QuickSpecs

Overview

HPE StoreFabric SN6620C Fibre Channel Switch

The HPE StoreFabric SN6620C Fibre Channel Switch (MDS 9148T) is the next generation 48-port 32Gbps Fibre Channel Switch providing high-speed Fibre Channel connectivity from the server rack to the SAN core. It empowers small, midsize, and large enterprises that are rapidly deploying cloud-scale applications providing the benefits of greater bandwidth, scale, and consolidation. The switch allows seamless transition to Fibre Channel Non-Volatile Memory Express (FC-NVMe) workloads whenever available without any hardware upgrade in the SAN. For flexibility, the HPE StoreFabric SN6620C Fibre Channel Switch scales from 24-48 ports. Additionally, investing in this switch for the lower-speed (8 or 16 Gbps) server rack gives you the flexibility to upgrade to 32 Gbps performance in the future.

The SN6620C can be provisioned, managed, monitored, and troubleshot using Cisco Data Center Network Manager (DCNM), which currently manages the entire suite of Cisco data center products. Powered by C-series MDS 9000 NX-OS Software, it includes storage networking features and functions and is compatible with C-series SN8500C (MDS 9700) Series Multilayer Directors, C-series SN6610C (MDS 9132T) Multilayer Fabric Switches, C-series SN6010C (MDS 9148S) Multilayer Fabric Switches and C-series SN6500C (MDS 9250i) Multi-service Fabric Switches, providing transparent, end-to-end service delivery in core-edge deployments.

HPE StoreFabric SN6620C FC Switch

Key Features and Benefits
- **High Performance for AFA and virtualized workloads**
    - Up to 1536 Gbps of aggregate bandwidth in a 1 rack unit (RU)
    - Up to 48 autosensing Fibre channel ports capable of speeds of 4/8/16/32 Gbps
    - Pay as you grow flexibility in increments of 8 ports with on-demand port activation licenses
    - Allow users to deploy them with 32Gb, 16Gb or 8Gb optics to accommodate their budget while being fully prepared for tomorrow.
- **Intelligent network services for modern SAN**
    - 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
    - Representational State Transfer (REST) and NX-API capabilities to enable flexible and rapid programming of utilities for the SAN.
- **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
    - Centralized management tool with task-based wizards that simplifies management of a standalone switch or multiple switches and fabrics. Reduced total cost of ownership

Hewlett Packard Enterprise

Standard Features

Industry leading 32-Gb Performance Capability
The switch offers full non-blocking 32-Gbps Fibre Channel performance on 48 line-rate ports and an aggregate bandwidth of 1536 Gbps in each direction in a 1 Rack unit form factor.

Scalability
The HPE StoreFabric SN6620C Fibre Channel Switch provides an option to deploy as few as twenty-four 32-Gbps Fibre Channel ports in the entry-level variant, which can grow in increments of 8 ports to 48 ports.

Cost Effective Intelligent Storage networking
The SN6620C switch comes standard 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. Please note that some services listed require the optional SN6000C Enterprise Package License.

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.

FlexAttach:
The FlexAttach feature gives SN6620C 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 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 SN6620C 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 SN6620C switch operating in NPV mode and the core switch to be bundled into a PortChannel.
Advanced traffic management features, such as fabricwide quality of service (QoS) and Inter-VSAN Routing (IVR), among others, are included with the optional HPE SN6000C Enterprise Package License.

Standard Features

IVR (MDS 9000 NX-OS Software Release 8.3(1) 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 SN6620C 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
- Hot-swappable C-series SFP and SFP+ optics
- Optional redundancy on all major components such as the power supply and fan
- PortChannels for Inter-Switch Link (ISL) resiliency
- F-port Channeling for resiliency on uplinks from a SN6620C switch operating in NPV mode
- Online diagnostics

Simplified Storage Management
Single-pane management:
The SN6620C can be provisioned, managed, monitored, and troubleshot using Cisco Data Center Network Manager, which currently manages the entire suite of Cisco data center products.

Interoperability
Offers compatibility with a broad range of Hewlett Packard Enterprise servers and operating systems, as well as disk and tape storage devices; see current compatibility matrix. Please refer to the Spock website below for more details.

Diagnostics
- Embedded diagnostics
- Network analysis

Standard Features

Software Components, Included

NX-OS

SN6620C includes the Cisco MDS 9000 NX-OS Software operating system version 8.3(1) or higher, Cisco Data Center Network Manager (Essentials Edition), and a set of configuration, maintenance and diagnostics tools. It also includes VSAN support, PortChannels, extended fabrics, and hardware-enforced zoning.

