QuickSpecs

Overview

The HP SN8000B and DC SAN Directors are part of the B-series portfolio and are the industry's leading Fibre Channel switching infrastructure solutions, combining breakthrough performance, scalability, and energy efficiency with long-term investment protection. The SN8000B Directors were designed to unleash the full potential of private cloud storage and virtualization. With unmatched scalability, 16 Gbps performance, reliability, and functionality, the SN8000B Directors are the strategic platform for transforming current SAN fabrics into cloud-optimized SANs. For SAN fabrics not requiring the performance of the 16 Gbps platforms, the DC SAN Directors are the most advanced 8 Gbps switching platforms in the industry.

All B-series SAN Directors are based on the same core technology and consist of two form factors. The SN8000B 8-Slot Director and DC SAN Backbone Director are both a 14U chassis and support 8 Fibre Channel blades for large enterprises to deliver maximum scalability, performance, and functionality. The SN8000B 4-Slot Director and the DC04 SAN Director are both a 9U chassis and support 4 Fibre Channel blades for mid-size enterprises as the core of their SANs.

The SN8000B SAN Directors are based on 7th generation technology and provide up to 384 16Gb or 512 8Gb FC ports. These directors also provide up to 32 QSFP based Inter Chassis Links (ICLs) which are equivalent to 128 16Gb FC ports. They support a range of fibre channel blade options including 32 port and 48 port 16Gb blades, and a 64 port 8Gb blade. They provide up to 8.2Tbps of total aggregate bandwidth and 512Gbps of slot bandwidth and are the ideal foundation for private cloud storage and highly virtualized environments.

The DC SAN Directors are based on 6th generation technology and provide up to 512 8Gb FC ports. They support several types of port blades -16, 32, 48, and 64 port 8Gb blades. They provide up to 4.1Tbps of total aggregate bandwidth and 256Gbps of slot bandwidth and are ideally suited to address the problems of traditional data centers

B-series SAN Directors offer multi protocol support through various blades with autosensing support, depending on model, for 16/10/8/4/2 Gbps Fibre Channel, FICON, FCIP, FCoE (future support for SN8000B) and data at rest Encryption.

To help minimize downtime costs, all B-series SAN Directors build upon years of innovation and leverages the core B-Series technology performing at greater than 99.999 percent uptime in the world's most demanding data centers.

The Power Pack+ set of tools monitors the network's health and performance. It is pre-configured on every SN8000B 8-Slot Director and DC SAN Backbone Director. It is available pre-configured or as an upgrade for every SN8000B 4-Slot Director and DC04 SAN Director. Power Pack+ also provides the foundation for integration into HP storage management tools, enabling infrastructure management through a single-pane-of-glass. Adaptive Networking is a new feature of the Power Pack+ tools which helps improve fabric behavior and ensures ample bandwidth for critical applications.

New features exclusively available on the SN8000B SAN Directors are:

There is a common ICL POD (Ports on Demand) license between SN8000B 8-Slot and 4-Slot chassis. A single ICL POD license will enable 16 QSFP ICLs or 1Tbps of bandwidth in both SN8000B 8-Slot and 4-Slot Director. A subsequent ICL POD license will enable an additional 16 QSFP ICLs or 1Tbps in SN8000B 8-Slot Director.

SN8000B SAN Directors allow customers to configure a port in any 16Gb blade at 10Gb FC speed. This is required for DWDM metro connectivity and will be enabled by a slot based 10GE license.

SN8000B SAN Directors provide features like in-flight encryption and compression as part of base Fabric Operating System (FOS) with any 16Gb blade. There are new diagnostic features (Diagnostic-Port aka D-Port, Optic Health Monitoring) that will allow functional and stress testing of cables and optics. They use the capabilities of FOS, Director ASIC, and B-series 16Gb optic and are available on 16Gb port blade with 16Gb B-series optics without any additional software license.

Overview
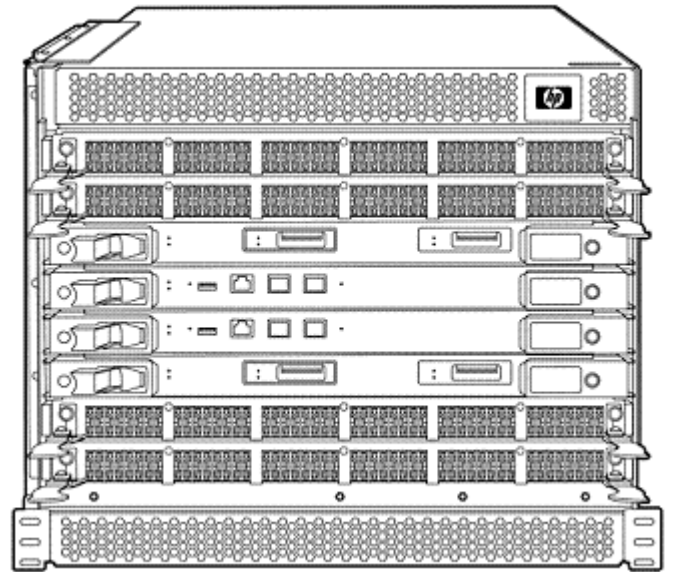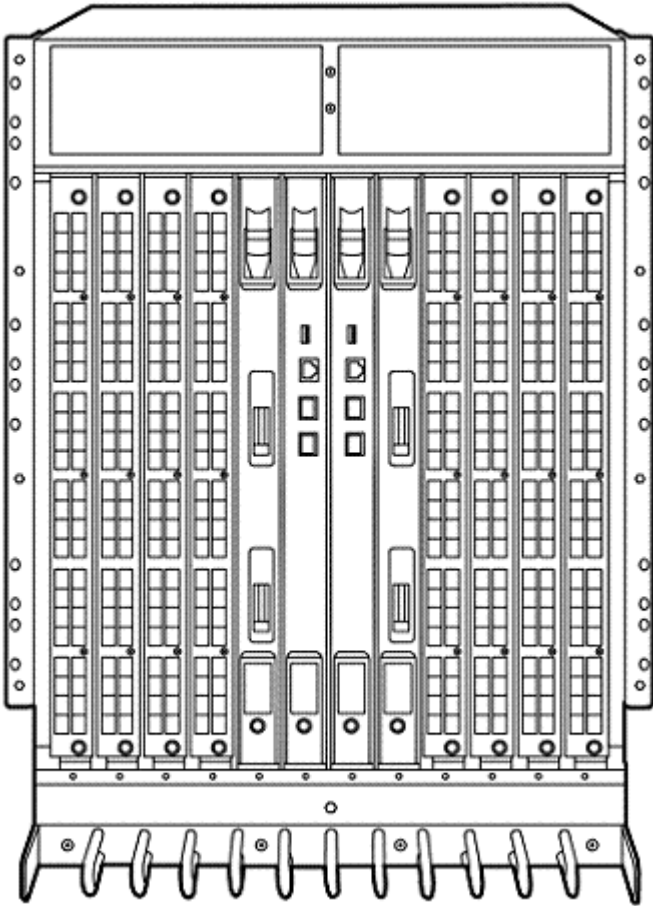
HP SN8000B 8-Slot SAN Director and DC SAN Backbone
Director (shown)
(identical chassis with different core blades and Fibre Channel
blades)

HP SN8000B 4-Slot Director and DC04 SAN Director (shown)
(identical chassis with different core blades and Fibre Channel
blades)

What's New

- HP SN8000B SAN Directors with 32-port and 48-port 16 Gbps and 64-port 8Gbps director blades which provide up to 8.2 Tbps of total aggregate bandwidth making them the ideal foundation for private cloud storage and highly virtualized environments.
- HP SAN Network Advisor provides comprehensive management of data center SAN fabrics, including configuration, monitoring, diagnostics, best-practices validation, and management of B-series SAN Directors, SAN Switches, and Host Bus Adapters (HBAs).

