Cisco MDS **9000** IP Storage Services Module

Highlights

- Flexible IP Storage Services: delivers both FCIP and iSCSI IP Storage services—software configurable on a port-by-port basis.

- Simplified business continuance and storage consolidation: Uses widely known IP to cost-effectively connect to more servers and more locations over greater distances than previously possible.

- Simplified management: Provides unified management environment independent of whether servers use Fibre Channel or IP to connect to the storage network

- Comprehensive security: combines ubiquitous IP security infrastructure with Cisco Virtual SANs (VSANs), hardware-based zoning and hardware-based access control lists (ACLs) to provide robust security.

- FCIP highlights

  – Simplifies data protection and business continuance strategies by enabling backup, remote replication, and disaster recovery over WAN distances using open-standard FCIP tunneling.

  – Improves utilization of WAN resources for backup and replication by tunneling up to 3 virtual Inter Switch Links (ISLs) on a single Gigabit Ethernet port.

  – Reduces SAN complexity by eliminating the need to deploy and manage a separate remote connectivity platform.

  – Preserves Cisco MDS 9000 Family enhanced capabilities including VSANs, advanced traffic management, and security across remote connections.

Figure 1

The Cisco MDS 9000 Family IP Services Module Delivers 8 Ports of Wirerate iSCSI or FCIP over Gigabit Ethernet

- iSCSI highlights
  - Extends the benefits of Fibre Channel SAN-based storage to IP-enabled servers at a lower cost point than possible using Fibre Channel interconnect alone.
  - Increases storage utilization and availability through consolidation of IP and Fibre Channel block storage.
  - Transparent operation preserves the functionality of legacy storage applications such as zoning tools.

Extending the Benefits of Fibre Channel SANs

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 have 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.

Integration with Cisco MDS 9000 Family Switching Services

The IP Storage Services Module integrates 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 DS-X9308-SMIP includes eight hot-swappable, small form-factor pluggable (SFP), LC Gigabit Ethernet interfaces. Modules can be configured with either short or long wavelength SFPs for connectivity up to 550m and 10km, respectively. Additionally, all ports are configurable for both FCIP and iSCSI operation on a port-by-port basis. Ports configured for FCIP operation can be further configured to support up to three virtual ISL connections.

FCIP for Remote SAN Extension

Data distribution, data protection, and business continuance strategies are critical 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 protection for valuable corporate information, but also promotes increased utilization of backup resources, reduces the impact of a catastrophic failure at a single site, 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.

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.

Cisco MDS 9000 Family FCIP Enhances SAN Security and Stability

The Cisco IP Storage Services Module allows VSANs to extend across FCIP tunnels. The VSAN functionality integrated into every Cisco MDS 9000 Family switch enables deployment of enterprise-wide consolidated storage networks. VSANs allow more efficient SAN utilization by creating hardware-based isolated environments within a single SAN fabric. 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 assuring absolute segregation, security of traffic, and retaining independent control of configuration on a VSAN-by-VSAN basis.

iSCSI for Cost-Effective Extension of SAN Storage to IP-Enabled Servers

Many IT managers have been hesitant to extend SAN access beyond their mission critical applications to mid-range 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 IP 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 Services Module is an integral component of the Cisco MDS 9000 Family, IP-connected servers will enjoy the same SAN scalability, availability, manageability, and intelligent services as those servers connected via Fibre Channel while maintaining the cost and ease-of-use benefits of IP. The Cisco MDS 9000 Family IP Storage Services Module provides the flexibility to architect a cost optimized storage network.

Transparent Operation

The Cisco MDS 9000 Family IP Storage Services Module provides 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.

