Overview

The HP StorageWorks DC SAN Directors are the most advanced B-Series director-class switches that combine breakthrough performance, scalability, and energy efficiency with long-term investment protection. Supporting open systems and mainframe environments, HP StorageWorks DC SAN Directors are designed to address the data growth and application demands of next generation data centers; enable server, SAN, and data center consolidation; and reduce infrastructure and administrative costs.

HP StorageWorks SAN Directors are available in two modular form factors that support the same port blades. The 14U DC SAN Backbone Director has eight vertical blade slots to provide up to 384 Fibre Channel ports and is targeted for large enterprise networks. The 9U DC04 SAN Director has four horizontal blade slots to provide up to 192 Fibre Channel ports and is targeted for midsize networks.

Both models feature ultra-high-speed Inter-Chassis Link (ICL) ports to connect two SAN directors, providing extensive scalability and flexibility at the network core. At the network edge, organizations can utilize B-series 8Gb switches, 4/256 SAN Director, or-for complete enterprise class capabilities-the DC04 SAN Director.

Both DC SAN Director models provide 256 Gbit/sec of bandwidth per slot (512 Gbit/sec aggregate data rate). Performance capabilities include:

- DC SAN Backbone Director:
    - 384 ports operating simultaneously at full 8Gb speed
    - 3 Tbit/sec of chassis bandwidth
    - 512 Gbit/sec of ICL bandwidth (freeing up to 64 8Gb ports per chassis for server, storage, and fabric connections)
- DC04 SAN Director:
    - 192 ports operating simultaneously at full 8Gb speed
    - 1.5 Tbit/sec of chassis bandwidth
    - 256 Gbit/sec of ICL bandwidth (freeing up to 32 8Gb ports per chassis)

HP DC SAN Directors include a Virtual Fabrics feature that enables partitioning of a physical SAN into logical fabrics and isolation by application, business group, customer, or traffic type. Optional Fibre Channel Integrated Routing alleviates the need for special-purpose blades or routers to connect servers and storage in separate fabrics. And optional SAN extension over long-distance IP connections accelerates offsite replication, backup, and restore.

The DC SAN Directors supports the same fibre channel blades with autosensing support for 1/2/4/8/10Gb Fibre Channel, FICON, and FCIP and encryption.

The DC SAN Directors are highly effective at reducing power consumption, cooling, and carbon footprint in data centers. While providing unmatched performance and scale, both models use less than one-half watt per Gbit/sec.
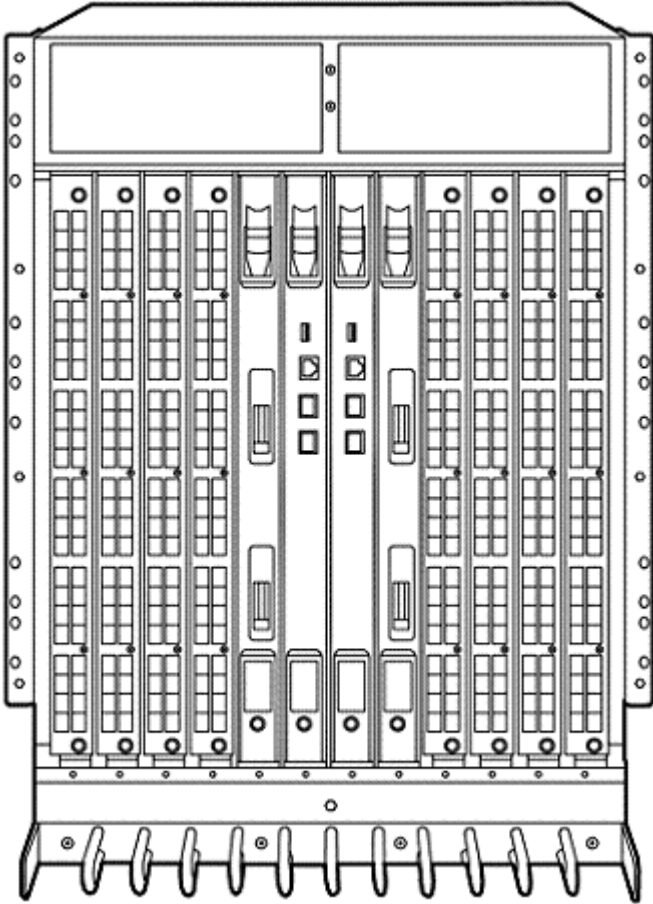
To help minimize downtime costs, the DC SAN Directors family builds upon years of innovation and leverages the core B-Series technology performing at greater than 99.999 percent uptime in the world's most demanding data centers. And to maximize return on existing investments, the DC SAN Directors connect natively to B- and M-Series fabrics without disruption.

