

Overview

HPE Storage Fibre Channel Switch B-series SN6650B

As enterprises respond to the digital transformation, data centers are under pressure to deliver greater performance, agility and operational efficiency to address exponential data growth and dynamic business demands. To gain the performance required, organizations are transitioning to all-flash data storage in their data center, which requires a modern storage network that can keep pace with innovations in compute and storage resources. By modernizing the SAN, organizations will be able to maximize productivity and increase the efficiency of their storage investments and futureproof them for emerging protocols like NVMe as well as slower FC speeds at the same time, even as they rapidly scale their environments. Moreover, the addition of automation 32Gb technology to Fibre Channel will transform SAN management by simplifying operations and freeing up resources to focus on business optimization and revenue opportunities. The HPE Storage Fibre Channel Switch B-series SN6650B 32Gb FC Switch provides the tools to optimize NVMe storage and automate SAN management tasks. It's a high-port density building block with 128 Fibre Channel ports increasing scale with 33% more connectivity at greater speeds up to 4 Tbps total system bandwidth for data center consolidation and the most demanding all flash workloads. New automation capabilities enable DevOps resources to automate operations to increase productivity with simple and open automation through open APIs and the Ansible automation engine. Enterprises can automate repetitive tasks and deliver consistent performance by eliminating human error. The NVMe-ready switch drives innovation by allowing organizations to seamlessly integrate with next-generation flash storage without a disruptive rip-and-replace. The HPE Storage Fibre Channel Switch B-series SN6650B enables new insight into NVMe storage fabrics with modern I/O traffic visibility to increase the efficiency of the SAN.

The HPE Storage Fibre Channel Switch B-series SN6650B is available in the following models:

- HPE SN6650B 32Gb 128/96 Power Pack+ 96-port 32Gb Short Wave SFP+ Integrated FC Switch
- HPE SN6650B 32Gb 128/48 48-port 32Gb Short Wave SFP+ Integrated Fibre Channel Switch

HPE Power Pack+ software provides the SAN administrator with the necessary tools to monitor the health and performance of the network, while also ensuring the highest levels of security, scalability and manageability. HPE Power Pack+ software includes additional software: Fabric Vision, ISL Trunking, and Extended Fabric.



HPE Storage Fibre Channel Switch B-series SN6650B

Overview

What's New

- The Q9V95C and Q9V96C products are now bundled with Secure optics
- Added HPE SANnav Management Software with 1-year, 3-years and 5-years term-license
- Updated product SKU (suffix rolled over from A to B)

Models

HPE Storage Fibre Channel Switch B-series SN6650B 32Gb FC Switch	
Description	SKU
HPE SN6650B 32Gb 128/48 48-port 32Gb Short Wave SFP+ Integrated Fibre Channel Switch	Q9V95C
HPE SN6650B 32Gb 128/96 Power Pack+ 96-port 32Gb Short Wave SFP+ Integrated Fibre Channel Switch	Q9V96C

Notes: The references to SFP+ in the description is intended to identify switches bundled with optics. The 32Gb optics are also referred to as SFP28 optics, referencing the industry standard for 32Gb optics.

Standard Features

Key Features and Benefits

- Simple and elegant scalability: Provides industry-leading port density with 128 FC ports in a compact 2U form factor for greater scalability while optimizing space utilization. With ninety-six 32Gb SFP+ ports and eight 4x32Gb Q-Flex ports, data centers can scale 48-128 ports with this compact design to deliver more connectivity with fewer switches.
- Features Ports on Demand (PoD) capabilities for fast, easy, and cost-effective scaling from 48 to 128 ports. PoDs are available in 24-port increments scaling up to 96 ports along with a 32-port QSFP PoD or PoD Kit for full 128 port support. PoD upgrades are available in 24-port upgrade kits, including both the license and 24 optics under one part number or the PoD licenses and optics can be purchased separately.
- Flexible, high-speed connectivity: QSFP ports offer ISL and devices connectivity with industry-leading 128Gb or 32Gb speeds. These ports are designed to support single QSFP or fan out to 4 standard SFP+ connections, enabling administrators to simplify cabling infrastructure.
- Handle more workloads faster: Handles more workloads faster with up to 4.096 Tbps total system bandwidth for high intensity mission-critical workloads while providing low-latency for flash and NVMe storage and 2X the speed of 16Gbps FC with high speed data reliability using forward error correction (FEC).
- Accelerate deployment and configuration times by automating management procedures: Available with New automation tools simplify and automate operations to increase productivity with open automation enabling DevOps resources to automate and orchestrate SAN resources through open APIs and the Ansible automation engine. Repetitive and time consuming configuration tasks are simplified reducing human error by automating management operations.
- Predefined, pretested templates: Leverages a library of templates and scripts for integration into third party tools. REST APIs and a library of pre-tested operational scripts reduce command errors and help deploy applications faster.
- Simplify operations by enabling visibility across the entire infrastructure: Provides operational consistency across diverse fabrics and VM applications using powerful ASIC data collection and Fabric Vision tools to provide deep visibility and actionable insights to ensure operational efficiency and data reliability.
- Optimize performance and ensure reliability with enhanced monitoring for NVMe: New NVMe over Fibre Channel enhanced monitoring offers integrated non-intrusive, real-time monitoring and alerting for network performance. This proactive monitoring of the health and performance of NVMe traffic and virtual machines provides deep diagnostics and visibility to maintain optimal network health and performance.
- Integrate NVMe ready solutions without a rip and replace: Integrates NVMe ready solutions without a rip and replace. By leveraging the efficiency of NVMe, combined with the high performance and low latency of 32Gb Fibre Channel, enterprises can accelerate IOPS to deliver the performance, application response time, and scale needed for next-generation data centers while making the transition NVMe seamless.
- Simplified low risk migration of SCSI based storage to NVMe storage: Provides an elegant coexistence strategy for existing SCSI-based FC SANs and NVMe storage. Allowing enterprises to facilitate a simplified and gradual SCSI data migration path to NVMe FC as business demands it.

