QuickSpecs

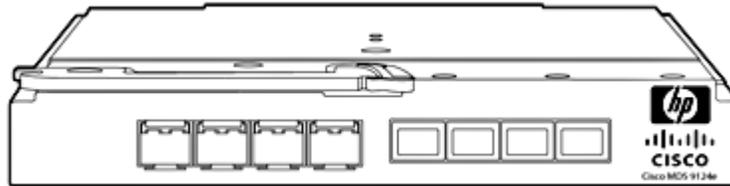*Overview*

The Cisco MDS 9124e Fabric Switch for HP c-Class BladeSystem, a 4Gbps Fibre Channel switch, delivers an embedded option for HP BladeSystem c-Class customers deploying storage area networks in their enterprise. The integrated design frees up rack space, enables a reduction of components such as cables and SFPs, and utilizes shared power and cooling within the BladeSystem enclosure resulting in space and cost savings. The hot-pluggable design, as well as support for non-disruptive software upgrades further enhances the availability features of the overall solution. The Cisco MDS 9124e Fabric Switch supports VSAN, an industry standard for fabric virtualization enabling more efficient network use by creating hardware-based isolated environments within a single physical SAN fabric or switch. In addition, the N-Port Virtualizer FlexAttach mode streamlines the infrastructure by reducing the number of domains to manage while enabling the ability to add or move servers without impacting the SAN. Advanced traffic management features such as PortChannels, virtual output queuing, and Fabric Shortest Path First (FSPF) optimize the fabric. Management is simplified with a broad range of integrated tools that range from a consistent Cisco MDS 9000 family Command Line Interface (CLI) to Cisco Fabric Manager and an industry-standard API that includes support for SNMP and SMI-S for integration with third-party and user-developed tools. Also, switch management is integrated with HP BladeSystem management tools including HP Onboard Administrator for BladeSystem, HP Systems Insight Manager, and HP Storage Essentials creating a unique and tightly integrated experience for server and storage administrators.

The Cisco MDS 9124e Fabric Switch combines value and performance in an embedded SAN switch, enabling increased productivity and substantial cost savings benefiting organizations with limited dedicated IT staff.

Cisco MDS 9124e Fabric Switch for HP c-Class BladeSystem

Key Features and Benefits

The Cisco MDS 9124e Fabric Switch for HP c-Class BladeSystem

Integrated design lowers TCO through consolidation	The Cisco MDS 9124e Fabric Switch hot-plugs into the back of the HP BladeSystem c-Class enclosure, freeing up rack space. Interconnect for servers and switches internal to the BladeSystem reduces cabling, SFPs and associated costs. Shared power and cooling resources further reduces cost and additional points of failure.
Exceptional performance, scalability and flexibility	Employs high speed technology for storage networking. Up to eight external facing ports auto-sense lower bandwidth components. N-Port Virtualizer feature uses NPIV technology to eliminate domain count concerns and FlexAttach mode extends the technology to enable servers to be added or moved without impact to the SAN.
High availability	Designed for environments where downtime is not an option. Up to six FC switches are supported in the BladeSystem enclosure. Hot-pluggable design supports non-disruptive upgrades, VSANs for fault isolation, and PortChannels for ISL resiliency.
Flexible licensing	Dynamic and growing businesses require the flexibility to manage their investment wisely. Designed to scale as business needs dictate with the option of a 12-port model and a 12-port upgrade license.
Traffic management	Simplifies deployment while optimizing core edge fabrics with support for virtual output queuing, flexible buffer credit allocation, PortChannels, Fabric Shortest Path First (FSPF), and more.
VSAN support	Support for up to 16 VSANs per switch that can be zoned as its own fabric enables efficiency, lower cost through shared usage, the flexibility of independent configuration control, and increased security through isolation of devices on the same physical SAN.
Long distance support	Individual ports can be configured with short-range, medium range, or long-range length SFP optics for connectivity of up to 500 meters, 4 kilometers and 10 kilometers, respectively.

