Cisco MDS 8G Fibre Channel Blade Switch for HP c-Class BladeSystem

Product Overview

The Cisco® MDS 8G Fibre Channel Blade Switch (Figure 1), capable of speeds of 8, 4, 2, and 1 Gbps, offers outstanding value by providing flexibility, high availability, security, and ease of use at an affordable price in a form factor to fit the HP c-Class BladeSystem. With its flexibility to expand ports in increments, the Cisco MDS 8G Fibre Channel Blade Switch offers the densities required for SAN deployments from entry level to advanced. Powered by Cisco MDS 9000 NX-OS Software, it includes advanced storage networking features and functions. The Cisco MDS 8G Fibre Channel Blade Switch is compatible with Cisco MDS 9500 Series Multilayer Directors and Cisco MDS 9200 Series Multilayer Fabric Switches, providing transparent, end-to-end service delivery in core-edge deployments.

The Cisco MDS 8G Fibre Channel Blade Switch for HP c-Class BladeSystem has two models: a base 12-port model and a 24-port model. A 12-port license upgrade is available to upgrade the 12-port model from 12 ports to 24 ports. In the 12-port model, 8 ports are for internal connections to the server, and 4 ports are external or SAN facing, In the 24-port model, 16 ports are internal for server connections, and 8 ports are external or SAN facing. The management of the module is integrated with the HP OpenView Management Suite.

The Cisco MDS 8G Fibre Channel Blade Switch for HP c-Class BladeSystem offers:

- **Intelligent storage networking services at an affordable price:** The Cisco MDS 8G Fibre Channel Blade Switch, powered by Cisco MDS 9000 NX-OS Software, offers intelligent storage networking capabilities such as virtual SANs (VSANs), PortChannels, quality of service (QoS), and security for cost-effective design, deployment, and management of departmental and enterprise SANs.
- **Highly available platform for mission-critical deployments:** The Cisco MDS 8G Fibre Channel Blade Switch is designed for environments in which downtime is not an option. It offers non disruptive software upgrades, VSANs for fault isolation, and PortChannels for Inter-Switch Link (ISL) resiliency.
- **Comprehensive security framework:** The Cisco MDS 8G Fibre Channel Blade Switch supports RADIUS and TACACS+, port security, fabric binding, Fibre Channel Security Protocol (FC-SP) host-to-switch and switch-to-switch authentication, Secure FTP (SFTP), Secure Shell Version 2 (SSHv2) and Simple Network Management Protocol Version 3 (SNMPv3) implementing Advanced Encryption Standard (AES), VSANs, hardware-enforced zoning, broadcast zones, and per-VSAN role-based access control (RBAC).
- **Enhanced scalability with flexible server mobility:** The Cisco MDS 8G Fibre Channel Blade Switch provides enhanced scalability with reduced domain ID use and the flexibility to add, replace, or move servers without the need to reconfigure the SAN. Cisco N-Port Virtualizer (NPV) technology helps blade server customers deploy large-scale SANs and operate them with any vendor's SAN core, and Cisco FlexAttach virtualizes the SAN identity of a server to help the server retain its SAN identity even if it is moved or replaced. Together, Cisco NPV and Cisco FlexAttach exceed the scalability and flexibility requirements of large-scale blade server deployments.

- **Simplified storage management:** The Cisco MDS 8G Fibre Channel Blade Switch includes built-in storage network management, with all features available through the command-line interface (CLI) or the Cisco Fabric Manager, a centralized management tool that simplifies management of a standalone switch or multiple switches and fabrics.
- **Sophisticated diagnostics:** Industry-leading intelligent diagnostics such as Fibre Channel Ping, Fibre Channel Traceroute, Switched Port Analyzer (SPAN), Cisco Fabric Analyzer, and integrated call-home capability enhance reliability, facilitate faster problem resolution, and reduce service costs. The Online Health Management System (OHMS) helps ensure hardware health at a module level at all times and enables early fault detection and proactive management.
- **Robust supportability:** The Cisco MDS 8G Fibre Channel Blade Switch includes On-board Failure Logging (OBFL) technology that maintains a record of the operating state, including environmental and failure information, to help enable quick and robust troubleshooting.
- **Reduced total cost of ownership (TCO):** A common platform architecture and the use of Cisco MDS 9000 SAN-OS Software intelligent storage networking services across all Cisco MDS 9000 Family switches reduce ongoing operating expenses by providing a consistent set of provisioning, management, and diagnostic capabilities.