QuickSpecs

Product Highlights

SN8000B SAN Director Highlights

HP SN8000B SAN Directors are the industry's most powerful Fibre Channel switching infrastructure solutions, providing the most reliable, scalable, high-performance foundation for private cloud storage and highly virtualized environments. They are designed to increase business agility while providing non-stop access to information and reducing infrastructure and administrative costs. The SN8000B director family:

- Unleashes the full potential of private cloud storage with unmatched scalability, performance, and reliability
- Enables simpler, flatter, low-latency chassis connectivity to reduce network complexity, management, and costs
- Optimizes data center connectivity over distance with integrated high-performance metro and global connectivity
- Simplifies and centralizes end-to-end Storage Area Network (SAN) management with comprehensive diagnostics, monitoring, and automation
- Maximizes performance for I/O- and bandwidth-intensive applications with more than seven times the performance of competitive offerings
- Protects investments in existing SAN fabrics and automation tools while reducing operational costs and minimizing business disruption

SN8000B Performance

- **SN8000B 8-Slot SAN Director**
  - 384 ports operating simultaneously at full 16Gb speed (maximum)
  - 8 Tbit/sec of chassis bandwidth
  - 2 Tbit/sec of Inter Chassis Link (ICL) bandwidth (freeing up to 128 16 Gb ports for server, storage, and fabric connections)
- **SN8000B 4-Slot Director**
  - 192 ports operating simultaneously at full 16Gb speed (maximum)
  - 4 Tbit/sec of chassis bandwidth
  - 1 Tbit/sec of Inter Chassis Link (ICL) bandwidth (freeing up to 64 16 Gb ports for server, storage, and fabric connections)

DC SAN Director Highlights

HP DC SAN Directors are the most advanced 8 Gbps switching platforms in the industry. They provide leading reliability, scalability, and performance for traditional data center environments. The DC SAN Directors family:

- Consolidates data center connectivity for highly available, lossless networking between applications and data, as well as between servers and storage networks
- Provides an adaptive platform for ensuring Quality of Service (QoS) to virtualized applications and data in server, networking, and storage complexes
- Scales up to eight times more than traditional SAN directors to support virtualized applications that leverage shared storage environments
- Improves energy efficiency by combining higher bandwidth with lower power consumption than existing solutions

QuickSpecs

Product Highlights

DC SAN Director Performance	- DC SAN Backbone Director 512 ports at 8Gb speed 4 Tbit/sec of chassis bandwidth 512 Gbit/sec of Inter Chassis Link (ICL) bandwidth (freeing up to 64 8Gb ports for server, storage, and fabric connections) - DC04 SAN Director 256 ports at 8Gb speed 2 Tbit/sec of chassis bandwidth 256 Gbit/sec of Inter Chassis Link (ICL) bandwidth (freeing up to 32 8Gb ports for server, storage, and fabric connections)

SAN scalability

The SN8000B 8-Slot Director scales up to 384 16 Gbps ports or 512 8Gbps ports in a single switch domain.

The SN8000B 4-Slot Director scales up to 192 16 Gbps ports or 256 8 Gbps ports in a single switch domain.

The DC SAN Backbone Director scales up to 512 8Gbps ports in a single switch domain.

The DC04 SAN Director scales up to 256 8 Gbps ports in a single switch domain.

Please see the following web site for SAN configuration support information:
http://www.hp.com/go/sandesignguide.

High-availability features

- Redundant, hot-swappable components
- Separate Control Processor (CP) and Core (CR) switching blades
- No active components on the backplane
- Redundant hot swappable power and cooling subsystems
- Enhanced data integrity on all data paths
- Fabric Shortest Path First (FSPF) rerouting around failed links
- Integration with SNMP managers
- Automatic Control Processor fail over
- Non-disruptive "hot" software code loads and activation
- Easy configuration, save and restore

Advanced Fabric Services

- ISL Trunking
- Hardware Enforced Zoning
- Frame Filtering
- Web Tools
- Enhanced Group Management (EGM)
- End-to-End Performance Analysis
- Extended Fabrics
- Fabric Watch
- Adaptive Networking
- Server Application Optimization (SAO)
- SAN Network Advisor

QuickSpecs

Product Highlights

Cabinet Support	22U, 36U, and 42U; 5000, 9,000 and 10,000 and 10,000 G2 series Cabinets are supported
	25U, 33U, and 41U HP system/e cabs
	NOTE: A maximum of two B-series SAN Director switches currently are supported to ship configured to order from the factory in a 42U, 10000 (10KG2) cabinet. However, 220V PDUs must be configured because 110V PDUs are not supported.

Software Components, Standard

Remote Switch	The Remote Switch fabric functions with the aid of a bridging device, or network bridge. The network bridge supports Fibre Channel physical interfaces, as well as secondary non-Fibre Channel FCIP physical interfaces.
Frame Filtering	An ASIC based capability in the 4 Gb, 8 Gb, and 16 Gb family of SAN switches 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.
Advanced Zoning	WWN Zoning and Access Control are included in the DC SAN Directors' hardware. Administrators can organize a physical fabric into logical groups and prevent unauthorized access by devices outside the Zone.
WebTools	WebTools is an intuitive and easy-to-use graphical interface that enables organizations to install and configure an SN8000B or DC SAN Director. SAN administrators can perform the initial configuration and basic management tasks by using a Java-capable Web browser from standard laptops, desktop PCs, or workstations 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.
	HP 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 management application is right for them - SAN Network Advisor Professional, Professional Plus, or Enterprise.

SAN Director Power Pack+ Software Bundle	The SAN Director Power Pack+ Software bundle includes: • Extended Fabric • ISL Trunking • Adaptive Networking • Advanced Performance Monitoring • Fabric Watch • Server Application Optimization (SAO) NOTE: Optional software for the SN8000B 4-Slot (QK712A) and DC04 Base SAN Director (AR478A)

Product Highlights

Extended Fabric	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.

FICON Support	Optional FICON CUP license which enables host control of switches in mainframe environments. FICON Accelerator is an optional software license that increases the speed of FICON disk and tape read and writes, while maintaining the integrity of command and acknowledgement sequences.

ISL Trunking	For high performance enhanced Trunking, this license logically groups up to eight E-ports to provide a high bandwidth trunk between two switches. Each 8 Gb or 16 Gb slot needs its own license. The switch operating system views the trunk as a single, high bandwidth resource (up to 64 Gb/s for 8 Gb, or up to 128 Gb/s for 16Gb) when routing connections between switches. Connections are load-balanced across the individual links, which comprise the logical trunk group.

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. TIZs use failover by default but it can be disabled if traffic should stop if a preferred path fails. TIZ can be used to manually map out traffic flows within a fabric based on application, priority, and topology.

Advanced Performance Monitor	This enabling technology helps administrators monitor and watch specific fabric metrics -- 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 maintaining overall balanced performance.

Top Talkers is a component of Advanced Performance Monitoring and tracks the top traffic flows for hosts and targets for a switch port or a switch. Top Talkers can help identify the ports that need certain Quality of Service (QoS) attributes or it can help determine portions of the physical topology that need reconfiguration. |

Fabric Watch	Fabric Watch enables each switch to monitor 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.

Product Highlights

Server Application Optimization (SAO)	Server Application Optimization (SAO) license improves overall application performance for physical servers and virtual machines. SAO, when deployed with B-Series Fibre Channel HBAs, extends B-Series Adaptive Networking from the B-series 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 license must be installed on the edge (server connected) switch
- Adaptive networking (AN) license must be installed on the edge (server connected) switch
- SAO requires B-series HBA installed in the server

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

- Allows management of a single Fabric OS (FOS) fabric (up to a 1,000 switch ports)
- Performs group switch management beyond the scope of Web Tools
- Does not offer management of the SN8000B 8-Slot, DC SAN Backbone Directors, or FICON.

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

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 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 Enterprise

SAN Network Advisor Enterprise and Professional+	HP SAN Network Advisor Enterprise and Professional+ are the enterprise-class products that support FOSt. 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 HP SAN Network Advisor Professional+ provides the same feature set except for support for the SN8000B 8-Slot Director, DC SAN Backbone Director, and FICON.

HP SAN Network Advisor Enterprise delivers unprecedented scalability, up to 24 fabrics and 9,000 switch ports, while HP SAN Network Advisor Professional+ scales to 4 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.

Optional Software:

HP SN8000B Inter Chassis Link License	Inter Chassis Links (ICLs) harness unused ports to connect the switching backplane of SAN Directors. The SN8000B SAN Directors offer Second-generation ICL technology which includes new optical ports, higher port density, and support for standard optical cables up to 50 meters. ICLs can connect up to six SN8000B Directors, enabling flatter, faster, and simpler fabrics that increase consolidation while reducing network complexity and costs.

ICLs enable scalable core edge and active-active mesh chassis topologies. These high-density chassis topologies reduce inter-switch cabling by 75 percent and free up to 33 percent of ports for server and storage. This maximizes overall port density in the lowest amount of rack space.

Product Highlights

The SN8000B 8-Slot Director has a total of 32 ICL ports (16 per core switching blade) that deliver 2.1 Tbps of bandwidth. This is equivalent to 128 16 Gbps ISLs. The SN8000B 4-Slot Director has a total of 16 ICL ports (eight per core switching blade) that deliver 1 Tbps of bandwidth. This is equivalent to 64 16 Gbps ISLs.