SN6650B 32Gb FC Switch*

- Provides the tools to optimize NVMe storage and automate SAN management tasks
- It is a high port density building block with a management platform designed to support application, data, and storage growth with 33% more port capacity than the HPE SN6500B 16Gb FC switch
- Delivers 48, 72, 80, 96, 104 or 128-ports in a 2U enclosure
- As an NVMe-ready switch, the SN6650B allows organizations to seamlessly integrate HPE B-series 32GbFibre Channel networks with the next generation of flash storage
- Features Integrated network sensors for advanced monitoring of NVMe workloads, helping to ensure optimal performance.
- Delivers new automation capabilities that enable DevOps resources to automate and orchestrate SAN

Standard Features

resources through open APIs and the Ansible automation engine

Notes: *32 Gbps performance can be obtained between two 32 Gbps capable devices.

Configuration Support

<https://support.hpe.com/hpsc/doc/public/display?docId=c00403562>

High-availability features

- Two integrated power supplies (2 total for 1+1 redundancy) and three fans (3 total for 2+1 redundancy)
 - Forward Error Correction (FEC): Enables recovery from bit errors in a data stream, enhancing transmission reliability and performance and FEC is mandatory in 32Gb links with more robust error recovery to support 32Gb performance
 - Enhanced Fault Detection Logic
 - Parity protection on all data paths and system memory
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Advanced Fabric Services

- Hardware Enforced Zoning
 - Frame Filtering
 - Built-in Web browser management tools
 - In-flight Compression
 - Dynamic and System Monitoring Capabilities for High Reliability
 - Virtual Fabrics
-

Cabinet Support

HPE (22U, 36U, and 42U) 10000 G2 Series, the Intelligent Series racks, and HPE (14U, 22U, 36U, 42U, and 47U) 11000 G2 Series racks, HPE G2 Advanced Series Racks & HPE G2 Enterprise Series Racks.

Notes: To order factory integration, add #0D1 after the part number on your sales order.

Software Components, Standard, Base Models

Frame Filtering

An ASIC based capability that enables new applications and features. The switch has the ability to "view" the first 64 bytes of the Fibre Channel frame. At this time, Frame Filtering enables advanced capabilities such as Advanced Zoning.

Advanced Zoning

WWN Zoning and Access Control are enforced by hardware that provides the same simple administration previously enforced only with software. Administrators can organize a physical fabric into logical groups and prevent unauthorized access by devices outside the Zone.

Web Tools

Web Tools is an intuitive and easy-to-use graphical interface that enables organizations to monitor and manage SAN fabrics. Tasks can be performed through a Java-capable, or HTML5 (FOS 9.x and later), Web browser from a standard laptop, desktop PC or workstation from any location within the enterprise.

In-flight Compression

In-flight compression optimizes network performance within the data center and over long-distance links. Data is compressed at the source and uncompressed at the destination. Performance varies by data type, but generally achieve 2:1 compression with minimal impact on performance.

Adaptive Networking

Standard Features

Adaptive Networking (AN) is a family of technologies which allow flexible control of traffic movement within the fabric which deliver application aware management of fabric resources. Applications may be used with multiple protocols and multiple classes of service. It includes the following features:

- **Ingress Rate Limiting:**

Allows the ingress bandwidth of a port to be throttled to a rate lower than negotiated with the SAN node. This could be very useful for enterprises offering stepped levels of service and enforcing SLAs.

- **Quality of Service (QoS):**

Enables zones with high, medium, and low priorities within a fabric on a zone by zone basis. This can be very useful for prioritizing array replication over MANs and WANs over less critical traffic.

- **Traffic Isolation Zones:**

Defines paths through a fabric for some or all nodes. Failover allows a non-preferred path to be used if the preferred fails. TIZs use failover by default but it can be disabled if traffic should stop if a preferred path fails. TIZ can be used to manually map out traffic flows within a fabric based on application, priority, and topology.

Software Components, Optional

SN6650B 32Gb Switch Power Pack+ Software Bundle

HPE Power Pack+ software provides the SAN administrator with the necessary tools to monitor the health and performance of the network, while also ensuring the highest levels of security, scalability and manageability. It is available pre-bundled with

HPE SN6650B 32Gb 128/96 Power Pack+ 96-port 32Gb Short Wave Q9V96B SFP+ Integrated FC Switch
HPE PowerPack+ Software includes the following- Fabric Vision, Extended Fabric, ISL Trunking

Notes: The customers can purchase it separately as optional software (Q9N41B/ Q9N41BAE).

Fabric Vision

Fabric Vision technology provides a breakthrough hardware and software solution that helps simplify that helps simplify monitoring, availability, increase operational stability, and dramatically reduce costs.

Featuring innovative monitoring, management, and diagnostic capabilities, Fabric Vision technology enables administrators to avoid problems before they impact operations, helping their organizations meet SLAs. Fabric Vision Includes:

- **Dashboards:** Provides integrated dashboards that display an overall SAN health view, along with details on out-of-range conditions, to help administrators easily identify trends and quickly pinpoint issues occurring on a switch or in a fabric.
- **IO Insight:** proactively monitors IO performance and behavior through integrated network sensors, providing deep insight into problems and helping to ensure service levels. This capability non-disruptively and non-intrusively gathers IO statistics from any device port, then feeds them to a monitoring policy that sets thresholds and generates alerts.
- **VM Insight:** This software applies IO Insight visibility for each Virtual Machine (VM). Integrated VM, application & device-level IO latency and IOPS monitoring enables administrators to set the baseline for application performance and identify the VM or physical layer responsible for the degraded performance.
- **Monitoring and Alerting Policy Suite (MAPS):** Simplifies fabric-wide threshold configuration, monitoring, and alerting with pre-built, rule- or policy-based templates. Administrators can configure the entire fabric (or multiple fabrics) at one time using common rules and policies, or customize policies for specific ports or switch elements. In addition, administrators can use IO Insight metrics to set thresholds in MAPS policies in order to be notified of application, VM, and storage IO performance degradation.
- **Fabric Performance Impact (FPI) Monitoring:** Leverages predefined MAPS policies to automatically

Standard Features

detect and alert administrators to different latency severity levels, and to identify slow drain devices that could impact network performance. This feature identifies various latency severity levels, pinpointing exactly which devices are causing or are impacted by a bottlenecked port, and quarantines slow drain devices automatically to prevent buffer credit starvation.

