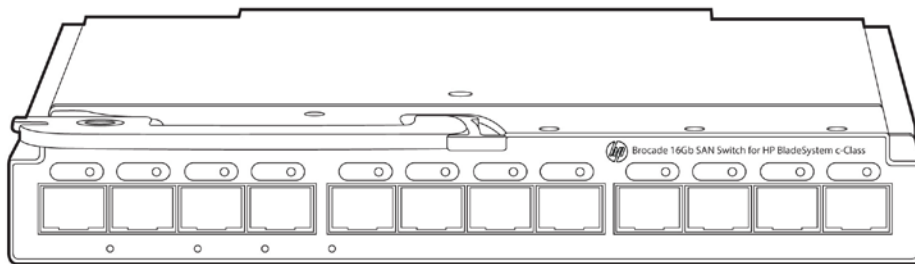## Overview

Brocade 16Gb SAN Switch for HPE BladeSystem c-Class

The Brocade 16Gb SAN Switch for HPE BladeSystem c-Class represents an easy to manage next generation embedded Fibre Channel switch with 16 Gbps Fibre Channel performance. It hot-plugs into the back of the HPE BladeSystem c-Class Enclosure and its integrated design frees up rack space, enables shared power and cooling, and reduces cabling and small form-factor pluggables. Enhanced trunking support with external switches provides higher bandwidth to enable demanding applications and high density server virtualization. The Power Pack+ software option enables you to manage data flow to maintain optimized application performance. In addition, both internal and external facing ports auto-sense lower bandwidth components for flexibility and investment protection (4, 8 or 16 Gbps for external ports and 8 or 16 Gbps for internal ports) and an upgrade license enables you to 'pay as you grow'. The Brocade 16Gb SAN Switch for HPE BladeSystem c-Class saves space and cost, significantly simplifies the SAN environment, enables easier deployment and management, and delivers the performance required for emerging higher throughput applications.

The HPE BladeSystem c7000 Platinum Enclosure is required to permit 16 Gbps speed on internal ports. Other HPE BladeSystem c7000 Enclosures will have a maximum speed of 8 Gbps.

Brocade 16Gb SAN Switch for HPE BladeSystem c-Class

Integrated SAN connectivity	• Enables data center consolidation with HPE BladeSystem c-Class through a state-of-the-art zero-footprint design while lowering cost through shared power and cooling, fewer cables and SFPs and a reduction in space.
16 Gbps storage networking	• Enables support of virtualized environments and other emerging technologies through high-speed technology that doubles the performance of the storage network. Both internal and external facing ports auto-sense lower bandwidth components for flexibility and investment protection (4, 8 or 16 Gbps for external ports and 8 or16 Gbps for internal ports).
Non-blocking architecture	• Includes connection speed support for all ports to provide a high-performance system with aggregate bandwidth of 448 Gbps (28 ports x 16 Gbps full duplex).
ISL Trunking performance enhancements	• Support for a single trunk made up of up to eight SAN ports for a total of up to 128 Gbps balanced throughput. Trunking of the SAN-facing ports with external Brocade or HPE B-series switches provides a high-bandwidth solution while lowering costs through fewer SFPs and cables. F-Port Trunking supported in Access Gateway mode.

Hewlett Packard Enterprise

Overview

Adaptive Networking Services

- Enables organizations to better manage data flows and meet service level agreements while maintaining optimized application performance in virtual environments with Adaptive Networking services, including Adaptive Fabric Quality of Service, Traffic Isolation, and Ingress Rate Limiting. This license is automatically enabled on new and upgraded switches running FOS 7.2.0 and later.

Access Gateway mode

- Employs N_Port ID Virtualization (NPIV), an ANSI T11 standard, to enable interoperability with other SAN fabrics and eliminate domain considerations while improving SAN scalability.

Broad range of management tools and SMI-s conformance

- Integrates with HPE Onboard Administrator for BladeSystem, HPE Systems Insight Manager, and HPE Storage Essentials and leverages HPE B-series management and monitoring tools. An SMI-s API enables the use of industry standard interfaces to integrate management with other applications.

Available in three models with a scalable licensing option

- Available in 16-port, 28-port and 28-port Power Pack+ Full Fabric models. Choose the features and management options that make sense for your needs. In addition, enables 'pay as you grow' scalability for easy, scalable growth in dynamic business environments with a non-disruptive 12-port upgrade for the 16-port model.

What's New

- Updated HPE B-series Network Advisor SKUSKUs to the next suffix (A to B) and added 3 Network Advisor E-LTU SKUSKUs (suffix AE)

Product Highlights

Advanced Fabric Services
- Hardware Enforced Zoning*
- Dynamic Path Selection*
- WebTools
- Enhanced Group Management (EGM)
- Power Pack+ fabric services software bundle (optional)
    - Fabric Vision
    - ISL Trunking
    - Fabric Watch**
    - Extended Fabrics*
    - Advanced Performance Monitoring**
- Secure Fabric OS (included in base FOS)*
- SAN Network Advisor (optional)

NOTE: **Partial support in Access Gateway mode (see the Access Gateway Administrator´s guide for full details)
* Not supported in Brocade Access Gateway mode.

