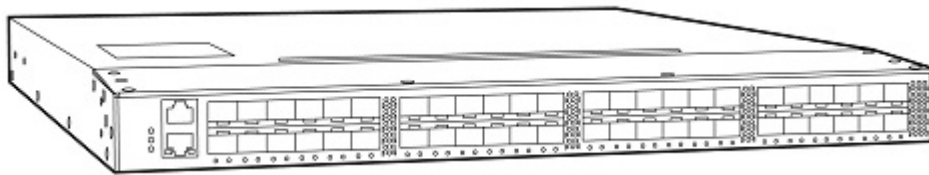# QuickSpecs

Overview

The StorageWorks SN6000C 8Gb Fabric Switch is a high-performance, flexible, cost-effective platform providing high-density, line-rate 8-Gbps ports for storage networking deployments in small, medium-sized, and large enterprise environments. The SN6000C switch offers outstanding value by providing high-availability, security, and ease of use at a cost-effective price in a compact one-rack-unit (1RU) form factor. With the flexibility to expand from 16 to 48 ports in 8-port increments, the SN6000C offers the densities required to scale from an entry-level departmental switch to top-of-the-rack switch to edge connectivity in enterprise SANs. The SN6000C delivers a nonblocking architecture, with all 48 1/2/4/8-Gbps ports operating at line rate concurrently.

The SN6000C supports the C-series Device Manager quick configuration wizard, which allows it to be deployed quickly and easily in networks of any size. Powered by C-series MDS 9000 NX-OS Software, it includes advanced storage networking features and functions and is compatible with C-series 9500 Series Multilayer Directors and C-series MDS 9100 and 9200 Series Multilayer Fabric Switches, providing transparent, end-to-end service delivery in core-edge deployments.

HP StorageWorks SN6000C Fibre Channel Switch

Key Features and Benefits

- **High Performance with exceptional flexibility**
  - ○ Up to 768 Gbps of aggregate bandwidth in a 1 rack unit (RU)
  - ○ Up to 48 autosensing Fibre channel ports capable of speeds of 1/2/4/8 Gbps
  - ○ Pay as you grow flexibility with on-demand port activation licenses
- **Intelligent storage networking services at a cost effective price**
  - ○ No additional cost for storage networking features like virtual SANs (VSANs), Inter-VSAN Routing (IVR) readiness, PortChannels, quality of service (QoS), and security
  - ○ N-Port ID Virtualization (NPIV) technology to provide independent management for each virtual machine
  - ○ N-Port Virtualization (NPV) and fabric-port (F-port) channeling features to enable scaling of SANs without reaching Fibre Channel domain ID limits
  - ○ FlexAttach feature enables transparent server deployment and movement without SAN reconfiguration
- **High Availability Platform**
  - ○ Designed for environments in which downtime is unacceptable
  - ○ Non-disruptive software upgrades, dual hot swappable power supplies, and hot swappable fans
  - ○ VSANs for fault isolation and PortChannels for Inter-Switch Link (ISL) resiliency
- **Simplified Management**
  - ○ Supports SAN plug and play capability
  - ○ Built in storage network management
  - ○ Reduced total cost of ownership

Product Highlights

Configuration support	Please see the following Web site for configuration support at: http://h18000.www1.hp.com/products/storageworks/san/documentation.html

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Industry leading 8-Gb Performance Capability	The switch offers full non-blocking 8-Gbps Fibre Channel performance on 48 line rate ports and an aggregate bandwidth of 768 Gbps full duplex in a 1 Rack unit form factor.

Scalability	The SN6000C switch comes in two preconfigured models of 16 or 32 ports. These models may be upgraded onsite to enable additional ports by adding 8-port On-Demand Port Activation licenses for total scalability of 48 ports.