- Configuration and Operational Monitoring Policy Automation Services Suite (COMPASS): Simplifies deployment, safeguards consistency, and increases operational efficiencies of larger environments with automated switch and fabric configuration services. Administrators can configure a template or adopt an existing configuration to seamlessly deploy a configuration across the fabric.
 - ClearLink Diagnostics: Ensures optical and signal integrity for Fibre Channel optics and cables, simplifying deployment and support of high-performance fabrics. ClearLink Diagnostic Port (D_Port) is an advanced capability of Fibre Channel platforms.
 - Flow Vision: A comprehensive tool that enables administrators to identify, monitor, and analyze specific application data flows in order to simplify troubleshooting, maximize performance and avoid congestion without using taps to ensure optimized performance:
 - **Flow Monitor:** Provides comprehensive visibility, automatic learning, and non-disruptive monitoring of a flow's performance. Administrators can monitor all flows from a specific host to multiple targets or volumes, from multiple hosts to a specific target/volume, or across a specific ISL. Additionally, they can perform volume-level monitoring of specific frame types to identify resource contention or congestion that is impacting application performance. With the IO Insight capability, administrators can monitor first IO response time, IO completion time, the number of pending IOs, and IOPS metrics for a flow from a specific host to a target or volume running SCSI or NVMe over Fibre Channel traffic. With VM Insight, administrators can monitor network throughput and IO statistics for each VM.
 - **Flow Learning:** Enables administrators to non-disruptively discover all flows that go to or come from a specific host port or a storage port, or traverse ISLs/IFLs or FCIP tunnels, to monitor fabric-wide application performance. In addition, administrators can discover top and bottom bandwidth-consuming devices and manage capacity planning.
 - **Flow Generator:** Provides a built-in traffic generator for pretesting and validating the data center infrastructure for robustness-including route verification and integrity of optics, cables, ports, back-end connections, and ISLs-before deploying applications.
 - **Flow Mirroring:** Enables administrators to non-disruptively create copies of specific application and data flows or frame types that can be captured for in-depth analysis.
 - Credit Loss Recovery: Automatically detects and recovers buffer credit loss at the Virtual Channel (VC) level, providing protection against performance degradation and enhancing application availability.
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Extended Fabric

Optional license which extends all of the scalability, reliability, and performance benefits of Fibre Channel Storage Area Networks (SANs) beyond the native 10 km distance specified by the Fibre Channel standard.

ISL Trunking

For high performance enhanced Trunking, this optional license logically groups up to eight 32 Gbps SFP+ ports per ISL trunk or up to two 128 Gbps QSFP ports per ISL trunk to provide a high bandwidth trunk between two switches. Each 32Gb switch needs its own license. The switch operating system views the trunk as a single, high bandwidth resource (up to 256Gb) when routing connections between 32Gb switches. Connections are load-balanced across the individual links, which comprise the logical trunk group.

Integrated Routing

Integrated Routing is an optional license which provides native Fibre Channel Routing (FCR) on a per-port basis, rather than limiting routing ports to those on a dedicated routing switch or blade. Just like traditional FCR, Integrated Routing uses EX_Ports to import/export devices between fabrics, enabling selective device

Standard Features

sharing while maintaining remote fabric isolation. Integrated Routing provides architecture flexibility to route on a port-by-port basis, enabling increased scalability and fault isolation.

HPE SANnav Management Software

HPE SANnav Management Software is the next-generation SAN management application suite for HPE B-series SAN environments. It consists of SANnav Management Portal Software and SANnav Global View Software:

- SANnav Management Portal is a next-generation SAN management application with a simple browser-based user interface (UI) streamlining common workflows, such as configuration, zoning, deployment, troubleshooting, and reporting.
- SANnav Global View helps administrators visualize the health, performance and inventory of multiple SANnav Management Portal instances at data centers across the globe or a single multi-tenant data center using a simple, intelligent dashboard. SANnav Management Portal and SANnav Global View not only transform SAN telemetry data into useful insights, such as health and performance scores, but also enable administrators to quickly associate real-time data with historical metrics and logs for in-depth analysis. This can help with spotting trends, establishing baselines, and identifying any behavioral changes over time.

HPE SANnav Management Software is available as a term-license for 1-year, 3-years and 5-years period as both - physical and electronic License-to-Use (LTU). It supports 8Gb, 16Gb and 32Gb FC Switches and Directors.

HPE Smart SAN for 3PAR

HPE Smart SAN for 3PAR, which is included with HPE 3PAR All-inclusive software and is optionally available for 3PAR systems without All-inclusive software. Smart SAN for 3PAR simplifies and automates traditional error-prone and tedious SAN zoning and host provisioning to just a few clicks or complex zoning configurations in minutes orchestrated from 3PAR. This allows a storage administrator to zone and provision the SAN with little or no FC expertise. It is an application embedded in SAN components (array, hosts and switches) that enables 3PAR arrays to orchestrate configuration, settings and policies across the SAN. Smart SAN is supported with HPE B-series Switches, Fibre Channel adapters (HBAs) and 3PAR storage. HPE Smart SAN for 3PAR through takes advantage of Fibre Channel Industry Association (FCIA) T11 standards Peer Zoning and uses Target Driven Peer Zoning (TDPZ) feature in Smart SAN which enables customers to automate peer zoning, resulting in the creation of fewer zones and enables configuration of zones in minutes and not in hours. Through automation, it reduces the probability of errors and potential downtime. Additional information can be found here:

<https://www.hpe.com/us/en/product-catalog/storage/storage-software/pip.hpe-smart-san-for-3par.8295863.html>

Notes:

- Supports B-series 32Gb, 16Gb and 8Gb FC switches with FOS 7.4.0a or later.
 - A list of supported HPE FC Adapters can be found at <http://www.hpe.com/storage/spock>
 - Supports 3PAR StoreServ storage with 3.2.2 or later with only 16Gb target ports on HPE 3PAR StoreServ storage.
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Service and Support

Warranty

(1-1-1) Hardware Warranty; 1-year parts; 1-year on-site (standard business hours, next business day response) and 1-year labor.

