

Overview

HPE B-series SN6650B Fibre Channel Switch

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 Gen6 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 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 SN6650B enables new insight into NVMe storage fabrics with modern I/O traffic visibility to increase the efficiency of the SAN.

The 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 SN6650B 32Gb 128/48 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 SN6650B Fibre Channel Switch

Overview

What's New

- 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

Description

SKU

HPE SN6650B 32Gb FC Switch

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
HPE SN6650B 32Gb 128/96 Power Pack+ 96-port 32Gb Short Wave SFP+ Integrated FC Switch	Q9V96B



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.
- 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 Gen6 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 Gen6 Fibre 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 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>



Standard Features

High-availability features

- Two integrated redundant, hot swappable power supplies with integrated cooling fans
 - Forward Error Correction (FEC): Enables recovery from bit errors in a data stream, enhancing transmission reliability and performance and FEC is mandatory in Gen 6 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
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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 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.



Standard Features

Adaptive Networking

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. TZs use failover by default but it can be disabled if traffic should stop if a preferred path fails. TZ 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 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.

Standard Features

- **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 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.



Standard Features

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.

SAN Network Advisor Enterprise and Professional+

HPE SAN Network Advisor Enterprise and Professional+ are the enterprise-class products that support FOS products. SAN Network Advisor Enterprise provides complete B-series Director Management including enterprise-class features/environments such as, Fibre Channel Routing, FCIP, adaptive networking, etc. while SAN Network Advisor Professional+ provides the same feature set except for support for the DC SAN Backbone Director, SN8000B 8-Slot Director, SN8600B 8-slot Director and FICON.

SAN Network Advisor Enterprise delivers unprecedented scalability, up to 100 fabrics and 15,000 switch ports, while SAN Network Advisor Professional+ scales to 36 SAN Fabrics and 2560 switch ports. To accommodate growth, there is an upgrade available to SAN Network Advisor Enterprise from SAN Network Advisor Professional Plus.

Notes: HPE SAN Network Advisor 14.4.5 supports only the Enterprise edition. Any migrations to 14.4.5 utilizing a Professional+ license will provide Enterprise level equivalent functionality while on 14.4.5. The Professional and Trial editions as well as the head-less SMI agent only editions are not supported in 14.4.5 for new installations or migration from previous HPE SAN Network Advisor versions.

See the HPE Single Point of Connectivity Knowledge (SPOCK) B-series stream for HPE SAN Network Advisor version support.

<https://www.hpe.com/storage/spock>

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.



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.
https://support.hpe.com/hpsc/doc/public/display?docId=emr_na-c00383139
- 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.

Achieve maximum return from your IT investment

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

Consume IT on your terms

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

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

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

Connect your devices

Unlock all of the benefits of your technology investment by connecting your products to Hewlett Packard Enterprise. Reduce down time, increase diagnostic accuracy and have a single consolidated view of your environment. By connecting, you will receive 24x7 monitoring, pre-failure alerts, automatic call logging, and automatic parts dispatch. HPE Proactive Care Service and HPE Datacenter Care Service customers will also benefit from proactive activities to help prevent issues and increase optimization. All of these benefits are already available to you with your server storage and networking products, securely connected to HPE support. Learn more about getting connected at <http://www.hpe.com/services/getconnected>

Free up resources with Operational Services from HPE Pointnext

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

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

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



Service and Support

Optimized Care

HPE Proactive Care* with 6 hour call-to-repair commitment, three year Support Service - HPE Proactive Care gives customers an enhanced call experience plus helps preventing problems and maintains IT stability by utilizing tailored, proactive reports with recommendations and advice when your products are connected to HPE. This Service combines three years' proactive reporting and advice with our highest level of hardware support – the HPE 24x7, six hour hardware call-to-repair. Hewlett Packard Enterprise is the only leading manufacturer who makes this level of coverage available as a standard service offering for your most valuable storage systems.

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

Standard Care

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

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

Basic Care

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

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

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

Related Services

HPE SAN Deployment Service

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

<http://h20195.www2.hpe.com/V2/GetPDF.aspx/5981-8527ENW.pdf>

HPE Basic Installation Service

Provides for the basic hardware installation of HPE branded storage devices to assist you in bringing your new hardware into operation in a timely and professional manner.