The Power Pack+ set of tools monitors the network's health and performance. It is pre-configured on every DC SAN Backbone Director and is available pre-configured or as an upgrade for every 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.
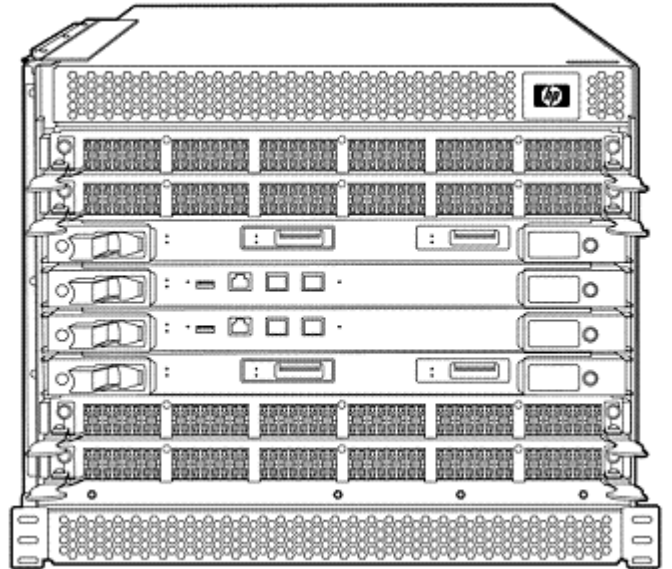
DC SAN Directors leverage B-series FOS to centralize data center management for greater efficiency. To help maximize network performance and reduce operational expense, HP StorageWorks Data Center Fabric Manager provides intuitive system

Overview

configuration, comprehensive management, and a topology-centric view across B-Series Fabric SANs. HP Data Center Fabric Manager Enterprise supports both DC SAN Directors, while the no-cost B-Series Data Center Fabric Manager Professional supports the DC04 SAN Director.

HP StorageWorks DC SAN Backbone Director
(pictured with the door removed)

HP StorageWorks DC04 SAN Director
(pictured with the door removed)

What's New

- DC04 SAN Director extends the DC product line in a smaller form factor and port density well suited for midsize enterprises.
- Encryption Fibre Channel blade for high-performance scalable fabric-based encryption to enforce data confidentiality and privacy requirements.

Product Highlights

DC SAN Director Highlights	

DC SAN Director Highlights

- Provides a highly robust 8Gb platform in two modular form factors for enterprise data centers supporting open system and mainframe environments
- Delivers breakthrough performance to meet data growth and access demands, expand virtualization, and consolidate resources
- "Five-nines" availability and reliability
- Provides a future-built multiprotocol architecture for consolidating server connectivity as emerging technologies like FCoE develop
- Delivers ten times the energy efficiency of competitive offerings, enabling data centers to support more server and storage equipment
- Power Pack+ set of tools provides advanced capabilities that help improve fabric behavior and ensure ample bandwidth for critical applications to improve service levels
- Security capabilities built into the ASIC eliminate the threat of unauthorized SAN access and unauthorized SAN configuration changes.
- Enables logical partitioning of platforms and fabrics into virtual data and management domains without sacrificing performance, scalability, security, or reliability
- Extends ROI by operating natively with B-Series and M-Series fabrics, and with common management tools
- Integrates fully with HP OpenView storage management products enabling infrastructure management through a single pane of glass.

Key Features and Benefits

- Outstanding scalability and performance:
  - 8 Gb/s per port , full line rate performance
  - Adaptive Networking improves traffic management and resource utilization and is ideal for virtualized environments
  - Greater trunking bandwidth and distance support
  - 10 Gb Fibre Channel Blade provides 6 Fibre Channel ports for higher ISL connectivity performance and utilization
- State of the art reliability:
  - Meets ultra-high availability requirements with redundant, hot-pluggable components, no single point of failure, and non-disruptive software upgrades
  - No active components on the backplane
- Broadest range of compatibility with SAN products:
  - Multi-vendor server and storage environment
  - Widest range of HP SAN solutions
  - Backward compatible with previously installed 1 Gb/s , 2 Gb/s, 4 Gb/s, and 8Gb/s SAN Switches
  - Interoperability with the more than 3.0 MILLION port HP SAN Switch installed base
  - Natively interoperability B-Series and M-Series fabrics,
- Multi-protocol Connectivity:
  - 8 Gb Fibre Channel, 10Gb Fibre Channel, Fibre Channel Routing, FCIP, FICON, Encryption and FCoE ready
  - Single platform for fibre channel and IP connectivity
  - FCIP Services for SAN Extension featuring
    - Hardware assisted traffic forwarding for greater performance
    - Hardware-based Encryption for greater security
- HP Power Pack+ - highest supported modular functionality:
  - Trunking - highest throughput between switches (64Gb/sec)
  - Adaptive Networking - maximize application performance
  - Fabric Watch - proactive threshold monitor
  - Advanced Performance Monitor - track/watch fabric metrics

Product Highlights

          o   Extended Fabrics - support for extended distance
- **Broadest Range of HP Packaged SAN Services**:
  - o Mission critical SAN Services
  - o Assessment and installation services for security

Performance	• **DC SAN Backbone Director**
	  o 384 ports operating simultaneously at full 8Gb speed
	  o 3 Tbit/sec of chassis bandwidth
	  o 512 Gbit/sec of Inter Chassis Link (ICL) bandwidth (freeing up to 64 8Gb ports for server, storage, and fabric connections)
	• **DC04 SAN Director**
	  o 192 ports operating simultaneously at full 8Gb speed
	  o 1.5 Tbit/sec of chassis bandwidth
	  o 256 Gbit/sec of Inter Chassis Link (ICL) bandwidth (freeing up to 32 8Gb ports for server, storage, and fabric connections)

SAN scalability	The DC SAN Backbone scales up to 384 ports in a single switch domain, participating in large core-to-edge fabrics. The DC DC04 SAN Director scales up to 192 ports in a single switch domain. It is ideal for the mid enterprise for which the port density of the DC SAN Backbone is not required or at the edge in a large multi-tiered SAN fabric with a DC SAN Backbone at the core. 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 • Remote Monitoring of entire data center via Instant Support Enterprise Edition (ISEE)
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 • Data Center Fabric Manager

QuickSpecs

Product Highlights

Cabinet Support	22U, 36U, and 42U; 5000, 9,000 and 10,000 series StorageWorks Cabinets are supported
	25U, 33U, and 41U HP system/e cabs
	NOTE: A maximum of two SAN Backbone Director switches currently are supported to ship configured to order from the factory in a StorageWorks 42U, 10000 (10KG2) cabinet. The Standard internal PDUs provided with StorageWorks cabinets CANNOT be used for the SAN Backbone Director. The DC SAN Backbone Director plugs directly into the wall.