Notes:

- The hardware warranty covers firmware and embedded non-saleable software.
- Certain restrictions and exclusions apply. Consult the Customer Support Center for details. Hardware or Software product installation is not included in the warranty, but is available and highly recommended.

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>

SAN Fabric Integration and Migration service

HPE Data Storage Services - SAN Fabric Integration and Migration simplifies the introduction of and migration to new HPE B-series SAN fabric devices. It helps maximize the value of your investment in your new HPE B-series SAN fabric devices by leveraging HPE Services expertise and best practices.

<https://www.hpe.com/psnow/doc/a50011015enw>

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.

[HPE Managed Services | HPE](#)

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>

Service and Support

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/complecare>

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>

Service and Support

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.

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/>
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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

Step 1 - Base Configuration (Select one)

Description	SKU
HPE SN6650B 32Gb 128/48 48-port 32Gb Short Wave SFP+ Integrated Fibre Channel Switch	Q9V95C
Notes: <ul style="list-style-type: none">– 32Gb 128-port FC Switch with 48 active ports bundled with 48 32Gb SFP+ Secure optics; accessory kit (rackmount kit, enterprise safety and regulatory information, installation guide with rack-mounting instructions), power cords, serial cable, base software of Fabric OS, Advanced Web Tools and Advanced Zoning– Requires the use of Secure optics	
HPE SN6650B 32Gb 128/96 Power Pack+ 96-port 32Gb Short Wave SFP+ Integrated Fibre Channel Switch	Q9V96C
Notes: <ul style="list-style-type: none">– 32Gb 128-port FC Switch with 96 active ports bundled with 96 32Gb SFP+ Secure optics; accessory kit (Rackmount kit, enterprise safety and regulatory information, installation guide with rack-mounting instructions), power cords, serial cable, base software of Fabric OS, Advanced Web Tools, Advanced Zoning, and HPE Power Pack+ software of Fabric Vision, ISL Trunking and Extended Fabric– HPE B-series software licenses are available through the Electronic Delivery (E-Delivery) mechanism. The E-Delivery software licenses are functionally equivalent to the corresponding physical licenses. The E-Delivery version (ending with AE) is listed first and the physical version is second.– Requires the use of Secure optics	

Step 2 - Options

With the release of FOS 9.0 the SN6650B will have mixed optic support dependent on the model as outlined below:

- Support Secure optics ONLY:
 - Models: Q9V95C & Q9V96C
- Support Secure and Standard optics:
 - Models: Q2S18A/B, Q9V95A/B & Q9V96A/B

Fibre Channel Transceivers- Standard

Description	SKU
HPE B-series 4x32Gb 4-pack Short Wave QSFP Transceiver	Q2R28A
Notes: This QSFP requires minimum version of FOS 8.1.0a	
HPE B-series 4x32Gb 8-pack Short Wave QSFP Transceiver	Q2R29A
Notes: This QSFP requires minimum version of FOS 8.1.0a	
HPE B-series 16Gb SFP+ Short Wave Transceiver	QK724A
HPE B-series 4x16Gb SW QSFP+ 100m 16-pack Transceiver	H6Z76A
HPE B-series 4x16 Short Wave QSFP Transceiver	K2Q87A

Fibre Channel Transceivers - Secure

Description	SKU
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Configuration Information

HPE B-series 16Gb SFP+ Short Wave 1-pack Secure Transceiver	R6B10A
HPE B-series 16Gb SFP+ Short Wave 8-pack Secure Transceiver	R6W28A
HPE B-series 16Gb SFP+ Long Wave 10km 1-pack Secure Transceiver	R6B11A
HPE B-series 32Gb SFP28 Short Wave 1-pack Secure Transceiver	R6B12A
HPE B-series 32Gb SFP28 Short Wave 8-pack Secure Transceiver	R6W26A
HPE B-series 32Gb SFP28 Long Wave 10km 1-pack Secure Transceiver	R6B13A
HPE B-series 32Gb SFP Extended Long Wave 25km 1-pack Secure Transceiver	R7M17A

Fibre Channel Transceivers - Secure (cont.)

Description	SKU
HPE B-series 32Gb SFP28 Extended Long Wave 25km 1-pack Secure Transceiver	R9S31A
Notes: R9S31A is only supported on the Q9V95C & Q9V96C with a Minimum FOS version is 9.1.1. The R9S31A must be used on both ends of the cable.	
HPE B-series 10Gb SFP+ Short Wave 1-pack Secure Transceiver	R6B14A
HPE B-series 10Gb SFP+ Long Wave 10km 1-pack Secure Transceiver	R6B15A
HPE B-series 4x32Gb QSFP28 Short Wave 100m 1-pack Secure Transceiver	R6B20A
HPE B-series 16Gb SFP+ Extended Long Wave 25km 1-pack Secure Transceiver	R6B21A
Notes: The switch supports Smartoptics. For more information regarding Smartoptics reference Brocade Fabric OS Open Systems Compatibility Matrix	

Accessories

HPE B-series 4G USB Drive	N9Y63A
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Optical Cables

Performance			
Distance - Maximum	HPE Standard OM3 Cable	HPE PremierFlex OM3+ Cable	HPE PremierFlex OM4 Cable
32Gb Performance:	70 meters	70 meters	100 meters
16Gb performance:	100 meters	100 meters	125 meters

HPE Premier Flex 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 Premier Flex OM4 QSFP Fiber Optic Cables

HPE Premier Flex MPO/MPO Multi-mode OM4 12 Fiber 1m Cable	Q1H63A
HPE Premier Flex MPO/MPO Multi-mode OM4 12 Fiber 2m Cable	Q1H64A
HPE Premier Flex MPO/MPO Multi-mode OM4 12 Fiber 5m Cable	Q1H65A
HPE Premier Flex MPO/MPO Multi-mode OM4 12 Fiber 10m Cable	QK729A
HPE Premier Flex MPO/MPO Multi-mode OM4 12 Fiber 15m Cable	Q1H66A
HPE Premier Flex MPO/MPO Multi-mode OM4 12 Fiber 30m Cable	Q1H67A