Overview

Broad range of management options	Simple and consistent with support by the Cisco MDS 9000 family management tools including a CLI, Cisco Fabric Manager and a standards-based API supporting SNMP and SMI-s. Also supported by HP unified server and storage management tools including HP Onboard Administrator, HP SIM, and HP Storage Essentials.
Comprehensive security	Offers an extensive security framework to protect highly sensitive data crossing today's enterprise networks.
Advanced diagnostics and troubleshooting tools	Integrates the industry's most advanced analysis and debugging tools for proactive diagnostics, verification of connectivity and route latency, and capturing and analyzing traffic.

Models

Cisco MDS 9124e Fabric Switch for HP c-Class BladeSystem	Cisco MDS 9124e 12-port Fabric Switch	AG641A
	Cisco MDS 9124e 24-port Fabric Switch	AG642A

Product Highlights

Configuration support	Please see the following Web site for configuration support at: http://h18000.www1.hp.com/products/storageworks/san/documentation.html
Cost Effective Intelligent Storage networking	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 enterprise SANs.
Highly available platform for mission-critical deployments	Designed for environments where downtime is not an option. It offers nondisruptive software upgrades, VSANs for fault isolation, and PortChannels for Inter-Switch Link (ISL) resiliency.
Flexibility	Offers up to 24 4/2/1-Gbps auto-sensing Fibre Channel ports with 4Gbps of dedicated bandwidth to each port, and an aggregate platform bandwidth of 192 Gbps. Starts with a base configuration of 12 ports (8 internal and 4 external ports) with flexibility to upgrade in the field to 24 ports using 12-port upgrade activation license. The N-Port Virtualizer (NPV) feature employs industry-standard N-Port Virtualization technology to eliminate domain count concerns and enable fabric interoperability. The FlexAttach feature further extends NPV to enable servers to be added or moved within or between BladeSystem enclosures without any impact to the SAN. There can be a total of 16 internal ports for connectivity to 16 server blades and 8 front panel ports for connectivity to the SAN, server, or storage devices.
Simplified storage management	Includes built-in storage network management, with all features available through a command-line interface (CLI) or integrated with HP Storage Essentials or Cisco Fabric Manager
Comprehensive security framework	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).
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.
Interoperability	Common platform architecture and the use of Cisco MDS 9000 NX-OS Software intelligent storage-networking services across all Cisco MDS 9000 family switches reduces ongoing operating expenses by providing a consistent set of provisioning, management, and diagnostic capabilities. Offers compatibility with a broad range of HP servers and operating systems, as well as storage devices; see current compatibility matrix.

Product Highlights

Software Components, Included

NX-OS	Cisco MDS 9000 NX-OS delivers numerous advanced storage networking capabilities for the Cisco MDS 9000 Family of Multilayer Intelligent Directors and Fabric Switches.
Cisco Fabric Manager	Provides integrated, comprehensive management of larger SAN environments allowing administrators to perform vital tasks such as topology, discovery, fabric configuration and verification, provisioning, monitoring, and fault resolution.

Software Components, Optional

Cisco Fabric Manager Server Package for HP BladeSystem c-Class — The Cisco Fabric Manager Server (FMS) package extends Cisco Fabric Manager by providing historical performance monitoring for network traffic hot-spot analysis, centralized management services, and advanced application integration. All standard Cisco Fabric Manager features and functions are fully integrated with the Cisco FMS capabilities.

Cisco Enterprise Package for HP BladeSystem c-Class — The Cisco MDS switch also has a set of additional advanced traffic engineering and advanced security features recommended for all Enterprise SANs. The additional features listed below are bundled together in the Cisco MDS 9000 Enterprise package.

- Quality of Service (QoS) levels
- Switch-Switch and Host-Switch Authentication
- Host to LUN Zoning
- Read-Only Zoning
- Individual Port Security
- VSAN Based Access Control

Cisco Fabric Manager Server/Enterprise Package for HP Bladesystem c-Class Bundle — The Cisco Fabric Manager Server and Enterprise Package for HP BladeSystem c-Class bundle offers all the benefits of Cisco Fabric Manager Server and Cisco Enterprise Package in one easy to purchase product number and priced exclusively for HP BladeSystem c-Class configurations.