Cost Effective Intelligent Storage networking	The SN6000C switch comes standard with advanced features in a compact, extremely cost-effective design that simplifies deployment and administration of small and medium-scale storage-area networks (SANs) and as an edge switch in a larger enterprise. **N-Port ID Virtualization NPIV)**: N-Port ID Virtualization (NPIV), a standard Fibre Channel protocol feature, individual virtual machines assume a full identity on the SAN so that Fibre Channel services such as zoning, Quality of Service (QoS), performance monitoring, and security can be provided to each virtual machine. **VSANs**: VSAN, an industry standard for fabric virtualization capabilities, enables more efficient storage network use by creating hardware-based isolated environments within a single physical SAN fabric or switch. Up to 32 VSANs are supported per switch. Each VSAN can be zoned as a typical SAN and maintains its own fabric services and management domains for added scalability and resilience. VSANs allow the cost of SAN infrastructure to be shared among more users, while helping ensure segregation of traffic and retaining independent control of configuration on a VSAN-by-VSAN basis. **PortChannels**: 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, helping ensure that the bundle remains active even in the event of a port failure. **N-Port Virtualization (NPV)**: The number of Fibre Channel domain IDs in a Fibre Channel SAN environment is limited. N-Port Virtualization (NPV) enables organization to scale there SANs without reaching these Fibre Channel domain ID limits because and switch with NPV does not use a Fibre Channel domain ID. NPV aggregates locally connected hosts into one or more uplinks to core switches in a pass through manner without using a Fibre Channel domain ID. **FlexAttach**: The C-series FlexAttach feature gives SN6000C switch customers the flexibility to add, move, or replace servers easily without the need to reconfigure SAN switches or storage arrays. It provides this flexibility by virtualizing the SAN identity of a server, which enables a server to retain its SAN

Product Highlights

identity even if the server is moved or replaced.

Quality of Service (QoS):

The Quality of Service (QoS) feature allows traffic to be classified into four distinct levels for service differentiation. QoS can be applied to help ensure that Fibre Channel data traffic for latency-sensitive applications receives higher priority over throughput-intensive applications such as data warehousing.

F-port trunking and channeling:

The F-port trunking feature enables multiple VSANs to be transported on the uplink from a SN6000C switch operating in NPV mode to the core switch. This feature will allow the consolidation of uplinks ports necessary for extending VSAN connectivity to the NP device.

The F-port channeling feature enables up to 16 physical uplinks between a SN6000C switch operating in NPV mode and the core switch to be bundled into a PortChannel.

IVR (MDS 9000 NX-OS Software Release 5.1(0) or later:

VSANs and Inter-VSAN routing (IVR) enable deployment of large-scale multisite and heterogeneous SAN topologies. Integrated VSANs in port-level hardware allow any port in a system or in a fabric to be partitioned into any VSAN. Integrated IVR provides line-rate routing between any of the ports in a system or in a fabric without the need for external routing appliances.

High Availability   The SN6000C switch is designed for environments in which downtime is unacceptable. It offers:

- Non Disruptive software upgrades
- Process monitoring and stateful process restart
- Per-VSAN fabric services
- Redundant, hot-swappable power supply and redundant, hot-swappable power supply and fan trays
- Hot-swappable C-series SFP and SFP+ optics
- PortChannels for Inter-Switch Link (ISL) resiliency
- F-port Channeling for resiliency on uplinks from a SN6000C switch operating in NPV mode
- Online diagnostics

Product Highlights

Simplified Storage Management	The SN6000C comes standard with three principal modes of management: the C-series MDS 9000 Family CLI, the Quick Configuration Wizard, and the C-series Fabric Manager.

Command Line Interface (CLI):

The C-series MDS 9000 Family CLI is easy to learn and delivers broad management capabilities. The C-series MDS 9000 Family CLI is an extremely efficient and direct interface designed to provide optimal capabilities to administrators in enterprise environments.

Quick Configuration Wizard:

The Quick Configuration Wizard helps eliminate management complexity and creates a readily available SAN environment for small- and midsized-business (SMB) applications. The wizard allows server access to storage to be set up quickly and easily in a single step using an intuitive GUI.

C-series Fabric Manager:

The C-series Fabric Manager is included with the SN6000C switch for integrated, comprehensive management of larger SAN environments. The C-series 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.

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.

Diagnostics	• Embedded diagnostics • Network analysis

Software Components, Included

SAN-OS	SN6000C includes the Cisco MDS 9000 NX-OS Software operating system version 5.0 (1a) or higher with a complete set of security features, Cisco Fabric Manager, a full suite of configuration, maintenance and diagnostics tools. It also includes VSAN support, PortChannels, extended fabrics, per VSAN-based access control, hardware-enforced zoning, Port Security and Host/Switch Authentication (DH-CHAP), RADIUS and TACACS+ and Advanced Encryption Standard (AES) and non-disruptive firmware upgrade capability.