Configuration Information

HPE Premier Flex MPO/MPO Multi-mode OM4 8 Fiber 50m Cable	QK731A
HPE Premier Flex MPO/MPO OM4 100m Cable	H6Z30A

HPE QSFP to 4xLC Breakout Cables

HPE Multi Fiber Push On to 4 x Lucent Connector 5m Cable	K2Q46A
HPE Multi Fiber Push On to 4 x Lucent Connector 15m Cable	K2Q47A
HPE Premier Flex MPO to 4xLC 30m Cbl	Q1H68A
HPE Premier Flex MPO to 4 x Lucent Connector 50m Cable	Q1H69A

HPE OM3 LC-LC Optical Cables

Description	SKU
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

Port on Demand (Pod) Kits

HPE SN6650B 32Gb 24-port Short Wave SFP28 Fibre Channel Upgrade License with Transceiver Kit	R7M11A
HPE SN6650B 4x32Gb 32-port Short Wave QSFP28 Fibre Channel Upgrade License with Transceiver Kit	R9S33A

Notes: The above PoD Kits are available as a physical upgrade package only; these are not available as an e-license because they include the optics. PoD Kits include Secure optics.

Step 3 - Optional Software

Notes:

- For Fabric OS (FOS) minimum requirements, please refer to: <https://h20272.www2.hpe.com/spock/>
- HPE B-series software licenses are available through the Electronic Delivery (E-Delivery) mechanism. The E-Delivery software licenses are functionally equivalent to the corresponding physical licenses. The E-Delivery version (ending with AE) is listed first and the physical version is second.

Software for SN6650B 32Gb FC Switch

Description	SKU
HPE SN6650B 32-port QSFP28 Upgrade E-LTU	Q9N40AAE
Notes: (Physical License - Q9N40A)	
32-port upgrade license to activate QSFP ports for HPE SN6650B 32Gb 128/48 Fibre Channel Switch (Q2S18B), HPE SN6650B 32Gb 128/48 48-port 32Gb Short Wave SFP+ Integrated Fibre Channel Switch (Q9V95B and Q9V95C) and HPE SN6650B 32Gb 128/96 Power Pack+ 96-port 32Gb Short Wave SFP+ Integrated FC Switch (Q9V96B and Q9V96C)	
HPE SN6650B Power Pack+ Upgrade E-LTU	Q9N41BAE

Configuration Information

Notes:

- (Physical License - Q9N41B)
 - The Power Pack+ Software Bundle kit includes Fabric Vision, , ISL Trunking, and Extended Fabric.
- | | |
|--------------------------------------|----------|
| HPE SN6650B Integrated Routing E-LTU | Q9N42BAE |
|--------------------------------------|----------|

Notes: (Physical License - Q9N42B)

SANnav Software Licenses:

- Notes: For users purchasing SANnav licenses for the first time, one of the following SKUs should be purchased. For users wanted to renew a SANnav license, a renewal license should be selected from the SANnav Renewal Software License in the next section.
- | | |
|---|----------|
| HPE SANnav Management Portal Base 1yr E-LTU | R3P45AAE |
| HPE SANnav Management Portal Enterprise 1yr E-LTU | R3P46AAE |

Description	SKU
HPE SANnav Global View 1yr E-LTU	R3P47AAE
HPE SANnav Management Portal Base 3yr E-LTU	R3P48AAE
HPE SANnav Management Portal Enterprise 3yr E-LTU	R3P49AAE
HPE SANnav Global View 3yr E-LTU	R3P50AAE
HPE SANnav Management Portal Base 5yr E-LTU	R4P29AAE
HPE SANnav Management Portal Enterprise 5yr E-LTU	R4P30AAE
HPE SANnav Global View 5yr E-LTU	R4P31AAE

Notes:

- The Base edition of HPE SANnav Management Portal does not support management of director class switches.
- HPE SANnav Management Software License-to-Use (LTU/E-LTU) includes maintenance and support for the duration of the license. At the end of the license period, customers have the option to renew the license, maintaining the same license key, by selecting from the SANnav Renewal Software License section below Software renewal via HPE Services is not allowed/supported.
- Trial Licenses: depending on the version of SANnav license, the trial period is different.
 - o 90-day trial license available with all SANnav releases through v2.2.0
 - o 30-day trial license available with SANnav v2.2.1 and v2.2.2
 - o No trial license available with SANnav v2.3.0 or later

SANnav Renewal Software Licenses

- Notes: For users who currently have a SANnav license and want to renew their software license, one of the following licenses should be selected. The SANnav license must align with the current type of software license i.e. in order to renew a Base license, the Base renewal licenses will need to be selected.
- | | |
|--|----------|
| HPE SANnav Management Portal Base 1-year Renewal E-LTU | S1S52AAE |
| HPE SANnav Management Portal Enterprise 1-year Renewal E-LTU | S1S55AAE |
| HPE SANnav Global View 1-year Renewal E-LTU | S1S58AAE |

Notes:

Configuration Information

- The Base edition of HPE SANnav Management Portal does not support management of director class switches.
 - HPE SANnav Management Software License-to-Use (LTU/E-LTU) includes maintenance and support for the duration of the license.
 - Trial Licenses - depending on the version of SANnav license, the trial period is different.
 - o 90-day trial license available with all SANnav releases through v2.2.0
 - o 30-day trial license available with SANnav v2.2.1 and v2.2.2
 - o No trial license available with SANnav v2.3.0 or later
-