BladeSystem compatibility

NOTE: The Cisco MDS 9124e Fabric Switch for HP c-Class BladeSystem must be deployed with the BladeSystem c-Class infrastructure and will only work with the HP BladeSystem c-Class Enclosures.

HP ProLiant Servers	ProLiant BLc server blades
HP Integrity Servers	Integrity BLc server blades
HP Mezzanine FC HBAs	Brocade 804 8Gb FC HBA Emulex LPe 1205-HP 8Gb FC HBA Emulex LPe1105-HP 4Gb FC HBA QLogic QMH2562 8Gb FC HBA QLogic QMH2462 4Gb FC HBA
HP BladeSystem c-Class Enclosures	HP BladeSystem c7000 and c3000 Enclosures

Product Highlights

Switch interoperability

HP C-series Switches, Directors, and Routers

HP C-series Multilayer Directors (8 Gbps and 4 Gbps capable)

- Cisco MDS 9513 Multilayer Director Switch
- Cisco MDS 9509 Multilayer Director Switch
- Cisco MDS 9506 Multilayer Director Switch

HP C-series Multilayer Fabric Switches (8Gbps and 4 Gbps capable)

- Cisco MDS 9216A Multilayer Fabric Switch
- Cisco MDS 9216i Multilayer Fabric Switch

HP 8 Gbps and 4 Gbps C-series Fabric Switches

- HP SN6000C Fabric Switch
- Cisco MDS 8Gb Fabric Switch for HP BladeSystem c-Class
- Cisco MDS 9134 Fabric Switch
- Cisco MDS 9124 Fabric Switch
- Cisco MDS 9020 Fabric Switch

HP 2 Gbps C-series Fabric Switches

- Cisco MDS 9120 Fabric Switch
- Cisco MDS 9140 Fabric Switch

HP Fibre Channel Interconnect Modules

- HP 4Gb Virtual Connect Fibre Channel Module for HP c-Class BladeSystem
- HP Virtual Connect 8Gb 24-port Fibre Channel Module
- HP Virtual Connect 8Gb 20-port Fibre Channel Module

Service and Support, HP Care Pack and Warranty Information

Warranty	(1-1-1) Hardware Warranty - One-year on-site warranty, normal business hours, next business day response, installation not included. **NOTE:** The hardware warranty covers firmware and embedded non-saleable software.

HP Care Pack Services: Packaged server and storage services for increased uptime, productivity and ROI
When you buy HP server and storage products and solutions, it's also a good time to think about what levels of support you may need. Our portfolio of service options reduce deployment and management worries while helping you get the most out of your server and storage investments. We take a holistic approach to your environment, bridging servers, blades, storage, software and network infrastructures with our packaged HP Care Pack Services for servers and storage.

Protect your business beyond warranty
When it comes to robustness and reliability, standard computing equipment warranties have matured along with technology. Good news that can also create problems stemming from depending on standard warranties designed to only protect against product defects and some downtime causes. Using a standard approach to warranty uplifts, such as HP Care Pack Services, helps reduce downtime risks and provides operational consistency for mission-critical and standard business computing.

HP Care Pack Services: Upgrading or extending standard server and storage warranties cost effectively
HP Care Pack Services offer a standard reactive hardware and software support services suite sold separately, or combined with our Support Plus and Support Plus 24 services. The portfolio also provides a combination of integrated proactive and reactive services, such as Proactive 24 Service and Critical Service. In addition with HP Proactive Select, you can acquire the specific proactive constancy and technical services. HP Proactive Select menu offers a broad set of service options that you can mix and match depending on your specific requirements. Proactive service options include offers for server, storage, network, SAN device, software, environment and education services.