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 and 8 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 a 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.

Both Data Center Fabric Manager Professional 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 - Data Center Fabric Manager Professional 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

NOTE: Optional software for the DC04 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.

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 switch needs its own license. The switch operating system views the trunk as a single, high bandwidth resource (up to 64 Gb) 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

Data Center Fabric Manager Professional

HP StorageWorks Data Center Fabric Manager 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) at a time
- Performs group switch management beyond the scope of Web Tools
- Does not offer management of the DC SAN Backbone Director
- Manages B-Series SAN Switches (M-Series switches require DCFM Enterprise)

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 Data Center Fabric Manager Professional and have a small SAN environment may over time feel the need for an enterprise-class product (Data Center Fabric Manager 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 Data Center Fabric Manager Professional to Data Center Fabric Manager Enterprise

Data Center Fabric Manager Enterprise

HP StorageWorks Data Center Fabric Manager Enterprise is the enterprise-class product that supports FOS products as well as FOS and M-EOS products together. It provides complete DC SAN Backbone Director management including enterprise-class features/environments such as FICON, Fibre Channel Routing, FCIP, adaptive networking, etc.

It delivers unprecedented scalability (up to 24 fabrics and 9,000 switch ports) compared to the existing products.

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

Data Center Fabric Manager Enterprise requires at least one FOS based B-series SAN switch in the SAN. While DCFM provides increased functionality, not all features available in FM or HAFM are available in DCFM, and some functions may operate differently. Please refer to the Migration and Transition guide for additional information.

Optional Software:

HP StorageWorks DC SAN Backbone Director Switch Inter-Chassis Link LTU

Inter Chassis Links (ICLs) harness unused ports to connect the switching backplane of one DC SAN Backbone Director with the switching backplane of a second DC SAN Backbone Director or DC04 SAN Director. This additional full duplex connection does not consume usable ports. ICL connections operate as hardware trunked ISLs.

Each ICL connection is the equivalent of 16 fixed speed 8Gbit/sec E_PORTs.

ICLs yield a 512Gbit/sec connection between two DC SAN Backbone chassis'. This is a full-duplex connection for an aggregate data movement of 1Tbit/sec.

ISL Trunking is automatically enabled across the 16 x 8Gbit/sec connections within each ICL resulting in a 128Gbit/sec, frame-balanced pipe. Each ICL exchange is balanced across the 4 ICLs.

ICLs can work in conjunction with conventional ISL using optical cables and ports on the DC SAN

Product Highlights

Backbone Director port blades. ISLs can be used to add bandwidth to the ICLs or to connect other switches to a DC SAN Backbone Director

NOTE: Two ICL licenses are required for ICL connectivity (one license required for each DC SAN Backbone Director or DC04 SAN Director). HP StorageWorks DC SAN Backbone Director Switch Inter-Chassis Link LTU (T4641) is only valid for DC SAN Backbone Directors.

HP StorageWorks DC04 SAN Director Switch Inter-Chassis Link LTU

Inter Chassis Links (ICLs) harness unused ports to connect the switching backplane of one DC04 SAN Backbone Director with the switching backplane of a second DC04 SAN Director or DC SAN Backbone Director. This additional full duplex connection does not consume usable ports. ICL connections operate as hardware trunked ISLs.

Each ICL connection is the equivalent of 8 fixed speed 8Gbit/sec E_PORTs.

ICLs yield a 256Gbit/sec connection between two DC04 SAN Director chassis'. This is a full-duplex connection for an aggregate data movement of 512Gbit/sec.

ISL Trunking is automatically enabled across the 8 x 8Gbit/sec connections within each ICL resulting in a 64Gbit/sec, frame-balanced pipe. Each ICL exchange is balanced across the 4 ICLs.

ICLs can work in conjunction with conventional ISL using optical cables and ports on the DC04 SAN Director port blades. ISLs can be used to add bandwidth to the ICLs or to connect other switches to a DC04 SAN Director

NOTE: Two ICL licenses are required for ICL connectivity (one license required for each DC SAN Backbone Director or DC04 SAN Director). HP StorageWorks DC04 SAN Director Switch Inter-Chassis Link LTU (T4642) is only valid for DC04 SAN Directors.

HP StorageWorks DC SAN Backbone Director ICL Bundle Kit

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. This additional full duplex connection does not consume usable ports. ICL connections operate as hardware trunked ISLs.

Each ICL Bundle Kit contains:

- four (4) 2 meter copper cables
- two ICL Licenses (one license required for each DC SAN Backbone Director)

Each ICL connection is the equivalent of 16 fixed speed 8Gbit/sec E_PORTs.