There is a common ICL POD (Ports on Demand) license between SN8000 8-Slot and 4-Slot chassis. A single ICL POD license will enable 16 QSFP ICLs or 1Tbps of bandwidth in both SN8000 8-Slot and 4-Slot SAN Director. A subsequent ICL POD license will enable an additional 16 QSFP ICLs or 1Tbps in a SN8000B 8-Slot Director.

NOTE: ICL licenses are required for each SN8000B SAN Director. ICL QSFPs and optical cables are required for connectivity.

HP DC SAN Director 16 Inter-Chassis Link LTU

Inter Chassis Links (ICLs) harness unused ports to connect the switching backplane of one DC SAN Director to the switching backplane of a second DC SAN Director.

The DC SAN Backbone Director has a total of 16 ICL ports (8 per core switching blade) that deliver 1 Tbps of bandwidth. This is equivalent to 64 8 Gbps ISLs. The DC04 SAN Director has a total of 8 ICL ports (four per core switching blade) that deliver 512 Gbps of bandwidth. This is equivalent to 32 16 Gbps ISLs.

The 16 Inter Chassis Link LTU enables 1Tbps of bandwidth in the DC SAN Backbone Director.

NOTE: Two ICL licenses are required for ICL connectivity (one license required for each DC SAN Director). HP DC SAN Backbone Director Switch Inter-Chassis Link LTU (T4641) is only valid for DC SAN Backbone Directors. AR480A required for ICL copper cable connectivity.

HP DC SAN Director 8 Inter-Chassis Link LTU

Inter Chassis Links (ICLs) harness unused ports to connect the switching backplane of one DC SAN Director to the switching backplane of a second DC SAN Director.

The DC SAN Backbone Director has a total of 16 ICL ports (8 per core switching blade) that deliver 1 Tbps of bandwidth. This is equivalent to 64 8 Gbps ISLs. The DC04 SAN Director has a total of 8 ICL ports (four per core switching blade) that deliver 512 Gbps of bandwidth. This is equivalent to 328Gbps ISLs.

The 8 Inter Chassis Link LTU enables 512 Gbps of bandwidth in the DC SAN Backbone Director and the DC04 SAN Director.

NOTE: Two ICL licenses are required for ICL connectivity (one license required for each DC SAN Director). AR480A required for ICL copper cable connectivity.

HP B-Series SAN Director FICON CUP Active License

Optional license feature provides Control Unit Port (CUP) in-band management function designed to allow mainframe applications to perform configuration, monitoring, management and statistics collection. These applications include System Automation for OS/390 (SA/390), Dynamic Channel Management Facility (DCM) and Resource Management Facility (RMF). Hardware- enforced FICON and FCP port zoning enhances separation with intermix operation.

NOTE: Supported for all B-series SAN Directors.

Product Highlights

HP DC SAN Director Switch Multiprotocol Ext Blade FICON CUP Accelerator Upgrade LTU	The FICON Accelerator software license increases the speed of FICON disk and tape read and writes, while maintaining the integrity of command and acknowledgement sequences NOTE: Supported for the MP Extension Blade (AP865A) for all B-series SAN Directors.
HP B-series SAN Backbone Director Integrated Routing LTU	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 blade or switch. 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. NOTE: Supported for all B-series SAN Directors.
HP MP Blade Performance Extension LTU	Optional software license to activate the high performance extension services. The HP MPR Blade provides two types of SAN Services:FC-FC Subnet Routing Service for SAN island consolidation: Logically connect devices in multiple SAN fabrics to share storage resources-from any fabric regardless of distance-with the administration and fault isolation benefits of separately managed fabrics. FCIP and FC Tunneling Service for SAN extension over distance: Either seamlessly and reliably extends HP B-Series SANs across MAN and WAN IP networks or dark fiber and xWDM Fibre Channel networks with high performance extension services, fully integrated with HP CA solutions for EVA and XP. FC and FCIP extension services are mutually exclusive. NOTE: HP MP Blade Performance Extension LTU (T4427A) is an optional license for HP Multi-Protocol Router blade (AG461B) for the DC SAN Directors.
10GbE and 10Gb FC Performance Upgrade	Optional software license to activate high performance for either 10GbE or 10Gb Fibre Channel connectivity. 10GbE Performance Upgrade LTU for MP Extension Blade Enables10 Gigabit Ethernet ports for the MP Extension Blade. Options for available Ethernet connectivity are: ● (10) 1 GbE ports and (1) 10 GbE port or ● (2) 10 GbE ports 10Gb Performance Upgrade LTU for 16Gb Fibre Channel Blades Enables customers to configure the first 8 ports of a 16Gb Fibre Channel blade at 10Gb Fibre Channel speed. This is required for DWDM and dark fiber metro connectivity. NOTE: The optional 10GbE and 10Gb Fibre Channel performance upgrade features are mutually exclusive. The 10GbE Performance upgrade feature is available on the MP Extension Blade (AP865A) for all B-series SAN Directors. The 10Gb Performance Upgrade feature is available for 16Gb Fibre Channel Blades for the SN8000B Directors. Requires 10Gb optics (QK726A and/or QK727A). The license is available on an individual SAN Director slot basis.

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Product Highlights

HP MP Extension Blade Advance Upgrade	Optional software license for the MP Extension Blade which enables two advanced extension features: FCIP Trunking and Adaptive Rate Limiting.

FCIP Trunking:

FCIP Trunking feature allows multiple IP source and destination address pairs (defined as FCIP circuits) via multiple of the 1 GE and 10 GE interfaces to provide high bandwidth FCIP tunnel and failover resiliency. In addition, each FCIP circuit supports four QoS classes (Class-F, Hi, Medium and Low Priority), each as a TCP connection.

Adaptive Rate Limiting:

An FCIP tunnel can be configured a minimum (guaranteed) committed rate as well as a maximum committed rate. FCIP tunnel will run at least the minimum rate. If additional bandwidth is needed, the committed rate will grow until the channel traffic demand is satisfied, maximum committed rate is reached, or the throughput capabilities of the network are reached.

NOTE: Supported for the MP Extension Blade (AP865A) for the SN8000B and DC SAN Directors.

HP Encryption Blade Performance Upgrade

Optional software license for the Encryption Blade which enables scalable encryption processing power. The Encryption Blade has a standard capacity of 48 Gb/s of encryption processing power. Additional encryption processing power can be added for disk I/O by purchasing and installing an Encryption Blade Disk Performance Upgrade. When the performance upgrade license is applied, encryption processing power of up to 96 Gb/s is available.

NOTE: Supported for the Encryption Blade (AR945A) for all B-series SAN Directors. The HP Encryption Blade supports both disk and tape based encryption. However, the HP Encryption Blade Performance Upgrade is only applicable to disk based encryption because tape based encryption performance is limited to 48Gb/s.

Service and Support, HP Care Pack, and Warranty Information

Warranty	SN8000B 8-Slot SAN Director	(2-2-2) Hardware Warranty - Hardware Warranty - Two-year on-site warranty, 24x7, 4-hour remote response, installation not included.
	SN8000B 4-Slot SAN Director	(2-2-2) Hardware Warranty - Hardware Warranty - Two-year on-site warranty, 24x7, 4-hour remote response, installation not included.
	DC SAN Backbone Director	(2-2-2) Hardware Warranty - Hardware Warranty - Two-year on-site warranty, 24x7, 4-hour remote response, installation not included.
	DC04 SAN Director	(2-2-2) Hardware Warranty - Hardware Warranty - Two-year on-site warranty, 24x7, 4-hour remote response, installation not included.

NOTE: The hardware warranty covers firmware and embedded non-saleable software. Saleable software carries its own warranty, see below.

Software Warranty - HP warrants only that the software media will be free of physical defects for a period of ninety (90) days from delivery.

EXCLUSIVE REMEDY: The entire liability of HP 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 HP in the country in which you obtained the software.

