QuickSpecs

Overview

Brocade 8Gb SAN Switch for HPE BladeSystem c-Class

The Brocade 8Gb SAN Switch for HPE BladeSystem c-Class delivers an easy to manage embedded Fibre Channel switch with 8 Gbps performance. The Brocade 8Gb SAN Switch hot-plugs into the back of the HPE BladeSystem c-Class Enclosure. The 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 such as server virtualization. New features in the Power Pack+ option enable you to manage data flow to maintain optimized application performance. The 12 or 24 auto-sensing ports support lower bandwidth components for investment protection and an upgrade license enables you to 'pay as you grow'. The Brocade 8Gb SAN Switch saves space and cost, significantly simplifies the SAN environment, enables easier deployment and management, and delivers the performance required for emerging higher throughput applications.
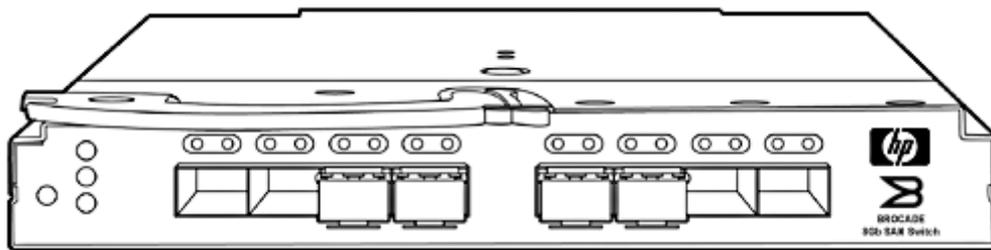
Brocade 8Gb SAN Switch

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.
8 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 (2, 4, or 8 Gb).
Non-blocking architecture	• Includes connection speed support for all ports to provide a high-performance system with aggregate bandwidth of up to 192 Gbps (24 ports x 8 Gbps at full duplex).
ISL Trunking performance enhancements	• Now providing support for up to a single trunk made up of all eight SAN ports for a total of up to 64 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.
Adaptive Networking Services	• Enables organizations to better manage data flows and meet service level agreements while maintaining optimized application performance in virtual environments with new Adaptive

Overview

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, 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 12-port, 24-port and 24-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 12-port model.

What's New

- Updated HPE B-series Network Advisor SKUs to the next suffix (A to B) and added 3 Network Advisor E-LTU SKUs (suffix AE)
- **New 2016 RoHS compliant HPE SAN switches**

NOTE: Restriction of Hazardous Substances Directive or RoHS is a directive adopted by the European Union that restricts the use of certain hazardous materials in the manufacture of various types of electronic and electrical equipment. The RoHS compliant products with new part numbers listed in this document are functionally equivalent to the corresponding products with old part numbers and are fully interchangeable.

Product Highlights

Advanced Fabric Services	- Hardware Enforced Zoning (included)* - Dynamic Path Selection (included)* - WebTools (included) - 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: * Not supported in Brocade Access Gateway mode.** ****Partial support in Access Gateway mode (see the Access Gateway Administrator's guide for full details)**
Manageability	- WebTools (included) - 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 enables Brocade embedded SAN switches to interoperate with other SAN fabrics running supported firmware. While in Brocade Access Gateway mode, the device must also 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 Brocade embedded SAN switches 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

Product Highlights

	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. Administrators can organize a physical fabric into logical groups and prevent unauthorized access by devices outside the Zone.
WebTools - included in Brocade Fabric OS	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 - included in Brocade 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	This suite of tools optimizes fabric behavior and ensures 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.
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. Solution Requirements: • SAO requires Brocade <> HBA installed in the server

Software Components, Optional

Product Highlights

Power Pack+ Software Bundle

The Power Pack+ Software Bundle includes:

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

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

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 64 Gbps when routing connections between 8 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.

Product Highlights

Advanced Performance Monitoring	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 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 Fabrci 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 up to 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.

BladeSystem compatibility

The Brocade 8Gb 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.