<https://h20195.www2.hpe.com/v2/Getdocument.aspx?docname=5981-9356enw>

HPE Service Credits

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

HPE Education Services

Provides comprehensive training designed to expand the skills of your IT staff and keep them up to speed with the latest technologies.

Consult your Hewlett Packard Enterprise Sales Representative or Authorized Channel Partner of choice for any additional questions and support options.



Service and Support

Parts and Materials

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

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

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

HPE Support Center

The Hewlett Packard Enterprise Support Center is a personalized online support portal with access to information, tools and experts to support HPE business products. Submit support cases online, chat with Hewlett Packard Enterprise experts, access support resources or collaborate with peers. Learn more <http://www.hpe.com/support/hpesc>

Hewlett Packard Enterprise Support Center Mobile App* allows you to resolve issues yourself or quickly connect to an agent for live support. Now, you can get access to personalized IT support anywhere, anytime.

HPE Insight Remote Support and HPE Support Center are available at no additional cost with a HPE warranty, HPE Support Service or HPE contractual support agreement.

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

For more information

<http://www.hpe.com/services>

<https://www.hpe.com/us/en/services/operational.html>

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

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

HPE Support Services are sold by Hewlett Packard Enterprise and Hewlett Packard Enterprise Authorized Service Partners:

- Services for customers purchasing from HPE or an enterprise reseller are quoted using HPE order configuration tools.
- Customers purchasing from a commercial reseller can find HPE Support Services at

<https://ssc.hpe.com/portal/site/ssc/>



Configuration Information

Step 1 - Base Configuration(Select one)

Description	SKU
HPE SN6650B 32Gb 128/48 Fibre Channel Switch	Q2S18B
Notes:	
<ul style="list-style-type: none"> – 32Gb 128-port FC Switch with 48 active ports; 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 optical transceivers listed below. 	
HPE SN6650B 32Gb 128/48 48-port 32Gb Short Wave SFP+ Integrated Fibre Channel Switch	Q9V95B
Notes: 32Gb 128-port FC Switch with 48 active ports bundled with 48 32Gb SFP+; 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	
HPE SN6650B 32Gb 128/96 Power Pack+ 96-port 32Gb Short Wave SFP+ Integrated FC Switch	Q9V96B
Notes:	
<ul style="list-style-type: none"> – 32Gb 128-port FC Switch with 96 active ports bundled with 96 32Gb SFP+; 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. 	

Step 2 - Options

Fibre Channel Transceivers

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 32Gb SFP28 Short Wave 1-pack Transceiver	P9H32A
HPE B-Series 32Gb SFP28 Long Wave 1-pack Transceiver	P9H29A
HPE B-series 4x32Gb 1-pack Long Wave 2km QSFP Transceiver	Q2R31A
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
HPE B-series 16Gb LW 25km FC SFP 1-pack Transceiver	H6Z29A
HPE B-series 16Gb SFP+ Long Wave 10km Transceiver	QK725A
HPE B-series 10Gb SFP+ Short Range Transceiver	QK726A
HPE B-series 10Gb SFP+ Long Range Transceiver	QK727A

Notes:

- HPE SN6650B supports the following HPE Complete SmartOptics 16Gb Tranceivers
- 16G FC embedded DWDM Solution
- For more information regarding Smartoptics SKUs/Accessories/Cables and ordering rules please refer HPE Complete Smartoptics Quickspecs.

<https://www.hpe.com/h20195/v2/Getdocument.aspx?docname=c05205226>

Configuration Information

Description

SKU

Accessories

HPE B-series 4G USB Drive

N9Y63A

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 MPO/MPO OM4 100m (12ft) Cable	H6Z30A

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
HPE Premier Flex MPO/MPO Multi-mode OM4 8 fiber 50m Cable	QK731A
HPE Premier Flex MPO/MPO OM4 100m (12ft) 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

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

Configuration Information

Step 3 - Optional Software*

Notes:

- For Fabric OS (FOS) minimum requirements, please refer to: <http://www.hpe.com/storage/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.