Manageability
- WebTools
- Enhanced Group Management (EGM)
- Advanced Performance Monitoring (optional Power Pack+ upgrade)
- HPE OnBoard Administrator (included with HPE BladeSystem)
- HPE Systems Insight Manager (included with HPE BladeSystem)
- HPE Storage Essentials (optional)
- API
- SNMP
- SMI

Interoperability   Brocade Access Gateway mode enables the Brocade 16Gb SAN Switch for HPE BladeSystem c-Class switch to interoperate with other SAN fabrics running supported firmware. While in Access Gateway mode, the device must be connected to an NPIV-enabled edge switch or director. Supported edge environments are listed in the Brocade Fabric OS® release notes.

Software Components, Standard

Access Gateway*   Brocade Access Gateway Mode enables seamless connectivity for the Brocade 16Gb SAN Switch for HPE BladeSystem c-Class to other supported SAN fabrics, enhances scalability and simplifies manageability. Utilizing N_Port ID Virtualization (NPIV) standards, Brocade Access Gateway eliminates switch/domain considerations.

NOTE: * Brocade Access Gateway mode does not support many switch-related features, including most features in the Power Pack+ bundle. Please refer to the Fabric OS Release Notes and Access Gateway Administrator's Guide for details.

Frame Filtering   A special B-Series 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 and Advanced Performance Monitoring (optional).

Advanced Zoning   Zoning (Port and Worldwide Name), as well as Access Control, are enforced by hardware within the ASIC that provides the same simple administration previously enforced only with software. Hardware enforcement enables the highest level of zoning enforcement without any impact to performance.

Product Highlights

	Administrators can organize a physical fabric into logical groups and prevent unauthorized access by devices outside the Zone.
WebTools	Enables organizations to monitor and manage single Fibre Channel switches and monitor small 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.
EGM	Enhanced Group Management (EGM) is a FOS license that is included with all B-Series switches and enables multi-switch operations. It helps automate operations across multiple switches to save time and streamline repetitive operations, which are typically prone to error. EGM drives consistency across fabrics, while minimizing the risk associated with potential downtime due to configuration mismatches. EGM provides streamlined troubleshooting for more effective fabric monitoring and diagnosis. SAN Network Advisor Professional, Professional Plus and Enterprise enable EGM functionality. Customers have EGM functionality enabled within the hardware product and need only to make the decision around which SAN Network Advisor application is right for them.
Dynamic Path Selection	Improves performance by dynamically routing data traffic across multiple links and trunk groups.
Secure Fabric OS	Secure Fabric OS features have been fully integrated into the base Fabric OS since v5.3.0. These comprehensive security features for SAN fabrics provide policy-based security protection for more predictable change management, assured configuration integrity and reduced risk of downtime. Security methods supported include digital certificates and digital signatures, multiple levels of password protection, strong password encryption and Public Key Infrastructure (PKI)-based authentication, and 128-bit encryption of the switch's private key used for digital signatures. These features enable organizations to customize SAN security to meet specific policy requirements and work in conjunction with Advanced Zoning to further secure access to the SAN, simplify storage management, and reduce provisioning time.
Adaptive Networking Services	Adaptive Networking services optimize fabric behavior and ensure ample bandwidth for mission-critical applications. The tools currently include Quality of Service (QoS), Ingress Rate Limiting, Traffic Isolation, and Top Talkers. By assigning zones a high, medium, or low priority, QoS allocates bandwidth in the event of congestion to expedite high-priority traffic and keep all traffic flowing. Ingress Rate Limiting restricts data flow from less-critical hosts at preset bandwidths. Traffic Isolation assigns high-bandwidth data flows to specific ISLs. And Top Talkers measures the top bandwidth-consuming traffic in real time for a specific physical or virtual device, or end to end across the fabric. **NOTE: Adaptive Networking Services are included by default in the switch firmware and do not require a separate license**
Server Application Optimization	Server Application Optimization (SAO) improves overall application performance for physical servers and virtual machines. SAO, when deployed with Brocade Fibre Channel HBAs, extends Brocade Adaptive Networking from the Brocade SAN fabric to the server infrastructure. This delivers application-level, fine-grain Quality of Service (QoS) management to the HBAs and related server applications. **NOTE: Server Application Optimization (SAO) is included by default in the switch firmware and does not require a separate license** **NOTE: SAO requires Brocade HBA installed in the server**

Software Components, Optional

Power Pack+ Software Bundle	The Power Pack+ Software Bundle includes:
	• Fabric Vision • ISL Trunking

Product Highlights

- Advanced Performance Monitoring**
- Extended Fabrics*
- Fabric Watch**

NOTE: * Not supported in Access Gateway mode
**Partial support in Access Gateway mode (see the Access Gateway Administrator´s guide for full details)

NOTE: The Power Pack+ Software Bundle includes Fabric Vision, Fabric Watch, ISL Trunking, Extended Fabric and Advanced Performance Monitor.
Adaptive Networking and Server Application Optimization features are included by default in the switch firmware and do not require a separate license

Fabric Vision

Fabric Vision offers innovative diagnostic, monitoring and management capabilities to help accelerate new application deployments, address SAN problems before they impact operations and reduce operational costs. It Includes

