

HP StorageWorks B-Series infrastructure

Family data sheet



HP StorageWorks 4/64 SAN Switch



Brocade 4 Gb SAN Switch for
HP BladeSystem c-Class



HP StorageWorks 400
Multi-Protocol (MP) Router



HP StorageWorks 4/256 SAN director
4 Gb/s 256-port Fibre Channel



The HP B-Series directors and switches are the most widely used SAN solutions in the industry with over 2.5 million ports deployed. The HP B-Series has and continues to offer the industry's most complete SAN solution portfolio from embedded to enterprise.

The HP StorageWorks 4/8 Base SAN Switch and 4/8 SAN Switch offer affordable, flexible 4 Gb/s connectivity to enable small and medium-sized organizations to easily deploy SANs and the ability to grow with their storage needs.

HP StorageWorks 4/8 Base SAN Switch and 4/8 SAN Switch

The HP StorageWorks 4/8 Base SAN Switch and 4/8 SAN Switch offer 4 Gb/s connectivity for entry-level storage area networks (SAN) and the ability to grow to larger core-to-edge SAN environments. The simplicity and ease-of-use advantages of these switches help increase administrator productivity and lower the cost of management. Both switches deliver eight (upgradeable to 16) high-performance auto-sensing 1, 2 or 4 Gb/s Fibre Channel ports. An optional 4-port activation license increases the number of active ports to 12 or 16 ports.

The 4/8 Base model provides single-switch connectivity for a new, simple SAN installation and connects to storage and servers only. The 4/8 SAN Switch scales to full multi-switch SAN configurations. The optional Power Pack software bundle provides the SAN administrator with the necessary tools to monitor the health and enhance performance of the network. Power Pack also provides the ability to extend native Fibre Channel connectivity to over 100 km. This reliable switch platform provides:

- Pay-as-you grow affordable scalability
 - Easy deployment, management and integration into a wide range of IT environments
 - Port scalability from 8 to 12 or 16 ports in 4-port increments
 - SAN scalability from single-switch to full fabric connectivity
 - Ability to start small and grow the storage network in a non-disruptive manner

- Investment protection
 - Backward and forward compatibility
 - Full interoperability with existing B-Series switches
 - Auto-sensing performance 1 Gb/s, 2 Gb/s and 4 Gb/s
- Increased efficiency to manage business growth
 - Increased performance and functionality for SANs at an entry-level price
 - Advantages of low-cost device connectivity and powerful capabilities that make SAN technology highly accessible and affordable
 - Increase operational efficiency and staff productivity

HP StorageWorks MSA SAN Switch 2/8

This entry-level, embedded SAN switch is available exclusively with the HP StorageWorks Modular Storage Array 1000 (MSA1000). Delivered with four small form factor pluggable (SFP) optics installed, this reliable switch offers:

- **Control**—Centralized management tools increase administrator's efficiency.
- **Superior performance**—Switch supports 2 Gb/s transfer with non-blocking for increased performance.
- **Efficient, space-saving design**—8-port 2 Gb/s array embedded Fibre Channel (FC) switch consumes zero rack space.

The HP StorageWorks 4/16 SAN Switch and 4/16 SAN Switch Power Pack models provide the flexibility, manageability and performance features that enterprises need to build powerful, flexible storage SANs and consolidate their data storage.

HP StorageWorks 4/16 SAN Switch and 4/16 SAN Switch Power Pack

HP StorageWorks 4/16 SAN Switch and 4/16 SAN Switch Power Pack deliver affordable and flexible 4 Gb/s connectivity for a storage area networks (SANs). The new interconnects can be incorporated into an extensive core fabric or placed at the edge of the SAN infrastructure. The simplicity and ease-of-use advantages of these switches help increase administrator productivity and lower the cost of management. Both switches deliver 16 high-performance auto-sensing 1, 2, or 4 Gb/s Fibre Channel ports. In addition, the 4/16 SAN switch and 4/16 SAN Switch Power Pack are fully non-blocking and provide 128 Gb switching (4 Gb full duplex) bandwidth. Both 4/16 models provide full SAN scaling capabilities. Both are ideal for new and existing SAN installations.