Technical Specifications

Family Information

Features	SN3000B 16 Gb FC Switch	SN3600B 32 Gb FC Switch	SN6000B 16Gb FC Switch and SN6000B 16Gb FC Power Pack+
Targeted Environment	Workgroups, Departments	Workgroups, Departments	Workgroups, Departments
Fibre Channel Port Bandwidth	16 Gbps	32 Gbps	16Gbps
Aggregate device bandwidth	384 - 768 Gb full duplex	768 Gb end-to-end full duplex	384- 768 Gb
OS Support	Notes: Please Refer to SPOCK https://www.hpe.com/storage/spock		
Storage system support	Primera, Nimble, 3PAR StoreServ, StoreVirtual , P9500/XP7, MSA		
FC Ports	12 or 24 enabled 24 Max	8 or 24 Enabled 24 Max	24 or 48 Enabled 48 Max
SFP	B-series	B-series	B-series
Advanced Trunking	Included with Power Pack+ Upgrade	Included with Power Pack+ or Optional Upgrade	Included with Power Pack+ or Optional Upgrade
Adaptive Networking	Included	Included	Included
Form factor	1U	1U	1U
Zoning Software	Yes (Included)	Yes (Included)	Yes (Included)
Hot plug, redundant power supplies	Optional	No	Yes
Hot plug fans	Yes (integrated with power supply)	Yes (integrated with power supply)	Yes (integrated with power supply)

Features	SN6600B 32Gb FC Switch and SN6600B 32Gb Power Pack+	SN6700B 64Gb FC Switch
Targeted Environment	Workgroups, Departments	Workgroups, Departments
Fibre Channel Port Bandwidth	32 Gbps	64Gb
Aggregate device bandwidth	2 Tbps	3.5 Tbps
OS Support	Notes: Please Refer to SPOCK https://www.hpe.com/storage/spock	
Storage system support	Primera, Nimble, 3PAR StoreServ, StoreVirtual , P9500/XP, MSA	
FC Ports	24 or 48 enabled 64 Max	24 Enabled 56 Max
SFP	B-series Optics (16Gb or 32Gb)	B-series Secure 24 32Gb SFP28 or 64Gb SFP56 included
Advanced Trunking	Included with Power Pack+ or Optional Upgrade	Included in Power Pack+ on all switches
Adaptive Networking	Included	Included
Form factor	1U	1U
Zoning Software	Yes (Included)	Yes (Included)
Hot plug, redundant power supplies	Yes	Yes
Hot plug fans	Yes (integrated with power supply)	Yes (integrated with power supply)

Technical Specifications

Features	1606 Extension SAN Switch	SN4000B SAN Extension Switch
Targeted Environment	Data Centers	Data Centers
Fibre Channel Port Bandwidth	8Gbps	16Gbps
Ethernet	1Gbps Ethernet	1/10/40Gbps Ethernet
OS Support	Notes: Please Refer to SPOCK https://www.hpe.com/storage/spock	
Storage system support	Primera, Nimble, 3PAR StoreServ, StoreVirtual , P9500/XP, MSA	
FC Ports	4 or 16 Enabled 16 Max	24 Enabled 24 Max
Ethernet Ports	2 or 6 Enabled 6 Max	16 ports 1/10GbE Enabled 16 Max 2 - 40GbE ports
SFP	B-series	B-series
Advanced Trunking	Included with Power Pack+ or Optional Upgrade	Included
Adaptive Networking	Included	Included
Form factor	1U	2U
Zoning Software	Yes (Included)	Yes (Included)
Hot plug, redundant power supplies	Yes	Yes
Hot plug fans	Yes	Yes

Features	SN8000B 8-Slot SAN Director Power Pack+	SN8600B 8-Slot SAN Director Power Pack+	SN8700B 8-Slot SAN Director Power Pack+
Targeted Environment	Cloud Optimized Data Centers	Cloud Optimized Data Centers	Cloud Optimized Data Centers
Port Bandwidth	Up to 16Gbps	Up to 32 Gbps	Up to 64Gbps
Aggregate device bandwidth	10.2Tbps	20.48 Tbps	31 Tbps
OS Support	Notes: Please Refer to SPOCK https://www.hpe.com/storage/spock		
Storage system support	Primera, Nimble, 3PAR StoreServ, StoreVirtual , P9500/XP, MSA		
Ports	Up to 512 SFP	512 32 Gbps ports or a 640-port equivalent with 128 Gbps (32 Gbps×4 QSFP ports)	512 ports - 384 device ports with a 64Gbps data rate plus 32 4x50Gbps ICLs or 640 ports - 512 device ports with a 32Gbps data rate plus 32 4x50Gbps ICLs
SFP	B-series	B-series	B-series Secure
Advanced Trunking	Included with Power Pack	Included with Power Pack	Included with Power Pack
Adaptive Networking	Included	Included	Yes (included)
Form factor	14U	14U	14U

Technical Specifications

Zoning Software	Yes (included)	Yes (included)	Yes (included)
Hot plug, redundant power supplies	Yes	Yes	Yes
Hot plug fans	Yes	Yes	Yes

Features	SN8000B 4-Slot SAN Director and 4-Slot SAN Director Power Pack+		
Targeted Environment	Cloud Optimized Data Centers	Cloud Optimized Data Centers	Cloud Optimized Data Centers
Port Bandwidth	Up to 16Gbps	Up to 32Gbps	Up to 64Gbps
Aggregate device bandwidth	5.1 Tbps	10.24 Tbps	15.5 Tbps
OS Support	Notes: Please Refer to SPOCK https://www.hpe.com/storage/spock		
Storage system support	Primera, Nimble, 3PAR StoreServ, StoreVirtual , P9500/XP, MSA		
Ports	Up to 256 SFP	Up to 256 32 Gbps ports or a 320-port equivalent with 16 ICL ports.	256 ports - 192 device ports with a 64Gbps data rate plus 16 4x50Gbps ICLs or 320 ports - 256 device ports with a 32Gbps data rate plus 16 4x50Gbps ICLs
SFP	B-series	B-Series	B-series Secure
Advanced Trunking	Included with Power Pack or Optional Upgrade	Included with Power Pack	Included with Power Pack
Adaptive Networking	Included	Included	Yes (included)
Form factor	9U	9U	9U
Zoning Software	Yes (included)	Yes (Included)	Yes (included)
Hot plug, redundant power supplies	Yes	Yes	Yes
Hot plug fans	Yes	Yes	Yes

