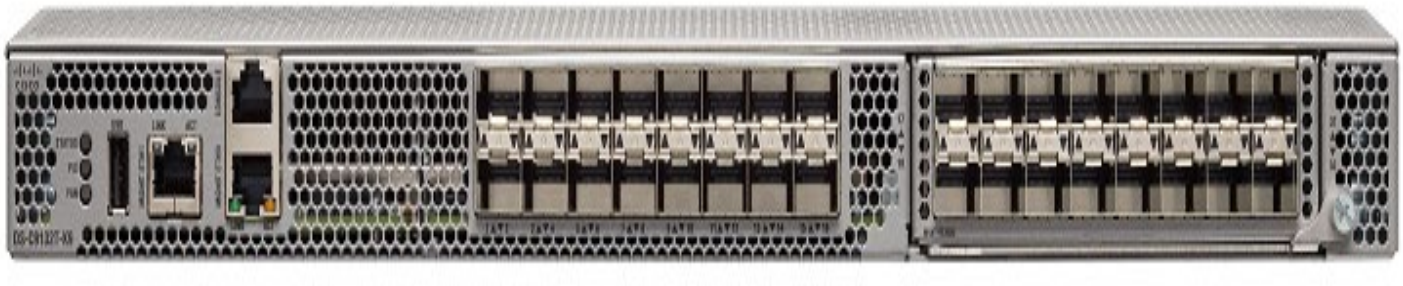
Overview

HPE C-series SN6610C Fibre Channel Switch

The HPE SN6610C Fibre Channel Switch (MDS 9132T) is the next generation 32 Gbps 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 using extremely dense virtualized servers, providing the dual benefits of greater bandwidth and consolidation all in a compact one-rack-unit (1RU) form factor. The switch offers state-of-art analytics and telemetry capability built into its next generation ASIC platform. For ultimate flexibility, the HPE SN6610C Switch scales from eight to thirty-two ports. Additionally, investing in this switch for the lower-speed (8- or 16-Gbps) server rack gives you the option to upgrade to 32-Gbps server connectivity in the future.

The SN6610C 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 SN6010C (MDS 9148S) Multilayer Fabric Switches and SN6500C (MDS 9250i) Series Multi-service Fabric Switches, providing transparent, end-to-end service delivery in core-edge deployments.



HPE C-series SN6610C FC Switch

Standard Features

Key Features and Benefits

- **High Performance for AFA and virtualized workloads**
  - Up to 1024 Gbps of aggregate bandwidth in a 1 rack unit (RU)
  - Up to 32 autosensing Fibre channel ports capable of speeds of 8/16/32 Gbps
  - Pay as you grow flexibility with port expansion module and on-demand port activation licenses
  - Configurable with 16 Gb FC SFP+ or 32 Gb FC SFP+ optics to accommodate a customer's 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

Industry leading 32-Gb Performance Capability

The switch offers full non-blocking 32-Gbps Fibre Channel performance on 32 line-rate ports and an aggregate bandwidth of 1024 Gbps in each direction in a 1 Rack unit form factor.

Scalability

The SN6610C switch comes in three preconfigured models of 8-port 16 Gb SFPs bundled, 8-port 32Gb SFPs bundled or 24-port 16Gb SFPs bundled. The SN6610C model can grow by 8 ports to 16 ports by installing the 8-port FC Upgrade License (additional SFPs required.) Customers who require more than 16 active ports may install the port expansion module which is equipped with 16 active 32-Gpbs ports to gain the full 32 active ports available with the SN6610C switch. Again, additional SFPs would be required; please see the supported C-series SFPs below.

Cost Effective Intelligent Storage networking

The SN6610C 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.

Standard Features

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 SN6610C 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 SN6610C 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 SN6610C 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.

IVR (MDS 9000 NX-OS Software Release 8.2.1)
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 SN6610C 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 SN6610C switch operating in NPV mode
- Online diagnostics

Simplified Storage Management
Single-pane management
The SN6610C 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.

Standard Features

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

Software Components, Included
NX-OS
SN6610C includes the Cisco MDS 9000 NX-OS Software operating system version 8.2(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 HPE's DCNM SN6000C license mentioned below.

Software Components, Optional
HPE SN6610C 8-Port Upgrade E-LTU
The flexibility of the SN6610C switch is provided by the C-series SN6610C 8-port 32Gb FC Upgrade license, which allows the addition of eight 32-Gbps ports.

HPE 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 SN6610C Switch provides basic switch configuration and troubleshooting capabilities. HPE's C-series 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 must purchase the HPE SN6000C DCNM E-LTU license (server-based or switch-based license) to continue to utilize the advanced DCNM features.

