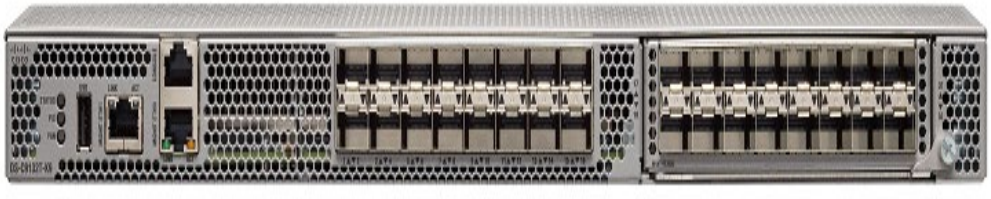
Overview

HPE Storage Fibre Channel Switch C-series SN6610C

The HPE Storage Fibre Channel Switch C-series SN6610C (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/SN8700C (MDS 9700) Series Multilayer Directors, C-series SN6620C (MDS 9148T) Multilayer Fabric Switches, C-series SN6630C (MDS 9396T) Multilayer Fabric Switches, C-series SN6010C (MDS 9148S) Multilayer Fabric Switches, C-series SN6710C (MDS 9124V) Multilayer Fabric Switches, C-series SN6720C (MDS 9148V) Multilayer Fabric Switches, and C-series SN6640C (MDS 9220i) Multi-service Fabric Switchesproviding transparent, end-to-end service delivery in core-edge deployments.



HPE Storage Fibre Channel Switch C-series SN6610C

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 five preconfigured models of 8-port 16 Gb SFPs bundled, 8-port 32Gb SFPs bundled, 24-port 16Gb SFPs bundled, 24-port 32Gb SFPs bundled, or 8-ports with four (4) 16Gb SFPs and four (4) 32Gb 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 must 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, HPE C-series SN6000C Advantage License, or HPE C-series SN6610C/SN6620C Premier 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.

Standard Features

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 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, HPE C-series SN6000C Advantage License, and HPE C-series SN6610C/SN6620C Premier 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

Standard Features

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.

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.

Notes: Starting from release 12.0.1a, DCNM is renamed as Nexus Dashboard Fabric Controller (NDFC). Read more at, **https://www.cisco.com/c/en/us/products/collateral/cloud-systems-management/prime-data-center-network-manager/san-innovation-ndfc-so.html**

Cisco Smart Licensing and Subscription Licenses

Starting from Cisco NX-OS 9.2(2), Smart Licensing Using Policy is available for HPE C-Series switches. This enables the customer to purchase subscription-based licenses for a period of time.

For more information, refer to Cisco MDS Licensing Guide, Smart Licensing Using Policy:
https://www.cisco.com/c/en/us/td/docs/dcn/mds9000/sw/9x/configuration/licensing/cisco-mds-9000-nx-os-licensing-guide-9x/smart-licensing-using-policy.html?dtid=osscdc000283

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.

Standard Features

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. From Cisco DCNM, Release 11.5(1), the trial period is extended to 120 days and the number of licenses is 50. However, the trial period remains 60 days and the number of licenses remains 500 for inline upgrades. Customers must purchase the HPE SN6000C DCNM Switch E-LTU to continue to utilize the advanced DCNM features.

Notes: Starting from release 12.0.1a, DCNM is renamed as Nexus Dashboard Fabric Controller (NDFC). Read more at, **https://www.cisco.com/c/en/us/products/collateral/cloud-systems-management/prime-data-center-network-manager/san-innovation-ndfc-so.html**

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

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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 SN6600C SAN Insights 1-year/3-year/5-year term E-LTU (switch-based-license) or HPE C-series SN6610C/SN6620C Premier E-LTU 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 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 Services is not allowed/supported.

HPE C-series Advantage License (Subscription License: 1/3/5 yrs)

The HPE C-series Advantage License is a combination of Cisco Data Center Network Manager and Enterprise Package licenses. It comes with 1, 3, or 5 year terms and provisioned through Cisco Smart Licensing.

HPE C-series Premier License (Subscription License: 1/3/5 yrs)

The HPE C-series Advantage License is a combination of Cisco Data Center Network Manager, Enterprise Package and SAN Analytics licenses. It comes with 1, 3, or 5 year terms and provisioned through Cisco Smart Licensing.

Notes: NX-OS 9.2(2) is the minimum required version for C-series Advantage and Premier Licenses.