Figure 1. Cisco MDS 8G Fibre Channel Blade Switch for HP c-Class BladeSystem

Key Features and Benefits

Exceptional Flexibility and Scalability

The Cisco MDS 8G Fibre Channel Blade Switch offers up to 24 autosensing Fibre Channel ports capable of speeds of 8, 4, 2, and 1 Gbps. With 8 Gbps of dedicated bandwidth for each port, the Cisco MDS 8G Fibre Channel Blade Switch is designed to meet the performance and scalability requirements of the most demanding environments.

The flexibility of the Cisco MDS 8G Fibre Channel Blade Switch is provided by the on-demand port activation license, which allows expansion from 12 ports to 24 ports. Customers can start with a base configuration and can upgrade onsite to activate more ports using these licenses.

The Cisco MDS 8G Fibre Channel Blade Switch external ports include hot-swappable, Small Form-Factor Pluggable (SFP/SFP+) line-card interfaces. Individual ports can be configured with either short- or long-wavelength SFP optics for connectivity of up to 500 meters (m) and 10 kilometers (km), respectively.

VSANs for Segmentation and Isolation

VSAN, an industry standard for fabric virtualization capabilities, allows efficient SAN use by creating hardware-based isolated environments within a single physical SAN or switch. The Cisco MDS 8G Fibre Channel Blade Switch supports up to 32 VSANs. Each VSAN can be zoned as a typical SAN and maintains its own fabric services and management domains for added scalability and resilience.

Advanced Traffic Management for High-Performance, Resilient SANs

Advanced traffic management capabilities integrated into the Cisco MDS 8G Fibre Channel Blade Switch simplify deployment and optimization of core-edge fabrics.

- Virtual output queuing helps ensure line-rate performance on each port, independent of traffic pattern, by eliminating head-of-line blocking.
- Each port group consisting of 4 ports has a pool of 128 buffer credits, with a default of 32 buffer credits per port. When extended distances are required, up to 125 buffer credits can be allocated to a single port in the port group. This extensibility is available without additional licensing.
- PortChannels allow users to aggregate up to 16 physical ISLs into a single logical bundle, providing optimized bandwidth use across all links. The bundle can consist of any port from the switch, to help ensure that the bundle remains active even in the event of a port 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.
- QoS can be used to manage bandwidth and control latency, to prioritize critical traffic.
- Comprehensive port and flow statistics facilitate sophisticated performance analysis and service-level agreement (SLA) accounting.

Advanced Diagnostics and Troubleshooting Tools

Management of storage networks requires proactive diagnostics, tools to verify connectivity and route latency, and mechanisms for capturing and analyzing traffic. The Cisco MDS 8G Fibre Channel blade switch integrates the industry's most advanced analysis and debugging tools. The power-on self-test (POST) and OHMS provide proactive health monitoring. The Cisco MDS 8G Fibre Channel blade switch provides the integrated hardware functions required to implement diagnostic capabilities such as Fibre Channel Traceroute to detail the exact path and timing of flows, and SPAN to intelligently capture network traffic. After traffic has been captured, it can be analyzed with the Cisco Fabric Analyzer, an embedded Fibre Channel analyzer. With the Cisco MDS 8G Fibre Channel Blade Switch, Cisco delivers a comprehensive tool set for troubleshooting and analysis of an organization's storage network.

Comprehensive Security

Recognizing the need for unassailable security in storage networks, the Cisco MDS 8G Fibre Channel Blade Switch offers an extensive security framework to protect highly sensitive data transported on today's enterprise networks.

- VSANs are used to achieve higher security and greater stability by providing complete isolation among devices that are connected to the same physical SAN.
- Intelligent packet inspection is performed at the port level, including the application of access control lists (ACLs) for hardware enforcement of zones, VSANs, and advanced port security features.

- Extended zoning capabilities help ensure that broadcasts are restricted to the selected zones (the broadcast zones).
- Smart Zoning: When the Smart Zoning feature is enabled, Cisco MDS 9000 Family fabrics provision the hardware access control entries specified by the zone set more efficiently, avoiding the superfluous entries that would allow servers (initiators) to talk to other servers, or allow storage devices (targets) to talk to other storage devices. This feature makes larger zones with multiple initiators and multiple targets feasible without excessive consumption of hardware resources. Thus, smart zones can correspond to applications, application clusters, hypervisor clusters, or other data center entities, saving the time that administrators previously spent creating many small zones, and enabling the automation of zoning tasks.
- FC-SP provides switch-to-switch and host-to-switch Diffie-Hellman Challenge Handshake Authentication Protocol (DH-CHAP) authentication supporting RADIUS and TACACS+, to help ensure that only authorized devices access protected storage networks. This feature, in conjunction with management access and control plane security, places the Cisco MDS 9000 Family among the most secure platforms of its kind.