HPE SN6000C Enterprise Package E-LTU
HPE's 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 Cisco's 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

Standard Features

HPE C-series SAN Insights (Cisco SAN Analytics)

Cisco SAN Analytics solution offers end-to-end visibility into Fibre Channel block storage traffic. The solution is natively available on the storage area network due to its integrated-by-design architecture with the HPE SN6610C 32Gb FC Switch. Cisco SAN Analytics delivers deep visibility into I/O traffic between the compute and the storage infrastructure. This information is in addition to the already-available visibility obtained from individual ports, switches, servers, virtual machines, and storage arrays that are integrated with Cisco Data Center Network Manager. Cisco SAN Analytics, once enabled via the *feature analytics* CLI command, provides a 120-day trial license. To continue the use of these features after the trial period ends, customers must purchase the HPE SN6630C SAN Insights 1-year/3-year/5-year term E-LTU (switch-based-license) for on-board Analytics, Streaming Telemetry and SAN Insights on Data Center Network Manager and other telemetry receivers.

To utilize the features of the HPE SAN Insights license and visualize the available Analytics and Telemetry data through the DCNM interface, customers must have both the HPE DCNM and HPE SAN Insights licenses installed, and be using DCNM version 11.1(1) or later and NX-OS 8.4(1) or later.

Notes: HPE SAN Insights Software License-to-Use (E-LTU) includes maintenance and support for the duration of the license. At the end of the license period, customer will need to purchase a new license to continue using the software. Software renewal via HPE PointNext Pointnext Services is not allowed/supported.

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.
Notes: 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.

Achieve maximum return from your IT investment

Get the expertise you need at every step of your IT journey with **HPE Pointnext services and support**. We help you lower your risks and costs using proven best practices, automation and methodologies that have been tested and refined by HPE experts through thousands of deployments globally. With **Advisory Services**, we focus on your business outcomes and goals, partnering with you to design your transformation and build a roadmap tuned to your unique challenges. Our **Professional** and **Operational Services** can be leveraged to speed up time-to-production, boost performance and accelerate your business. HPE Pointnext specializes in flawless and on-time implementation, on-budget execution, and creative configurations that get the most out of software and hardware alike.

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**

Consume IT on your terms

HPE GreenLake Flex Capacity

Combines the simplicity, agility, and economics of public cloud with the security and performance benefits of on-premises IT. You determine your own “Right Mix” of Hybrid IT and workload placement without having to use.

With its agile pay-per-use service, HPE GreenLake Flex Capacity can help your IT organization:

- Avoid IT expenses stemming from overprovisioning
- Improve time to market by maintaining a safe buffer of capacity, ready for use when you need it
- Keep capacity ahead of demand with regular monitoring—and a simple change order to replenish
- Pay for only the capacity used, not the capacity deployed
- Reduce IT risk with tailored support

Free up resources with Operational Services from HPE Pointnext

Choose from the recommended services for customers purchasing from Hewlett Packard Enterprise or an authorized reseller are quoted using Hewlett Packard Enterprise order configuration tools.

Service and Support

HPE Datacenter Care

Helps customers to address the pressing needs of IT today and smoothly transform to a more agile cloud-like IT operations model. We help run and monitor your IT by offloading the day to day routine tasks, helping customers be more predictive and proactive, and saving time with one place to call with for all of their IT. Datacenter Care is available as both tailored statement of work and as a packaged service for 3, 4, and 5 year terms.

For HPE SN6600C SAN Insights Software with the 1-year term LTU, Datacenter Care is available as a tailored statement of work service. For HPE SN6600C SAN Insights Software with the 3-years, or 5-years term LTUs, Datacenter Care is available as both a tailored statement of work, and also as a 3-years, or 5-years term packaged service (matching the SW LTU term).

Partner with an assigned account team backed by local and global experts, access HPE enhanced call experience with priority access, use specialized support for complex, technologies, choose hardware and software support for your devices, implement proactive monitoring to stay ahead of issues , and access HPE IT best practices and IP. HPE Datacenter Care advantage options are available to add to your agreement to give you specialized expertise for performance, security, back up analysis, and much more.

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.

For HPE SN6600C SAN Insights Software with the 3-years, or 5-years term LTUs, Proactive Care is available as a 3-years, or 5-years term packaged service (matching the SW LTU term).