- Monitoring and Alerting Policy Suite: A policy-based monitoring tool with pre-built rules and automation that simplifies fabric-wide threshold configuration and monitoring.
- Flow Vision: A comprehensive tool that enables administrators to identify, monitor, and analyze specific application data flows without using taps to ensure optimized performance
- Health and performance dashboard: A single customizable screen displayed in HPE SAN Network Advisor that contains all critical SAN information for convenient review and analysis

Fabric Vision will be included by default in all HPE StoreFabric B-series Fibre Channel switches and Directors bundled with Power Pack+ (with FOS 7.2.0a and later). In all other cases, Fabric Vision can be enabled on HPE StoreFabric B-series Fibre Channel switches and Directors in any one of the following ways

- Application of the Fabric Vision LTU (FOS 7.2.0a and later)
- Application of the Power Pack+ LTU (FOS 7.2.0a and later)
- Upgrading existing Switch/Director loaded with Power Pack+ to FOS 7.2.0a or later
- Upgrading existing Switch/Director loaded with both Advanced Performance Monitor (APM) and Fabric Watch (FW) licenses to FOS 7.2.0a or later

ISL Trunking

For high performance and seamless failover, this optional license logically groups up to eight E-ports (switch mode) or F-ports (Access Gateway mode) to provide a high bandwidth trunk between two Brocade or HPE B-Series switches. Each switch needs its own license. The fabric operating system views the trunk as a single, high bandwidth ISL resource (up to 128 Gbps when routing connections between 16 Gbps capable switches). Connections are load-balanced across the individual links, which comprise the logical trunk group.

Fabric Watch

Fabric Watch enables each switch to monitor the health of the SAN for potential faults-and automatically alert network managers to problems before they become failures. Fabric Watch tracks a variety of SAN fabric elements, events, and counters. Monitoring fabric-wide events, ports, SFPs, and environmental parameters permits early fault detection and isolation as well as performance measurement. Each switch in the SAN needs its own Fabric Watch license.
NOTE: Fabric Watch has been obsoleted in FOS 7.4.0 and later. Users can migrate their Fabric Watch settings to the Fabric Vison licensed Monitoring and Performance Suite (MAPS) prior to upgrading.

Advanced Performance

This enabling technology helps administrators monitor application data traffic from a SID (Source ID) to a DID (Destination ID), so they can fine-tune and scale the fabric more efficiently. Plus, Advanced

Product Highlights

Monitoring	Performance Monitoring includes the ability for early warning detection of hot spots within the fabric, a powerful tool for maximizing SAN performance. **NOTE: Advanced Performance Monitoring has been obsoleted in FOS 7.4.0 and later. Users can utilize the Fabric Vision licensed Flow Vision features for performance monitoring.**

Extended Fabrics	Extends the native Fibre-Channel traffic up to 590 km. Extended Fabrics increases 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.

SAN Network Advisor Professional

HPE SAN Network Advisor Professional is a management application available at no-charge and comes with B-series SAN Switches and:

- Allows management of two Fabric OS (FOS) fabrics (up to 300 switch ports and 1000 devices) at a time
- Performs group switch management beyond the scope of Web Tools
- Does not offer management of the SN8000B 8-Slot or DC SAN Backbone Directors

It is targeted for SMB customers that use FOS based SAN fabrics and require a management solution for smaller SANs based fabrics.

SMB customers that initially start off with SAN Network Advisor Professional and have a small SAN environment may over time feel the need for an enterprise-class product (SAN Network Advisor Professional+ or SAN Network Advisor Enterprise) as their environments start to grow in size and complexity, and as they start to uptake more enterprise-class functionality (such as Fibre Channel Routing, FCIP, etc.). A non-disruptive upgrade path is available from SAN Network Advisor Professional to SAN Network Advisor Professional+ or SAN Network Advisor Enterprise.

SAN Network Advisor Enterprise and Professional+

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

HPE SAN Network Advisor Enterprise delivers unprecedented scalability, up to 100 fabrics and 15,000 switch ports, while HPE 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.

Both offerings provide brand-new features including Adaptive Networking features for quality of service, ingress rate limiting and traffic isolation zones.

HPE Smart SAN for 3PAR

HPE Smart SAN, optional software for HP 3PAR, makes end-to-end SAN configuration and management simple and reduces the probability of errors through automation. 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 B-series Switches, HPE StoreFabric Fibre Channel adapters (HBAs) and 3PAR storage. HPE Smart SAN for 3PAR through its Target Driven Peer Zoning (TDPZ) feature 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: **http://www8.hp.com/us/en/products/storage-software/product-detail.html?oid=8295863#!tab=features**
NOTE: Supports B-series 16Gb and 8Gb FC switches with FOS 7.4.0a or later.
NOTE: A list of supported HPE FC Adapters can be found at

Product Highlights

https://h20272.www2.hp.com/spock/
NOTE: Supports 3PAR StoreServ storage with 3.2.2 or later with only 16Gb target ports on HPE 3PAR StoreServ storage.

BladeSystem compatibility

The Brocade 16 Gb SAN Switch for HPE BladeSystem c-Class must be deployed within the HPE BladeSystem c-Class infrastructure and is compatible only with HPE BladeSystem c-Class Enclosures.