High-Availability Platform for Mission-Critical Environments

The Cisco MDS 8G Fibre Channel Blade Switch is designed for mission-critical availability. Non-disruptive software upgrades and the unique capability to automatically restart failed processes combine to define a new standard for fabric switch availability.

High availability is implemented at the fabric level through the industry's most robust and highest-performance ISLs. PortChannel capability allows users to aggregate up to 16 physical ports into one logical bundle. The bundle can sustain the failure of any physical link without causing application disruption. Additionally, FSPF multipathing provides the intelligence to load balance across up to 16 equal-cost paths and, if a switch fails, to dynamically reroute traffic.

Simplified Management

The Cisco MDS 8G Fibre Channel Blade Switch provides three principal modes of management: the Cisco MDS 9000 family CLI, the Cisco Fabric Manager, and integration with HP storage management tools.

- **Consistent, logical CLI:** Adhering to the syntax of the widely known Cisco IOS® Software CLI, the Cisco MDS 9000 Family CLI is easy to learn and delivers broad management capabilities. The Cisco MDS 9000 Family CLI is an extremely efficient interface designed to provide excellent capabilities to administrators in enterprise environments.
- **Cisco Fabric Manager:** Cisco Fabric Manager is included with the Cisco MDS 8G Fibre Channel Blade Switch for integrated, comprehensive management of larger SAN environments. Cisco Fabric Manager is a responsive, easy-to-use Java application that allows administrators to perform vital tasks such as topology discovery, fabric configuration and verification, provisioning, monitoring, and fault resolution.
- **Cisco MDS 8G Fibre Channel Blade Switch:** The Cisco MDS 8G Fibre Channel Blade Switch provides an extensive API for integration with third-party and user-developed management tools. The APIs are based on industry-standard protocols, including SNMP and the Storage Networking Industry Association (SNIA) Storage Management Initiative Specification (SMI-S).

Specifications

Minimum Software Requirements

- Cisco MDS 9000 NX-OS Software Release 5.0.4 or later

Performance and Port Configurations

- **Port speed:** 8-, 4-, 2-, and 1-Gbps autosensing with 8 Gbps of dedicated bandwidth per port
- **Buffer credits:** Up to 128 for a group of 4 ports, with a default of 32 buffer credits per port
- **Configuration:** Base configuration with 12 ports for the HP c-Class BladeSystem, with option to upgrade to 24 ports
- **PortChannel:** Up to 16 ports in a PortChannel

Supported Optics, Media, and Transmission Distances

Table 1 summarizes the interfaces and distances supported by the Cisco MDS 8G Fibre Channel Blade Switch.

Table 1. Optics, Media, and Transmission Distances Supported by the Cisco MDS 8G Fibre Channel Blade Switch

SFP/SFP+	Wavelength (Nanometers)	Fiber Type	Core Size (Microns)	Baud Rate (GBd)	Cable Distance
DS-SFP-FC8G-SW, DS-SFP-FC8G-SWHP=	850	Multimode Fiber (MMF)	62.5	2.125	150 m (492 ft)
			62.5	4.250	70 m (230 ft)
			62.5	8.500	21 m (69 ft)
			50.0 (OM2)	2.125	300 m (984 ft)
			50.0 (OM2)	4.250	150 m (492 ft)
			50.0 (OM2)	8.500	50 m (164 ft)
			50.0 (OM3)	2.125	500 m (1640 ft)
			50.0 (OM3)	4.250	380 m (1246 ft)
			50.0 (OM3)	8.500	150 m (492 ft)
			50.0 (OM4)	2.125	520 m (1706 ft)
			50.0 (OM4)	4.250	400 m (1312 ft)
			50.0 (OM4)	8.500	190 m (623 ft)
DS-SFP-FC8G-LW	1310	Single-Mode Fiber (SMF)	9.0	2.125	10 km (6.2 mi)
			9.0	4.250	10 km (6.2 mi)
			9.0	8.500	10 km (6.2 mi)
DS-SFP-FC4G-SW, DS-SFP-FC4G-SWHP=, DS-SFP-4G-SW-4HP=	850	Multimode Fiber (MMF)	62.5	1.0625	300 m (984 ft)
			62.5	2.125	150 m (492 ft)
			62.5	4.250	70 m (230 ft)
			50.0 (OM2)	1.0625	500 m (1640 ft)
			50.0 (OM2)	2.125	300 m (984 ft)
			50.0 (OM2)	4.250	150 m (492 ft)
			50.0 (OM3)	1.0625	860 m (2821 ft)
			50.0 (OM3)	2.125	500 m (1640 ft)
			50.0 (OM3)	4.250	380 m (1246 ft)