HPE Proactive Care is available in 3, 4 and 5 year terms with a choice of response levels: Next Business day (NBD), 24x7 with a 4 hour response, and 24x7 with 6 hour call to repair (CTR). This Service combines both reactive support when there is a problem with an enhanced call experience and start to finish case management with proactive reporting and advice.
https://www.hpe.com/h20195/v2/GetPDF.aspx/4AA3-8855ENW.pdf

HPE Proactive Care Advanced

Incorporates all the deliverables of HPE Proactive Care plus includes personalized support from a local, assigned Account Support Manager who will share best practice advice and personalized recommendations designed to help improve availability and performance to help increase stability and reduce unplanned downtime. Leverage your system's ability to connect to HPE for pre-failure alerts, automatic call logging and parts dispatch. For business critical incidents, Proactive Care Advanced offers critical event management to help reduce mean time to resolution. HPE Service Credits are included to redeem for technical and operational services. For HPE SN6600C SAN Insights Software with the 3-years, or 5-years term LTUs, Proactive Care Advanced is available as a 3-years, or 5-years term packaged service (matching the SW LTU term).

https://www.hpe.com/h20195/v2/getdocument.aspx?docname=4AA5-3259ENW

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

HPE Foundation Care (choose the response level that meets your needs)

HPE Foundation Care helps to simplify your support experience and make HPE your first call to help resolve hardware or software problems.

For HPE SN6600C SAN Insights Software with the 3-years, or 5-years term LTUs, Foundation Care is available as a 3-years, or 5-years term packaged service (matching the SW LTU term).
https://www.hpe.com/h20195/V2/GetDocument.aspx?docname=4AA4-8876ENW&cc=us&lc=en

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Service and Support

Other related services from HPE Pointnext

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/5981-8527ENW.pdf

HPE Service Credits

Offers flexible services and technical skills to meet your IT demands as your business evolves. With a menu of services, you can access additional resources and specialist skills to help you maintain peak performance of your IT. HPE Service Credits help you proactively respond to your dynamic IT and business needs

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

HPE 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.

Defective Media Retention is an option available with HPE Datacenter Care, HPE Proactive Care, Proactive Care Advanced, and HPE Foundation Care and applies only to Disk or eligible SSD/Flash Drives replaced by HPE 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 HPE experts, access support resources or collaborate with peers.

Learn more **https://support.hpe.com/hpesc/public/home**

Hewlett Packard Enterprise 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.
Notes:*HPE Support Center Mobile App is subject to local availability

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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 HPE 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 SN6610C switch comes in three preconfigured models of 8-ports with eight (8) 16 Gb SFPs bundled, 8-ports with eight (8) 32Gb SFPs bundled or 24-ports with twenty-four (24) 16Gb SFPs bundled. The 8-port SN6610C bundles can grow by 8 ports to 16 ports by installing the 8-port FC Upgrade license. Thereafter, users must install the port expansion module with sixteen 32-Gbps ports to get to 32 ports.

Step 1 - Base Configuration(Select one)

Description	SKU
HPE SN6610C 32Gb 8-port 16Gb Short Wave SFP+ Fibre Channel Switch	
HPE SN6610C 32Gb 8-port 16Gb Short Wave SFP+ Fibre Channel Switch	Q9D34A
HPE SN6610C 32Gb 8-port 32Gb Short Wave SFP+ Fibre Channel Switch	
HPE SN6610C 32Gb 8-port 32Gb Short Wave SFP+ Fibre Channel Switch	Q9D35A
HPE SN6610C 32Gb 24-port 16Gb Short Wave SFP+ Fibre Channel Enterprise Switch	
HPE SN6610C 32Gb 24-port 16Gb Short Wave SFP+ Fibre Channel Enterprise Switch	Q9D36A

Notes: To order factory integration, add OD1 after the part number on your sales order

Step 2 - Optional Software

On Demand Port Activation License

HPE SN6610C 32Gb 8-port Fibre Channel Upgrade E-LTU	Q9Z41AAE

Management Software

HPE SN6000C Data Center Network Manager E-LTU	TC364AAE
HPE C-series SN6000C DCNM Switch E-LTU	R4F89AAE
HPE SN6000C Enterprise Package E-LTU	A7515AAE
HPE C-series SN6600C SAN Insights 1yr E-LTU	R5Z90AAE
HPE C-series SN6600C SAN Insights 3yr E-LTU	R4F92AAE
HPE C-series SN6600C SAN Insights 5yr E-LTU	R5Z91AAE

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

Notes:* Compatible with SFP28 MSA spec

16 Gb FC Transceivers

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

Configuration Information

8Gb FC Transceivers

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

Notes: Each port on the SN6610C may be configured to accept Short or Long Wave SFP optical transceivers. There are three SN6610C switch bundles available: one populated with 8 16Gb SFPs, one populated with 8 32Gb FPs and one populated with 24 16Gb SFPs. For the remaining ports, please use only the above Cisco SFP optical transceivers; no substitutions allowed. Using other transceivers may void product warranty.