Software Components, Optional

8-Port Upgrade License	The flexibility of the SN6000C switch is provided by the C-series SN6000C On-Demand Port Activation license, which allows the addition of 8-Gbps ports.

C-series Fabric Manager Server Package	The "Standard" C-series Fabric Manager software that is included at no charge with the SN6000C Switch provides basic switch configuration and troubleshooting capabilities. The C-series Fabric Manager Server (FMS) Package extends C-series Fabric Manager by providing historical performance data collection for network traffic hot-spot analysis, centralized management services and advanced application integration.

Service and Support and Warranty Information

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 link 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.

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.

For increased uptime, productivity and ROI -HP Care Pack packaged services for Storage
These days, you need to get the most out of your storage investment-you can't afford not to. When you buy HP storage products and solutions, it's also a good time to think about what levels of service and support you may need. To help take the worry out of deploying, designing, maintaining, and managing your environment, we've designed a portfolio of service options that are as: flexible, reliable and scalable as your storage. Unlike storage-only vendors, we take a holistic approach to your entire environment, bridging storage, servers, blades, software and network infrastructures with our HP Care Pack packaged services for Storage.

Protect your business beyond the warranty
When it comes to robustness and reliability, standard warranties on today's computing equipment have matured just as the technologies have matured. Good news on some fronts-but also a source of potential problems and subsequent consequences that come from depending on standard warranties alone. Standard warranty protects against product defects and some causes of downtime- but not the business. By using a standard approach to warranty uplifts, such as HP Care Pack Services, you can reduce downtime risks and be more certain of operational consistency for both mission-critical and standard business computing. Simply put, HP Care Pack Services normalize the warranty of combined products - helping you proactively guard against unplanned downtime.

Extending warranties with HP Care Pack Services
For cost-effective upgrading or extending your standard warranty, HP Care Pack Services offer a suite of standard reactive hardware and software support services that are sold separately, or combined as with our Support Plus and Support Plus 24 services. The portfolio also provides a combination of proactive and reactive services, such as Proactive 24 Service and Critical Service. In addition, with HP Proactive Select we offer an innovative approach to service delivery that gives you the flexibility to acquire the specific proactive services you need today, then add services as your needs evolve. HP Proactive Select offers a broad set of technical or per-event type service options - including server, storage, and network, SAN device, and software, environment, installation and education services. Services that you can mix and match depending on your

Service and Support and Warranty Information

specific requirements, from preliminary planning and equipment delivery to installation, configuration, integration, and testing, through every level of ongoing support. Our HP Care Pack packaged services for Storage assures help when you need it most. And for many products, post-warranty HP Care Pack Services are available when your original warranty has expired.

HP Storage Services: Offering reliability, flexibility and value-just like your storage
HP Storage Services offers a full spectrum of customer care, from technology support to complex migrations to complete completely managed services. HP Factory Express provides customization, integration and deployment services for turnkey solutions. HP Education offers flexible, comprehensive training on storage networking, disk storage systems, and storage software to help your IT staff get the most out of your investments. And HP Financial solutions extend innovative financing and asset management programs to cost-effective buy, manage and eventually retire your older equipment.

HP Storage Services, the trusted business technology experts who manage your technology in action, because when technology works, business works. http://www.hp.com/hps/storage

NOTE: Care Pack Services availability may vary by product and country.

HP Care Pack Services are sold by HP and HP Authorized Service Partners:

- Services for customers purchasing from HP or an enterprise reseller are quoted using HP order configuration tools.
- Customers purchasing from a commercial reseller can find HP Care Pack Services at

http://www.hp.com/go/lookuptool

Recommended HP Care Pack Services for optimal satisfaction with your HP product.

Recommended Support	**3-Year HP Support Plus 24**
	For a higher return on your storage investment, HP Support Plus 24 provides integrated hardware and software support services designed specifically for your technology. Available 24x7, this 3-year combined reactive support option delivers onsite hardware support and over-the-phone software support around-the-clock. Leverage the full strength of HP Technology Services - customers can trust the services professionals at HP to work collaboratively with them, putting our strategic and technical know-how to work across their entire infrastructure.