Specifications

Interfaces

- Physical Interfaces: 8 SFP Type LC
- Gigabit Ethernet (IEEE 802.3z)
- Occupies one slot in a Cisco MDS 9000 Family platform

Scalability

- IP storage ports per chassis: 8 to 80 ports per chassis
- IP storage ports per rack: Up to 192 ports per 42U rack
- Virtual ISLs per port (FCIP mode): 3
- Ports per Gigabit EtherChannel®: 2 ports
- Supported optics, media, and transmission distances:

Optics	Media	Distance
1-Gbps—SX, LC SFP	50/125 micron multimode	550 m
1-Gbps—SX, LC SFP	62.5/125 micron multimode	275 m
1-Gbps—LX/LH, LC SFP	9/10 micron singlemode	10 km

IP/Ethernet Standards

- Internet 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
    - EEE 802.3z Gigabit Ethernet
    - IEEE 802.1Q VLAN

Indicators

- Status: green (operational)/red (faulty)/orange (module booting or running diagnostics)
- Link: green (port active)/blinking green (port active—beacon)/orange (disabled)/off (not active/connected)/ blinking orange (failed diagnostic and disabled

Environmental

- Temperature, ambient operating
  - 32 F (0 C) to 104 F (40 C)
- Temperature, ambient nonoperating and storage
  - –40 F (–40 C) to 158 F (70 C)
- Humidity (RH), ambient (noncondensing) operating
  - 10% to 90%
- Humidity (RH), ambient (noncondensing) nonoperating and storage
  - 5% to 95%
- Altitude, operating
  - Sea level to 6500 feet (2000 m)

Physical Characteristics

- Dimensions (H x W x D)
  - 1.2 x 14.4 x 16 in. (3.0 x 35.6 x 40.6 cm) Requires chassis for operation
- Weight
  - Switching module only: 10 lb (4.5 kg)

Safety Compliance

When installed in a system, the Cisco MDS 9000 Family Fibre Channel Switching Modules meet the following compliance and safety standards:

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

Industry EMC, Safety, and Environmental Standards

- GR-63-Core NEBS Level 3

- GR-1089-Core NEBS Level 3

- ETS 300 019 Storage Class 1.1

- ETS 300 019 Transportation Class 2.3

- ETS 300 019 Stationary Use Class 3.1

- ETS 300 386

Ordering Information

Part Number	Description
332907-B21	MDS 9500 8-port 1GE IP Storage Services Module The Cisco MDS 9000 Family IP Storage Services Module provides tightly integrated iSCSI and FCIP connectivity
Options:	
336223-B21	1GB-E/2FC SW SFFPLG-LC (SW optical module SFP, LC) Tri Rate Transceiver,1Gbit Ethernet to 1 or 2 Gbit Fibre Channel Short Wave Small Form Factor Puggable Transceiver
336224-B21	1GB-E/2FC LW SFFPLG-LC (LW optical module SFP, LC) Tri Rate Transceiver,1Gbit Ethernet to 1 or 2 Gbit Fibre Channel Short Wave Small Form Factor Puggable Transceiver
348232-001	MDS 9200 FCIP Services Software License SAN Extension over IP package license for one FCIP storage services module in a MDS 9200 series switch
346703-001	MDS 9500 FCIP Services Software License SAN Extension over IP package license for one FCIP storage services module in a MDS 9500 series switch
Course Wave Division Multiplexing Solution	The Cisco CWDM Extended Distance Solution is designed to transmit multiple 1/2 Gbps Fibre Channel and/or Gigabit Ethernet traffic streams over a single, shared fiber optic cable. The CWDM solution consists of a two slot (1RU) CWDM Chassis, which accommodates up to two passive optic CWDM Mux plug-in modules. Two types of modules are available: an 8-wavelength multiplexer/demultiplexer module and a 4-wavelength multiplexer/demultiplexer module with add/drop capabilities. The color coded active CWDM wavelength-specific SFPs are installed into available Fibre Channel and IP ports within one or more MDS Directors. Up to 8 CWDM wavelength-specific SFPs may be connected to the passive optic CWDM Mux plug-in module, using the 1 meter or 5 meter single mode Lucent Connector (LC)/Standard Connector (SC) fiber optic jumper cables. Each wavelength-specific SFP represents a color or channel, and up to 8 channels are transmitted simultaneously between sites, over a single, shared fiber optic cable, helping reduce the costs for Extended Distance Solutions.
347427-B21	4 Wavelength Add/Drop Mux Consists of a two slot (1RU) CWDM Chassis, which accommodates up to two passive optic CWDM Mux plug-in modules and a 4-wavelength multiplexer/demultiplexer module with add/drop capabilities
347428-B21	8 Wavelength Mux/Demux Consists of a two slot (1RU) CWDM Chassis, which accommodates up to two passive optic CWDM Mux plug-in modules and an 8-wavelength multiplexer/demultiplexer module