Cisco Data Center Network Manager

Cisco Data Center Network Manager (Essentials Edition) is a responsive, easy-to-use Java application that simplifies management across multiple switches and fabrics. Cisco Data Center Network Manager enables administrators to perform vital tasks such as topology discovery, fabric configuration and verification, LUN security, monitoring, and fault resolution. All functions are available through a secure interface, which enables remote management from any location. Cisco Data Center Network Manager may be used independently or in conjunction with third-party management applications. Cisco provides an extensive API for integration with third-party and user developed management tools. Additional advanced features are available with the HPE DCNM SN6000C license mentioned below.

Software Components, Optional

HPE StoreFabric SN6620C 8-Port Upgrade E-LTU

The flexibility of the SN6620C switch is provided by the C-series SN6620C 8-port 32Gb FC Upgrade license, which allows the addition of eight 32-Gbps ports.

HPE StoreFabric SN6000C Data Center Network Manager E-LTU

The "Standard" Cisco Data Center Network Manager (Essentials Edition) software that is included at no charge with the SN6620C Switch provides basic switch configuration and troubleshooting capabilities. The HPE C-series StoreFabric Data Center Network Manager (DCNM) License (for the SN6000C Fabric Switches) extends Cisco Data Center Network Manager by advanced features such as historical performance data collection for network traffic hot-spot analysis, centralized management services and advanced application integration. By default, a 30-day trial license (with advanced features) is enabled on the switch. Customers may purchase the HPE StoreFabric SN6000C DCNM E-LTU license to continue to utilize the advanced DCNM features.

HPE StoreFabric SN6000C Enterprise Package E-LTU

The HPE C-series MDS switches have a set of advanced traffic engineering and advanced security features that are recommended for all Enterprise SANs. These features are bundled together in a management application called the HPE SN6000C Enterprise Package. Please refer to the Cisco MDS Enterprise Package Data Sheet for more information:
http://www.cisco.com/c/en/us/products/collateral/storage-networking/mds-9000-software-licensing/product_data_sheet09186a00801ca6ac.html

Service and Support

Warranty

(1-1-1) Hardware Warranty; 1-year parts; 1-year on-site (8x5, next business day response) and 1-year labor.
NOTE: The hardware warranty covers firmware and embedded non-saleable software. Hardware or Software product installation is not included in the warranty, but is available and highly recommended.

Protect your business beyond warranty with HPE Support Services

HPE Pointnext provides a comprehensive portfolio including Advisory and Transformational, Professional, and Operational Services to help accelerate your digital transformation. From the onset of your transformation journey, Advisory and Transformational Services focus on designing the transformation and creating a solution roadmap. Professional Services specializes in creative configurations with flawless and on-time implementation, and on-budget execution. Finally, operational services provides innovative new approaches like Flexible Capacity and Datacenter Care, to keep your business at peak performance. HPE is ready to bring together all the pieces of the puzzle for you, with an eye on the future, and make the complex simple.

Connect your devices

Unlock all of the benefits of your technology investment by connecting your products to Hewlett Packard Enterprise. Reduce down time, increase diagnostic accuracy and have a single consolidated view of your environment. By connecting, you will receive 24x7monitoring, pre-failure alerts, automatic call logging, and automatic parts dispatch. HPE Proactive Care Service and HPE Datacenter Care Service customers will also benefit from proactive activities to help prevent issues and increase optimization. All of these benefits are already available to you with your server storage and networking products, securely connected to HPE support. Learn more about getting connected at **http://www.hpe.com/services/getconnected**

Optimized Care
HPE Proactive Care* with 6 hour call-to-repair commitment, three year Support Service

HPE Proactive Care gives customers an enhanced call experience plus helps prevent problems and maintains IT stability by utilizing tailored, proactive reports with recommendations and advice when your products are connected to HPE. This Service combines three years' proactive reporting and advice with our highest level of hardware support – the HPE 24x7, six hour hardware call-to-repair. HPE is the only leading manufacturer who makes this level of coverage available as a standard service offering for your most valuable storage systems.
https://www.hpe.com/h20195/v2/GetPDF.aspx/4AA3-8855ENW.pdf

Standard Care
HPE Proactive Care* with 24x7 coverage, three year Support Service

HPE Proactive Care gives customers an enhanced call experience. When your products are connected to HPE, Proactive Care helps prevent problems and maintains IT stability by utilizing personalized proactive reports with recommendations and advice This Service combines three years proactive reporting and advice with our 24x7 coverage, four hour hardware response time when there is a problem.

https://www.hpe.com/h20195/v2/GetPDF.aspx/4AA3-8855ENW.pdf

*HPE Proactive Care and HPE Proactive Care Advanced require that the customer connect their devices to make the most of these services and receive all the deliverables.