- Improve uptime with responsive hardware and software services
- Enjoy consistent service coverage across geographically dispersed sites
- Update HP software at a predictable cost
- Increase customer satisfaction-with no interoperability gaps

http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-6638EN.pdf

Recommended Deployment	**HP Enhanced Implementation Service for SANs**
	For customers who are building a new SAN or expanding their existing one, we offer the HP Enhanced Implementation Service for SANs. This provides complete design and implementation services for Fibre Channel, FCOE, FCIP, SAS and iSCSI SAN connectivity components. Covering all major SAN connectivity technologies including virtual as well as physical hosts, no competitor offers a more complete end to end SAN design and implementation service, ensuring comprehensive optimal SAN connectivity tailored to your specific environment.

- Ensures optimal SAN connectivity tailored to your specific environment.
- Allows your IT resources to stay focused on their core tasks and priorities
- Reduces implementation time, impact and risk to your storage environment
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Service and Support and Warranty Information

- Helps ensure a successful implementation for complex deployments by providing HP project management

http://h20195.www2.hp.com/v2/GetPDF.aspx/5981-8527EN.pdf

Related HP Care Pack Services that will enhance your HP product experience.

Related Services   **3-Year HP Critical Service for SANs**

As an alternative to our recommended support level, for customers who want a comprehensive support solution across their SAN:

As SANs become increasingly central to your everyday business operations, maximizing uptime in these mission-critical environments poses increasingly difficult challenges. You need to resolve complex multivendor interoperability issues. You need to identify and address potential trouble spots before data availability is impaired. And you need to respond rapidly and effectively whenever problems occur.

Offering a comprehensive, robust suite of proactive and reactive services, HP Critical Service for SANs is expressly designed to help you in all these crucial areas.

Comprehensive proactive services

A team of HP Services experts works closely with you to analyze your SAN environment and maximize your SAN availability. Your SAN is thoroughly assessed for supportability. Configuration details and a topology map are recorded and used to assist in fault isolation, daily operation, and planning for future growth. In addition, your HP team helps you with firmware upgrade planning and implementation, as well as change management planning. Remote monitoring and configuration tracking using secure, real-time tools including the HP Instant Support Enterprise Edition (ISEE) Advanced Configuration framework give you an early warning of emerging SAN problems.

Your proactive support can also include a 100 percent SAN interconnectivity guarantee*. And, if you contract for Critical Service coverage for HP StorageWorks XP storage, you can take advantage of a 100 percent data accessibility guarantee* as well.

Fast reactive services

If a critical problem does occur, HP helps you address it quickly via single-point-of-contact problem management. You're immediately connected with HP Services support specialists, and your call receives priority status for prompt troubleshooting and resolution. Remote SAN diagnostics and reconfiguration capabilities, plus enhanced problem-escalation procedures, help you restore peak performance fast.

HP Critical Service for SANs enables you to:

Boost business productivity through increased SAN availability
Prevent problems through direct access to SAN expertise and hands-on assistance
Resolve problems rapidly through single-source event-management and escalation support
Reduce risk and improve efficiency by proactively managing changes across your SAN environment
Improve SAN stability with firmware upgrade planning and implementation assistance

Service and Support and Warranty Information

Free your IT staff to focus on core business issues
Alleviate the need to recruit and train SAN experts

http://h20195.www2.hp.com/v2/GetPDF.aspx/5982-0079EN.pdf

HP Assessment Service for SANs

For customers interested in improving availability of their SAN and decreasing potential for unplanned downtime:

The HP Assessment Service for SANs offers customized technical and operational guidance to customers employing HP storage subsystems and the interconnecting storage area network (SAN) infrastructure. In a typical engagement, HP or one of our authorized business partners will perform a detailed discovery using HP's proprietary toolset to gain an understanding of the configuration of your storage devices and SAN topology.

The findings from this process will be compared to HP best practices and industry standards as defined by IT Service Management (ITSM) disciplines. The results of the evaluation will be quickly and efficiently processed into information you can leverage. This information, in the form of a comprehensive HP SAN Assessment report, will be summarized by HP or one of our authorized business partners with recommendations that are intended to improve availability levels and ongoing management of your storage and SAN environment.

http://h20195.www2.hp.com/v2/GetPDF.aspx/5981-9510EN.pdf

eSupport

HP eSupport is a portfolio of technology-based services that assist you with managing your business environment - from the desktop to the data center.