QuickSpecs

Family Information

Features	8/8 SAN Switch Base and 8/8 SAN Switch	8/24 SAN Switch Base	8/40 SAN Switch and 8/40 SAN Switch Power Pack+	8/80 SAN Switch and 8/80 SAN Switch Power Pack+	SN6000B 16Gb FC Switch and SN6000B 16Gb FC Power Pack+
Targeted Environment	Workgroups, Departments	Workgroups, Departments	Workgroups, Departments	Workgroups, Departments	Workgroups, Departments
Fibre Channel Port Bandwidth	8Gbit/sec	8Gbit/sec	8Gbit/sec	8Gbit/sec	16Gbit/sec
Aggregate device bandwidth	128 - 384 Gbit/sec end-to-end	256 - 384 Gbit/sec end-to-end	384 - 640 Gbit/sec end-to-end	768 - 1280 Gbit/sec end-to-end	768 - 1536 Gbit/sec end-to-end
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	P9000/XP, 3PAR, P6000/EVA, P2000/MSA				
FC Ports	8 Enabled 24 Max	16 Enabled 24 Max	24 Enabled 40 Max	48 Enabled 80 Max	24 or 48 Enabled 48 Max
SFP	B-series	B-series	B-series	B-series	B-series
Advanced Trunking	Optional Upgrade	Included with Power Pack+ or Optional Upgrade	Included with Power Pack+ or Optional Upgrade	Included with Power Pack+ or Optional Upgrade	Included with Power Pack+ or Optional Upgrade
Adaptive Networking	Optional Upgrade	Included with Power Pack+ or Optional Upgrade	Included with Power Pack+ or Optional Upgrade	Included with Power Pack+ or Optional Upgrade	Included with Power Pack+ or Optional Upgrade
Form factor	1U	1U	1U	2U	1U
Zoning Software	Yes (Included)	Yes (Included)	Yes (Included)	Yes (Included)	Yes (Included)
Hot plug, redundant power supplies	No	No	Yes	Yes	Yes
Hot plug fans	No	No	Yes	Yes	Yes (integrated with power supply)

Features	2408 FCoE CN Switch and 2408 FCoE CN Switch Power Pack+	1606 Extension SAN Switch	Encryption SAN Switch
Targeted Environment	Workgroups, Departments	Data Centers	Data Centers
Fibre Channel Port Bandwidth	8Gbit/sec	8Gbit/sec	8Gbit/sec
Ethernet	10Gbit/sec Converged Enhanced Ethernet	1Gbit/sec Ethernet	N/A
Aggregate device bandwidth			512 Gbit/sec end-to-end
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	P9000/XP, 3PAR, P6000/EVA, P2000/MSA		
FC Ports	8 Enabled 8 Max	4 or 16 Enabled 16 Max	32 Enabled 32 Max
Ethernet Ports	24 Enabled 24 Max	2 or 6 Enabled 6 Max	N/A

Family Information

SFP	B-series	B-series	B-series
Advanced Trunking	Included with Power Pack+ or Optional Upgrade	Included with Power Pack+ or Optional Upgrade	Optional Upgrade
Adaptive Networking	No	Included with Power Pack+ or Optional Upgrade	Optional Upgrade
Form factor	1U	1U	2U
Zoning Software	Yes (Included)	Yes (Included)	Yes (Included)
Hot plug, redundant power supplies	Yes	Yes	Yes
Hot plug fans	Yes	Yes	

Features	SN8000B 8-Slot SAN Director Power Pack+	SN8000B 4-Slot SAN Director and 4-Slot SAN Director Power Pack+	DC SAN Backbone Director Power Pack+	DC04 SAN Director and DC04 SAN Director Power Pack+
Targeted Environment	Cloud Optimized Data Centers	Cloud Optimized Data Centers	Traditional Data Centers	Traditional Data Centers
Port Bandwidth	Up to 16Gbit/sec	Up to 16Gbit/sec	8Gbit/sec	8Gbit/sec
Aggregate device bandwidth	8.2 Tbit/sec end-to-end	4.1 Tbit/sec end-to-end	4.1 Tbit/sec end-to-end	2 Tbit/sec end-to-end
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	P9000/XP, 3PAR, P6000/EVA, P2000/MSA			
Ports	Up to 512 SFP	Up to 256 SFP	Up to 512	Up to 256
SFP	B-series	B-series	B-series	B-series
Advanced Trunking	Included with Power Pack	Included with Power Pack or Optional Upgrade	Included with Power Pack+	Included with Power Pack+ or Optional
Adaptive Networking	Included with Power Pack	Included with Power Pack or Optional Upgrade	Included with Power Pack+	Included with Power Pack+ or Optional
Form factor	14U	9U	14U	9U
Zoning Software	Yes (included)	Yes (included)	Yes (Included)	Yes (Included)
Hot plug, redundant power supplies	Yes	Yes	Yes	Yes
Hot plug fans	Yes	Yes	Yes	Yes

QuickSpecs

Family Information

Features	Embedded SAN Switch for EVA4400	Brocade 8Gb SAN Switch for HP c-Class BladeSystem	B-Series Multi-protocol Router Blade	B-Series Multi-protocol Extension Blade
Targeted Environment	Workgroups, Departments	Workgroups, Departments	Data Centers	Data Centers
Port Bandwidth	8Gbit/sec	8Gbit/sec	4 Gbit/sec FC Ethernet: 1 Gbit/sec	8 Gbit/sec FC Ethernet: 1 or 10 Gbit/sec
Aggregate device bandwidth	320 Gbit/sec end-to-end	384 Gbit/sec end-to-end	N/A	N/A
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	P9000/XP, 3PAR, P6000/EVA, P2000/MSA			
Ports	20 external per EVA Controller Pair	4 or 8 external / 8 or 16 internal	18 ports: 16 FC and 2 Gigabit Ethernet	16 8Gb FC and 10 1GbE or 2 10GbE
SFP	B-series	B-series	HP	B-series
Advanced Trunking	Included with Power Pack+ or Optional Upgrade	Included with Power Pack+ or Optional Upgrade	Optional Upgrade to chassis	Optional Upgrade to chassis
Adaptive Networking	Included with Power Pack+ or Optional Upgrade	Included with Power Pack+ or Optional Upgrade	Optional Upgrade to chassis	Optional Upgrade to chassis
Form factor	Embedded	Embedded	Blade in 4/256, DC SAN Back, or DC04 SAN Dir	Blade in SN8000B and DC SAN Directors
Zoning Software	Embedded	Yes (Included)	Yes (Included)	Yes (Included)
Hot plug, redundant power supplies	Yes, in EVA 4400 Enclosure	Yes, in BladeSystem Enclosure	Yes, in director chassis	Yes, in director chassis
Hot plug fans	Yes, in EVA 4400 Enclosure	Yes, in BladeSystem Enclosure	Yes, in director chassis	Yes, in director chassis

Configuration Information

Step 1 – Base Configuration and Power Pack

Select one:

Model

Model Description	Part Number
HP SN8000B 8-Slot Power Pack+ SAN Backbone Director	QK710A

16Gb 384-port or 8Gb 512-port capable Fibre Channel Director, 2 control processors, 2 16Gb core blades, 2 power supplies, 1 2 GB USB Device, rack rails, cable comb Zoning, Web tools, Enhanced Group Management, Adaptive Networking, Advanced Performance Monitor, Fabric Watch, ISL Trunking, Extended Fabrics, Server Application Optimization, and SAN Network Advisor Enterprise Software 75 day trial kit (separate DVD). Does not include Port blades or SFPs.

HP SN8000B 4-Slot Power Pack+ SAN Director	QK711A

16Gb 192-port or 256-port capable Fibre Channel Director, 2 control processors, 2 16Gb core blades, 2 power supplies, 1 2 GB USB Device, rack rails, cable comb Zoning, Web tools, Enhanced Group Management, Adaptive Networking, Advanced Performance Monitor, Fabric Watch, ISL Trunking, Extended Fabrics, Server Application Optimization, SAN Network Advisor Professional Software (separate DVD), and SAN Network Advisor Enterprise Software 75 day trial kit (separate DVD). Does not include Port blades or SFPs.

HP SN8000B 4-Slot SAN Director	QK712A

16Gb 192-port or 8Gb 256-port capable Fibre Channel Director, 2 control processors, 2 16Gb core blades, 2 power supplies, 1 2 GB USB Device, rack rails, cable comb Zoning, Web tools, Enhanced Group Management, and SAN Network Advisor Professional (separate DVD), and SAN Network Advisor Enterprise Software 75 day trial kit (separate DVD). Does not include Port blades or SFPs.

HP DC SAN Backbone Director Power Pack+	AK857B

8Gb 512-port capable Fibre Channel Director , 2 control processors, 2 power supplies, 2 8Gb core blades,1 2 GB USB Device, rack rails, cable comb Zoning, Web tools, Enhanced Group Management, Adaptive Networking, Advanced Performance Monitor, Fabric Watch, ISL Trunking, Extended Fabrics, Server Application Optimization, and SAN Network Advisor Enterprise Software 75 day trial kit (separate DVD). Does not include Port blades or SFPs.