Security

- VSANs
- Zoning
  - Hardware-enforced zoning
  - Logical-unit-number (LUN) zoning and read-only zones
- FC-SP for host-to-switch and switch-to-switch authentication
- Port security
- Management access
  - SSHv2
  - SNMPv3
  - IP ACLs

Compatibility

Fibre Channel Protocols

- 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 2.1 (BSR INCITS 460-200x)
- FC-PI-4, Revision 8.0 (INCITS 450-2009)
- FC-FS, Revision 1.9 (ANSI/INCITS 373-2003)
- FC-FS-2, (BSR INCITS 424-200x)
- FC-FS-3, Revision 0.9 (BSR INCITS PN-1861-D-200x)
- FC-LS, Revision 1.62 (ANSI/INCITS 433-2007)
- 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, (BSR INCITS 461-200x)
- FC-GS, (ANSI INCITS 288-1999)
- FC-GS-3, Revision 7.01 (ANSI/INCITS 348-2001)

- FC-GS-4, Revision 7.91 (ANSI/INCITS 387-2004)
- FC-GS-5, (ANSI INCITS 427-2007)
- FC-GS-6, (BSR INCITS 463-200x)
- 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)
- 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, (BSR INCITS PN-1828-D-200x)
- 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-MI-2, Revision 2.6 (INCITS TR-39-2005)
- FC-SP, Revision 1.6 (ANSI/INCITS 426-2007)
- FC-DA, Revision 3.1 (INCITS TR-36-2004)
- SNPing (ANSI INCITS 443-2008)
- MIB-FA (INCITS/TR-32:2003 (R2008))
- FAIS Revision 1

MIBs

- Class of service (CoS): Classes 2, 3, and F
- Fibre Channel standard port types: E, F, and FL
- Fibre Channel enhanced port types: SD, and TE

Fabric Services

- Name server
- Registered state change notification (RSCN)
- Login services
- Public loop
- Broadcast
- In-order delivery
- Name-server zoning

Diagnostics and Troubleshooting Tools

- POST diagnostics
- Online diagnostics
- Internal loopbacks
- SPAN
- Fibre Channel Traceroute capability
- Fibre Channel Ping
- Fibre Channel Debug
- Cisco Fabric Analyzer
- Syslog
- Port-level statistics

Management

- Access methods
  - Access is through the blade server chassis management port
- Access protocols
  - CLI
  - SNMP
  - SMI-S
- Security
  - Role-based ACL (RBACL) using RADIUS or TACACS+ authentication, authorization, and accounting (AAA) functions
  - VSAN-based roles
  - SSHv2
  - SNMPv3
- Management applications
  - Cisco MDS 9000 Family CLI
  - Cisco Fabric Manager and Cisco Device Manager
  - Cisco Fabric Manager Server (optional; requires Cisco Fabric Manager Server license)

Availability

- Nondisruptive software upgrades
- Stateful process restart
- Per-VSAN fabric services
- Hot-swappable SFP/SFP+ optics
- PortChannels aggregating up to 16 ports
- Online diagnostics

Serviceability

- Configuration file management
- Call home
- Port beaconing
- System LEDs
- SNMP traps for alerts

Ordering Information

Table 2 provides ordering information for the Cisco MDS 8G Fibre Channel Blade Switch. Table 3 lists specifications.

Table 2. Ordering Information

Cisco MDS 8G Fibre Channel Blade Switch for HP c-Class BladeSystem	HP Part Number
Cisco MDS 8G FC Blade Switch 12-Port Fabric Switch	AW563A
Cisco MDS 8G FC Blade Switch 24-Port Fabric Switch	AW564A
Cisco MDS 8G FC Blade Switch 12-Port License Upgrade	TA804A

Table 3. Specifications

Cisco MDS 8G Fibre Channel Blade Switch	Specifications
Internal (Server-Facing Ports)	8 ports (12-port model) 16 ports (24-port model)
External (SAN-Facing Ports)	4 ports (12-port model) 8 ports (24-port model)
Dimensions	(H x W x D) 1.25 x 7.75 x 11 IN
Power Consumption	60 W
SFPs Shipped	2 8-Gbps SW SFP (12-port model) 4 8-Gbps SW SFP (24-port model)
SFPs Supported	2/4/8-Gbps Fibre Channel-Shortwave, SFP+ 2/4/8-Gbps Fibre Channel-Longwave, SFP+ 1/2/4-Gbps Fibre Channel-Shortwave, SFP

Service and Support

HP provides Level 1 and 2 support for its blade switches.

For More Information

For more information, visit http://www.cisco.com or contact your local account representative.

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