Support Portal
The HP support portal provides one-stop access to the information, tools and services you need to manage the daily operations of your IT environment.

Features include:

- Access to self-solve tools (including search technical knowledge base)
- Efficient logging and tracking of support cases
- Collaboration with other business and IT professionals
- Download of patches and drivers
- Access to diagnostic tools
- Proactive notification of relevant information

Access to certain features of the support portal requires an HP service agreement. To access the support portal, visit: http://www.hp.com/support

HP Insight Remote Support software delivers secure remote support for your HP Servers and Storage, 24 X 7, so you can spend less time solving problems and more time focused on your business. You can have your systems remotely monitored for hardware failure using secure technology that's been proven at thousands of companies around the world. In many cases, you can avoid problems before they occur.

Service and Support and Warranty Information

Customer Technical Training

Consider education as an integral part of your strategy to get the best return on investment for your HP storage solution. HP offers a variety of training courses on storage software, networking, archiving and disk storage systems. Our classes are available in many delivery modalities from traditional instructor-led courses at one of our 80 training centers worldwide to on-site training customized to your needs or online. www.hp.com/learn/storage

HP Services Awards

HP Services continues to be recognized for service and support excellence by customers, partners, industry organizations and publications around the world. Recent honors and award reflect our services team's dedications, technical expertise, professionalism and uncompromising commitment to customer satisfaction. For a list of all our awards, please visit:
http://h20219.www2.hp.com/services/cache/433028-0-0-225-121.htm

Additional Services Information

For more information about HP Care Pack Services for Storage, please visit:
http://www.hp.com/hps/storage

For more information about HP Care Pack Services for Storage, please visit:
http://www.hp.com/hps/storage

Family Information

	Cisco MDS 9513 w/Dual Supervisor 2	Cisco MDS 9222i	Cisco MDS 9509 w/Dual Supervisor 2	Cisco MDS 9506 w/Dual Supervisor 2
Introduction Date	May 2006	November 2007	May 2006	May 2006
Switch Type	Multilayer Director	Multilayer Fabric Switch	Multilayer Director	Multilayer Director
Maximum ports	528 Fibre Channel, 58 IP ports	18 fixed auto-sensing 4/2/1-Gbps Fibre Channel ports, 4 1-Gb Ethernet ports	336 Fibre Channel, 50 IP ports	192 Fibre Channel, 26 IP ports
Number of slots per chassis	Thirteen		Nine	Six

	HP SN6000C	Cisco MDS 9134	Cisco MDS 9124	Cisco MDS 9124e Fabric Switch for HP c-Class BladeSystem
Introduction Date	June 2010	March 2008	March 2007	March 2007
Switch Type	Fabric Switch	Multilayer Fabric Switch	Fabric Switch	Embedded Switch
Maximum ports	Up to (48) 8/4/2/1-Gbps Fibre Channel ports	Up to (32) 4/2/1-Gbps Fibre Channel, (2) 10-Gbps Fibre Channel	Up to (24) 4/2/1-Gbps Fibre Channel ports	Up to (24) 4/2/1-Gbps Fibre Channel ports
Number of slots per chassis	N/A, Fixed FRU	N/A, Fixed FRU	N/A, Fixed FRU	NA

NOTE: Please Refer to SAN Design Guide pointer
http://www.hp.com/go/SANdesign or http://www.hp.com/go/SANdesignguide

Configuration Information

The HP StorageWorks SN6000C 8Gb Fabric Switch comes preconfigured with 16 or 32 autosensing Fibre Channel ports capable of 8, 4, 2, and 1 Gps in a compact 1RU form factor chassis. An On-Demand Port Activation license is available for "pay as you grow" expansion in 8-port increments for up to 48 Fibre Channel ports. The port slots are empty and optical transceivers are required to utilize the ports. Short, Medium and Long Range optical transceiver options (SFPs) are available and must be ordered separately.