Technical Specifications

Features	Brocade 16Gb SAN Switch for HPE c-Class BladeSystem	Brocade 8Gb SAN Switch for HPE c-Class BladeSystem	Brocade 16Gb Fibre Channel SAN Switch Module for HPE Synergy
Targeted Environment	Enterprise, Datacenters, Workgroups, Departments	Workgroups, Departments	Enterprise, Datacenters, Workgroups, Departments
Port Bandwidth	16 Gbps	8 Gbps	16 Gbps
Aggregate device bandwidth	448 Gbps	192 Gbps	576 Gbps
OS Support	Notes: Please Refer to SPOCK https://www.hpe.com/storage/spock		
Storage system Support	Primera, Nimble, 3PAR StoreServ, StoreVirtual , P9500/XP, MSA		
Ports	12 external /16 internal	4 or 8 external / 8 or 16 internal	8 SFP+ external, 4 QSFP external /12 internal
SFP	B-series	B-series	B-series
Advanced Trunking	Included with Power Pack+ or Optional Upgrade	Included with Power Pack+ or Optional Upgrade	Included with Power Pack+ or Optional Upgrade
Adaptive Networking	Included	Included	Included
Form factor	Embedded	Embedded	Embedded
Zoning Software	Yes (Included)	Yes (Included)	Yes (Included)
Hot plug, redundant power supplies	Yes, in BladeSystem Enclosure	Yes, in BladeSystem Enclosure	Yes, in Synergy Frame
Hot plug fans	Yes, in BladeSystem Enclosure	Yes, in BladeSystem Enclosure	Yes, in Synergy Frame

System Architecture

Fibre Channel ports	<p>96 SFP+ ports capable of operating at 4/8/10/16/32 Gbps Fibre Channel auto-sensing speeds; 8 QSFP ports capable of operating at 4x32 / 4x16 / 4x8 / 4x4 Gbps Fibre Channel speeds.</p> <p>Offers a base configuration of 48 ports, two 24-port SFP+ PoD (Ports on Demand), and one 32-port QSFP PoD. The switch has a total of eight 32 Gbps QSPF ports. This allows users to grow from 48 ports to 128 ports. Supports F/E/EX_Port and D_Port types on the SFP+ ports and only F/E/EX_Port and D_Port types on the QSFP ports.</p>
Scalability	Full fabric architecture with a maximum of 239 switches
Certified maximum	<p>Single fabric: 56 domains, 7 hops</p> <p>MPR fabric: 19 hops</p> <p>Refer to SAN Design Guide for current configuration information: https://www.hpe.com/storage/spock</p>
Interoperability	<ul style="list-style-type: none">8/8 SAN Switch8/24 SAN Switch1606 Extension SAN SwitchSN3000B Fibre Channel SwitchSN4000B SAN Extension SwitchSN6000B Fibre Channel SwitchSN6500B Fibre Channel Switch

Technical Specifications

	<ul style="list-style-type: none">• SN8000B 8-Slot SAN Backbone Director• SN8000B 4-Slot SAN Director• SN3600B Fibre Channel Switch• SN6600B Fibre Channel Switch• SN8600B 8-slot SAN Director• SN8600B 4-slot SAN Director• Brocade 8Gb SAN Switch for HPE BladeSystem c-Class• Brocade 16Gb SAN Switch for HPE BladeSystem c-Class• Brocade 16Gb Fibre Channel SAN Switch Module for HPE Synergy• Brocade 32Gb Fibre Channel SAN Switch Module for HPE Synergy• SN3600B Fibre Channel Switch• SN6600B Fibre Channel Switch• SN6650B Fibre Channel Switch• SN8700B 8-Slot SAN Director• SN8700B 4-Slot SAN Director• SN6700B Fibre Channel Switch
Performance	Fibre Channel: 4.25 Gbps line speed, full duplex; 8.5 Gbps line speed, full duplex; 10.53 Gbps line speed, full duplex; 14.025 Gbps line speed, full duplex; 28.05 Gbps, full duplex; 112.2 Gbps, full duplex; auto-sensing of 4/8/10/16/32 Gbps port speeds and capable of supporting 128 Gbps speeds; 10 Gbps optionally programmable to fixed port speed. Auto-sensing of 4x32 / 4x16 / 4x8 / 4x4 Gbps speeds on the QSFP ports.
ISL Trunking	Frame-based trunking with up to eight 32 Gbps connections between a pair of switches combined to form a single logical ISL with a speed of up to 256 Gbps (512 Gbps full duplex) per ISL trunk. Exchange-based load balancing across ISLs with DPS included in Fabric OS. On the QSFP ports 256 Gbps trunks are supported by trunking 2x (4x32 Gbps) QSFP ports.
Aggregate bandwidth	4 Tbps
Maximum Fabric latency	Latency for locally switched ports is < 780 ns (including FEC); compression is 1 µs per node
Maximum frame size	2112-byte payload
Frame buffers	15K frame buffers with dynamic buffer sharing capability across ports
Classes of service	Class 2, Class 3, Class F (Inter-switch frames)
Port types	D_Port (ClearLink Diagnostic Port), E_Port, EX_Port, F_Port, AE_Port, optional port-type control
Data traffic types	Fabric switches supporting unicast
Media types	<p>Hot-pluggable, industry-standard Small Form-Factor Pluggable Plus (SFP+), LC connector; Short-Wave Laser (SWL), Long-Wave Laser (LWL); Extended Long-Wave Laser (ELWL); distance depends on fiber optic cable and port speed. Supports SFP+ (32/16/8 Gbps), SFP+ (16/8/4 Gbps), SFP+ 10 Gbps optical transceivers, 4x32 Gbps QSFP SWL and 4x16 Gbps QSFP SWL optical transceivers.</p> <p>Notes: 32 Gbps ELWL is currently not supported with Fabric OS v8.2.0 but is planned for future support.</p>
USB	One USB port for system log file downloads or firmware upgrades
Fabric services	Monitoring and Alerting Policy Suite (MAPS); Flow Vision; Brocade Adaptive Networking (Ingress Rate Limiting, Traffic Isolation, QoS); Fabric Performance Impact (FPI) Monitoring; Slow Drain Device Quarantine (SDDQ); Brocade Advanced Zoning (default zoning, port/WWN zoning, broadcast zoning, peer zoning, target-driven zoning); Dynamic Path Selection (DPS); Brocade Extended Fabrics; Enhanced BB Credit Recovery; FDMI; Frame Redirection; Frame-based Trunking; FSPF; Integrated Routing; Brocade ISL Trunking; Management Server;