The 4/16 SAN Switch Power Pack provides the SAN administrator with the necessary tools to monitor the health and performance of the network, while also providing the highest levels of security, scalability and manageability. Power Pack also provides the ability to extend native Fibre Channel connectivity to over 100 km. Power Pack software features are available pre-configured on the switch or as an upgrade to existing switches. Power Pack also provides the foundation for integration into HP Storage Essentials, providing a SAN administrator the capability to manage the entire environment through a single pane of glass. Small form factor pluggable optical transceivers (SFPs) are available separately. These comprehensive switches facilitate:

- **Control**—Centralized management tools increase administrator's efficiency.
- **Superior performance**—Switch supports 4 Gb/s per port with completely non-blocking performance.

- **Investment protection**—Reduced administrative overhead and low incremental cost allow you to upgrade and scale as needs evolve.
- **Advanced availability**—Hot code activation provides the ability to do software upgrades with 100 percent application uptime and non-disruption to data traffic.
- **Flexibility**—Power Pack software tools provide the capability to monitor for hot spots and proactively address potential issues; Power Pack includes ISL Trunking, Fabric Watch, Extended Fabric and Advanced Performance Monitoring.

HP Services

HP Services has end-to-end, industry-leading expertise in delivering solutions that help you improve your business agility. From initial assessment and design to technical integration and ongoing support, HP Services can be your single point of contact and accountability.

HP related services:

- **HP Installation and Startup Service for the HP StorageWorks Multi-Protocol Router**—includes helping you with the design, configuration and verification of the multi-protocol (MP) router's Fibre Channel (FC) subnet routing and FCIP connectivity to a remote site.
- **Other HP Storage Services** include:
 - SAN Solution Service
 - HP StorageWorks Secure Fabric OS Installation and Startup Service
 - Cisco MDS Switches Installation Service
- **HP Care Pack Services**—a comprehensive portfolio of services for maintaining the highest levels of IT availability.
 - Critical Service
 - Proactive 24 service
 - Support Plus 24 service
- **Instant Support Enterprise Edition (ISEE)**—remote monitoring and support solution for your IT data center.
- **Business Continuity Services**—protect and minimize disruption to IT infrastructure and associated business processes against site outages, disasters and environmental events.

For further information on HP storage services, please visit: www.hp.com/hps/storage.

The SAN Switch 4/32 and 4/32 Power Pack provide the flexible building blocks customers need to deploy highly scalable, highly available and easily manageable storage area networks in Adaptive Enterprise deployments.

HP StorageWorks SAN Switch 4/32 and 4/32 Power Pack

The 32-port fabric switch offers very flexible connectivity for a high-performance SAN. The switches deliver 16, 24 or 32 high-performance auto-sensing 1, 2, or 4 Gb/s Fibre Channel ports. The SAN Switch 4/32 base model ships with 16 active ports. Ports can be activated in 8-port increments with the purchase of a ports-on-demand upgrade license. The SAN Switch 4/32 easily integrates into the installed base of B-Series SANs. It provides non-blocking data transfer and increased application data throughput.

The SAN Switch 4/32 utilizes current B-Series management and monitoring software tools to enhance operational efficiencies and improve SAN investment and simplifies enterprise SAN deployment by combining higher edge switch port density with exceptional scalability, performance and reliability. Advanced fabric services, including Power Pack, are available pre-configured on the switch or as an optional upgrade.