Basic Care
HPE Foundation Care 24x7, three-year Support Service

HPE Foundation Care 24x7 gives you access to HPE 24 hours a day, seven days a week for assistance on resolving issues. This service includes need based Hardware onsite response within four hours. Simplify your support experience and make HPE your first call to help resolve hardware or software problems.

https://www.hpe.com/h20195/v2/GetPDF.aspx/4AA4-8876ENW

Service and Support

Related Services

HPE Basic Installation Service
Provides for the basic hardware installation of HPE branded servers, storage devices and networking options to assist you in bringing your new hardware into operation in a timely and professional manner.

https://www.hpe.com/h20195/V2/GetPDF.aspx/5981-9356EN.pdf
HPE SAN Deployment Service
Hewlett Packard Enterprise delivers complete design and implementation services for Fibre Channel, FCoE, FCIP, SAS, and iSCSI SAN connectivity components.

http://h20195.www2.hpe.com/V2/GetPDF.aspx/5981-8527EN.pdf

HPE Datacenter Care service
HPE Datacenter Care helps improve IT stability and security, increase the value of IT, and enable agility and innovation. It is a structured framework of repeatable, tested, and globally available services "building blocks." You can deploy, operate, and evolve your datacenter wherever you are on your IT journey. With HPE Datacenter Care, you benefit from a personalized relationship with HPE via a single point of accountability for HPE and others' products.

For more information, visit **http://www.hpe.com/services/datacentercare**

HPE Education Services
Keep your IT staff trained making sure they have the right skills to deliver on your business outcomes. Book on a class today and learn how to get the most from your technology investment.

http://www.hpe.com/ww/learn

Parts and Materials
Hewlett Packard Enterprise will provide HPE-supported replacement parts and materials necessary to maintain the covered hardware product in operating condition, including parts and materials for available and recommended engineering improvements.

Parts and components that have reached their maximum supported lifetime and/or the maximum usage limitations as set forth in the manufacturer's operating manual, product quick-specs, or the technical product data sheet will not be provided, repaired, or replaced as part of these services.

The defective media retention service feature option applies only to Disk or eligible SSD/Flash Drives replaced by Hewlett Packard Enterprise due to malfunction.

HPE Support Center
The HPE Support Center is a personalized online support portal with access to information, tools and experts to support HPE business products. Submit support cases online, chat with Hewlett Packard Enterprise experts, access support resources or collaborate with peers.

Learn more **https://support.hpe.com/hpesc/public/home**
The HPE Support Center Mobile App* allows you to resolve issues yourself or quickly connect to an agent for live support. Now, you can get access to personalized IT support anywhere, anytime.
HPE Insight Remote Support and HPE Support Center are available at no additional cost with a HPE warranty, HPE Support Service or HPE contractual support agreement.

*HPE Support Center Mobile App is subject to local availability

Service and Support

For more information
http://www.hpe.com/services
https://www.hpe.com/us/en/services/operational.html

To learn more on HPE Storage Services, please contact your Hewlett Packard Enterprise sales representative or Hewlett Packard Enterprise Authorized Channel Partner. Contact information for a representative in your area can be found at "Contact HPE"

https://www.hpe.com/us/en/contact-hpe.html

HPE Support Services are sold by Hewlett Packard Enterprise and Hewlett Packard Enterprise Authorized Service Partners:
- Services for customers purchasing from HPE or an enterprise reseller are quoted using HPE order configuration tools.
- Customers purchasing from a commercial reseller can find HPE Support Services at **https://ssc.hpe.com/portal/site/ssc/**

Configuration Information

The SN6620C Switch comes preconfigured with 24 or 48 autosensing Fibre Channel ports capable of 32, 16, 8Gb and 4Gb 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. Customers can choose between standalone models or 32Gb SFPs bundled configuration.