ICLs yield a 512Gbit/sec connection between two DC SAN Backbone chassis'. This is a full-duplex connection for an aggregate data movement of 1Tbit/sec.

ISL Trunking is automatically enabled across the 16 x 8Gbit/sec connections within each ICL resulting in a 128Gbit/sec, frame-balanced pipe. Each ICL exchange is balanced across the 4 ICLs.

ICLs can work in conjunction with conventional ISL using optical cables and ports on the DC SAN Backbone Director port blades. ISLs can be used to add bandwidth to the ICLs or to connect other switches to a DC SAN Backbone Director

NOTE: HP StorageWorks DC SAN Backbone Director ICL Bundle Kit is only valid between two DC SAN Backbone Directors.

HP StorageWorks B-Series SAN Director

Optional software allows FICON Director Switching to provide Fibre Channel and FICON intermix, FICON Control Unit Port (CUP), and FICON cascading for more than one B-Series SAN Director in XP

Product Highlights

FICON CUP Active License	Storage Array environments. The 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.
HP B-series SAN Backbone Director Integrated Routing LTU	Integrated Routing is an optional license which provides native Fibre Channel Routing (FRC) 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.

HP StorageWorks 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.

Service and Support, HP Care Pack, and Warranty Information

Warranty	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.

HP Care Pack Services. Scalable, Flexible, Dependable. Like your storage.

Your storage is evolving. Get scalable support that evolves with it. HP Care Pack Services is an easy-to-buy, easy-to-use portfolio of packaged services covering your lifecycle needs. You can rely on our highly skilled, HP certified professionals to offer a breadth of expertise across leading storage technologies, and work side by side with you for optimal results. Push services beyond expectations and choose support that meets the changing needs of your business with the same reliability, scalability and flexibility you demand of your storage.

Protect your business beyond the warranty

Standard warranty protects against product defects and some causes of downtime. HP Care Pack Services helps you proactively guard against unplanned downtime which can reduce your productivity and profitability. By using a standard approach to warranty uplifts, such as HP Care Pack Services, customers can be more sure of consistency of operations for both mission-critical and standard business computing.

Extending warranties with HP Care Pack Services

The key to normalizing the warranty of combined solutions-is making service uplift simple: HP Care Pack Services. This portfolio of predefined packages, extending across the entire IT lifecycle, offering consulting, education, technical support, optimization, risk assessment, and more. It's entirely flexible allowing customers to extend the cover to the precise level of support required. Customer's standard hardware warranty, for example, can be upgraded to next-business-day response, to same-day coverage, or even to a committed six-hour call-to-repair service available 24 hours every day of the week.

Provide consistent, predictable levels of support across your entire department or business
Give you direct access to proven technical and problem-solving expertise
Offer a choice of response-time and repair-time commitments
Are available whenever and wherever you do business

For many products, post-warranty HP Care Pack Services are available when your original warranty has expired. Choose the support levels that meet your business requirements, from basic to mission-critical. http://www.hp.com/hps/storage

NOTE: Care Pack Services availability may vary by product and country.

Recommended Services	HP Care Pack Services recommended for optimal satisfaction of all deployments of your product.	
	3-Year HP Support Plus 24	24x7x365 hardware and software services - plus cost-saving software updates and more

Service and Support, HP Care Pack, and Warranty Information

HP Support Plus 24 helps you increase performance and availability with comprehensive, consistent hardware and software services. Working with your IT team, HP Services engineers deliver onsite hardware support and over-the-phone software support around-the-clock 365 days per year. Service coverage encompasses HP products and selected multivendor hardware and software.

In addition, this convenient HP Care Pack packaged service makes software updates available to you at substantial savings.

Choose Support Plus 24 when you need to:

Improve uptime with responsive hardware and software services available anytime
Cost-effectively obtain expert 24x7 multivendor hardware and software support
Enjoy consistent service coverage across geographically dispersed sites
Update HP and selected third-party software at a predictable cost
Take advantage of subscription savings on software updates

HP SAN Solution Service   Get your SAN implementation right - right from the start.

Storage has become essential to the growth and agility of your business. That's why choosing an HP SAN as your data management solution is a smart business decision. But your SAN can deliver the results you need only if it is implemented correctly and integrated with your business.

SAN installation, startup, and integration call for specialized expertise in planning and design, hardware configuration, network software installation, and operability verification. Your SAN needs to be configured for high performance and availability. And it needs to be integrated with your applications, management environment, and business processes.

Product Number	Product Name	Service Name	Care Pack Services Product # and Band
AK857B	HP StorageWorks DC SAN Backbone Director Switch	3-Year HP Support Plus 24	HA111A3-7KW
AR478A	HP StorageWorks DC04 SAN Director Switch	HP SAN Solution Service	Contact your HP sales rep or Channel Partner for assistance
AR479A	HP DC04 Power Pack+ SAN Director Switch	3-Year HP Support Plus 24	HA110A3-4QN
TA640A	HP DC04 Power Pack+ SAN Director Upg LTU	3-Year HP Support Plus 24	HA110A3-4QP
AK858B	HP SAN Director 16-port 8Gb FC Blade	3-Year HP Proactive 24 for SANs	HA111A3-9CF
AK859B	HP SAN Director 32-port 8Gb FC Blade	3-Year HP Proactive 24 for SANs	HA111A3-9CG
AK860B	HP SAN Director 48-port 8Gb FC Blade	3-Year HP Proactive 24 for SANs	HA111A3-9K3

Service and Support, HP Care Pack, and Warranty Information

AK861B	HP SAN Director 6-port 10Gb FC Blade	3-Year HP Proactive 24 for SANs	HA111A3-9K4
AG461B	HP SAN Director Multi-Protocol Router Blade	3-Year HP Proactive 24 for SANs	HA111A3-8S1

Related Services

Services that will enhance the user experience in many product deployments.