Technical Specifications

	NPIV; Time Server; Registered State Change Notification (RSCN); Reliable Commit Service (RCS); Simple Name Server (SNS); Virtual Fabrics (Logical Switch, Logical Fabric); Read Diagnostics Parameter (RDP)
Extension	Fibre Channel, in-flight compression (Brocade LZO) and encryption (AES-GCM-256); integrated optional 10 Gbps Fibre Channel for DWDM MAN connectivity
Management	
Management software supported	HTTPS/HTTP, SNMP v1/v3 (FE MIB, FC Management MIB), SSH; Auditing, Syslog; Brocade Advanced Web Tools; Network Advisor SAN Enterprise ; HPE SANnav Management Software, Command Line Interface (CLI); SMI-S compliant; trial licenses for add-on capabilities
Security	DH-CHAP (between switches and end devices), FCAP switch authentication; HTTPS, IPsec, IP filtering, LDAP with IPv6, OpenLDAP, Port Binding, RADIUS, TACACS+, user-defined Role-Based Access Control (RBAC), Secure Copy (SCP), Secure RPC, Secure Syslog, SFTP, SSH v2, SSL, Switch Binding, Trusted Switch. , Secure Boot., TLS v1.2/v1.3 The SN6650B Switch provides up to 12 in-flight encryption and compression ports
Management access	10/100/1000 Mbps Ethernet (RJ-45), serial port (RJ-45), and one USB port
Diagnostics	ClearLink optics and cable diagnostics, including electrical/optical loopback, link traffic/latency/distance; flow mirroring; built-in flow generator; POST and embedded online/offline diagnostics, including environmental monitoring, FCping and Pathinfo (FC traceroute), frame viewer, non-disruptive daemon restart, optics health monitoring, power monitoring, RAStracelogging, and Rolling Reboot Detection (RRD)
Mechanicals	
Enclosure	Back-to-front airflow; non-port-side intake; port-side exhaust; 2U
Size	Width: 44.0 cm (17.32 in.) Height: 8.67 cm (3.41 in.) Depth: 60.96 cm (24 in.)
System Weight	21.31 kg (47.00 lb) with two power supply FRUs, and three fan FRUs without transceivers
Environment	
Operating environment	Temperature: 0°C to 40°C/32°F to 104°F Humidity: 10% to 85% (non-condensing)
Non-operating	Temperature: -25°C to 70°C/-13°F to 158°F Humidity: 10% to 90% (non-condensing)
Operating Altitude	Up to 3,000 m (9,842 ft)
Storage altitude	Up to 12 km (39,370 ft)
Shock	Operating: Up to 20 G, 6 ms half-sine Non-operating: Half-sine, 33 G 11 ms, 3/eg axis
Vibration	Operating: 0.5 g sine, 0.4 grms random, 5 to 500 Hz Non-operating: 2.0 g sine, 1.1 grms random, 5 to 500 Hz
Heat dissipation	128 ports at 3,512 BTU/hr

Technical Specifications

Power	
Power Supply	Two power supply FRUs with integrated power module, voltage range of 90 V to 264 V AC (for AC units)
Fans	Three fan FRUs
AC input	100 V to 240 V nominal, 90 V to 264 V range, 12 A
AC Input line frequency	50 Hz to 60 Hz nominal, 47 Hz to 63 Hz range
AC Power Consumption	Maximum 942 W with all 128 ports operating at 32 Gbps (96 ports populated with 32 Gbps SWL optics and 8 QSFP ports populated with 4×32 Gbps SWL optics) Maximum of 495 W for empty chassis with no optics in idle configuration

Summary of Changes

Date	Version History	Action	Description of Change
07-Oct-2024	Version 22	Changed	Overview, Standard Features and Configuration Information sections were updated. All SFM/Storage Fabric Manager references removed; fixed formatting on optics heading
03-Sep-2024	Version 21	Changed	Service and Support section was updated
15-Apr-2024	Version 20	Changed	Rebranding Series Name applied
13-Nov-2023	Version 19	Changed	Standard Features, Service and Support and Configuration Information sections were updated. HPE Services Rebranding Added reference to Storage Fabric Manager
24-Jul-2023	Version 18	Changed	Configuration Information and Technical Specifications sections were updated Removed Network Orchestrator
05-Jun-2023	Version 17	Changed	Service and Support and Configuration Information sections were updated
01-Aug-2022	Version 16	Changed	Added QSFP PoD Kit
16-May-2022	Version 15	Changed	Updated SW references to reflect new HW revisions
21-Feb-2022	Version 14	Changed	Updated fan reference and port upgrade PN
01-Nov-2021	Version 13	Changed	Updated reference to Secure optics requirements
04-Oct-2021	Version 12	Changed	Service and Support section was updated Obso SKU was removed
02-Aug-2021	Version 11	Changed	Added 16Gb and 32Gb 8-Pack Transceivers along with PoD Kits
07-June-2021	Version 10	Changed	Added 32Gb Ext LW Transceiver
07-Dec-2020	Version 9	Changed	Overview, Standard Features, Configuration Information and Technical Specifications sections were updated
05-Oct-2020	Version 8	Changed	Standard Features and Configuration Information sections were updated
06-Jul-2020	Version 7	Changed	QuickSpecs layout was updated and Branding Refresh was applied.
06-Apr-2020	Version 6	Changed	Standard Features, Configuration Information and Technical Specifications sections were updated
03-Feb-2020	Version 5	Changed	Overview, Standard Features, Service and Support and Configuration Information sections were updated.
07-Oct-2019	Version 4	Changed	SKU T5528BAE was removed.
03-Sep-2019	Version 3	Changed	Sections were updated.
05-Nov-2018	Version 2	Changed	Overview, Standard Features, Models, Configuration Information, Product Highlights, Technical Specifications sections were updated. SKUs descriptions were updated. QuickSpecs updated with the current Recommended-Extended Options
04-Jun-2018	Version 1	New	New QuickSpecs

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