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.

HPE Services

No matter where you are in your transformation journey, you can count on HPE Services to deliver the expertise you need when, where and how you need it. From planning to deployment, ongoing operations and beyond, our experts can help you realize your digital ambitions.
https://www.hpe.com/services

Consulting services

No matter where you are in your journey to hybrid cloud, experts can help you map out your next steps. From determining what workloads should live where, to handling governance and compliance, to managing costs, our experts can help you optimize your operations.
https://www.hpe.com/services/consulting

HPE Managed Services

HPE runs your IT operations, providing services that monitor, operate, and optimize your infrastructure and applications, delivered consistently and globally to give you unified control and let you focus on innovation.
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Operational services

Optimize your entire IT environment and drive innovation. Manage day-to-day IT operational tasks while freeing up valuable time and resources. Meet service-level targets and business objectives with features designed to drive better business outcomes.
https://www.hpe.com/services/operational

Recommended Services

HPE Tech Care Service

HPE Tech Care Service is the operational support service experience for HPE products. The service goes beyond traditional support by providing access to product specific experts, an AI driven digital experience, and general technical guidance to not only reduce risk but constantly search for ways to do things better. HPE Tech Care Service delivers a customer-centric, AI driven, and digitally enabled customer experience to move your business forward. HPE Tech Care Service is available in three response levels. Basic, which provides 9x5 business hour availability and a 2-hour response time. Essential which provides a 15-minute response time 24x7 for most enterprise level customers, and Critical which includes a 6-hour repair commitment where available and outage management response for severity 1 incidents.

https://www.hpe.com/services/techcare

HPE Complete Care Service

HPE Complete Care Service is a modular, edge-to-cloud IT environment service designed to help optimize your entire IT environment and achieve agreed upon IT outcomes and business goals through a personalized experience. All delivered by an assigned team of HPE Services experts. HPE Complete Care Service provides:

- A complete coverage approach -- edge to cloud
- An assigned HPE team
- Modular and fully personalized engagement
- Enhanced Incident Management experience with priority access
- Digitally enabled and AI driven customer experience

https://www.hpe.com/services/completecare

Service and Support

Other related services from HPE Services

HPE Lifecycle Services

HPE Lifecycle Services provide a variety of options to help maintain your HPE systems and solutions at all stages of the product lifecycle. A few popular examples include:

- Lifecycle Install and Startup Services: Various levels for physical installation and power on, remote access setup, installation and startup, and enhanced installation services with the operating system.
- HPE Firmware Update Analysis Service: Recommendations for firmware revision levels for selected HPE products, taking into account the relevant revision dependencies within your IT environment.
- HPE Firmware Update Implementation Service: Implementation of firmware updates for selected HPE server, storage, and solution products, taking into account the relevant revision dependencies within your IT environment.
- Implementation assistance services: Highly trained technical service specialists to assist you with a variety of activities, ranging from design, implementation, and platform deployment to consolidation, migration, project management, and onsite technical forums.
- HPE Service Credits: Access to prepaid services for flexibility to choose from a variety of specialized service activities, including assessments, performance maintenance reviews, firmware management, professional services, and operational best practices.

https://www.hpe.com/services/lifecycle

- For a list of the most frequently purchased services using service credits, see the **HPE Service Credits Menu**

HPE SAN Deployment Service

Hewlett Packard Enterprise delivers complete design and implementation services for Fibre Channel, FCoE, FCIP, SAS, and iSCSI SAN connectivity components.

Learn more: **https://www.hpe.com/psnow/doc/5981-8527enw?jumpid=in_lit-psnow-red**

HPE 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.

Learn more: **https://h20195.www2.hpe.com/v2/Getdocument.aspx?docname=5981-9356enw**

HPE Education Services

Training and certification designed for IT and business professionals across all industries. Broad catalogue of course offerings to expand skills and proficiencies in topics ranging from cloud and cybersecurity to AI and DevOps. Create learning paths to expand proficiency in a specific subject. Schedule training in a way that works best for your business with flexible continuous learning options.

https://www.hpe.com/services/training

Defective Media Retention

An option available with HPE Complete Care Service and HPE Tech Care Service and applies only to Disk or eligible SSD/Flash Drives replaced by HPE due to malfunction.

Consult your HPE Sales Representative or Authorized Channel Partner of choice for any additional questions and services options.

Service and Support

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 QuickSpecs, or the technical product data sheet will not be provided, repaired, or replaced as part of these services.