Part Number	Description
347419-B21	1470 NM CWDM FC SFP Color coded active CWDM wavelength-specific 1470 nano meter SFP
347420-B21	1490 NM CWDM FC SFP Color coded active CWDM wavelength-specific 1490 nano meter SFP
347421-B21	1510 NM CWDM FC SFP Color coded active CWDM wavelength-specific 1510 nano meter SFP
347422-B21	1530 NM CWDM FC SFP Color coded active CWDM wavelength-specific 1530 nano meter SFP
347423-B21	1550 NM CWDM FC SFP Color coded active CWDM wavelength-specific 1550 nano meter SFP
347424-B21	1570 NM CWDM FC SFP Color coded active CWDM wavelength-specific 1570 nano meter SFP
347425-B21	1590 NM CWDM FC SFP Color coded active CWDM wavelength-specific 1490 nano meter SFP
347426-B21	1610 NM CWDM FC SFP Color coded active CWDM wavelength-specific 1610 nano meter SFP
347429-B21	Fibre Cable LC/SC 1 Meter 1 meter single mode Lucent Connector (LC)/Standard Connector (SC) fiber optic jumper cable
347430-B21	Fibre Cable LC/SC 5 Meter 1 meter single mode Lucent Connector (LC)/Standard Connector (SC) fiber optic jumper cable

**For more information on the HP offering of Cisco products,
please visit: http://h18006.www1.hp.com/storage/saninfrastructure.html**

CISCO SYSTEMS | hp invent ®

Corporate Headquarters
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
www.cisco.com
Tel: 408 526-4000
      800 553-NETS (6387)
Fax: 408 526-4100

European Headquarters
Cisco Systems International BV
Haarlerbergpark
Haarlerbergweg 13-19
1101 CH Amsterdam
The Netherlands
www-europe.cisco.com
Tel: 31 0 20 357 1000
Fax: 31 0 20 357 1100

Americas Headquarters
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
www.cisco.com
Tel: 408 526-7660
Fax: 408 527-0883

Asia Pacific Headquarters
Cisco Systems, Inc.
Capital Tower
168 Robinson Road
#22-01 to #29-01
Singapore 068912
www.cisco.com
Tel: +65 317 7777
Fax: +65 317 7799

**Cisco Systems has more than 200 offices in the following countries and regions. Addresses, phone numbers, and fax numbers are listed on the
Cisco Web site at www.cisco.com/go/offices**

Argentina • Australia • Austria • Belgium • Brazil • Bulgaria • Canada • Chile • China PRC • Colombia • Costa Rica • Croatia
Czech Republic • Denmark • Dubai, UAE • Finland • France • Germany • Greece • Hong Kong SAR • Hungary • India • Indonesia • Ireland
Israel • Italy • Japan • Korea • Luxembourg • Malaysia • Mexico • The Netherlands • New Zealand • Norway • Peru • Philippines • Poland
Portugal • Puerto Rico • Romania • Russia • Saudi Arabia • Scotland • Singapore • Slovakia • Slovenia • South Africa • Spain • Sweden
Switzerland • Taiwan • Thailand • Turkey • Ukraine • United Kingdom • United States • Venezuela • Vietnam • Zimbabwe

EW/LW4449 0703