HPE ProLiant Servers	ProLiant BLc server blades (All Proliant BLc server blades with support for Fibre Channel Mezzanine cards)
HPE Integrity Servers	Integrity BLc server blades

Product Highlights

HPE FC HBA Mezzanines All HPE Fibre Channel Mezzanine cards for Bladesystem c-Class are supported

- Please refer to HPE FC HBA Mezzanine Product QuickSpecs for server support details. 8Gb FC HBA Mezzanie support with the Brocade 8GB SAN Switch requires HPE FOS v6.2.Od or later. Brocade 804 8GB FC HBA requires FOS v6.3.1c or 6.4.0b or later.

HPE BladeSystem c-Class Enclosures HPE BladeSystem c7000 and c3000 Enclosures

Switch interoperability

HPE B-Series Switches, Directors, and Routers	**Gen 5 Fibre Channel 16 Gb 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 BaldeSystem c-Class
	8 Gb Switches and Directors	8/8 SAN Switch 8/24 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 - Virtual Connect FlexFabric 24-Port Module for c-Class BladeSystem
	Multi-Protocol Routers and Gateways	- Multi-protocol Extension Blade 1606 Extension SAN Switch - Multi-Protocol Router Blade - SN4000B SAN Extension Switch

Warranty, Service and Support 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 Support Services

Protect your business beyond warranty with HPE Support Services

HPE Technology Services delivers confidence, reduces risk and helps customers realize agility and stability. Our integrated portfolio of Services for storage help customers reduce costs, optimize data, streamline storage management, and improve backup and recovery. HPE Support Services enable you to choose the right service level, length of coverage and response time as you purchase your new storage solution, giving you full entitlement for the support for need for your IT and business.

Connect your devices:

Unlock all of the benefits of your technology investment by connecting your products to Hewlett Packard Enterprise. Achieve up to 77%[1] reduction in down time, near 100%[2] diagnostic accuracy and a single consolidated view of your environment. By connecting, you will receive 24x7monitoring, pre-failure alerts, automatic call logging, and automatic parts dispatch. HPE Proactive Care Service and HPE Datacenter Care Service customers will also benefit from proactive activities to help prevent issues and increase optimization. All of these benefits are already available to you with your server, storage and networking products, securely connected to Hewlett Packard Enterprise support.
1- IDC
2 – HP CSC reports 2014 - 2015

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 Hewlett Packard Enterprise. This Service combines three years' proactive reporting and advice with our highest level of hardware support - The Hewlett Packard Enterprise 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.

http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA3-8855ENW.pdf

Warranty, Service and Support Information

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
	http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA3-8855ENW.pdf
Related Services	**HPE SAN Deployment Service**: Provides installation and configuration of your storage area network (SAN). HPE SAN Deployment Service covers a comprehensive complement of technologies, including Fibre Channel (FC), Fibre Channel over Ethernet (FCoE), Fibre Channel over IP (FCIP), FICON (Fibre Channel for HPE XP Storage Array-based mainframe storage), and iSCSI or serial-attached SCSI (SAS), for switches and associated devices. This service implements a new single-fabric or dual-fabric SAN or extends an existing SAN but does not include configuration of arrays or storage devices that are covered by their own corresponding deployment services.
	• http://h20195.www2.hpe.com/V2/GetPDF.aspx/5981-8527EN.pdf
	HPE Installation Service - Provides for the basic hardware installation of Hewlett Packard Enterprise branded servers, storage devices and networking options to assist you in bringing your new hardware into operation in a timely and professional manner.
	http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-9356EN.pdf
Additional Services	Implementation service, SAN Architecture service. For more information on service options, please visit our Web site at: **http://www.hpe.com/storage/san**

Configuration Information

Step 1 – Base Configurations

Select one:

Model Name	Model Description	Part Number
HPE B-Series 8/12c SAN Switch BladeSystem c-Class	(1) 8 Gb SAN Switch; 12 ports enabled for any combination (internal and external); two (2) short wave 8 Gb SFP+s; full fabric connectivity; documentation	AJ820C*
HPE B-Series 8/24c SAN Switch BladeSystem c-Class	(1) 8 Gb SAN Switch; 24 ports enabled (16 internal, 8 external); four (4) short wave 8 Gb SFP+s; full fabric connectivity; documentation	AJ821C*
HPE B-Series 8/24c SAN Switch Pwr Pk+ BladeSystem c-Class	(1) 8 Gb SAN Switch; 24 ports enabled (16 internal, 8 external); four (4) short wave 8 Gb SFP+s; full fabric connectivity; documentation and includes Power Pack+ Bundle and management tools (see software components, optional)	AJ822C*

NOTE: * The new part numbers for these models indicate RoHS compliance. Equivalent models with old part numbers may still be ordered until they are made obsolete. #0D1 may appear after this part number on your sales order when factory integration is indicated.