HP server and storage lifecycle support services offers a full spectrum of customer care-from technology support to complex migrations to complete managed services. HP Factory Express provides customization, integration and deployment services for turnkey solutions. HP Education Services offer flexible, comprehensive training on to help your IT staff get the most out of your server and storage investments. HP Financial solutions extend innovative financing and cost-effective asset management programs-from purchase to equipment retirement.

Learn more: www.hp.com/services/servers and www.hp.com/services/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.

3-Year HP Proactive 24 for SANs
To help you resolve interoperability issues, HP Proactive 24 (P24) for SANs provides integrated hardware and software support services designed specifically for your SAN. Available 24x7, this 3-year comprehensive hardware and software support service combines proactive problem prevention with responsive assistance for rapid problem resolution. Leverage the full strength of HP Technology Services, a collaborative relationship with HP Services strengthens your IT team and gives you direct access to our technical expertise as issues arise. Today's HP Technology Services portfolio helps customers manage their technology in action-because when technology works, business works.

- Enhance the skills and efficiency of IT staff through knowledge transfer, shared best practices in storage management, and

Service and Support, HP Care Pack and Warranty Information

hands-on assistance
- Improve SAN availability and operational effectiveness
- Boost productivity through effective change management, configuration assistance, and performance optimization

http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA0-1614ENUC.pdf

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

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

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

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 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:

Service and Support, HP Care Pack and Warranty Information

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
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/4AA1-2941ENW.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

Customer Technical Training

Service and Support, HP Care Pack and Warranty Information

HP Education Services
In today's cost-conscious business environment, IT professionals, developers, consultants and users face an interesting challenge: how to keep up with the latest technologies and expand important skills while delivering profitable results on current projects. To help address this challenge, HP offers innovative training solutions that help keep you up-to-date on virtualization, server, storage, Insight Control, Citrix, Microsoft® and open source/Linux-related topics-while spending less time away from business-critical activities.

HP Services Awards

HP Technology 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.

Additional Services Information

To learn more on HP ProLiant servers, HP BladeSystem servers and HP storage products, please contact your HP sales representative or HP Authorized Channel Partner. Or visit www.hp.com/services/proliant or www.hp.com/services/bladesystem or http://www.hp.com/hps/storage

Family Comparison Chart

	Cisco MDS 9513 w/Dual Supervisor 2	Cisco MDS 9222i	Cisco MDS 9509 w/Dual Supervisor 2	Cisco MDS 9506 w/Dual Supervisor 2	Cisco MDS 8Gb Fabric Switch for HP BladeSystem c-Class
Introduction Date	May 2006	November 2007	May 2006	May 2006	Nov 2010
Switch Type	Multilayer Director	Multilayer Fabric Switch	Multilayer Director	Multilayer Director	Fabric Switch
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	up to 24 8/4/2-Gbps auto-sensing Fibre Channel ports
Number of slots per chassis	Thirteen		Nine	Six	N/A

	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

Step 1 – Base Configuration

Select one:

Model Number	Model Description	Part Number
Cisco MDS 9124e 12-port Fabric Switch	(1) 4Gb SAN Switch; 12 ports enabled (8 internal, 4 external); two (2) short range 4Gb SFPs; SAN-OS; eight (8) port dust covers; documentation	AG641A*
Cisco MDS 9124e 24-port Fabric Switch	(1) 4Gb SAN Switch; 24 ports enabled (16 internal, 8 external); four (4) short range 4Gb SFPs; SAN-OS; eight (8) port dust covers; documentation	AG642A*
	* #0D1 will appear after this part number on your sales order when factory integration is indicated.	