How to purchase services

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 services at **https://ssc.hpe.com/portal/site/ssc/**

AI Powered and Digitally Enabled Support Experience

Achieve faster time to resolution with access to product-specific resources and expertise through a digital and data driven customer experience.

Sign into the HPE Support Center experience, featuring streamlined self-serve case creation and management capabilities with inline knowledge recommendations. You will also find personalized task alerts and powerful troubleshooting support through an intelligent virtual agent with seamless transition when needed to a live support agent.

https://support.hpe.com/hpesc/public/home/signin

Consume IT on your terms

HPE GreenLake edge-to-cloud platform brings the cloud experience directly to your apps and data wherever they are—the edge, colocations, or your data center. It delivers cloud services for on-premises IT infrastructure specifically tailored to your most demanding workloads. With a pay-per-use, scalable, point-and-click self-service experience that is managed for you, HPE GreenLake edge-to-cloud platform accelerates digital transformation in a distributed, edge-to-cloud world.

- Get faster time to market
- Save on TCO, align costs to business
- Scale quickly, meet unpredictable demand
- Simplify IT operations across your data centers and clouds

To learn more about HPE 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**

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

Configuration Information

The SN6610C switch comes in five preconfigured models of 8-ports with eight (8) 16 Gb SFPs bundled, 8-ports with eight (8) 32Gb SFPs bundled, 24-ports with twenty-four (24) 16Gb SFPs bundled, 24-ports with twenty-four (24) 32Gb SFPs bundled, or 8-ports with four(4) 16Gb SFPs and four (4) 32Gb 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 Configurations

HPE SN6610C 32Gb 8-port 16Gb Short Wave SFP+ Fibre Channel Switch

Description	SKU
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 32/8 32Gb Short Wave SFP+ Fibre Channel v2 Switch*	Q9D35B*
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
HPE SN6610C 8-port 16/32Gb SFP+ DCNM SAN Insights Switch	R7L02A

Notes: This is a bundled 32Gb FC switch that has 4x16Gb and 4x32Gb optics, 1-year DCNM term license and 1-year SAN Insights term license included. Customers must purchase 2 units to gain the performance insights so they can more effectively manage their SAN. After the 1-year term expires, customers must purchase DCNM E-LTU (R4F89AAE) and SAN Insights (R5Z90AAE or R4F92AAE or R5Z91AAE) licenses or SN6610C/SN6620C Premier E-LTU to continue to use the DCNM/SAN Insights features.

HPE SN6610C 32Gb 32/24 32Gb Short Wave SFP+ Fibre Channel Switch	S1R84A
HPE SN6610C 32Gb 32/24 32Gb Short Wave SFP+ Fibre Channel v2 Switch*	S1R84B*

Notes:

- To order factory integration, add OD1 after the part number on your sales order
- *These part numbers include built-in discounts. No additional cost relief available.

Step 2 - Optional Software

On Demand Port Activation License

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

Management Software

HPE SN6000C Advantage 1-year E-LTU	R9N32AAE
HPE SN6000C Advantage 3-year E-LTU	R9N36AAE
HPE SN6000C Advantage 5-year E-LTU	R9N40AAE

Notes: Advantage license is a combination of Nexus Dashboard Fabric Controller (Data Center Network Manager) and Enterprise Package

HPE SN6610C/SN6620C Premier 1-year E-LTU	R9N44AAE
HPE SN6610C/SN6620C Premier 3-year E-LTU	R9N47AAE
HPE SN6610C/SN6620C Premier 5-year E-LTU	R9N50AAE

Notes: Premier license is a combination of Nexus Dashboard Fabric Controller (Data Center Network Manager), Enterprise Package and SAN Analytics

Configuration Information

Description	SKU
HPE SN6000C DCNM Switch E-LTU	R4F89AAE
HPE SN6000C Enterprise Package E-LTU	A7515AAE
HPE SN6600C SAN Insights 1-year E-LTU	R5Z90AAE
HPE SN6600C SAN Insights 3-year E-LTU	R4F92AAE
HPE SN6600C SAN Insights 5-year E-LTU	R5Z91AAE

Step 3 – Options

Select each required option with quantities specified:

32Gb FC Transceivers*

Description	SKU
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

8Gb FC Transceivers

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 five SN6610C switch bundles available: one populated with 8 16Gb SFPs, one populated with 8 32Gb SFPs, one populated with 24 16Gb SFPs, and one populated with 24 32Gb SFPs. 32Gb Starter Kit comes with 4 16Gb SFPs and 4 32Gb 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