NOTE: The HPE BladeSystem c7000 Platinum Enclosure is required to permit 16 Gbps speed on the internal ports. Other HPE BladeSystem c7000 Enclosures will have a maximum speed of 8 Gbps.

NOTE: The HPE BladeSystem Onboard Administrator (OA) 4.0 is required when configuring the Brocade 16Gb SAN Switch for HPE BladeSystem c-Class in a C7000 enclosure.

HPE ProLiant Servers	ProLiant BLc server blades (ProLiant BLc server blades with support for 8Gb and 16Gb Fibre Channel Mezzanine cards - Please refer to the server and mezzanine card QuickSpecs for details)
HPE FC HBA Mezzanines	8Gb and 16Gb HPE Fibre Channel Mezzanine cards for Bladesystem c-Class are supported

- Please refer to the HPE FC Mezzanine HBA Product QuickSpecs for server support details. 16Gb FC HBA Mezzanine support with the Brocade 16Gb SAN Switch for HPE BladeSystem c-Class requires HPE FOS 7.1.0_blv or later
- For more information on Hewlett Packard Enterprise FC Mezzanine Host Bus Adapters, please refer to **http://h18000.www1.hp.com/products/blades/components/c-class-adapters.html**

NOTE: 4 Gb Fibre Channel Mezzanine adapters are not supported

HPE BladeSystem c-Class Enclosures	HPE BladeSystem c7000 Enclosure
NOTE: The HPE BladeSystem c7000 Platinum Enclosure is required to permit 16 Gbps speed on the internal ports. Other HPE BladeSystem c7000 Enclosures will have a maximum speed of 8 Gbps.

Switch interoperability

HPE B-Series Switches, Directors, and Routers	**16 Gb Fibre Channel Switches and Directors**	

- SN8000B Director Switch (Enterprise)
- SN6500B Fibre Channel Switch (High-end)
- SN6000B Fibre Channel Switch (Midmarket)
- SN3000B Fibre Channel Switch (Entry)
- Brocade 16Gb Fibre Channel SAN Switch Module for HPE Synergy
- Brocade 16Gb SAN Switch for HPE BladeSystem c-Class

8 Gb Switches

- 8/24 SAN Switch
- 8/8 SAN Switch
- Brocade 8Gb SAN Switch for HPE c-Class BladeSystem

Virtual Connect

- HPE Virtual Connect 4Gb Fibre Channel Module for HPE c-Class BladeSystem
- HPE Virtual Connect 8Gb 24-port Fibre Channel Module
- HPE Virtual Connect 8Gb 20-port Fibre Channel Module
- HPE Virtual Connect 16Gb 24-port Fibre Channel Module
- Virtual Connect FlexFabric 10Gb/24-Port Module for c-Class BladeSystem

Product Highlights

- HPE Virtual Connect FlexFabric-20/40 F8 Module for c-class Blade System

Multi-Protocol Routers and Gateways
- Multi-protocol Extension Blade
- 1606 Extension SAN Switch
- SN4000B SAN Extension Switch

Service and Support, HPE Care Pack, and Warranty Information

Warranty

(1-1-1) Hardware Warranty - One-year on-site warranty, normal business hours, next business day response, installation not included.
NOTE: The hardware warranty covers firmware and embedded non-saleable software. Saleable software carries its own warranty, please see below.

Software Warranty: Hewlett Packard Enterprise warrants only that the software media will be free of physical defects for a period of ninety (90) days from delivery.
NOTE: EXCLUSIVE REMEDY: The entire liability of Hewlett Packard Enterprise and its suppliers and your exclusive remedy for software that does not conform to this Limited Warranty shall be the repair or replacement of the defective media. This warranty and remedy are subject to your returning the defective media during the warranty period to Hewlett Packard Enterprise in the country in which you obtained the software.

Services Included with Product Purchase

The Power Pack+ Software Bundle includes one year of Hewlett Packard Enterprise standard business hours, standard business days Software Support (includes software technical support and software product and documentation updates).

HPE Service and Support Services to accelerate time to results

HPE Storage Services bring you a rich portfolio of consulting and support services designed to add value to our core storage products and solutions. We have the know-how and experience to put storage technology to work for you. We work closely with you as your strategic partner, leveraging our full services portfolio to make sure that everything works to optimize your enterprise.

Choose from services aligned to our storage product offerings and lifecycle. From mission-critical onsite services to innovative web-based remote support, you choose the precise level of attention and support your business demands.

HPE Technology Services for BladeSystem

Capitalizing on HPE BladeSystem capabilities requires a service partner who understands your increasingly complex business technology environment. That's why it makes sense to team up with the people who know Hewlett Packard Enterprise infrastructure hardware and software best - the experienced professionals at HPE Services.

Protect your business beyond warranty with HPE Pointnext operational services

HPE Pointnext operational services offer complete care and support expertise with committed response choices designed to meet your IT and business needs.

HPE Foundation Care services offer scalable reactive support-packages for HPE BladeSystem and software. You can choose the type and level of service that is most suitable for your IT and business needs. HPE Proactive Care delivers high levels of system availability through proactive service management and advanced technical response.