Step 2 – Additional Options

Select each type of required options with quantities specified:

Hardware:

Model Name	Model Description	Part Number
8 Gb Optical Transceivers (SFP+s)	Short Wave:	*AJ716A
	HPE 8Gb SW B-series FC SFP+	
	HP 8Gb Shortwave B-series Fibre Channel 1 Pack SFP+ Transceiver	AJ716B
	HP 8Gb Long Wave B-series 10km Fibre Channel 1 Pack SFP+ Transceiver	AJ717A
	HP B-series 8Gb Extended Long Wave 25km Fibre Channel SFP+ Transceiver 1 Pack	AW538A
4 Gb Optical Transceivers (SFPs)	HP 4Gb Short Wave B-series Fibre Channel 1 Pack SFP Transceiver	AJ715A
	HP 4Gb Long Wave B-series 30km Fibre Channel SFP Transceiver 1 Pack	AN211A
Optical cables	**PremierFlex OM4 type cables**	
	HP Premier Flex LC/LC Multi-mode OM4 2 fiber 1m Cable	QK732A
	HP Premier Flex LC/LC Multi-mode OM4 2 fiber 2m Cable	QK733A
	HP Premier Flex LC/LC Multi-mode OM4 2 fiber 5m Cable	QK734A
	HP Premier Flex LC/LC Multi-mode OM4 2 fiber 15m Cable	QK735A
	HP Premier Flex LC/LC Multi-mode OM4 2 fiber 30m Cable	QK736A
	HP 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	
	HP LC to LC Multi-mode OM3 2-Fiber 0.5m 1-Pack Fiber Optic Cable	AJ833A
	HP LC to LC Multi-mode OM3 2-Fiber 1.0m 1-Pack Fiber Optic Cable	AJ834A
	HP LC to LC Multi-mode OM3 2-Fiber 2.0m 1-Pack Fiber Optic Cable	AJ835A
	HP LC to LC Multi-mode OM3 2-Fiber 5.0m 1-Pack Fiber Optic Cable	AJ836A
	HP LC to LC Multi-mode OM3 2-Fiber 15.0m 1-Pack Fiber Optic Cable	AJ837A
	HP LC to LC Multi-mode OM3 2-Fiber 30.0m 1-Pack Fiber Optic Cable	AJ838A
	HP LC to LC Multi-mode OM3 2-Fiber 50.0m 1-Pack Fiber Optic Cable	AJ839A

Configuration Information

NOTE: * AJ716A is End of Life (EOL) and is replaced by AJ716B because of RoHS compliance; however, the SKU is still orderable until supplies are diminished.

Software:

Power Pack+ Software Bundle	HPE B-series Entry Switch Power Pack+ E-LTU	T5521AAE (Physical License - T5521A)

For upgrading Full Fabric 8 Gb switches to Power Pack+. Includes bundled license for:

- Fabric Vision
- ISL Trunking
- Advanced Performance Monitoring
- Fabric Watch
- Server Application Optimization
- Extended Fabrics

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	*T5521AAE
	HPE B-series Entry Switch ISL Trunking E-LTU	T5527AAE (Physical License - T5527A)
	*Advanced Performance Monitoring	*T5521AAE
	*Extended Fabrics	*T5521AAE
	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 or Advanced Performance Monitoring or Extended Fabrics Software a purchase of the T5521AAE/T5521A 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 first of

Configuration Information

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 The HPE Product Download web site.