3-Year HP Critical Service for SANs
3-Year HP Critical Service for SANs offers a comprehensive, robust suite of proactive and reactive services expressly designed to help you resolve complex interoperability issues and maximize uptime and data availability in your SAN environment.

HP Assessment Service for SANs
HP Assessment Service for SANs offers customized technical and operational guidance to customers with a deployed storage area network (SAN) infrastructure, and provides recommendations to help improve availability levels and ongoing management of your SAN environment.

Product Number	Product Name	Service Name	Care Pack Services Product # and Band
AK857B	HP StorageWorks DC SAN Backbone Director Switch	3-Year HP Critical Service for SANs	HA112A3-7KW
AK858B	HP SAN Director 16-port 8Gb FC Blade	3-Year HP Critical Service for SANs	HA112A3-9CF
AK859B	HP SAN Director 32-port 8Gb FC Blade	3-Year HP Critical Service for SANs	HA112A3-9CG
AK860B	HP SAN Director 48-port 8Gb FC Blade	3-Year HP Critical Service for SANs	HA112A3-9K3
AK861B	HP SAN Director 6-port 10Gb FC Blade	3-Year HP Critical Service for SANs	HA112A3-9K4
AG461B	HP SAN Director Multi-Protocol Router Blade	3-Year HP Critical Service for SANs	HA112A3-8S1

eSupport

HP eSupport is a portfolio of technology-based services that assist you with managing your business environment - from the desktop to the data center.

Support Portal
The HP support portal provides one-stop access to the information, tools and services you need to manage the daily operations of your IT environment.

Features include:

- Access to self-solve tools (including search technical knowledge base)
- Efficient logging and tracking of support cases
- Collaboration with other business and IT professionals
- Download of patches and drivers
- Access to diagnostic tools
- Proactive notification of relevant information

Access to certain features of the support portal requires an HP service agreement. To access the support portal, visit: http://www.hp.com/support
Remote Support Technology (RST)-HP Remote Support Pack

Service and Support, HP Care Pack, and Warranty Information

Taking a more proactive approach to IT support, the HP Remote Support pack plug-in module easily integrates with HP Systems Insight Manager to provide a powerful, unified "single pane of glass" solution for onsite and remote management.

HP Remote Support Pack enhances HP Systems Insight Manager with intelligent event diagnosis plus the automatic submission of hardware event notifications securely to HP support, including acknowledgment and status returns. It adds remote configuration collections to allow the delivery of assessment and proactive services for your SAN storage and HP-UX environments.

Customer Technical Training	Consider education as an integral part of your strategy to get the best return on investment for your HP storage solution. HP offers a variety of training courses on storage software, networking, archiving and disk storage systems. Our classes are available in many delivery modalities from traditional instructor-led courses at one of our 80 training centers worldwide to on-site training customized to your needs or online. www.hp.com/learn/storage
HP Services Awards	HP Services continues to be recognized for service and support excellence by customers, partners, industry organizations and publications around the world. Recent honors and award reflect our services team's dedications, technical expertise, professionalism and uncompromising commitment to customer satisfaction. For a list of all our awards, please visit: http://h20129.ww2.hp.com/services/cache/77318-0-0-225-121.html.
Additional Services	For more information about HP Care Pack Services for Storage, please visit: http://www.hp.com/hps/storage

If you have specific questions, contact your local HP representative. Contact information for a representative in your area can be found at "Contact HP" http://www.hp.com |

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+	DC04 SAN Director and DC04 SAN Director Power Pack+	DC SAN Backbone Director Power Pack+
Targeted Environment	Workgroups, Departments	Workgroups, Departments	Workgroups, Departments	Workgroups, Departments	Data Centers	Data Centers
Port Bandwidth	8Gbit/sec	8Gbit/sec	8Gbit/sec	8Gbit/sec	8Gbit/sec	8Gbit/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	3 Tbit/sec end-to-end	6.5 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	XP, EVA, MSA					
Ports	8 Enabled 24 Max	16 Enabled 24 Max	24 Enabled 40 Max	48 Enabled 80 Max	Up to 192	Up to 384
SFP	B-series	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	Included with Power Pack+
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	Included with Power Pack+
Form factor	1U	1U	1U	2U	7U	14U
Zoning Software	Yes (Included)	Yes (Included)	Yes (Included)	Yes (Included)	Yes (Included)	Yes (Included)
Hot plug, redundant power supplies	No	No	Yes	Yes	Yes	Yes
Hot plug fans	No	No	Yes	Yes	Yes	Yes