HP DC04 SAN Director Power Pack+	AR479A

8Gb 256-port capable Fibre Channel Director , 2 control processors, 2 power supplies, 2 8Gb core blades, 1 2 GB USB Device, rack rails, cable comb Zoning, Web tools, Enhanced Group Management, Adaptive Networking, Advanced Performance Monitor, Fabric Watch, ISL Trunking, Extended Fabrics, Server Application Optimization, SAN Network Advisor Professional Software (separate DVD), and SAN Network Advisor Enterprise Software 75 day trial kit (separate DVD). Does not include Port blades or SFPs.

HP DC04 SAN Director	AR478A

8Gb 256-port capable Fibre Channel Director , 2 control processors, 2 power supplies, 2 8Gb core blades, 1 2 GB USB Device, rack rails, cable comb Zoning, Web tools, Enhanced Group Management, and SAN Network Advisor Professional (separate DVD), and SAN Network Advisor Enterprise Software 75 day trial kit (separate DVD). Does not include Port blades or SFPs.

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Step 2 – Additional Port Configurations

Model Description	Quantity	Part Number
HP SN8000B 16Gb 32-port blade		QK713A
32-port 16Gb/s Director Blade NOTE: Only supported in SN8000B Directors (QK710A, QK711A, and QK712A). Requires B-series optical SFP transceivers for each port as listed below.	Add the appropriate quantity of 32-port blades to meet requirements	
HP SN8000B 16Gb 48-port blade		QK714A
48-port 16Gb/s Director Blade NOTE: Only supported in SN8000B Directors (QK710A, QK711A, and QK712A). Requires B-series optical SFP transceivers for each port as listed below.	Add the appropriate quantity of 48-port blades to meet requirements	
HP 8/16 port blade		AK858B
16-port 8Gb/s Director Blade NOTE: Only supported in DC SAN Directors (AK857B, AR479A, AR478A). Requires B-series optical SFP transceivers for each port as listed below.	Add the appropriate quantity of 16-port blades to meet requirements	
HP 8/32 port blade		AK859B
32-port 8Gb/s Director Blade NOTE: Only supported in DC SAN Directors (AK857B, AR479A, AR478A). Requires B-series optical SFP transceivers for each port as listed below.	Add the appropriate quantity of 32-port blades to meet requirements	
HP 8/48 port blade		AK860B
48-port 8 Gb/s Director Blade NOTE: Only supported in DC SAN Directors (AK857B, AR479A, AR478A). Requires B-series optical SFP transceivers for each port as listed below.	Add the appropriate quantity of 48-port blades to meet requirements	
HP 8/64 port blade		BK798A
64-port 8 Gb/s Director Blade NOTE: Supported in all B-series SAN Directors. Includes 64 mSFPs. Requires high density cables or adaptors listed below.	Add the appropriate quantity of 64-port blades to meet requirements	
HP Encryption FC Blade		AR945A
16-port 8 Gb/s Encryption Director Blade NOTE: Encryption with the Encryption SAN Switch and the HP Encryption FC Blade is not fully supported with Thin Provisioned LUNs in storage arrays. HP recommends LUNs to be encrypted are	Add maximum of 4	

Configuration Information

fully provisioned. For LUNs that are already thin provisioned and then encryption enabled, be aware that enabling First Time Encryption (FTE) or Re-Key will make the LUN fully provisioned. This is applicable to any array in general.
NOTE: Requires HP Enterprise Secure Key Manager (ESKM) or HP Secure Key Manager (SKM) for Key Management (creating, distributing, authenticating, and storing encryption keys to ensure proper use). Supported in all B-series SAN Directors. Requires B-series optical SFP transceivers for each port as listed below.

HP 10/24 Blade for DC SAN Directors		AP866A
24 10 GbE CEE ports and 32 8Gb FC ports to the core switch over the backplane for FCoE converged SAN and LAN traffic. NOTE: Only supported in DC SAN Directors (AK857B, AR479A, AR478A). The 10/24 Blade is only compatible with 8Gb or 10Gb blades in the same chassis. NOTE: Requires B-series CEE optical SFP transceivers for each port as listed below.	Add maximum of 4	

HP Multi Protocol Extension Blade		AP865A
22 enabled ports (12 8Gb Fibre Channel and 10 1 GbE) multi-protocol extension blade for SAN connectivity over FCIP. Additional 1 or 2 10GbE ports require 10GbE performance upgrade (TA751A) which will impact the number of available 1 GbE ports. NOTE: Supported in all B-series SAN Directors. Requires B-series optical SFP transceivers for each port as listed below.	Add maximum of 4	

HP Multi-protocol Router Blade for B-Series		AG461B
18 ports (16 4Gb Fibre Channel and 2 1GbE) multi-protocol router providing 2 types of SAN services: FC subnet routing, and FCIP tunneling. Includes rack mount kit, advanced zoning and web tools. NOTE: Only supported in DC SAN Directors (AK857B, AR479A, AR478A).	Add the appropriate quantity of 18-port blades to meet requirements	

Add Software:

HP Director Power Pack+ SAN Director Switch		TA640A
Adaptive Networking, Fabric Watch, ISL Trunking, Extended Fabric, Advanced Performance Monitoring, Server Application Optimization NOTE: Optional software for only the SN8000B 4-Slot Director (QK711A) and the DC04 SAN Director (AR478A)		

HP SN8000B Inter Chassis Link License		TC351A
Inter Chassis Links (ICLs) harness unused ports to connect the switching backplane of one SN8000B Director with the switching backplane of a second SN8000B Director. Each ICL connection is the equivalent of 16 fixed speed 16Gbit/sec E_PORTs. This additional full duplex connection provides up to an additional 2 Tbit/sec of bandwidth and does not consume usable ports. There is a common ICL POD (Ports on Demand) license between SN8000 8-Slot and 4-Slot chassis. A single ICL POD license will enable 16 QSFP ICLs or 1Tbps of bandwidth in both SN8000B 8-Slot and 4-Slot SAN Director. A subsequent ICL POD license will enable an additional 16 QSFP ICLs or 1Tbps in a SN8000B 8-Slot	A maximum of six SN8000B SAN Directors may be connected using ICL connectivity	

Configuration Information

Director.

NOTE: Each SN8000B SAN Director requires a license for ICL connectivity (TC351A). Also requires QSFP (QK728A) and cables for ICL connectivity (QK729 and/or QK731A).

HP DC SAN Director 16 Inter-Chassis Link LTU		TA641A
Inter Chassis Links (ICLs) harness unused ports to connect the switching backplane of one DC SAN Backbone with the switching backplane of a second DC SAN Backbone Director or DC04 SAN Director. Each ICL connection is the equivalent of 16 fixed speed 8Gbit/sec E_PORTs. This additional full duplex connection provides an additional 1 Tbit/sec of bandwidth and does not consume usable ports. ICL connections operate as hardware trunked ISLs. NOTE: Each DC SAN Director requires a license for ICL connectivity. TA641A is only supported on DC SAN Backbone Director. HP DC SAN Director ICL Cable Kit (AR480A) is required for the physical connection.	A maximum of three DC SAN Directors may be connected using ICL connectivity	
HP DC SAN Director 8 Inter-Chassis Link LTU		TA642A
With the 8 port ICL licenses you could connect up to 3 DC04 directors, or 3 DC SAN Backbone Directors' at half the available bandwidth, or any combination of above models totaling 3. Each ICL connection is the equivalent of 8 fixed speed 8Gbit/sec E_PORTs. This additional full duplex connection provides an additional 512 Gbit/sec of bandwidth and does not consume usable ports. ICL connections operate as hardware trunked ISLs. NOTE: Each DC SAN Director requires a license for ICL connectivity. TA642A is supported on DC SAN Backbone Director or DC04 SAN Director. HP DC SAN Director ICL Cable Kit (AR480A) is required for the physical connection.	A maximum of three DC SAN Directors may be connected using ICL connectivity	

HP SN8000B SAN Director Inter Chassis Link Cable	HP Premier Flex MPO/MPO Multi-mode OM4 8 fiber 10m Cable NOTE: Required for TC351A.	One cable/ICL connector supports 4 ports of ICL connectivity between 2 chassis	QK729A
	HP Premier Flex MPO/MPO Multi-mode OM4 8 fiber 50m Cable NOTE: Required for TC351A.	One cable/ICL connector supports 4 ports of connectivity between 2 chassis	QK731A
	HP DC SAN Director Inter-Chassis Link Cable Kit		AR480A
	Four 2 meter copper cables used to connect two DC SAN Directors via an Inter Chassis Link (ICL) License NOTE: Required for TA641A and TA642A.	One Kit is required for each ICL connection	
	HP 8-Slot SAN Director Integrated Routing		T5530A
	HP SN8000B 8-Slot and SAN Backbone Director Integrated Routing LTU NOTE: Optional Integrated Routing License for the SN8000B 8-Slot Director (QK710A) and the DC SAN Backbone Director (AK857B).		
	HP 4-Slot SAN Director Integrated Routing		TA643A

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HP SN8000B 4-Slot and DC04 SAN Director Switch Integrated Routing LTU NOTE: Optional Integrated Routing License for theSN8000B 4-Slot Director (QK711A and QK712A) and DC04 SAN Director (AR479A and AR478A).	
HP 10GbE Performance Upgrade for MP Extension Blade or 10Gb FC for 16Gb FC blades	TA751A

Optional software license to activate high performance for either 10GbE or 10Gb Fibre Channel connectivity.