Family Comparison

Features	8/8 SAN Switch Base and 8/8 SAN Switch	8/24 SAN Switch Base		SN3000B 16Gb FC Switch and SN3000B 16Gb FC Power Pack+	SN6000B 16Gb FC Switch and SN6000B 16Gb FC Power Pack+
Targeted Environment	Workgroups, Departments	Workgroups, Departments		Workgroups, Departments	Workgroups, Departments
Fibre Channel Port Bandwidth	8Gbit/sec	8Gbit/sec		16Gbit/sec	16Gbit/sec
Aggregate device bandwidth	64-192 Gbit/sec	128-192 Gbit/sec		192-384 Gbit/sec	384-768 Gbit/sec
OS Support	**NOTE:** Please Refer to SAN Design Guide http://www.hp.com/go/sandesign or http://www.hp.com/go/sandesignguide				
Storage system support	MSA3PAR StoreServ, StoreVirtual 4000, P9000/XP, P6000/EVA, P2000/MSA				
FC Ports	8 Enabled 24 Max	16 Enabled 24 Max		12 or 24 Enabled 24 Max	24 or 48 Enabled 48 Max
SFP	B-series	B-series		B-series	B-series
Advanced Trunking	Optional Upgrade	Included with Power Pack+ or Optional Upgrade		Included with Power Pack+ Upgrade	Included with Power Pack+ or Optional Upgrade
Adaptive Networking	Included	Included		Included	Included
Form factor	1U	1U		1U	1U
Zoning Software	Yes (Included)	Yes (Included)		Yes (Included)	Yes (Included)
Hot plug, redundant power supplies	No	No		Optional	Yes
Hot plug fans	No	No		Yes (integrated with power supply)	Yes (integrated with power supply)

Features	1606 Extension SAN Switch	
Targeted Environment	Data Centers	
Fibre Channel Port Bandwidth	8Gbit/sec	
Ethernet	1Gbit/sec Ethernet	
FCIP/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.hp.com/go/sandesignguide	
Storage system support	MSA3PAR StoreServ, StoreVirtual 4000, P9000/XP, P6000/EVA, P2000/MSA	
FC Ports	4 or 16 Enabled 16 Max	

Family Comparison

Ethernet Ports	2 or 6 Enabled 6 Max		
SFP	B-series		
Advanced Trunking	Included with Power Pack+ or Optional Upgrade		
Adaptive Networking	Included		
Form factor	1U		
Zoning Software	Yes (Included)		
Hot plug, redundant power supplies	Yes		
Hot plug fans	Yes		

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.hp.com/go/sandesignguide**			
Storage system support	**MSA3PAR StoreServ, StoreVirtual 4000, P9000/XP, P6000/EVA, P2000/MSA**			
Ports	Up to 512 SFP	Up to 256 SFP		
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		
Hot plug fans	Yes	Yes	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	448 Gbit/sec (24 ports x	192 Gbit/sec		576 Gb/s (36 ports x 16

Family Comparison

bandwidth	16Gb/s)			Gb/s)
OS Support	**NOTE:** Please Refer to SAN Design Guide http://www.hp.com/go/sandesign or http://www.hp.com/go/sandesignguide			
Storage system Support	**MSA3PAR 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

Fibre Channel ports	Brocade 8/12c SAN Switch model: 12 - 8 Gb ports in any internal/external port combination (ships with two 8 Gb short wave SFP+s) Brocade 8/24c SAN Switch models: 16 internal 8 Gb ports and 8 external 8 Gb auto-sensing ports (ships with four 8 Gb short wave SFP+s)
Device support and Scalability guidelines	**http://h18006.www1.hp.com/products/storageworks/san/documentation.html**
Performance	8 Gb/sec 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	FL_Port, F_Port, and E_Port; self-discovery based on switch type (U_Port)
Data traffic types	Fabric switches supporting unicast and broadcast
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	POST and embedded online/offline diagnostics

Dimensions	Depth	11.00 in. (with handle protrusion)
	Height	1.13 in.
	Width	7.63 in.
	Weight	Approx. 2.91 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)

Technical Specifications

			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-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.