Family Information

Features	4/8 SAN Switch Base and 4/8 SAN Switch	4/16 SAN Switch and 4/16 SAN Switch Power Pack	4/32B SAN Switch and 4/32B SAN Switch Power Pack	4/64 SAN Switch and 4/64 SAN Switch Power Pack	4/256 SAN Director and 4/256 SAN Director Power Pack
Targeted Environment	Workgroups, Departments	Workgroups, Departments	Workgroups, Departments	Workgroups, Departments	Data Centers
Port Bandwidth	4Gbit/sec	4Gbit/sec	4Gbit/sec	4Gbit/sec	4Gbit/sec
Aggregate device bandwidth	64 Gbit/sec end-to-end	128 Gbit/sec end-to-end	128 Gbit/sec end-to-end	512 Gbit/sec end-to-end	3.2 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	XP, EVA, MSA				
Ports	8 Enabled 16 Max	16 Enabled	16 Min 32 Max	32 Min 64 Max	Up to 384
SFP	HP	HP	HP	HP	HP
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
Form factor	1U	1U	1U	2U	14U
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

Features	Embedded SAN Switch for EVA4400	Brocade 4Gb SAN Switch for HP c-Class BladeSystem	HP 400 Multi-protocol Router	B-Series Multi-protocol Router Blade
Targeted Environment	Workgroups, Departments	Workgroups, Departments	Workgroups, Departments	Data Centers
Port Bandwidth	8Gbit/sec	4Gbit/sec	4 Gbit/sec Ethernet: 1 Gbit/sec	4 Gbit/sec Ethernet: 1 Gbit/sec
Aggregate device bandwidth	320 Gbit/sec end-to-end	192 Gbit/sec end-to-end	128 Gbit/sec end to end	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	XP, EVA, MSA			
Ports	20 external per EVA Controller Pair	4 or 8 external / 8 or 16 internal	18 ports: 16 FC and 2 Gigabit Ethernet	18 ports: 16 FC and 2 Gigabit Ethernet
SFP	B-series	HP	HP	HP
Advanced Trunking	Optional Upgrade	Optional Upgrade	Optional Upgrade	Optional Upgrade to chassis
Adaptive Networking	Included with Power Pack+ or Optional Upgrade	No	No	Optional Upgrade to DC SAN Director Backbone Chassis
Form factor	Embedded	Embedded	1U	Blade in SAN Director
Zoning Software	Yes (Included)	Yes (Included)	Yes (Included)	Yes (Included)

Family Information

Hot plug, redundant power supplies	Yes, in EVA 4400 Enclosure	Yes, in BladeSystem Enclosure	Yes	Yes, in SAN Director chassis
Hot plug fans	Yes, in EVA 4400 Enclosure	Yes, in BladeSystem Enclosure	Yes	Yes, in SAN Director chassis

QuickSpecs

Configuration Information

Step 1 – Base Configuration and Power Pack

Select one:

Model	Model Description	Part Number
StorageWorks DC SAN Backbone Director Power Pack+	384-port capable Fibre Channel Director with 8Gb capable performance, 2 control processors, 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 and Data Center Fabric Manager Enterprise Software 90 day trial kit (separate DVD). Does not include Port blades or SFPs.	AK857B
StorageWorks DC04 SAN Director Power Pack+	192-port capable Fibre Channel Director with 8Gb capable performance, 2 control processors, 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, Data Center Fabric Manager Professional Software (separate DVD), and Data Center Enterprise Software 90 day trial kit (separate DVD). Does not include Port blades or SFPs.	AR479A
StorageWorks DC04 SAN Director	192-port capable Fibre Channel Director with 8Gb capable performance, 2 control processors, 2 power supplies, 1 2 GB USB Device, rack rails, cable comb Zoning, Web tools, Enhanced Group Management, and Data Center Fabric Manager Professional (separate DVD), and Data Center Fabric Manager Enterprise Software 90 day trial kit (separate DVD). Does not include Port blades or SFPs.	AR478A

Step 2 – Additional Port Configurations

	Model Description	Quantity	Part Number
8/16 port blade	16-port 8Gb/s Director Blade NOTE: Requires B-series optical SFP transceivers for each port as listed below.	Add the appropriate quantity of 16-port blades to meet requirements	AK858B
8/32 port blade	32-port 8Gb/s Director Blade NOTE: Requires B-series optical SFP transceivers for each port as listed below.	Add the appropriate quantity of 32-port blades to meet requirements	AK859B
8/48 port blade	48-port 8 Gb/s Director NOTE: Requires B-series optical SFP transceivers for each port as listed below.	Add the appropriate quantity of 48-port blades to meet requirements	AK860B
10/6 port blade	6-port 10Gb/s Director Blade NOTE: Requires optical XFP transceivers for each port as listed below.	Add the appropriate quantity of 6-port blades to meet requirements	AK861B

Configuration Information

Encryption FC Blade	16-port 8 Gb/s Encryption Director Blade NOTE: Requires B-series optical SFP transceivers for each port as listed below.	DC Backbone Director - add maximum of 4 DC04 SAN Director - add maximum of 4	AR945A
HP StorageWorks Multi-protocol Router Blade for B-Series	18 ports (16 Fibre Channel and 2 Gigabit Ethernet) multi-protocol router providing 2 types of SAN services: FC subnet routing, and FCIP tunneling. Includes rack mount kit, advanced zoning and web tools.	Add the appropriate quantity of 18-port blades to meet requirements	AG461B

Add Software:

HP DC04 Power Pack+ SAN Director Switch	Adaptive Networking, Fabric Watch, ISL Trunking, Extended Fabric, Advanced Performance Monitoring NOTE: Optional software for only the DC04 SAN Director (AR478A)		TA640A
HP StorageWorks DC SAN Backbone Director ICL LTU	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. 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 two DC SAN Directors may be connected using ICL connectivity	TA641A
HP StorageWorks DC04 SAN Director ICL LTU	Inter Chassis Links (ICLs) harness unused ports to connect the switching backplane of one DC04 SAN Director with the switching backplane of a second DC SAN Backbone Director or DC04 SAN Director. 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 only supported on DC04 SAN Director. HP DC SAN Director ICL Cable Kit (AR480A) is required for the physical connection.	A maximum of two DC SAN Directors may be connected using ICL connectivity	TA642A
HP DC SAN Director Inter-Chassis Link Cable Kit	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.		AR480A
HP StorageWorks DC SAN Backbone Director ICL Kit	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. 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.	A maximum of two DC SAN Backbone Directors may be connected using ICL connectivity	AK862A

Configuration Information

Contents of ICL kit include:

Four (2) meter copper cables

Two (2) ICL Licenses (one license required for each DC SAN Backbone Director)

NOTE: HP StorageWorks DC SAN Backbone Director ICL Kit (AK862) only valid for connecting two DC SAN Backbone Directors.

HP DC SAN Backbone Director Integrated Routing	HP StorageWorks SAN Backbone Director Integrated Routing LTU	T5530A
	NOTE: Optional Integrated Routing License for the DC SAN Backbone Director.	
HP DC04 SAN Director Integrated Routing	HP StorageWorks DC04 SAN Director Switch Integrated Routing LTU	T4643A
	NOTE: Optional Integrated Routing License for the DC04 SAN Director.	
MP Blade Performance Extension	HP StorageWorks MP Blade Performance Extension LTU	T4427A
	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 Adaptive Networking	HP StorageWorks DC SAN Director Switch Adaptive Networking LTU	TA644A
	NOTE: Optional Adaptive Networking License for the DC04 SAN Director.	
HP Fabric Watch	HP StorageWorks B-Series Fabric Watch Dir Swt LTU ALL	334218-B21
	NOTE: Optional Fabric Watch License for the DC04 SAN Director.	
HP ISL Trunking	HP StorageWorks B-Series ISL Trunking Dir Swt LTU ALL	325887-B21
	NOTE: Optional ISL Trunking License for the DC04 SAN Director.	
HP Advanced Performance Monitoring	HP StorageWorks B-Series Advanced Performance Monitor Dir Swt LTU ALL	334219-B21
	NOTE: Optional Advanced Performance Monitoring License for the DC04 SAN Director.	
HP Extended Fabric	HP StorageWorks B-Series Extended Fabric Dir Swt LTU ALL	325886-B21
	NOTE: Optional Extended Fabric License for the DC04 SAN Director.	
HP FICON	HP StorageWorks Director FICON Cup LTU* *only supported in XP Storage array environments	T4401A*
DCFM Enterprise	HP StorageWorks Data Center Fabric Manager Enterprise	T5542A

Configuration Information

Step 3 – Additional Options

Additional Power Supply	HP StorageWorks DC SAN Backbone Director Power Supply - Quantity 1	AK863A
	NOTE: Optional Power Supply for the DC SAN Backbone Director.	
Optical Transceivers	HP 8Gb Short Wave B-Series FC SFP+ 1 Pack	AJ716A
	HP 8Gb Long Wave B-series 10km FC SFP+ 1 Pack	AJ717A

Distance - Maximum	OM2 Cable	OM3 Cable
8Gb performance:	50 meters	150 meters
4Gb performance:	150 meters	270 meters
2Gb performance:	300 meters	500 meters

HP 4Gb Short Wave B-Series FC SFP 1 Pack	AJ715A

Distance - Maximum	OM2 Cable	OM3 Cable
4Gb performance:	150 meters	270 meters
2Gb performance:	300 meters	500 meters
1Gb performance:	500 meters	860 meters

HP 4Gb Long Wave B-Series FC SFP 1 Pack - 10km	AK870A
HP 4Gb Long Wave B-Series FC SFP 1 Pack - 30km	AN211A
HP BLc 10Gb SR XFP Opt Kit	443756-B21
HP BLc 10Gb LR XFP Opt Kit	443757-B21

USB Device	2 GB USB Device	AK864A

Optical cables	**LC-LC type cables**	
	HP 2 m Multi-mode OM2 LC/LC Fibre Channel Cable	221692-B21
	HP 5 m Multi-mode OM2 LC/LC Fibre Channel Cable	221692-B22
	HP 15 m Multi-mode OM2 LC/LC Fibre Channel Cable	221692-B23
	HP 30 m Multi-mode OM2 LC/LC Fibre Channel Cable	221692-B26
	HP 50 m Multi-mode OM2 LC/LC Fibre Channel Cable	221692-B27
	LC-SC type cables	
	HP 2 m Multi-mode OM2 LC/SC Fiber Channel Cable	221691-B21
	HP 5 m Multi-mode OM2 LC/SC Fiber Channel Cable	221691-B22
	HP 15 m Multi-mode OM2 LC/SC Fibre Channel Cable	221691-B23
	HP 30 m Multi-mode OM2 LC/SC Fibre Channel Cable	221691-B26
	HP 50 m Multi-mode OM2 LC/SC Fibre Channel Cable	221691-B27