Configuration Information

Description	SKU
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 SN8700C 4-slot/8-slot/16-slot 16/32/64Gb FC Director	Multilayer Director	4-slot: 192 16/32/64 Gbps Fibre Channel ports 8-slot: 384 16/32/64 Gbps Fibre Channel ports 16-slot: 768 16/32/64 Gbps Fibre Channel ports	Four/Eight/Sixteen
HPE C-series SN6710C 64Gb Fabric Switch	Multilayer Fabric Switch	Twenty-four 64 Gbps Fibre Channel ports	One fixed
HPE C-series SN6720C 64Gb Fabric Switch	Multilayer Fabric Switch	Forty-eight 64 Gbps Fibre Channel ports	One fixed
HPE C-series SN6640C 32Gb Multi-service Switch	Multilayer Fabric Switch	Up to 12 32-Gbps Fibre Channel ports, four 1/10-, two 25-, and one 40- Ethernet IP storage services ports	One fixed
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

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

Technical Specifications

Security

- VSANs
- FC-SP for host-to-switch and switch-to-switch authentication
- Secure FTP (SFTP)
- Port security
- Control-plane security
- Management access
  - SSHv2
  - SNMPv3
  - IP ACLs

Compatibility

Fibre Channel protocols

- FC-PH, Revision 4.3 (ANSI INCITS 230-1994)
- FC-PH, Amendment 1 (ANSI INCITS 230-1994/AM1-1996)
- FC-PH, Amendment 2 (ANSI INCITS 230-1994/AM2-1999)
- FC-PH-2, Revision 7.4 (ANSI INCITS 297-1997)
- FC-PH-3, Revision 9.4 (ANSI INCITS 303-1998)
- FC-PI, Revision 13 (ANSI INCITS 352-2002)
- FC-PI-2, Revision 10 (ANSI INCITS 404-2006)
- FC-PI-3, Revision 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)

Technical Specifications

- 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-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 SN6000C Enterprise Package license, HPE C-series SN6000C Advantage License, or HPE C-series SN6610C/SN6620C Premier License to be activated.

- NPIV
- VSAN
- PortChannels
- NPV mode
- 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 Health Management System (OHMS) diagnostics
- Internal loopbacks
- Fibre Channel traceroute
- Fibre Channel ping
- Fibre Channel debug
- Cisco Fabric Analyzer
- Syslog
- Port-level statistics
- SPAN
- Power-on-Self-Test 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
  - Command Line Interface (CLI) using the console and Ethernet port
  - SNMPv3 using the Ethernet port and in-band IP over Fibre Channel access
  - NX-API
- Security
  - Per-VSAN RBAC using LDAP, RADIUS, and TACACS+-based AAA functionsVSAN-based roles
  - SSHv2 implementing AES
  - SNMPv3 implementing AES
  - Simple File Transfer Protocol (SFTP)

Management Applications

- 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, HPE C-series SN6000C Advantage License, or HPE C-series SN6610C/SN6620C Premier License)
- C-series Nexus Dashboard Fabric Controller (optional; requires license which includes Nexus Dashboard Fabric Controller features)

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/Link Cable 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
- 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
- CAN/CSA-C22.2 No. 60950
- EN 60950
- IEC 60950
- 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
13-Nov-2023	Version 16	Changed	HPE Services Rebranding
02-Oct-2023	Version 15	Changed	HPE Re-branding - Series name and HPE Services information updated
05-Jun-2023	Version 14	Changed	Overview, Standard Features, Service and Support, Configuration Information and Technical Specifications sections were updated. Added Volume Program PNs Added 64Gb Switch references updates
04-Apr-2022	Version 13	Changed	Added NDFC and Subscription licenses
04-Oct-2021	Version 12	Changed	Service and Support section was updated Obso SKU was removed
02-Aug-2021	Version 11	Changed	Service and Support section was updated.
01-Mar-2021	Version 10	Changed	Added 32Gb Starter Kit information
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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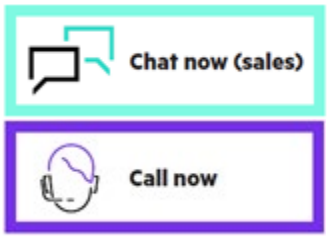

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