10GbE Performance Upgrade LTU for MP Extension Blade

Enables10 Gigabit Ethernet ports for the MP Extension Blade. Options for available Ethernet connectivity are:

- (10) 1 GbE ports and (1) 10 GbE port or
- (2) 10 GbE ports

10Gb Performance Upgrade LTU for 16Gb Fibre Channel Blades

Enables customers to configure the first 8 ports of a 16Gb Fibre Channel blade at 10Gb Fibre Channel speed. This is required for DWDM and dark fiber metro connectivity.

NOTE: The optional 10GbE and 10Gb Fibre Channel performance upgrade features are mutually exclusive. The 10GbE Performance upgrade feature is available on the MP Extension Blade (AP865A) for all B-series SAN Directors. The 10Gb Performance Upgrade feature is available for 16Gb Fibre Channel Blades for the SN8000B SAN Directors. Requires 10Gb Optics (QK726A and/or QK727A). The license is available on an individual SAN Director slot basis.

HP MP Extension Blade Advanced Upgrade	TA752A

HP Multi Protocol Extension Blade Advanced Upgrade LTU

This optional license enables two advanced extension features: FCIP Trunking and Adaptive Rate Limiting.

NOTE: Optional Advanced Extension license is available on all B-series SAN Directors for the MP Extension Blade (AP865A) on an individual SAN Director slot basis.

HP Extension Blade FICON CUP Accelerator Upgrade	TA753A

Advanced Accelerator for FICON accelerates disk and tape read and write operations, maximizing FICON performance
NOTE: The FICON CUP accelerator support is contingent upon IBM certification. Please refer to HP's B-Series FICON connectivity stream at HP "Single Point of Connectivity Knowledge" (SPOCK) for the latest information.
http://spock.corp.hp.com/
NOTE: The Optional FICON CUP Accelerator license is available on the DC SAN Backbone and DC04 SAN Director for the MP Extension Blade (AP865A) on an individual SAN Director slot basis.

HP Encryption Performance Upgrade	TA665A

HP Encryption Blade Performance Upgrade

The Encryption Blade has a standard capacity of 48 Gb/s of encryption processing power. Additional encryption processing power can be added for disk I/O only by

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purchasing and installing an Encryption Blade Disk Performance Upgrade. When the performance upgrade license is applied, encryption processing power of up to 96 Gb/s is available.

NOTE: The HP Encryption Blade supports both disk and tape based encryption. However, the HP Encryption Blade Performance Upgrade is only applicable to disk based encryption because tape based encryption performance is limited to 48Gb/s.

MP Blade Performance Extension   T4427A
HP MP Blade Performance Extension LTU

Optional software license to activate the high performance extension services for either IP or FC connectivity in the MP Blade (AG461A). IP and FC extension services are mutually exclusive. It includes the Encryption Services License.

HP ISL Trunking	HP B-Series ISL Trunking Dir Swt LTU ALL	325887-B21
	NOTE: Optional ISL Trunking License for the SN8000B 4-Slot Director and DC04 SAN Director.	
HP Extended Fabric	HP B-Series Extended Fabric Dir Swt LTU ALL	325886-B21
	NOTE: Optional Extended Fabric License for the DC04 SAN Director.	
HP FICON	HP Director FICON Cup LTU*	T4401A*
	NOTE: Only supported in XP Storage array environments and is contingent upon IBM certification. Please refer to HP's mainframe connectivity stream at HP "Single Point of Connectivity Knowledge" (SPOCK) for the latest information. http://spock.corp.hp.com/	
Management	HP B-series SAN Network Advisor Enterprise Software	TC352A
	HP B-series SAN Network Advisor Professional Plus Software	TC353A
	HP B-series SAN Network Advisor Professional Plus Upgrade Software	TC354A

Step 3 – Additional Options

Additional Power Supply	HP DC SAN Backbone Director Power Supply - Quantity 1	AK863A
	NOTE: Add in pairs; max. of 4 supported in DC SAN Backbone chassis.	
	NOTE: Optional Power Supply for the B-series SAN Directors. The power supply is shipped with one PDU cord and one power cord.	
Fibre Channel Optical Transceivers	HP 16Gb Short Wave B-series SFP+ 1 Pack	QK724A
	HP 8Gb Short Wave B-Series FC SFP+ 1 Pack	AJ716A
	NOTE: NOT qualified and supported on 16Gb Fibre Channel blades (QK713A and QK714A).	
	HP 8Gb Short Wave B-series FC SFP+ 1 Pack	AJ716B
	NOTE: ONLY qualified and supported on 16Gb Fibre Channel blades (QK713A and QK714A).	
	HP 16Gb Long Wave B-series 10km FC SFP+ 1 Pack	QK725A
	HP 8Gb Long Wave B-series 10km FC SFP+ 1 Pack	AJ717A
	HP 8Gb Long Wave B-series 25km FC SFP+ 1 Pack	AW538A

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	HP 4Gb Short Wave B-Series FC SFP 1 Pack	AJ715A
	NOTE: Not supported and qualified on 16Gb Fibre Channel blades (QK713A and QK714A).	
	HP 4Gb Long Wave B-Series FC SFP 1 Pack - 10km	AK870A
	NOTE: Not supported and qualified on 16Gb Fibre Channel blades (QK713A and QK714A).	
	HP 4Gb Long Wave B-Series FC SFP 1 Pack - 30km	AN211A
	NOTE: Not supported and qualified on 16Gb Fibre Channel blades (QK713A and QK714A).	
	HP B-series 10Gb SFP+ Short Wave Transceiver	QK726A
	HP B-series 10Gb SFP+ Long Wave Transceiver	QK727A
	HP BLc 10Gb SR XFP Opt Kit	443756-B21
	HP BLc 10Gb LR XFP Opt Kit	443757-B21
	HP 4x16Gb Short Wave B-series QSFP 16 Pack	QK728A
	NOTE: Required for SN8000B Inter Chassis Link License (TC351A).	
Converged Enhanced Ethernet (CEE) Optical Transceivers	HP 10GbE SR B-Series+ 1 Pack	AP823A
	HP 10GbE LR B-series CEE SFP+ 1 Pack	AP824A

Transceiver Performance

Distance - Maximum	HP Standard OM2 Cable	HP Standard OM3 Cable	HP PremierFlex OM3+ Cable	HP PremierFlex OM4 Cable
16Gb performance:	35 meters	100 meters	100 meters	125 meters
8Gb performance:	50 meters	150 meters	150 meters	190 meters
4Gb performance:	150 meters	380 meters	380 meters	400 meters
2Gb performance:	300 meters	500 meters	500 meters	
1Gb performance:	500 meters	860 meters	860 meters	

USB Device	2 GB USB Device	AK864A
Optical cables	**HP PremierFlex OM4+ Fiber Optic Cables**	
	10m HP Premier Flex OM4 MPO/MPO Multi-mode Optical Cable	QK729A
	50m HP Premier Flex OM4 MPO/MPO Multi-mode Optical Cable	QK731A
	1m HP PremierFlex OM4 LC/LC Multi-mode Optical Cable	QK732A
	2m HP PremierFlex OM4 LC/LC Multi-mode Optical Cable	QK733A
	5m HP PremierFlex OM4 LC/LC Multi-mode Optical Cable	QK734A
	15m HP PremierFlex OM4 LC/LC Multi-mode Optical Cable	QK735A
	30m HP PremierFlex OM4 LC/LC Multi-mode Optical Cable	QK736A
	50m HP PremierFlex OM4 LC/LC Multi-mode Optical Cable	QK737A
	HP PremierFlex OM3+ Optical Cables	
	.5m HP PremierFlex OM3+ LC/LC Multi-Mode Optical Cable	BK837A
	1m HP PremierFlex OM3+ LC/LC Multi-mode Optical Cable	BK838A
	2m HP PremierFlex OM3+ LC/LC Multi-mode Optical Cable	BK839A
	5m HP PremierFlex OM3+ LC/LC Multi-mode Optical Cable	BK840A