Discover, plan, and design

Choose from a rich portfolio of services to make the most of Brocade 16Gb SAN Switch for HPE Blade System c-Class, so you can efficiently and affordably consolidate, manage, and extract value from unstructured data.

Start here to understand your HPE 16Gb SAN Switch for HPE Blade System c-Class options. Plan with confidence with services designed to help you detail the complete solution and specify the right storage area network (SAN) solutions technology.

Service and Support, HPE Care Pack, and Warranty Information

HPE Backup Recovery Efficiency Analysis - Assessment of how efficiently backup components are being used as the amount of data to be backed up continues to grow exponentially via analysis intelligence and a snapshot of your current backup environment.
https://www.hpe.com/h20195/v2/getpdf.aspx/4aa3-8490enw.pdf

HPE Backup Recovery Impact Analysis - Focus placed on service requirements and design as the key to success for gaining a clear understanding of the role of increasingly diverse data protection strategies. **https://www.hpe.com/h20195/v2/getpdf.aspx/4aa4-1175enw.pdf**

HPE Backup Recovery Modernization - Initial discovery, interviews, reference architecture design, proposal content development, vendor grading, and final recommendations carried out so as to require minimal resources and locations on your part. **https://www.hpe.com/h20195/v2/getpdf.aspx/4aa4-1199enw.pdf**

Deploy and integrate	Mitigate risk and accelerate storage implementation with services to improve capacity utilization to reduce costs as you establish information management standards applicable to backup, replication, and archiving needs.

HPE Install Storage Blade Service - This easy-to-buy, easy-to-use HPE Care Pack service helps ensure that your new Hewlett Packard Enterprise hardware is installed smoothly, efficiently, and with minimal disruption of your IT and business operations.
http://h71028.www7.hp.com/ERC/downloads/5981-9356EN.pdf

HPE Proactive Select - A flexible way to purchase services to fit your environment with an extensive menu of HPE Proactive Select event and technical services, such as onsite firmware upgrades, health checks, assessments, and education
http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA2-3842ENW.pdf

HPE Installation and Startup Services for HPE BladeSystem c-Class Infrastructure c3000 or C7000 enclosures - Provides for hardware installation (c-Class ProLiant and Integrity server blades, storage blades, Ethernet Interconnects and Virtual Connect) and software installation and startup of a BladeSystem c7000 or c3000 Infrastructure in a single enclosure including deployment of OS (two servers), HPE Insight Control and Server Deployment (RDP).
https://www.hpe.com/h20195/v2/getpdf.aspx/4aa0-5964enw.pdf

Operate and support	Choose the right support to maximize uptime, free up your resources, and achieve improved value-as you get the most out of the existing IT assets while accelerating time-to-revenue.

HPE Proactive Care 24x7 - Hardware and software support services designed specifically for your technology with rapid access to Advanced Solution Center Specialists plus firmware and software management and best practice advice
https://www.hpe.com/h20195/v2/getpdf.aspx/4aa3-8855enw.pdf

HPE Proactive Care Personalized Support - An option-if you have HPE Proactive Care- to bring increased personalization of the Proactive Care support experience through the assignment of an Account Service Manager (ASM) who provides IT best practice advice to help address IT issues and projects. **https://www.hpe.com/h20195/v2/getpdf.aspx/4aa4-3446enw.pdf**

HPE Education Services - Comprehensive training for new, as well as experienced, storage administrators designed to expand your skills and keep you up to speed with the latest storage and virtualization technology from HPE Storage.
http://education.hp.com/curr-storsan.htm

Service and Support, HPE Care Pack, and Warranty Information

Optimized Care - Delivers the highest levels of performance and stability through deployment and proactive management practices

Choose from levels of operate and support care

3-Year HPE 6 hour Call to Repair Response, Proactive Care
Combined reactive and proactive support for hardware and software helping optimize your systems and delivering high levels of availability through proactive service management and advanced technical response. Hardware problem resolution to return the hardware in operating condition within 6 hours of the initial service request. A Technical Account Manager, as your single point of contact, will own your call or issue end to end until resolved.
https://www.hpe.com/h20195/v2/getpdf.aspx/4aa3-8855eee.pdf

Additional options
HPE Proactive Care Personalized Support (once per Proactive Care support new environment) and 10 HPE Proactive Select credits per year

Standard Care - maintains high level of uptime, along with expert help to cut the cost and complexity of implementation and support

3-Year HPE 24x7 4 hour response, Proactive Care Service
This service gives you combined reactive and proactive support including rapid access to our Advanced Solution Center to manage and prevent problems and a Technical Support Specialist with a broad level of technical knowledge that will engage with additional technical expertise as needed from Hewlett Packard Enterprise vast global resources.
https://www.hpe.com/h20195/v2/getpdf.aspx/4aa3-8855eee.pdf

Additional options
HPE Proactive Care Personalized Support (once per Proactive Care support new environment) and 10 HPE Proactive Select credits per year

Remote Support Automation

HPE Insight Remote Support-Available at no additional cost to all warranty, HPE Care Pack Service and service agreement customers, uses proven technology to deliver secure, reliable 24x7 remote monitoring, diagnosis and problem resolution.
https://www.hpe.com/h20195/v2/getpdf.aspx/4aa2-4676enw.pdf
http://h18004.www1.hp.com/products/servers/management/insight-remote-support/overview.html