Step 2 – Additional Options

Hardware:

Model Name	Model Description	Part Number
4Gb Optical Transceivers (SFPs)	Cisco MDS 9000 4Gb FC SFP, Short Range Transceiver 500m, (4 Pack)	AE379A
	Cisco MDS 9000 4 Gb FC SFP 4km Medium Range Transceiver	AE494A
	Cisco MDS 9000 4 Gb FC SFP 10km Long Range Transceiver	AE380A

Distance Maximum

Connection Speed	OM2 Cable	OM3 Cable	PremierFlex Cable
4Gb	310m	500m	500m
2Gb	500m	860m	860m

NOTE: Additional SFPs are optional and must be ordered separately. Fibre Channel ports on the MDS 9124e Fabric Switch may be configured to accept either Short Range SFP or Long Range SFP optic transceivers. However, when ordering the MDS 9124e Fabric Switch, ports must be populated with above SFP optical transceiver options only (no substitutes allowed). Using other transceivers may void product warranty.

Model Name	Model Description	Part Number
4Gb Optical Transceivers (SFPs)	**PremierFlex OM3+ LC-LC type cables**	
	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
	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 type cables	
	.5 m LC-LC Multi-Mode OM3 Fibre Channel Cable	AJ833A
	1 m LC-LC Multi-Mode OM3 Fibre Channel Cable	AJ834A
	2 m LC-LC Multi-Mode OM3 Fibre Channel Cable	AJ835A
	5 m LC-LC Multi-Mode OM3 Fibre Channel Cable	AJ836A
	15 m LC-LC Multi-Mode OM3 Fibre Channel Cable	AJ837A
	30 m LC-LC Multi-Mode OM3 Fibre Channel Cable	AJ838A

Configuration Information

	50 m LC-LC Multi-Mode OM3 Fibre Channel Cable	AJ839A
	OM2 LC-LC type cables	
	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

Software:

Optional Software	Cisco MDS 9124e 12-port Upgrade LTU **NOTE:** Licensed per switch	T5169A
	Cisco Fabric Manager Server Package for HP BladeSystem c-Class LTU **NOTE:** Licensed per switch	TC316A
	Cisco Enterprise Package for HP BladeSystem c-Class LTU **NOTE:** Licensed per switch	TC317A
	Cisco Fabric Manager Server/Enterprise Package Bundle for HP BladeSystem c-Class LTU **NOTE:** Licensed per switch	TC318A

Step 3 – 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

Fibre Channel ports	**Cisco MDS 9124e 12-port Fabric Switch model** 8 internal 4Gb internal ports and 4 external 4 Gbps auto-sensing ports (ships with two (2) 4 Gbps short range SFPs) **Cisco MDS 9124e 24-port Fabric Switch model** 16 internal 4Gb internal ports and 8 external 4 Gbps auto-sensing ports (ships with four (4) 4 Gbps short range SFPs)
Device support and Scalability guidelines	http://h18006.www1.hp.com/products/storageworks/san/documentation.html
Performance	4 Gb/sec line speed, full duplex
Certified maximum	Certified maximum information available at: http://h18006.www1.hp.com/products/storageworks/san/documentation.html
Switch core	Non-blocking
Maximum frame size	2112-byte payload
Classes of service	Class 2, Class 3, Class F (inter-switch frames)
Port types	FL_Port, F_Port, and E_Port; N_Port, self-discovery based on switch type (U_Port)
Data traffic types	Fabric switches supporting unicast and broadcast
Media types	Small Form-Factor Pluggable (SFP) laser. 1/2/4Gb short range up to 500 m (1,640 ft.), 1/2/4Gb medium range up to 4 km and 1/2/4Gb long range up to 10 km.
Laser	Short-range, medium range, and long-range transceivers (SFP's)

	Distance using short-wave 4Gb optical transceivers at 2Gb and 4Gb connection speed:	
	4 Gbps:	PremierFlex OM3+/OM3 fiber: 270 m
		OM2 fiber: 150 m
	2 Gbps:	PremierFlex OM3+/OM3 fiber: 500 m
		OM2 fiber: 300 m