Step 1 - Base Configuration (Select one)

Model Description	Part Number

HPE StoreFabric SN6620C 48/24 32Gb Fibre Channel Switch

HPE StoreFabric SN6620C 32Gb 48/24 Fibre Channel Switch	R0P12A

48-Port Fabric Switch with 24 active ports, Dual Power Supplies, Power Cords (configurable by ship-to country) and 4 Fans, VSANs, PortChannels, Cisco Data Center Network Manager, firmware, accessory kit and documentation.

HPE StoreFabric SN6620C 32Gb 24-port 32Gb SFP+ Fibre Channel Switch

HPE StoreFabric SN6620C 32Gb 24-port 32Gb SFP+ Fibre Channel Switch	R0P13A

48-Port Fabric Switch with 24 active ports bundled with 24x32Gb SW SFP+, Dual Power Supplies, Power Cords (configurable by ship-to country) and 4 Fans, VSANs, PortChannels, Cisco Data Center Network Manager, firmware, accessory kit and documentation.

HPE StoreFabric SN6620C 32Gb 48-port 32Gb SFP+ Fibre Channel Switch

HPE StoreFabric SN6620C 32Gb 48-port 32Gb SFP+ Fibre Channel Switch	R0P14A

48-Port Fabric Switch with 48 active ports bundled with 48x32Gb SW SFP+, Dual Power Supplies, Power Cords (configurable by ship-to country) and 4 Fans, VSANs, PortChannels, Cisco Data Center Network Manager, firmware, accessory kit and documentation.

Step 2 - Optional Software

On Demand Port Activation License

HPE StoreFabric SN6620C 32Gb 8-port Fibre Channel Upgrade E-LTU	R0Z10AAE

Management Software

HPE StoreFabric SN6000C Data Center Network Manager E-LTU	TC364AAE
HPE StoreFabric SN6000C Enterprise Package E-LTU	A7515AAE

Step 3 - Options

Select each required option with quantities specified:

32Gb FC Transceivers*

HPE C-series 32 Gb Fibre Channel Short Wave SFP+ Transceiver	Q9D30A
HPE C-series 32 Gb Fibre Channel Long Wave SFP+ Transceiver	Q9D31A

* Compatible with SFP28 MSA spec

16 Gb FC Transceivers

HPE StoreFabric C-series 16 Gb Fibre Channel SW SFP+ Transceiver	C8S72A
HPE StoreFabric C-series 16 Gb Fibre Channel LW SFP+ Transceiver	C8S73A

8Gb FC Transceivers

HPE MDS 9000 8Gb FC SFP+ Short Range Transceiver	AJ906A
HPE MDS 9000 8Gb FC SFP+ Long Range Transceiver	AJ907A

NOTE: Each port on the SN6620C may be configured to accept Short or Long Wave SFP optical transceivers. There are two SN6620C switch bundles available: one populated with 24 32Gb SW SFPs and one populated with 48 32Gb SW SFPs. For the standalone switch, please use only the above Cisco SFP optical transceivers; no substitutions allowed. Using other transceivers may void product warranty.

Configuration Information

Installation and Deployment Services
For complete design and implementation of Fibre Channel connectivity components, select **HPE SAN Deployment Service**
http://h20195.www2.hpe.com/V2/GetPDF.aspx/5981-8527EN.pdf
For basic hardware installation, select **HPE Installation Service**
https://www.hpe.com/h20195/V2/GetPDF.aspx/5981-9356EN.pdf

Recommended Cables
HPE PremierFlex OM4+ Fiber Optic Cables

HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 1m Cable	QK732A
HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 2m Cable	QK733A
HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 5m Cable	QK734A
HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 15m Cable	QK735A
HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 30m Cable	QK736A
HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 50m Cable	QK737A

HPE OM3 LC-LC Optical Cables

HPE LC to LC Multi-mode OM3 2-Fiber 0.5m 1-Pack Fiber Optic Cable	AJ833A
HPE LC to LC Multi-mode OM3 2-Fiber 1.0m 1-Pack Fiber Optic Cable	AJ834A
HPE LC to LC Multi-mode OM3 2-Fiber 2.0m 1-Pack Fiber Optic Cable	AJ835A
HPE LC to LC Multi-mode OM3 2-Fiber 5.0m 1-Pack Fiber Optic Cable	AJ836A
HPE LC to LC Multi-mode OM3 2-Fiber 15.0m 1-Pack Fiber Optic Cable	AJ837A
HPE LC to LC Multi-mode OM3 2-Fiber 30.0m 1-Pack Fiber Optic Cable	AJ838A
HPE LC to LC Multi-mode OM3 2-Fiber 50.0m 1-Pack Fiber Optic Cable	AJ839A