For more information

http://www.hp.com/services/storage

To learn more on HPE Storage Services, please contact your Hewlett Packard Enterprise sales representative or Hewlett Packard Enterprise Authorized Channel Partner

HPE Pointnext operational services are sold by Hewlett Packard Enterprise and Hewlett Packard Enterprise Authorized Service Partners:

- Services for customers purchasing from Hewlett Packard Enterprise or an enterprise reseller are quoted using Hewlett Packard Enterprise order configuration tools.
- Customers purchasing from a commercial reseller can find HPE Pointnext operational services at **http://www.hp.com/go/lookuptool**

Configuration Information

Step 1 – Base Configurations

Select one:

	Part Number
Brocade 16Gb/16 SAN Switch for HPE BladeSystem c-Class	C8S45A

- (1) 16 Gb SAN Switch
- 16 ports enabled for any combination (internal and external)
- full fabric connectivity
- documentation

	Part Number
Brocade 16Gb/28 SAN Switch for HPE BladeSystem c-Class	C8S46A

- (1) 16 Gb SAN Switch
- 28 ports enabled (16 internal, 12 external)
- full fabric connectivity
- documentation

	Part Number
Brocade 16Gb/28 SAN Switch Pwr Pk+ for HPE BladeSystem c-Class	C8S47A

- (1) 16 Gb SAN Switch
- 28 ports enabled (16 internal, 12 external)
- full fabric connectivity
- documentation and includes Power Pack+ Bundle and management tools (see software components, optional)

Step 2 – Additional Options

Select each type of required options with quantities specified:

Hardware:

Model Name	Model Description	Part Number
16 Gb Optical Transceivers (SFP+)	HPE B-series 16Gb SFP+ Short Wave Transceiver	QK724A
	HPE B-series 16Gb SFP+ Long Wave 10km Transceiver	QK725A
	HPE B-series 16Gb LW 25km FC SFP 1-pack Transceiver	H6Z29A
8 Gb Optical Transceivers (SFP+)	HPE 8Gb Shortwave B-series Fibre Channel 1 Pack SFP+ Transceiver	AJ716B
	HPE 8Gb Long Wave B-series 10km Fibre Channel 1 Pack SFP+ Transceiver	AJ717A
	HPE B-series 8Gb Extended Long Wave 25km Fibre Channel SFP+ Transceiver 1 Pack	AW538A
Optical cables	**PremierFlex OM4 type 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
	LC-LC for between 4/8 Gb and 4/8 Gb Fibre Channel devices	
	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

Configuration Information

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

Software:

Power Pack+ Software Bundle

Brocade 16Gb Embedded Switch Power Pack+ E-LTU — TC464AAE (Physical License - TC464A)

(For upgrading Full Fabric 16 Gb SAN Switch for HPE BladeSystem c-Class to Power Pack+). Includes bundled license for

- Fabric Vision
- ISL Trunking
- Advanced Performance Monitoring
- Fabric Watch
- Extended Fabrics

NOTE: Adaptive Networking and Server Application Optimization features will be included by default in all Fabric OS releases for this switch and do not require a separate license

Optional Software

Brocade 8/16Gb Embedded FC Switch 12-port Upgrade E-LTU — T5517AAE (Physical License - T5517A)

HPE 8/16Gb Embedded Switch Fabric Vision E-LTU — TC514AAE (Physical License - TC514A)

Fabric Watch* — TC464AAE*

HPE B-series ISL Trunking E-LTU — T5527AAE (Physical License - T5527A)

Advanced Performance Monitoring* — TC464AAE*

Extended Fabrics* — TC464AAE*

HPE SAN Network Advisor Enterprise Software E-LTU — TC352BAE(Physical License – TC352B)

HPE SAN Network Advisor Professional Plus Software E-LTU — TC353BAE (Physical License – TC353B)

HPE SAN Network Advisor Professional Plus Upgrade E-LTU — TC354BAE (Physical License – TC354B)

NOTE: * In order to obtain Fabric Watch, Advanced Performance Monitoring or Extended Fabrics Software, a purchase of the TC464AAE or (Physical License TC464A) Power Pack+ Software Bundle is required.

NOTE: Some HPE B-series software licenses are now available through the Electronic Delivery (E-Delivery) mechanism. The E-Delivery software licenses with new part numbers listed in this document are functionally equivalent to the corresponding physical licenses with different part numbers. Some software licenses in this document are represented by two part numbers, the

Configuration Information

first of which is the E-Delivery version (ending with AAE) and the second is the physical version.

NOTE: HPE SAN Network Advisor software will no longer be shipped as a DVD to customers. Instead, customers will be able to access and download the software from Hewlett Packard Enterprise Product Download web site.