Step 1 - Base Configuration

Select one:

Model	Model Description	Part Number
HP StorageWorks SN6000C 16-ports Active Fabric Switch	Base 48-Port Fabric Switch with 16 8-Gbps active ports, Dual Power Supplies, Power Cords (configurable by ship to country) and Fans, VSANs, PortChannels, and Cisco Fabric Manager. Includes Accessory kit. (no SFPs included)	AW585A
HP StorageWorks SN6000C 32-ports Active Fabric Switch	Base 48-Port Fabric Switch with 32 8-Gbps active ports, Dual Power Supplies, Power Cords (configurable by ship to country) and Fans, VSANs, PortChannels, and Cisco Fabric Manager. Includes Accessory kit. (no SFPs included)	AW586A

Step 2 - Optional Software

On Demand Port Activation License	Description	Part Number
HP StorageWorks SN6000C 8-port Upgrade LTU	8 port upgrade license for SN6000C 16 Port Switch (AW585A) and 32 Port Switch (AW586A)	TA829A

Management Software	Part Number
HP MDS 9100 Fab Mgr Serv-1MDS9200 Swt LTU	A7512A
HP MDS 9100 Ent Pkg -1 MDS 9100 Swt LTU	A7515A

Step 3 - Options

Select each required option with quantities specified:

8 Gb Transceivers	Quantity	Part Number
HP MDS 9000 8Gb FC SFP+ Short Range XCVR	1 min, 48 max	AJ906A
NOTE: Optional - Must be ordered separately.		
HP MDS 9000 8Gb FC SFP+ Long Range XCVR	1 min, 48 max	AJ907A
NOTE: Optional - Must be ordered separately.		

4 Gb Transceivers	Quantity	Part Number
HP MDS 9000 4Gb FC SFP, 4pk Shrt Range XCVR	1 min, 12 max	AE379A
NOTE: Optional - Must be ordered separately.		
HP MDS 9000 4Gb FC SFP, Med Range XCVR	1 min, 48 max	AE494A
NOTE: Optional - Must be ordered separately.		
HP MDS 9000 4Gb FC SFP, Lng Range XCVR	1 min, 48 max	AE380A
NOTE: Optional - Must be ordered separately.		

NOTE: Each port on the SN6000C may be configured to accept Short, Medium or Long Wave SFP optical transceivers. However, when ordering the SN6000C, active ports must be populated with above SFP optical transceivers only. (No substitutes allowed) Using other transceivers may void product warranty.

PremierFlex OM3+ type cables	Part Number
0.5m PremierFlex LC/LC Multi-Mode Optical Cable	BK837A
1m PremierFlex LC/LC Multi-Mode Optical Cable	BK838A
2m PremierFlex LC/LC Multi-Mode Optical Cable	BK839A

Configuration Information

5m PremierFlex LC/LC Multi-Mode Optical Cable		BK840A
15m PremierFlex LC/LC Multi-Mode Optical Cable		BK841A
30m PremierFlex LC/LC Multi-Mode Optical Cable		BK842A
50m PremierFlex LC/LC Multi-Mode Optical Cable		BK843A
OM3 LC-LC for between two 2/4/8 Gb devices		**Part Number**
.5 m LC-LC Multi-Mode Fibre Channel Cable		AJ833A
1 m LC-LC Multi-Mode Fibre Channel Cable		AJ834A
2 m LC-LC Multi-Mode Fibre Channel Cable		AJ835A
5 m LC-LC Multi-Mode Fibre Channel Cable		AJ836A
15 m LC-LC Multi-Mode Fibre Channel Cable		AJ837A
30 m LC-LC Multi-Mode Fibre Channel Cable		AJ838A
50 m LC-LC Multi-Mode Fibre Channel Cable		AJ839A
OM2 LC-LC for between two 2/4/8 Gb devices		**Part Number**
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
Course Wave Division Multiplexer Solution		**Part Number**
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
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
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

Step 4 - Installation Service Option

http://www.hp.com/hps/support

For more information on HP SAN switches, contact any of our worldwide sales offices or visit our Web site at:
http://www.hp.com/go/san.