Fabric services	Name server, registered state change notification (RSCN), login services, public loop, broadcast, in-order delivery, name-server zoning
Options	SFP media, upgrade licensing, management software
Supported software	Telnet, SNMP (FE MIB, FC Management MIB), HP Systems Insight Manager, HP Storage Essentials, HP Onboard Administrator for BladeSystem, Fabric Manager, Fabric Manager Server, Enterprise Package
Management access	In-band via HP On-Board Administrator for BladeSystem
Diagnostics	Power-on self test (POST) diagnostics, online diagnostics, internal loopbacks, SPAN, Fibre Channel traceroute, Fibre Channel Ping, Fibre Channel Debug

Dimensions	Depth	11.00 in. (with handle protrusion)	
	Height	1.25 in.	
	Width	7.75 in.	
	Weight	Approx. 2.83 lb - without media	
Environment	**System Inlet Temperature**	Operating	10° to 35°C (50° to 95°F) at sea level with an altitude derating of 1.0°C per every 305m (1.8°F per every 1000ft) above sea level to a maximum of 3050m (10,000ft), no direct sustained sunlight. Maximum rate of change is 10°C/Hr (18°F/Hr). The upper limit may be limited by the type and number of options installed. System performance may be reduced if operating with a fan fault or above 30°C (86°F).

Technical Specifications

		Non-operating	-30° to 60°C (-22° to 140°F). Maximum rate of change is 20°C/Hr (36°F/Hr).
	Relative Humidity	Operating	10 to 90% relative humidity (Rh), 28°C (82.4°F) maximum wet bulb temperature, non-condensing.
		Non-operating	5 to 95% relative humidity (Rh), 38.7°C (101.7°F) maximum wet bulb temperature, non-condensing.
	Altitude	Operating	3050 m (10,000 ft). This value may be limited by the type and number of options installed. Maximum allowable altitude change rate is 457 m/min (1500 ft/min).
		Non-operating	9144 m (30,000 ft). Maximum allowable altitude change rate is 457 m/min (1500 ft/min).
Vibration	Operating		1 G, 10-500 Hz, 60 minutes per axis
	Non-operating		2 G, 10-500 Hz, 30 minutes
Shock	Operating		Half-sine-wave shock, 40 G, 2 ms duration, in each direction of three mutually perpendicular axes.
	Non-operating		Half-sine-wave shock, 140 G, 2 ms duration, in each direction of three mutually perpendicular axes; and square-wave shock up to 80 G, 180 inches/s velocity change, in each direction of three mutually perpendicular axes.

EMI	CFR 47 Subpart B of Part 15 of the FCC Rules, Class A level CISPR22 Class A EN55022 Class A VCCI Class A ITE AS/NZS 3548 Class A CNS 13438 Class A EMC Directive (89/336/EEC) for CE Marking in European Union
Safety	Underwriters Laboratories, UL60950 Canadian Standards Association, CSA60950 TUV Rheinland of North America, EN60950 Nemko, EN60950 Low Voltage Directive (73/23/EEC) for CE Marking in European Union
Fibre Channel Standards And Revisions	• FC-PH, Revision 4.3 • FC-PH-2, Revision 7.4 • FC-PH-3, Revision 9.4 • FC-GS-2, Revision 5.3 • FC-GS-3, Revision 7.01 • FC-FLA, Revision 2.7 • FC-FG, Revision 3.5 • FC-SW-2, Revision 5.3 • FC-AL, Revision 4.5 • FC-AL-2, Revision 7.0 • FC-PLDA, Revision 2.1 • FC-VI, Revision 1.61 • FCP, Revision 12 • FCP-2, Revision 7 • FC-SB-2, Revision 2.1

Technical Specifications

- FC-BB, Revision 4.7
- FC-FS, Revision 1.9
- FC-PI, Revision 13
- FC-MI, Revision 1.99
- FC-Tape, Revision 1.17
- IP over Fibre Channel (RFC 2625)
- Extensive IETF-standards-based TCP/IP, SNMPv3, and Remote Monitoring (RMON) MIBs
- Class of service: Class 2, Class 3, Class F
- Fibre Channel standard port types: E, F, FL
- Fibre Channel enhanced port types: SD, TE