Technical Specifications

	HPE StoreFabric SN8500C 4-slot/-8-slot 16/32Gb FC Director	HPE StoreFabric SN6610C 32Gb Fabric Switch	HPE StoreFabric SN6620C 32Gb Fabric Switch	HPE StoreFabric SN6010C 16Gb Fabric Switch	HPE StoreFabric SN6500C 16Gb Multi-service Switch
Switch Type	Multilayer Director	Multilayer Fabric Switch	Multilayer Fabric Switch	Multilayer Fabric Switch	Multi-service Fabric Switch
Maximum ports	**4-slot:** 192 16/32 Gbps Fibre Channel ports, 192 FCoE ports **8-slot:** 384 16/32 Gbps Fibre Channel ports, 384 FCoE ports	Up to 32 32 Gbps Fibre Channel ports	Up to 48 32 Gbps Fibre Channel ports	Up to 48 16 Gbps Fibre Channel ports	Up to 40 16 Gbps FC ports, 2 fixed 10GbE FCIP ports, 8 fixed 10GbE FCoE ports
Number of slots per chassis	Four/Eight	One fixed and One Expansion Slot	One fixed	One fixed	Two fixed

NOTE: For additional switch support information, refer to the C-series FC Switch Connectivity Stream on the Single Point of Connectivity Knowledge (SPOCK) website at: **https://h20272.www2.hpe.com/spock/**. You must sign up for a Hewlett Packard Enterprise Passport to enable access. Once logged in, click Switches under Other Hardware in the last navigation panel of the window to access the Fibre Channel Switch Streams. Click on the C-Series FC Switch Connectivity Stream to open the document.

Minimum software requirements
MDS 9000 NX-OS Software Release 8.3(1)

Performance and port configuration
- Port speed: 32, 16 and 8 Gbps autosensing with 32 Gbps of dedicated bandwidth per port
- Buffer credits: Up to 8300 for a group of 16 ports, with a default of 500 buffer credits per port and a maximum of 8270 buffer credits for a single port in
- the group
- Ports per chassis: Up to 48 32-Gbps ports
- Base configuration with 24 ports; additional configuration for up to 48 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

Technical Specifications

Fabric Services

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

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 4 (ANSI INCITS 460-2011)
- FC-PI-4, Revision 8 (ANSI INCITS 450-2008)
- FC-PI-5, Revision 6 (ANSI INCITS 479-2011)
- FC-PI-6 (ANSI INCITS 512-2015)
- FC-FS, Revision 1.9 (ANSI INCITS 373-2003)
- FC-FS-2, Revision 1.01 (ANSI INCITS 424-2007)
- FC-FS-2, Amendment 1 (ANSI INCITS 424-2007/AM1-2007)
- FC-FS-3, Revision 1.11 (ANSI INCITS 470-2011)
- FC-FS-4
- FC-LS, Revision 1.62 (ANSI INCITS 433-2007)
- FC-LS-2, Revision 2.21 (ANSI INCITS 477-2011)
- FC-LS-3, Includes revision 3.53
- 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, Revision 8.5 (ANSI INCITS 461-2010)
- FC-SW-6
- FC-GS-3, Revision 7.01 (ANSI INCITS 348-2001)
- FC-GS-4, Revision 7.91 (ANSI INCITS 387-2004)
- FC-GS-5, Revision 8.51 (ANSI INCITS 427-2007)
- FC-GS-6, Revision 9.4 (ANSI INCITS 463-2010)
- FC-GS-7, Includes revision 10.8
- 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, Revision 2b (ANSI INCITS 481-2011)
- FC-SB-2, Revision 2.1 (ANSI INCITS 349-2001)
- FC-SB-3, Revision 1.6 (ANSI INCITS 374-2003)
- FC-SB-3, Amendment 1 (ANSI INCITS 374-2003/AM1-2007)
- FC-SB-4, Revision 3.0 (ANSI INCITS 466-2011)
- FC-SB-5, Revision 2.00 (ANSI INCITS 485-2014)
- FC-BB-6, Revision 2.00 (ANSI INCITS 509-2014)
- FC-BB-2, Revision 6.0 (ANSI INCITS 372-2003)
- FC-BB-3, Revision 6.8 (ANSI INCITS 414-2006)
- FC-BB-4, Revision 2.7 (ANSI INCITS 419-2008)
- FC-BB-5, Revision 2.0 (ANSI INCITS 462-2010)
- FC-VI, Revision 1.84 (ANSI INCITS 357-2002)
- FC-SP, Revision 1.8 (ANSI INCITS 426-2007)
- FC-SP-2, Revision 2.71 (ANSI INCITS 496-2012)
- FAIS, Revision 1.03 (ANSI INCITS 432-2007)
- FAIS-2, Revision 2.23 (ANSI INCITS 449-2008)
- FC-IFR, Revision 1.06 (ANSI INCITS 475-2011)
- 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-MI-3, Revision 1.03 (INCITS TR-48-2012)
- FC-DA, Revision 3.1 (INCITS TR-36-2004)
- FC-DA-2, Revision 1.06 (INCITS TR-49-2012)
- FC-MSQS, Revision 3.2 (INCITS TR-46-2011)
- Fibre Channel classes of service: Class 2, Class 3, and Class F
- Fibre Channel standard port types: E, F, and B
- Fibre Channel enhanced port types: SD, ST, and TE
- FC-NVMe
- In-band management using IP over Fibre Channel (RFC 2625)
- IPv6, IPv4, and Address Resolution Protocol (ARP) over Fibre Channel (RFC 4338)
- Extensive IETF-standards-based TCP/IP, Simple Network Management Protocol Version 3 (SNMPv3), and Remote Monitoring (RMON) MIBs