Family Comparison

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	8Gbit/sec	8Gbit/sec	
Aggregate device bandwidth	64-192 Gbit/sec	128 – 192 Gbit/sec	
OS Support	**NOTE: Please Refer to SAN Design Guide** http://www.hp.com/go/sandesign **or** http://www.hpe.com/support/SANDesignGuide		
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	

Features	SN3000B 16Gb FC Switch and SN3000B 16Gb FC Power Pack+	SN6000B 16Gb FC Switch and SN6000B 16Gb FC Power Pack+	SN6500B 16Gb FC Switch and SN6500B 16Gb FC Power Pack+
Targeted Environment	Workgroups, Departments	Workgroups, Departments	Workgroups, Departments
Fibre Channel Port Bandwidth	16Gbit/sec	16Gbit/sec	16Gbit/sec
Aggregate device bandwidth	192-384 Gbit/sec	384-768 Gbit/sec	768-1536 Gbit/sec
OS Support	**NOTE: Please Refer to SAN Design Guide** http://www.hp.com/go/sandesign **or** http://www.hpe.com/support/SANDesignGuide		
Storage system support	**3PAR StoreServ, StoreVirtual 4000, P9000/XP, P6000/EVA, P2000/MSA**		
FC Ports	12-24 Enabled 24 Max	24 or 48 Enabled 48 Max	48 or 96 Enabled 96 Max
SFP	B-series	B-series	B-series
Advanced Trunking	Included with Power Pack+	Included with Power Pack+ or Optional Upgrade	Included with Power Pack+ or Optional Upgrade
Adaptive Networking	Included	Included	Included
Form factor	1U	1U	2U
Zoning Software	Yes (Included)	Yes (Included)	Yes
Hot plug, redundant power supplies	Optional	Yes	Yes

Family Comparison

Hot plug fans	Yes	Yes (integrated with power supply)	Yes

Features	8/24 Bundled FC Switch	SN6000B 16Gb Bundled FC Switch
Targeted Environment	Workgroups, Departments	Workgroups, Departments
Fibre Channel Port Bandwidth	8Gbit/sec	16Gbit/sec
Aggregate device bandwidth	128 - 192Gbit/sec	384-768Gbit/sec
OS Support	NOTE: Please Refer to SAN Design Guide http://www.hp.com/go/sandesign or http://www.hpe.com/support/SANDesignGuide	
Storage system support	3PAR StoreServ, StoreVirtual 4000, P9000/XP, P6000/EVA, P2000/MSA	
FC Ports	16 Enabled 24 Max	24 or 48 Enabled 48 Max
SFP	B-series, 16 units included in the box	B-series, 24 units 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	No	Yes
Hot plug fans	No	Yes (integrated with power supply)

Features	SN8000B 8-Slot SAN Director Power Pack+	SN8000B 4-Slot SAN Director and 4-Slot SAN Director Power Pack+		
Targeted Environment	Cloud Optimized Data Centers	Cloud Optimized Data Centers		
Port Bandwidth	Up to 16Gbit/sec	Up to 16Gbit/sec		
Aggregate device bandwidth	10.2 Tbit/sec	5.1 Tbit/sec		
OS Support	NOTE: Please Refer to SAN Design Guide http://www.hp.com/go/sandesign or http://www.hpe.com/support/SANDesignGuide			
Storage system Support	3PAR StoreServ, StoreVirtual 4000, P9000/XP, P6000/EVA, P2000/MSA			
Ports	Up to 512	Up to 256		
SFP	B-series	B-series		
Advanced Trunking	Included with Power Pack	Included with Power Pack or Optional Upgrade		
Adaptive Networking	Included	Included		
Form factor	14U	9U		
Zoning Software	Yes (included)	Yes (included)		
Hot plug, redundant power supplies	Yes	Yes		

Family Comparison

Hot plug fans	Yes	Yes		
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	16Gbit/sec	8Gbit/sec	16 Gbit/sec	
Aggregate device bandwidth	448 Gbit/sec (24 ports x 16Gb/s)	192 Gbit/sec	576 Gb/s (36 ports x 16 Gb/s)	
OS Support	NOTE: Please Refer to SAN Design Guide http://www.hp.com/go/sandesign or http://www.hpe.com/support/SANDesignGuide			
Storage system support	3PAR StoreServ, StoreVirtual 4000, P9000/XP, P6000/EVA, P2000/MSA			
Ports	12 external /16 internal	8 external /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	

Features	**1606 Extension SAN Switch**	**SN4000 SAN Extension Switch**
Targeted Environment	Data Centers	Data Centers
Fibre Channel Port Bandwidth	8Gbit/sec	16 Gbit/sec
Ethernet	1Gbit/sec Ethernet	1/10/40 Gbit/sec Ethernet
FCIP/FICON	Yes, optional license required for FICON	Yes, optional license required for FICON
OS Support	NOTE: Please Refer to SAN Design Guide http://www.hp.com/go/sandesign or http://www.hpe.com/support/SANDesignGuide	
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 with Power Pack+
Adaptive Networking	Included	Included
Form factor	1U	2U
Zoning Software	Yes (Included)	Yes (Included)
Hot plug, redundant	Yes	Yes