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Summary of Changes

Date	Version History	Action	Description of Change
07-Jun-2016	From Version 25 to 26	Changed	Updated SAN Network Advisor SKU/E-LTU and added SMART SAN details
31-Mar-2016	From Version 24 to 25	Changed	Changed made to the Overview, Sevice and Support and Family Comparison Sections. Descriptions Updated.
10-Jun-2014	From Version 23 to 24	Changed	Changes were made throughout the QuickSpecs.
18-Apr-2014	From Version 22 to 23	Removed	Hardware Product Services was removed from Service and Support, HPE Care Pack, and Warranty Information.
17-Jan-2014	From Version 21 to 22	Changed	Updated the following: Product Highlights - Advanced Fabric Services - added new note for Fabric Watch and Advanced Performance Monitoring; Software Components, Optional - added new note for Advanced Performance Monitoring and Fabric Watch
09-Dec-2013	From Version 20 to 21	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 19 to 20	Changed	Fabric Vision was added to Product Highlights 2408 FCoE CN Switch and 2408 FCoe CN Switch Power Pack+ was removed from Family Information chart
13-Sep-2013	From Version 18 to 19	Changed	Updated the Product Highlights Section - Switch Interoperability
19-Aug-2013	From Version 17 to 18	Changed	Product descriptions were revised for Hardware Services On-site Service in Hardware Product Services and Additional Options and Optional software in Configuration Information
19-Apr-2013	From Version 16 to 17	Changed	Product Highlights: Updated Switch interoperability section HPE B-Series Switches, Directors, and Routers.
08-Mar-2013	From Version 15 to 16	Changed	Family Comparison: Updated Storage system support in the Family Information sections.
15-Feb-2013	From Version 14 to 15	Changed	Changes were made in the Family Comparison Section.
31-Aug-2012	From Version 13 to 14	Changed	Changes were made in Configuration Information.
24-Aug-2012	From Version 12 to 13	Changed	Changes were made throughout the QuickSpecs.
13-Aug-2012	From Version 11 to 12	Changed	Changes were made in Overview, Configuration Information and Technical Specifications sections.
18-May-2012	From Version 10 to 11	Changed	Updated the following: Additional Options added AJ816B
26-Sep-2011	From Version 9 to 10	Changed	Updated Key Features and Benefits in the Overview, Interoperability and Access Gateway, removed Secure Fabric OS and added 16 GB and removed 2 Gb Swtiches and Directors in Product Highlights, Optional Software in the Configuration Information and completely revised Family Comparison.
08-Jul-2011	From Version 8 to 9	Changed	Updated the following sections: Product Highlights - Advanced Fabric Services, EGM, SAN Network Advisor; Configuration Information - Step 2 - Optional Software; Technical Specifications - Supported software. Replaced DCFM references with SAN Network

Summary of Changes

			Advisor
09-Jun-2011	From Version 7 to 8	Removed	Removed "StorageWorks" throughout the document.
27-Sep-2010	From Version 6 to 7	Added	PremierFlex OM3+ type cables were added to Step 2.
18-Jun-2010	From Version 5 to 6	Changed	Updated the following sections: Advanced Fabric Services; Software Components, Optional; Extended Fabrics - Server Application Optimization added; BladeSystem compatibility - added Brocade 804 8Gb FC HBA and note; Software - power pack+ Software Bundle added support note; optional software - added Server Application Optimization and DC Fabric Mgr Professional Plus Upgrade.
19-Mar-2010	From Version 4 to 5	Changed	Updated the following sections: Product Highlights; Software components standard - access gateway, EGM, Software components optional, Data Center Fabric Manager Professional, Data Center Fabric Manager Enterprise and Professional Plus, Switch interoperability; Configuration Information - Step 2 - Additional Options; Software - PowerPack+ Software Bundle; Optional Software; Family Comparison table (remove obsolete switches); Technical Specifications - media types and laser.
01-May-2009	From Version 3 to 4	Changed	Completely revised BladeSystem Compatibility in the Product Highlights section to show HPE ProLiant Servers, HPE Integrity Servers, HPE Mezzanine FC HBAs and HPE BladeSystem c-Class Enclosures supported.
		Removed	4/32 SAN Switch and 4/32 SAN Switch Power Pack from the Family Comparison charts.
20-Mar-2009	From Version 2 to 3	Changed	Updated Brocade Software 8Gb SAN Switch for HPE BladeSystem c-Class in the Family Comparison table, added F-Port Trucking supported in Access Gateway mode to ISL Trucking performance and enhancements in the Overview section and removed LC-SC for between a 1 Gb and 2/4 Gb Fibre Channel Device from Optical Cables in Step 2 of the Configuration Information section.
17-Nov-2008	From Version 1 to 2	Added	Enhanced Group Management (EGM) and Data Center Fabric Manager throughout the QuickSpecs and HPE 8Gb Long Wave B-Series 10km FC SFP +1 Pack to Step 2 in the Configuration Information section.
		Changed	Optional Software in Step 2 of the Configuration Information section.

Summary of Changes

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