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15m HP PremierFlex OM3+ LC/LC Multi-mode Optical Cable	BK841A
30m HP PremierFlex OM3+ LC/LC Multi-mode Optical Cable	BK842A
50m HP PremierFlex OM3+ LC/LC Multi-mode Optical Cable	BK843A
HP OM3 LC-LC Optical Cables	
.5m HP OM3 LC/LC Multi-mode Optical Cable	AJ833A
1m HP OM3 LC/LC Multi-mode Optical Cable	AJ834A
2m HP OM3 LC-LC Multi-mode Optical Cable	AJ835A
5m HP OM3 LC-LC Multi-mode OM3 Optical Cable	AJ836A
15m HP OM3 LC-LC Multi-mode OM3 Optical Cable	AJ837A
30m HP OM3 LC-LC Multi-mode OM3 Optical Cable	AJ838A
50 m HP OM3 LC-LC Multi-mode OM3 Optical Cable	AJ839A

High Density Cables

Due to the high number of connections required for the 64-port blade, a unique set of cables and couplers must be used to enable the High Density 64-port blade for the DC SAN Directors. There are two methods available for cabling the 64-port blade: The first method is directly from the 64-port blade to a standard LC-LC cable using an mSFP/LC Cable with an LC/LC Multi-mode Coupler as show in example A in the diagram below. The second is through the use of a patch panel as shown in example B. A list of recommended patch panels ,manufactured by CommScope and available through distributors such as Anixter, Graybar, CSC, and AccuTech, is provided below:
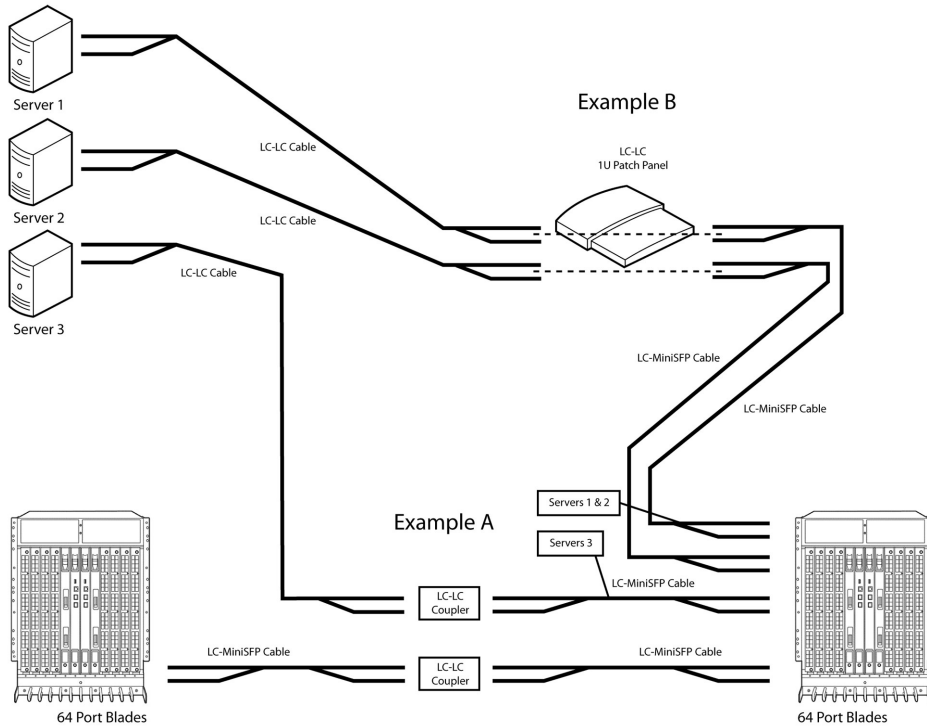
For Inter Switch Links (ISL) between two 64-port blades, two mSFP/LC FC Cables along with a LC/LC Multi-mode Coupler as shown in example C can be used.

LC-MiniSFP Cables:

1.5m MM OM3 mSFP/LC FC Cable	BK784A
2.5m MM OM3 mSFP/LC FC Cable	BK785A
5m MM OM3 mSFP/LC FC Cable	BK786A
LC/LC Multi-mode Coupler 8 Pack	BK787A

Configuration Information

Recommended Patch Panels for the High Density Cables

Type	LC-LC	MPO-MPO (MTP-MTP)
CommScope part number	760139683	760136473
CommScope orderable model	3603D-1U-UP UHD w(3) 3603P-48LC-LS	3603D-1U-UP UHD w(3) 3603D-1U-72MPO
Rack unit	1U	1U
Number of ports	72	72 MPO or 432 LC ports (cables)
Lead time	4 weeks or sooner	4 weeks or sooner

NOTE: Up to 1024 DC SAN Backbone Director ports are supported per 42U rack using Patch Panels. The last 16 ports require couplers when using LC-LC Patch Panels.

Trunk Cables for mSFP Connection

Type	Description	Length	Corning Part Number	Amphenol Part Number
mSFP to MTP	mSFP LC - MTP-female, 12 fiber, 12" breakout, OM3, 50/125	Need to specify length when ordering	PN varies based on length H93S5TE9-BMU-XXXM (XXX = length)	PN varies based on length 943-99867-1XXXX (XXXX = length)

Technical Specifications

Fibre Channel ports	16 port, 32 port, 48 port, and 64 port 8Gb Fibre Channel port blade options for the DC SAN Directors. 32 port and 48 port 16Gb and 64 port 8Gb Fibre Channel port blade options for the SN8000B SAN Directors.
Control processor	Redundant (active/standby) hot swappable control processor modules
Scalability	Full fabric architecture: http://h18006.www1.hp.com/products/storageworks/san/documentation.html
SN8000B 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; auto-sensing of 4, 8, and 16 Gbps port speeds; 10 Gbps and optionally programmable to fixed port speed
DC SAN Director Performance	Fibre Channel: 1.063 Gbps line speed, full duplex; 2.125 Gbps line speed, full duplex ; 4.25 Gbps line speed, full duplex; 8.5 Gbps line speed, full duplex; auto-sensing of 2 Gb, 4 Gb, and 8 Gb port speeds; optionally programmable to fixed port speed; speed matching between 2 Gb, 4 Gb, and 8 Gb ports
SN8000B ISL Trunking	Up to eight 16 Gbps ports per ISL trunk; up to 128 Gbps per ISL trunk
DC SAN Director ISL Trunking	Up to eight 8 Gbit/sec ports per ISL trunk; up to 64 Gbit/sec per ISL trunk. Up to two 8-port trunk groups supported on 16-port blades, four 8-port trunk groups supported on 32-port blades, eight 8-port trunk groups supported on 48-port and 64-port blades. ISL Trunking at 2 Gbit/sec for compatibility with B-Series legacy switches and director
SN8000B Chassis Bandwidth	SN8000B 8-Slot SAN Director: 8.2 Tbps per chassis (384 ports × 16 Gbps data rate + 2.048 Tbps ICL bandwidth) SN8000B 4-Slot SAN Director: 4.1 Tbps per chassis (192 ports × 16 Gbps data rate + 1.024 Tbps ICL bandwidth)
DC SAN Director Chassis Bandwidth	4 Tbit/sec (DC SAN Backbone Director) or 2 Tbit/sec (DC04 SAN Director)
SN8000B Slot bandwidth	512 Gbps (data rate)
DC SAN Director Slot bandwidth	256 Gbps (data rate)
SN8000B Local Switching bandwidth	512 Gbps for 16/32: 32 ports × 16 Gbps (data rate) 768 Gbps for 16/48: 48 ports × 16 Gbps (data rate) 512 Gbps for 8/64: 64 ports × 8 Gbps (data rate)
DC SAN Director Local switching bandwidth	128 Gbps available for FC8-16: 8 Gbps x 16 ports 256 Gbps available for FC8-32: 8 Gbps x32 ports 384 Gbps available for FC8-48: 8 Gbps x 48 ports 512 Gbps available for FC8-64: 8 Gbps x 64 ports
SN8000B Switch latency	Locally switched port latency is 800 ns; blade-to-blade latency is 2.4 μsec; encryption/compression is less than 6 μsec per node; Forward Error Correction (FEC) adds 400 ns between E_Ports (enabled by default)
Switch latency	Locally switched ports 700 ns, blade to blade latency is 2.1 micro-seconds
Maximum frame size	2112-byte payload
SN8000B Frame buffers	8192 per 16-port group on 32-port blades and up to 8192 per 24-port group on 48-port blades, dynamically allocated
DC SAN Director Frame buffers	2048 per 16-port group on the 16,32, and 64-port blades and up to 2048 per 24-port group on the 48-port blade, dynamically allocated
Classes of service	Class 2, Class 3, Class F (inter-switch frames)
SN8000B Fibre Channel Port Types	D_Port (Diagnostic Port), E_Port, EX_Port, F_Port, M_Port (Mirror Port); self-discovery based on switch type (U_Port); optional port type control
DC San Director Port types	FL_Port (except on 48-port blades), F_Port, M_Port (Mirror Port) and E_Port; self-discovery based on switch type (U_Port); optional port type control
Data traffic types	Fabric Switches supporting unicast, multicast (255 groups), and broadcast
USB	1 USB port for firmware download and for Supportsave