Description

SKU

Software for SN6650B 32Gb FC Switch

HPE SN6650B 24-port Fibre Channel Upgrade E-LTU Q9N39AAE

Notes: (Physical License - Q9N39A)

24-port upgrade license for HPE SN6650B 32Gb 128/48 Fibre Channel Switch (Q2S18B) and HPE SN6650B 32Gb 128/48 48-port 32Gb Short Wave SFP+ Integrated Fibre Channel Switch (Q9V95B)

HPE SN6650B 32-port QSFP28 Upgrade E-LTU QN40AAE

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 HPE SN6650B 32Gb 128/96 Power Pack+ 96-port 32Gb Short Wave SFP+ Integrated FC Switch (Q9V96B)

HPE SN6650B Power Pack+ Upgrade E-LTU Q9N41BAE

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)

HPE SANnav Management Portal Base 1yr E-LTU R3P45AAE

Notes: (Physical License – R3P45A)

HPE SANnav Management Portal Enterprise 1yr E-LTU R3P46AAE

Notes: (Physical License – R3P46A)

HPE SANnav Global View 1yr E-LTU R3P47AAE

Notes: (Physical License – R3P47A)

HPE SANnav Management Portal Base 3yr E-LTU R3P48AAE

Notes: (Physical License – R3P48A)

HPE SANnav Management Portal Enterprise 3yr E-LTU R3P49AAE

Notes: (Physical License – R3P49A)

HPE SANnav Global View 3yr E-LTU R3P50AAE

Notes: (Physical License – R3P50A)

HPE SANnav Management Portal Base 5yr E-LTU R4P29AAE

Notes: (Physical License – R4P29A)

HPE SANnav Management Portal Enterprise 5yr E-LTU R4P30AAE

Notes: (Physical License – R4P30A)

HPE SANnav Global View 5yr E-LTU R4P31AAE



Configuration Information

Notes:

- (Physical License – R4P31A)
- 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, customer will need to purchase a new license to continue using the software. Software renewal via HPE PointNext is not allowed/supported.
- A 90-day, full-featured trial license for SANnav Management Portal and SANnav Global View is available.

Description

SKU

HPE Smart SAN for HPE 3PAR StoreServ 7200/7400/7200c/7400c/7440c/7450/7450c E-LTU

L7D48AAE

Notes: (Physical License - L7D48A)

HPE Smart SAN for HPE 3PAR StoreServ 8200/8400/8440/8450 E-LTU

L7D49AAE

Notes: (Physical License - L7D49A)

HPE Smart SAN for HPE 3PAR StoreServ 10400/10800 E-LTU

L7D50AAE

Notes: (Physical License - L7D50A)

HPE Smart SAN for HPE 3PAR StoreServ 20800/20450/20850 E-LTU

L7D51AAE

Notes: (Physical License - L7D51A)

Notes: Universal Temporary Licenses (UTLs) are available for trial usage or to test select features before purchasing permanent licenses. These UTLs enable optional features on B-series Directors and Switches on a temporary basis for one-time usage. Additional information can be found at the following URL using your HPE Passport credentials:

<https://h20392.www2.hpe.com/portal/swdepot/displayProductInfo.do?productNumber=BROCADETRIAL>



Technical Specifications

Family Information

Features	8/8 SAN Switch Base and 8/8 SAN Switch	8/24 SAN Switch Base
Targeted Environment	Workgroups, Departments	Workgroups, Departments
Fibre Channel Port Bandwidth	8Gbps	8Gbps
Aggregate device bandwidth	64 - 192 Gbps	128 - 192 Gbps
OS Support	Notes: Please Refer to SPOCK https://www.hpe.com/storage/spock	
Storage system support	3PAR StoreServ, StoreVirtual 4000, P9000/XP, P6000/EVA, P2000/MSA	
FC Ports	8 Enabled 24 Max	16 Enabled 24 Max
SFP	B-series	B-series
Advanced Trunking	Optional Upgrade	Included with Power Pack+ or Optional Upgrade
Adaptive Networking	Included	Included
Form factor	1U	1U
Zoning Software	Yes (Included)	Yes (Included)
Hot plug, redundant power supplies	No	No
Hot plug fans	No	No



Technical Specifications

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	3PAR StoreServ, StoreVirtual 4000, P9000/XP7, P6000/EVA, P2000/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)