Technical Specifications

Minimum software requirements	MDS 9000 NX-OS Software Release 5.0

Performance and port configuration
- 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 and a maximum of 125 buffer credits for a port
- Ports per chassis: Up to 48 8-Gbps ports
- Base configuration with 16 ports; additional configuration for 32 ports available.
- Upgrade ports in 8-port increments from any configuration with the port activation license
- PortChannel: Up to 16 ports in a PortChannel

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)

Technical Specifications

- 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
- Extensive IETF-standards-based TCP/IP, SNMPv3, and Remote Monitoring (RMON) MIBs
- Class of service: 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
- Broadcast
- In-order delivery
- Name-server zoning

Advanced Services
- NPIV
- VSANs
- PortChannels
- NPV mode
- FlexAttach
- F-port trunking and channeling
- IVR (in Cisco MDS 9000 NX-OS Software Release 5.1(0) or later)

Diagnostic and Troubleshooting
- POST diagnostics
- Online diagnostics
- Internal loopbacks
- SPAN
- Fibre Channel traceroute
- Fibre Channel ping
- Fibre Channel debug
- Cisco Fabric Analyzer
- Syslog
- Port-level statistics

Management
- Access methods
  - Out-of-band 10/100/1000 Ethernet port
  - EIA/TIA-232 serial console port
  - In-band Fibre Channel over IP (FCIP)
- Access protocols
  - CLI
  - SNMP
  - SMI-S
- Security
  - RBAC using RADIUS or TACACS+ authentication, authorization, and accounting (AAA) functions
  -
  -

Technical Specifications

	○ VSAN-based roles
	○ SSHv2
	○ SNMPv3
Management Applications	• Zero-touch deployment with DHCP (in Cisco MDS 9000 NX-OS Software Release 5.1(0) or later)
	• C-series MDS 9000 Family CLI
	• Quick Configuration Wizard
	• C-series Fabric Manager and Device Manager
	• C-series Fabric Manager Server (optional; requires C-series Fabric Manager Server license)
Availability	• Nondisruptive software upgrades
	• Process monitoring and stateful process restart
	• Per-VSAN fabric services
	• Redundant, hot-swappable power supply and redundant, hot-swappable power supply and fan trays
	• Hot-swappable SFP and SFP+ optics
	• PortChannels aggregating up to 16 ports
	• F-port Channeling
	• Online diagnostics
Serviceability	• Configuration file management
	• Call Home
	• Port beaconing
	• System LEDs
	• SNMP traps for alerts
Environmental	• Physical dimensions (H x W x D) of 1RU: 1.72 x 17.16 x 18.89 in. (4.47 x 43.59 x 47.98 cm)
	• Weight of switch with dual power supplies: 22.2 lb (10 kg)
	• Ambient operating temperature: 32 to 104°F (0 to 40°C)
	• Ambient nonoperating temperature: -40 to 158°F (-40 to 70°C)
	• Humidity (RH), ambient (noncondensing) operating: 10 to 90%
	• Humidity (RH), ambient (noncondensing) nonoperating and storage: 5 to 95%
	• Operating altitude: -197 to 6500 ft (-60 to 2000 m)
Power and Cooling	• Power supplies (300W AC) (maximum of 2 per switch)
	• AC Input: 100 to 240 VAC nominal (+/-10% for full range)
	• Frequency: 50 to 60 Hz nominal (+/-3 Hz for full range)
	• Maximum power consumption:
	○ With 4-Gbps optics (48 ports fully populated): 99W with 0.89A at 110 VAC and 0.45A at 220 VAC
	○ With 8-Gbps optics (48 ports fully populated): 101W with 0.90A at 110 VAC and 0.46A at 220 VAC
	• Airflow: Rear to front (toward ports)
Safety	• UL 60950 -1
	• CAN/CSA-C22.2 No. 60950 -1
	• EN 60950 -1
	• IEC 60950 -1
	• AS/NZS 60950
	• IEC 60825
	• EN 60825
	• 21 CFR 1040
EMC	• FCC Part 15 (CFR 47) Class A
	• ICES-003 Class A
	• EN55022 Class A
	• CISPR22 Class A
	• AS/NZS CISPR22 Class A

Technical Specifications

- VCCI Class A
- EN55024
- KN24
- EN50082-1
- EN61000-3-2
- EN61000-3-3
- EN61000-6-1
- CISPR24
- NEBS
- GR-63-Core NEBS Level 3
- GR-1089-Core NEBS Level 3
- ETSI
- ETS 300 019 Storage Class 1.1
- ETS 300 019 Transportation Class 2.3
- ETSI 300 019 Stationary Use Class 3.1