Technical Specifications

SN8000B Media types	16 Gbps: 16/32 and 16/48 FC blades require B-series hot-pluggable SFP+, LC connector; 16 Gbps SWL 10 Gbps: 16/32 and 16/48 require B-series hot-pluggable SFP+, LC connector; 10 Gbps SWL, LWL 8 Gbps: Encryption Blade; and MP Extension Blade blades require B-series hot-pluggable SFP+, LC connector; 8 Gbps SWL, LWL, ELWL ICL QSFP: B-series Core Blades require B-series hot-pluggable QSFP, MTP connector; 4×16 Gbps SWL Fibre Channel distance subject to fiber-optic cable and port speed
DC SAN Director Media types	Fibre Channel media type: Hot-pluggable, industry-standard Small Form Factor Pluggable (SFP) and SFP+, LC connector; Short-Wave Laser (SWL) and Long-Wave Laser (LWL); distance depends on fiber optic cable and port speed; supports SFP+ (2, 4, and 8 Gbit/sec) and SFP (1, 2, and 4 Gbit/sec) optical transceivers CEE media type: Hot-pluggable, 10 Gigabit Ethernet SFP+ supports any combination of Short-Reach (SR) and Long-Reach (LR) optical transceivers
Fabric services	Advanced Performance Monitoring (APM) (including Top Talkers for E_Ports, F_Ports, and Fabric mode); Adaptive Networking (Ingress Rate Limiting, Traffic Isolation, QoS); Bottleneck Detection; Advanced Zoning (default zoning, port/WWN zoning, broadcast zoning); Dynamic Fabric Provisioning (DFP); Dynamic Path Selection (DPS); Extended Fabrics; Enhanced BB credit recovery; Fabric Watch; FDMI; Frame Redirection; Frame-based Trunking; FSPF; Integrated Routing; IPoFC; ISL Trunking; Management Server; NPIV; NTP v3; Port Fencing; Registered State Change Notification (RSCN); Reliable Commit Service (RCS); Server Application Optimization (SAO); Simple Name Server (SNS); Virtual Fabrics (Logical Switch, Logical Fabric)
SN8000B Extension	Supports DWDM, CWDM, and FC-SONET devices; Fibre Channel, in-flight compression and encryption (AES-GCM-256) BB credit recovery; FCIP, Adaptive Rate Limiting (ARL), data compression, Fast Write, read/write Tape Pipelining, QoS
FICON	FICON cascading; support for lossless DLS; FICON CUP; Advanced Accelerator for FICON (FICON Global Mirror and XRC emulation and read/write Tape Pipelining).

High availability	Control Processor	Redundant (active/standby) control processor modules; automatic failover; non-disruptive software upgrades; dual-flash memory on each control processor to store two software images
	Modules	Hot swappable
	Backplane	Fully passive
	Input power	Dual or quad AC inputs
	Chassis power	Dual AC-DC power supply modules, N+2 redundant, SN8000B 8-Slot and DC SAN Backbone supports two additional power modules
	Cooling	DC SAN Backbone Director: Three blower assembly modules (two operational required) DC04 SAN Director: Two blower assembly modules (one required for operation)

Management	HTTP, SNMP v1/v3 (FE MIB, FC Management MIB), SSH; Auditing, Syslog; Web Tools, APM, Fabric Watch; SAN Network Advisor SAN Enterprise (SN8000B and DC SAN Directors) or SAN Network Advisor SAN Professional/Professional Plus (SN8000B 4-Slot and DC04 SAN Director); Command Line Interface (CLI); SMI-S compliant; Administrative Domains; trial licenses for add-on capabilities
Security	AES-GCM-256 encryption on ISLs; DH-CHAP (between switches and end devices), FCAP switch authentication; FIPS 140-2 L2-compliant, HTTPS, IPsec, IP filtering, LDAP with IPv6, Port Binding, RADIUS, User-defined Role-Based Access Control (RBAC), Secure Copy (SCP), Secure RPC, SFTP, SSH v2, SSL, Switch Binding, Trusted Switch

Technical Specifications

Management access	10/100/1000 Ethernet (RJ-45), in-band over Fibre Channel; serial ports (RJ-45) and one USB per Control Processor blade	
SN8000B Diagnostics	D_Port offline diagnostics, including electrical/optical loopback, link traffic/latency/distance; POST and embedded online/offline diagnostics, including environmental monitoring, FCping and Pathinfo (FC traceroute), frame viewer, non-disruptive daemon restart port mirroring (SPAN port), optics health monitoring, power monitoring (16 Gbps blades-only), RAStrace logging, and Rolling Reboot Detection (RRD)	
DC SAN Director Diagnostics	POST and embedded online/offline diagnostics	
Mechanical specifications	Ports per rack	Up to 1536 ports per 42U rack
		Up to 1024 DC SAN Backbone Director ports per 42U rack using Patch Panels.
		NOTE: The last 16 ports require couplers when using LC-LC Patch Panels.
	Enclosure	Rear panel-to-door airflow; SN8000B 4-Slot and DC04 SAN Director ships with 1U exhaust shelf
	Width	17.22 in (43.74 cm)
	Size	SN8000B 8-Slot and DC SAN Backbone Director Width: 43.74 cm (17.22 in) Height: 61.24 cm (24.11 in, 14U) Depth (without door): 61.19 cm (24.09 in) Depth (with door): 73.20 cm (28.82 in) SN8000B 4-Slot and DC04 SAN Director Width: 43.74 cm (17.22 in) Height: 35.00 cm (13.78 in, 8U) plus 4.37 cm exhaust shelf (1.72 in, 1U) Depth without door: 61.19 cm (24.09 in) Depth with door: 73.20 cm (28.82 in)
	Weight	SN8000B 8-Slot and DC SAN Backbone Director 103.50 kg (228.20 lb) fully populated 39.55 kg (82.20 lb) for chassis SN8000B 4-Slot and DC04 SAN Director 68.04 kg (150.00 lb) fully populated 25.26 kg (56.80 lb) for chassis
Environment	Temperature	Operating 32° to 104° F (0° to 40° C)
		Non-operating -25° to 70° C (-13° to 158° F)
	Humidity	Operating 5% to 85% non-condensing at 104° F (40° C)
		Non-operating 0% to 93%
	Altitude	Up to 3000 meters (9800 feet)
	Shock	20 g, 6 ms, half sine
	Vibration	Operating 0.5 g p-p, 5 to 500 to 5 Hz
		Non-operating 2.0 g, 5 to 500 Hz
	SN8000B Heat Dissipation	8-Slot Chassis Min: 32-port configuration 873 W, 2982 BTU/hr (no QSFP) Max: 384-port configuration (fully-loaded w/QSFPs) 2242 W, 7654 BTU/hr

Technical Specifications

	Heat dissipation	4-Slot Director Min: 32-port configuration (no QSFP)	618 W, 2111 BTU/hr
		Max: 192-port configuration (fully-loaded w/QSFPs), 1195 W	1195 W, 4078 BTU/hr
		DC SAN Backbone Director Min: 16-port configuration	505 W, 1722 BTU/hr
		Max: 384-port configuration:	1337 W, 4564 BTU/hr
		DC04 SAN Director Min: 16-port configuration	363 W, 1239 BTU/hr
		Max: 192-port configuration	753 W, 2570 BTU/hr
Power	Supported power range	Nominal	110-240 VAC, single phase
		In-rush current	60A maximum, peak
		Input frequency range	47-63 Hz
	Power Supplies	Two power supplies included with each director	Output voltages (each): 48V at 20 amps; 12V at 4 amps
			Maximum output power: 2000 watts
			AC inrush current 20A maximum, peak
	Power Cables	The DC SAN Directors come with two 220V US power cords and 2 C19-C20 220V PDU jumpers.	
Certified maximum		Please Refer to SAN Design Guide at the following URL: http://www.hp.com/go/sandesignguide.	