Technical Specifications

Advanced Services

Diagnostic and Troubleshooting

Please note that some services require the optional Enterprise Package license to be activated.

- NPIV
- VSAN
- PortChannels
- NPV mode
- FlexAttach
- F-port trunking and channeling
- Flow-based and zone-based QoS
- IVR (in Cisco MDS 9000 NX-OS Software Release 8.3(1) or later)
- SPAN
- POST diagnostics
- Online diagnostics
- Internal loopbacks
- 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
  - VSAN-based roles
  - SSHv2
  - SNMPv3

Management Applications

- Zero-touch deployment with DHCP (in Cisco MDS 9000 NX-OS Software Release 6.2.9 or later)
- Cisco MDS 9000 Family CLI
- Cisco Data Center Network Manager
- C-series StoreFabric Data Center Network Manager (optional; requires C-series StoreFabric Data Center Network Manager license)

Availability

- Non-disruptive software upgrades
- Process monitoring and stateful process restart
- Per-VSAN fabric services
- Hot-swappable SFP and SFP+ optics
- PortChannels aggregating up to 16 ports
- F-port Channeling
- Online diagnostics

Technical Specifications

Safety
- CE Marking
- UL 60950 -1
- CAN/CSA-C22.2 No. 60950 -1
- EN 60950 -1
- IEC 60950 -1
- TS 001
- AS/NZS 3260
- 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 3548 Class A
- VCCI Class A
- EN55024
- EN50082-1
- EN61000-3-2
- EN61000-3-3
- EN61000-6-1

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 17.3 x 22.3 in. (4.37 x 43.9 x 56.6 cm)
- Weight of fully configured chassis: 19.1 lb (8.6 kg)
- Ambient operating temperature: 32 to 104°F (0 to 40°C)
- Ambient non-operating temperature: -40 to 158°F (-40 to 70°C)
- Humidity (RH), ambient (noncondensing) operating: 10 to 90%
- Humidity (RH), ambient (noncondensing) non-operating and storage: 10 to 95%
- Operating altitude: -197 to 6500 ft (-60 to 2000 m)

Power and Cooling
- Power supplies (650W 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)
- Typical power consumption:
    - ° 217W for Idle 48-Port switch without optics modules
    - ° 251W for 48-Port switch with 24 32G SW optics modules under typical conditions
    - ° 297W for 48-Port switch with 48 32G SW optics modules under typical conditions
- 125W (on fully populated config running 16G 100% traffic load at 25C)Airflow: Rear to front (toward ports)
- Cisco recommends maintaining a minimum air space of 2.5 in. (6.4 cm) between walls and chassis air vents and a minimum horizontal separation of 6 in. (15.2 cm) between two chassis to prevent overheating

Summary of Changes

Date	Version History	Action	Description of Change
03-Dec-2018	Version 1	New	New QuickSpecs

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