Technical Specifications

Fibre Channel ports	Up to 384 ports (DC SAN Backbone Director) or 192 ports (DC04 SAN Director), universal (E, F, and FL); up to eight Fibre Channel modules (DC SAN Backbone Director) or four Fibre Channel modules, either 16 port, 32 port, or 48 port
Control processor	Redundant (active/standby) hot swappable control processor modules
Scalability	Full fabric architecture: http://h18006.www1.hp.com/products/storageworks/san/documentation.html
Performance	1.063 Gb line speed, full duplex; 2.125 Gb line speed, full duplex ; 4.25 Gb line speed, full duplex; 8.5 Gb 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
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, and eight 8-port trunk groups supported on 48-port blades. ISL Trunking at 2 Gbit/sec for compatibility with B-Series legacy switches and directors.
Aggregate bandwidth	3 Tbit/sec (DC SAN Backbone Director) or 1.5 Tbit/sec (DC04 SAN Director)
Core switching bandwidth	256 Gbps full duplex bandwidth available per port blade slot from core switching
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
Switch latency	Locally switched ports 700 ns, blade to blade latency is 2.1 micro-seconds
Maximum frame size	2112-byte payload
Frame buffers	2048 per 16-port group on the 16/32-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)
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
Media types	Hot-pluggable, B-Series Small Form-factor Pluggable (SFP), LC connector; Short-Wavelength Laser (SWL) up to 500 meters (1,640 feet); Long-Wavelength Laser (LWL) up to 10 km (6.2 mi); Extended Long-Wavelength Laser (ELWL) up to 100 km (62.1 mi); distance depends on fiber optic cable and port speed
Fabric services	Simple Name Server; Registered State Change Notification (RSCN) , NTP, RADIUS, RCS (Reliable Commit Service) Advanced Zoning; WebTools; Enhanced group Management, ,Fabric Watch; Extended Fabrics; ISL Trunking; DPS; QoS; End-to-End Performance Monitoring, FICON Control Unit Port (CUP)

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, 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)

Technical Specifications

Management		SSH v2, HTTP/HTTPS, SNMP v1/v3, Telnet; SNMP (FE MIB, FC Management MIB); WEB TOOLS; Fabric Watch; Data Center Fabric Manager Enterprise (DC SAN Backbone Director, DC04 SAN Director), Data Center Fabric Manager Professional (DC04 SAN Director); Fabric Manager; SMI-S, RADIUS.	
Management access		10/100/1000 Ethernet (RJ-45), in-band over Fibre Channel; serial ports (RJ-45) and one USB per Control Processor blade	
Diagnostics		POST and embedded online/offline diagnostics	
Mechanical specifications	Mounting	Rack-mountable in a standard 19-inch (48.26 cm) EIA rack; Telco-style mid-mounting available	
	Ports per rack	Up to 1152 ports per 42U rack	
	Enclosure	Rear panel-to-door airflow; DC04 SAN Director ships with 1U exhaust shelf	
	Width	17.22 in (43.74 cm)	
	Size	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) 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	DC San Backbone Director 103.50 kg (228.20 lb) for 384-port configuration fully populated 39.55 kg (82.20 lb) for chassis DC04 SAN Director 68.04 kg (150.00 lb) for 192-port configuration 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
	Heat dissipation	DC SAN Backbone Director	505 W, 1722 BTU/hr
		Min: 16-port configuration	1337 W, 4564 BTU/hr
		Max: 384-port configuration:	
		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	20A maximum, peak
		Input frequency range	47-63 Hz

Technical Specifications

NOTES:

A fully loaded DC SAN Backbone Director Power Pack switch requires a maximum of 1,530 Volt-Amps maximum under normal operating condition and 1,843 Volt-Amps maximum under failure conditions. This results in a main current of 6.3A amps (7.6A failure mode) at 240V AC line voltage or 16.3 amps (19.6A failure mode) at 100V AC line voltage.

The rated AC input range is 110 to 264V AC

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	Power Cables included	

Certified maximum Interoperability	Please Refer to SAN Design Guide at the following URL: http://www.hp.com/go/sandesignguide.

- SAN Switch 8
- SAN Switch 16
- SAN Switch 8-EL
- SAN Switch 2/8V
- 4/8 SAN Switch
- SAN Switch 16-EL
- SAN Switch 2/16V
- SAN Switch 2/16N FF
- 4/16 SAN Switch
- Integrated /32
- SAN Switch 2/32
- 4/32 SAN Switch
- 4/32B SAN Switch
- 4/64 SAN Switch
- Core Switch 4/64
- SAN Director 2/128
- SAN Director 4/256
- DC SAN Director
- DC04 SAN Director
- SAN Switch 2/16
- SAN Switch 1/16-EL
- MSA SAN Switch 2/8
- 8/8 SAN Switch
- 8/24 SAN Switch
- 8/40 SAN Switch
- 8/80 SAN Switch
- Brocade 4Gb SAN Switch for p-class HP BladeSystem
- Brocade 4Gb SAN Switch for c-class HP BladeSystem
- 400 MP Router
- B-Series MP Router Blade

Switch core	Non-blocking
Fabric latency	$< 2\,\mu$ sec. with no contention, cut-through routing
Hardware Options	8Gb 16, 32 and 48 port FC Card, 10Gb 6 port FC Card, iSCSI blade, MP-Router blades ; SFP media
Supported software	Telnet, SNMP, WebTools, Zoning, Fabric Watch, Extended Fabric, Advanced Performance Management, ISL Trunking, Adaptive Networking, Data Center Fabric Manager Optional