 or 2Gb Fibre Channel, Short Wave, Optical Transceivers, Small-Form-Factor-Pluggable, Short Wave	A7487A
Long Wave Transceiver	1GB-Ethernet to 1 or 2Gb Fibre Channel, Long Wave, Optical Transceivers, Small-Form-Factor-Pluggable, Long Wave	A7488A

Recommended Cables *Optical Cables*

LC-LC for between two 2 Gb devices

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

LC-SC for between a 1 Gb/s and a 2 Gb/s device

2m LC-LC Multi-Mode Fibre Channel Cable	221691-B21
5m LC-LC Multi-Mode Fibre Channel Cable	221691-B22
15m LC-LC Multi-Mode Fibre Channel Cable	221691-B23
30m LC-LC Multi-Mode Fibre Channel Cable	221691-B26
50m LC-LC Multi-Mode Fibre Channel Cable	221691-B27

Configuration Information

The MDS 9000 IP Storage Services modules are designed to plug into an expansion slot in the MDS 9200 and MDS 9500 series switches. Please refer to the SAN design guide for the latest supported configuration information. The SAN design guide can be accessed on the Worldwide Web at: <http://www.hp.com/go/san>.

Step 1 – Base Configuration

Select one:

Model Number	Model Description	Part Number
HP MDS 9000 8 Port IP Storage Services Module	HP MDS 9000 8-pt IP STG services module.	A7470A

Step 2 - Options

Description with Parts Shipped	Quantity	Part Number
HP MDS 9500 8-pt FCIP Services SW LTU (required for FCIP operation on MDS 9500 Series Directors)	1 per module	A7469A
HP MDS 9200 8-pt FCIP Services SW LTU (required for FCIP operation on MDS 9200 series multilayer switches)	1 per module	A7474A
HP MDS 9500 4-pt FCIP Services SW LTU (required for FCIP operation on MDS 9500 Series Directors with 4 port IP service Module, A7562A)	1 per module	T3694A
HP MDS 9200 4-PT FCIP Services SW LTU (required for FCIP operation on MDS 9200 series multilayer switches with 4 port IP service Module, A7562A)	1 per module	T3695A
Tri Rate Transceiver, 1Gbit Ethernet to 1 or 2 Gbit Fibre Channel Short Wave Small Form Factor Puggable Transceiver	1-8	A7487A
Tri Rate Transceiver, 1Gbit Ethernet to 1 or 2 Gbit Fibre Channel Long Wave Small Form Factor Puggable Transceiver	1-8	A7488A

Technical Specifications

Protocol Support

- IP Standards
 - RFC 791 IPv4
 - RFC 793, 1323 TCP
 - RFC 894 IP/Ethernet
 - RFC 1041 IP/802
 - RFC 792, 950, 1256 ICMP
 - RFC 1323 TCP performance enhancements
 - RFC 2338 VRRP
- Ethernet Standards
 - IEEE 802.3z Gigabit Ethernet
 - IEEE 802.1Q VLAN

Features and functions

- IP storage services
 - FCIP
 - iSCSI
 - Internet Storage Name Server (iSNS)
 - iSCSI Network Boot Protocol (iNBP)
- Advanced Functionality
 - VSAN
 - Inter-VSAN Routing
 - EtherChannel® with Multipath Load Balancing
 - FCIP compression
 - FCIP Write Acceleration
 - FCIP Tape Acceleration
- Diagnostics and troubleshooting Tools
 - Power-on-self-test (POST) diagnostics
 - Online diagnostics
 - Internal port loopbacks
 - SPAN and Remote SPAN
 - Cisco Fabric Analyzer
 - Syslog
 - Online system health
 - Port-level statistics
 - Real Time Protocol Debug
- Network security
 - VSANs
 - Access Control Lists
 - Per-VSAN role-based access control
 - iSCSI zoning
 - iSCSI name
 - IP address
 - Management access
 - SSH v2 implementing AES
 - SNMPv3 implementing AES
 - SFTP
- Serviceability
 - Configuration file management
 - Call Home
 - Power-management LEDs
 - Port beaconing
 - System LED
 - SNMP traps for alerts
 - Network boot

Technical Specifications

Performance

- Port speed: 1-Gbps Ethernet
- IP storage services ports per chassis: 8 to 48 ports per chassis
- IP storage services ports per rack: Up to 144 ports per 42U rack
- FCIP tunnels: up to 3 per port
- EtherChannel: Up to 2 1-Gbps ports

Reliability and Availability

- Hot-swappable module
- Hot-swappable SFP optics
- Online diagnostics
- Stateful Process Restart
- Non-disruptive Supervisor Failover
- Fabric-based multipathing
- Per-VSAN fabric services
- Virtual Routing Redundancy Protocol (VRRP) for management and FCIP or iSCSI connections

Network Management

- Access methods through Cisco MDS 9500 Series Supervisor module
 - 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

Reliability and Availability

- Hot-swappable module
- Hot-swappable SFP optics
- Online diagnostics

O/S Support

Cisco MDS SAN-OS Release 2.0(1) or later

Dimensions (HxWxD)

1.75 x 14.4 x 16 in (3.0 x 35.6 x 40.6 cm)

Weight

4 oz

Shipping Weight

14 oz

Cable Type

See Connectors/Cables

Maximum Transfer Rate

1 GB Ethernet to 1/2 Gb FC

Relative Humidity (non-condensing)

Operating	10 to 90%, ambient (non-condensing) operating
Shipping	5 to 95%, ambient (non-condensing) non-operating and storage

Temperature Range

Operating	32° to 104° F (0° to 40° C), ambient operating
Shipping	-40° to 158° F (-40° to 70° C), ambient non-operating and storage

Altitude Operation

Altitude Operation -197 to 6500 feet (-60 to 2000 meter)

Technical Specifications

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