Technical Specifications

Features	SN6600B 32Gb FC Power Pack+	SN6600B 32Gb Power Pack+ Bundled (SFP+) FC Switch
Targeted Environment	Workgroups, Departments	Workgroups, Departments
Fibre Channel Port Bandwidth	32 Gbps	32 Gbps
Aggregate device bandwidth	2 Tbps	2 Tbps
OS Support	Notes: Please Refer to SPOCK https://www.hpe.com/storage/spock	
Storage system support	3PAR StoreServ, StoreVirtual 4000, P9000/XP, P6000/EVA, P2000/MSA	
FC Ports	24 or 48 enabled 64 Max	24 or 48 Enabled 64 Max
SFP	B-series (16Gb or 32Gb)	B-series, 24 or 48 32Gb SFP+ included in the box
Advanced Trunking	Included with Power Pack+ or Optional Upgrade	Included with Power Pack+ or Optional Upgrade
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	3PAR StoreServ, StoreVirtual 4000, P9000/XP, P6000/EVA, P2000/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



Technical Specifications

Features	SN8000B 8-Slot SAN Director Power Pack+	SN8600B 8-Slot SAN Director Power Pack+
Targeted Environment	Cloud Optimized Data Centers	Cloud Optimized Data Centers
Port Bandwidth	Up to 16Gbps	Up to 32 Gbps
Aggregate device bandwidth	10.2Tbps	20.48 Tbps
OS Support	Notes: Please Refer to SPOCK https://www.hpe.com/storage/spock	
Storage system support	3PAR StoreServ, StoreVirtual 4000, P9000/XP, P6000/EVA, P2000/MSA	
Ports	Up to 512 SFP	512 32 Gbps ports or a 640-port equivalent with 128 Gbps (32 Gbps×4 QSFP ports)
SFP	B-series	B-series
Advanced Trunking	Included with Power Pack	Included with Power Pack
Adaptive Networking	Included	Included
Form factor	14U	14U
Zoning Software	Yes (included)	Yes (included)
Hot plug, redundant power supplies	Yes	Yes
Hot plug fans	Yes	Yes



Technical Specifications

Features	SN8000B 4-Slot SAN Director and 4-Slot SAN Director Power Pack+	SN8600B 4-slot SAN Director Power Pack+
Targeted Environment	Cloud Optimized Data Centers	Cloud Optimized Data Centers
Port Bandwidth	Up to 16Gbps	Up to 32Gbps
Aggregate device bandwidth	5.1 Tbps	10.24 Tbps
OS Support	Notes: Please Refer to SPOCK https://www.hpe.com/storage/spock	
Storage system support	3PAR StoreServ, StoreVirtual 4000, P9000/XP, P6000/EVA, P2000/MSA	
Ports	Up to 256 SFP	Up to 256 32 Gbps ports or a 320-port equivalent with 16 ICL ports.
SFP	B-series	B-Series
Advanced Trunking	Included with Power Pack or Optional Upgrade	Included with Power Pack
Adaptive Networking	Included	Included
Form factor	9U	9U
Zoning Software	Yes (included)	Yes (Included)
Hot plug, redundant power supplies	Yes	Yes
Hot plug fans	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	3PAR StoreServ, StoreVirtual 4000, P9000/XP, P6000/EVA, P2000/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



Technical Specifications

System Architecture

Fibre Channel ports	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 4×32 / 4×16 / 4×8 / 4×4 Gbps Fibre Channel speeds. 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.
Scalability	Full fabric architecture with a maximum of 239 switches
Certified maximum	Single fabric: 56 domains, 7 hops MPR fabric: 19 hops Refer to SAN Design Guide for current configuration information: https://support.hpe.com/hpsc/doc/public/display?docId=c00403562
Interoperability	<ul style="list-style-type: none"> • 8/8 SAN Switch • 8/24 SAN Switch • 1606 Extension SAN Switch • SN3000B Fibre Channel Switch • SN4000B SAN Extension Switch • SN6000B Fibre Channel Switch • SN6500B Fibre Channel Switch • 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
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 4×32 / 4×16 / 4×8 / 4×4 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 2× (4×32 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

Technical Specifications

Media types	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, 4×32 Gbps QSFP SWL and 4×16 Gbps QSFP SWL optical transceivers. Notes: 32 Gbps ELWL is currently not supported with Fabric OS v8.2.0 but is planned for future support.
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; 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	HTTP, SNMP v1/v3 (FE MIB, FC Management MIB), SSH; Auditing, Syslog; Brocade Advanced Web Tools; Network Advisor SAN Enterprise or Network Advisor SAN Professional/Professional Plus; 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. 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, RAStrace logging, 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
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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