Fan Tray

HPE SN6610C Fan Tray	Q9D38A

Power Supply

HPE SN6610C 650W Power Supply	Q9D37A

Expansion Module (required to accommodate more than 16 active ports)

HPE SN6610C 16-port Fibre Channel Expansion Module	Q9D33A

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/5981-8527ENW.pdf

For basic hardware installation, select **HPE Installation Service**
https://h20195.www2.hpe.com/v2/Getdocument.aspx?docname=5981-9356enw

Cables

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

HPE PremierFlex OM4+ Fiber Optic Cables

HPE Premier Flex MPO/MPO Multi-mode OM4 12 fiber 10m Cable	QK729A
HPE Premier Flex MPO/MPO Multi-mode OM4 8 fiber 50m Cable	QK731A
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

Technical Specifications

Family Information

	Switch Type	Maximum ports	Number of slots per chassis
HPE C-series SN8500C/SN8700C 4-slot/8-slot 16/32/64Gb FC Director	Multilayer Director	4-slot: 192 16/32/64 Gbps Fibre Channel ports, 192 FCoE ports 8-slot: 384 16/32/64 Gbps Fibre Channel ports, 384 FCoE ports	Four/Eight
HPE C-series SN6630C 32Gb Fabric Switch	Multilayer Fabric Switch	Up to 96 32 Gbps Fibre Channel ports	One fixed
HPE C-series SN6620C 32Gb Fabric Switch	Multilayer Fabric Switch	Up to 48 32 Gbps Fibre Channel ports	One fixed
HPE C-series SN6610C 32Gb Fabric Switch	Multilayer Fabric Switch	Up to 32 32 Gbps Fibre Channel ports	One fixed and one expansion slot
HPE C-series SN6010C 16Gb Fabric Switch	Multilayer Fabric Switch	Up to 48 16 Gbps Fibre Channel ports	One fixed
HPE C-series SN6500C 16Gb Multi-service Switch	Multilayer Fabric Switch	Up to 40 16 Gbps FC ports, 2 fixed 10GbE FCIP ports, 8 fixed 10GbE FCoE ports	Two fixed

Notes: 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 8.2(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 32 32-Gbps ports
- Base configuration with 8 ports; additional configuration for up to 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

Technical Specifications

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)

Technical Specifications

- 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-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-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

Fabric Services

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

Advanced Services

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 8.2(1) or later)

Technical Specifications

Diagnostic and Troubleshooting

- Online diagnostics
- Internal loopbacks
- Fibre Channel traceroute
- Fibre Channel ping
- Fibre Channel debug
- Cisco Fabric Analyzer
- Syslog
- Port-level statistics
- SPAN
- POST Diagnostics
- Link Diagnostics (ISL Diagnostics and HBA Diagnostics)
- Read Diagnostic Parameter

Management

- Access methods
  - Out-of-band 10/100/1000 Ethernet port
  - EIA/TIA-232 serial console port
  - In-band IP over Fibre Channel (RFC 2625)
- Access protocols
  - CLI
  - SNMP
  - SMI-S
  - NX-API
- Security
  - RBAC using RADIUS or TACACS+ authentication, authorization, and accounting (AAA) functions
  - VSAN-based roles
  - SSHv2
  - SNMPv3
  - SFTP

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 Data Center Network Manager (optional; requires C-series Data Center Network Manager license)

Availability

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

Technical Specifications

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 20.11 inches
- Weight of fully configured chassis: 21.65 lb (9.82 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:
  - 72W for idle base switch with 16 ports activated without SFPs
  - 43W for idle expansion module with 16 ports activated without SFPs
  - 80W for 8 ports activated with 32G SFPs with traffic at 25°C
- 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

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

Technical Specifications

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

Summary of Changes

Date	Version History	Action	Description of Change
17-Aug-2020	Version 9	Changed	Corrected tech specs and added SN8700C product family information
03-Aug-2020	Version 8	Changed	QuickSpecs layout was updated and Branding Refresh was applied.
04-May-2020	Version 7	Changed	Added SAN Insights 1/5 yr licenses
03-Feb-2020	Version 6	Changed	Added SAN Insights and DCNM Switch based licenses
15-Jul-2019	Version 5	Added	Family Information and Configuration Information sections were updated.
02-Apr-2019	Version 4	Changed	Configuration Information section was updated.
03-Dec-2018	Version 3	Changed	DCNM information was updated Product Highlights, Service and Support, Family Information and Technical Specifications were revised
01-Oct-2018	Version 2	Changed	Configuration Information were revised.
02-Jul-2018	Version 1	Created	New QuickSpecs.

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