Family Comparison

power supplies		
Hot plug fans	Yes	Yes

Technical Specifications

Fibre Channel ports	16 Internal (downlink) ports; 12 External (uplink) ports - universal (E, F, N, D) ports 16/16c SAN Switch model: (16) 16 Gb ports in any internal/external port combination enabled 16/28c SAN Switch models: 16 internal 16Gb ports and 12 external 16 Gb auto-sensing ports enabled
Device support and Scalability guidelines	**http://h18006.www1.hp.com/products/storageworks/san/documentation.html**
Performance	16 Gbps line speed, full duplex
Certified maximum	Certified maximum information available at: **http://h18006.www1.hp.com/products/storageworks/san/documentation.html**
Switch core	Non-blocking
Fabric latency	700 nSec. Latency increases as input port speed is lower than the output port speed.
Maximum frame size	2112-byte payload
Classes of service	Class 2, Class 3, Class F (inter-switch frames)
Port types	D_Port (Diagnostic port), E_Port, F_Port; optional port type control Brocade Access Gateway mode: F_Port and NPIV-enabled N_Port
Data traffic types	Fabric switches supporting unicast
Media types	Hot-pluggable, B-Series Branded Small Form Factor Pluggable (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 (4/2/1 Gbit/sec) and/or SFP+ (8/4/2 Gbit/sec) optical transceivers.
Laser	Short-wave, long-wave, and extended long wave laser transceivers (SFP's) are supported
Fabric services	Simple Name Server, Registered State Change Notification (RSCN). Includes Advanced WebTools Enhanced group Management and Advanced Zoning. Optional fabric services include: Adaptive Networking, Fabric Watch, ISL Trunking, Advanced Performance Monitoring, and Extended Fabrics.
Options	SFP media, port upgradeable licensing, advanced management software licensing
Supported software	Telnet, SNMP (FE MIB, FC Management MIB), HPE Systems Insight Manager, HPE Storage Essentials, HPE Onboard Administrator for BladeSystem, Advanced WebTools, Enhanced Group Management, , Advanced Zoning, SAN Network Advisor, Fabric Watch, and Advanced Performance Monitoring
Management access	WebTools, SMI-s provider, SNMP, Telnet, and Secure Telnet
Diagnostics	Cable diagnostic (D_Port), including electrical/optical loopback, link traffic/latency/distance

Dimensions		
	Depth	10.57 in.
	Height	1.1 in.
	Width	7.59 in.
	Weight	Approx. 3.3 lb - without media

Environment	**System Inlet Temperature**	Operating	10° to 35°C (50° to 95°F) at sea level with an altitude derating of 1.0°C per every 305m (1.8°F per every 1000ft) above sea level to a maximum of 3050m (10,000ft), no direct sustained sunlight. Maximum rate of change is 10°C/Hr (18°F/Hr). The upper limit may be limited by the type and number of options installed. System performance may be reduced if operating with a fan fault or above 30°C (86°F).
		Non-operating	-30° to 60°C (-22° to 140°F). Maximum rate of change is 20°C/Hr (36°F/Hr).
	Relative Humidity	Operating	10 to 90% relative humidity (Rh), 28°C (82.4°F) maximum wet bulb temperature, non-condensing.
		Non-operating	5 to 95% relative humidity (Rh), 38.7°C (101.7°F) maximum wet bulb temperature, non-

Technical Specifications

			condensing.
	Altitude	Operating	3050 m (10,000 ft). This value may be limited by the type and number of options installed. Maximum allowable altitude change rate is 457 m/min (1500 ft/min).
		Non-operating	9144 m (30,000 ft). Maximum allowable altitude change rate is 457 m/min (1500 ft/min).
Vibration		Operating	1 G, 10-500 Hz, 60 minutes per axis
		Non-operating	2 G, 10-500 Hz, 30 minutes
Shock		Operating	Half-sine-wave shock, 40 G, 2 ms duration, in each direction of three mutually perpendicular axes.
		Non-operating	Half-sine-wave shock, 140 G, 2 ms duration, in each direction of three mutually perpendicular axes; and square-wave shock up to 80 G, 180 inches/s velocity change, in each direction of three mutually perpendicular axes.

Summary of Changes

Date	Version History	Action	Description of Change
23-Oct-2017	Version 8	Changed	Care Pack naming and Service and Support- Parts and Materials updated.
07-Jun-2016	From Version 6 to 7	Changed	Changes made to the Overview, Tecjnical Specifications, Family Comparison and Product Highlights sections
09-Jan-2015	From Version 5 to 6	Changed	Removed the reference to the HPE Integrity Server on the Product Highlights Section
10-Jun-2014	From Version 4 to 5	Changed	Text was formatted in Configuration Information section
17-Jan-2014	From Version 3 to 4	Changed	Updated the following: Product Highlights - Advanced Fabric Services - added new note for Fabric Watch and Advanced Performance Monitoring and Secure Fabric OS; Software Components, Optional - added new note for Advanced Performance Monitoring and Fabric Watch; Configuration Information - Step 2 - additional options - added HPE B-series 16Gb Long Wave 25km Fibre Channel SFP+ 1 Pack, H6Z29A
09-Dec-2013	From Version 2 to 3	Changed	Brocade 8Gb and 16Gb SAN Switch for HPE BladeSystem c-Class Fabric Vision LTU was added to Optional Software in Configuration Information

HPE 8/40 SAN Switch and 8/40 SAN Switch Power Pack+ was removed from Family Information |
| 15-Oct-2013 | From Version 1 to 2 | Added | Fabric Vision was added to Product Highlights |
| | | | |

f 𝕏 in ✉
Sign up for updates

Hewlett Packard Enterprise