This highly available switch offers:

- **Advanced availability**—Offers redundant, hot-swappable, removable power supplies and cooling units, ideal for supporting corporate infrastructure implementations.
- **Efficiency**—Provides ports-on-demand capability for instant scalability and “pay-as-you-grow” value.
- **Superior performance**—Features industry-leading 4 Gb/s performance per port for strategic, data-intensive applications.
- **Stability**—Provides investment protection as the device is forward and backward compatible with the entire family of 1 Gb and 2 Gb/s B-Series switches and directors.
- **Adaptability**—Offers 4 Gb/s technology with auto-sensing capabilities to recognize 1, 2 or 4 Gb/s devices.
- **Compatibility**—Works seamlessly with all B-Series FC Core, Director and SAN switch products.
- **Flexibility**—Power Pack software tools provide the capability to monitor for hot spots and proactively address potential issues and provide the ability to extend native Fibre Channel distances to over 500 km; Power Pack includes ISL Trunking, Fabric Watch, Extended Fabrics and Advanced Performance.

The HP StorageWorks 4/64 provides affordable high-density connectivity for high-performance mid-range to large storage area networks.

Monitoring.

HP StorageWorks SAN Switch 4/64 and 4/64 Power Pack

The HP StorageWorks 4/64 SAN Switch and 4/64 Power Pack switches offer affordable, high-density connectivity for a high-performance SAN. The new switches can be incorporated into an extensive core fabric or placed at the edge of the SAN. They deliver 32, 48 or 64 high-performance auto-sensing 1, 2 or 4 Gb/s Fibre Channel ports. The 4/64 SAN Switch base model ships with 32 active ports. Ports can be activated in 16-port increments with the purchase of an upgrade license.

Storage networking features include redundant, removable power supplies and cooling, making the switches ideal for supporting corporate infrastructure implementations. The 4/64 SAN Switch includes web management tools and hardware and software enforced zoning. The 4/64 SAN Switch Power Pack provides the SAN administrator with the necessary tools to monitor the health and performance of the network, while ensuring the highest levels of security, scalability and manageability. Power Pack also provides the ability to extend native Fibre Channel connectivity to over 500 km. Power Pack also provides the foundation for integration into HP Storage Essentials.

This highly available switch offers:

- **Performance**—Industry-leading 4 Gb/s performance makes it ideal for strategic, data-intensive applications. It offers increased network performance with enhanced ISL trunking, which enables a high-speed data path up to 32 Gb/s.
- **Affordable scalability**—Utilizes ports-on-demand capabilities provide fast, easy and cost-effective scalability from 32 to 64 ports in 16-port increments. Solution provides a modular “pay-as-you-grow” approach that supports cost-effective business growth and easy upgrades.
- **High availability**—Non-disruptive software upgrades (hot code load and activation), as well as redundant, hot-swappable, removable power supplies and cooling units, make this the ideal solution for supporting corporate infrastructure implementations.
- **Investment protection and flexibility**—The 4/64 SAN Switch is forward and backward compatible with the entire family of 1, 2 or 4 Gb B-Series switches and directors.
- **Ease of management**—Current B-Series management and monitoring software tools are utilized to vastly improve operational efficiencies and provide a wise SAN investment. It is fully integrated with HP SAN Management tools.
- **Increased consolidation**—Simplified enterprise SAN deployment is provided by a high-density port count in a single-domain switch for exceptional scalability, performance and reliability.

The physical integration of the Brocade 4 Gb SAN Switch within the HP BladeSystems p-Class and c-Class significantly simplifies deployments and increases flexibility and performance, while reducing costs as a result of rack consolidation, reduced cabling and fewer SFPs.

The Brocade 4 Gb SAN Switch for HP BladeSystem p-Class and the Brocade 4 Gb SAN Switch for HP BladeSystem c-Class

As members of the B-Series family of Fibre Channel switches, the Brocade 4 Gb SAN Switches for the HP BladeSystems deliver the latest technology from HP for connecting HP BladeSystems to Fibre Channel SANs. IT managers have the capability to consolidate multiple HP servers, Fibre Channel switches and Ethernet switches into a single platform for better connectivity to the networked infrastructure. This integration of technology results in space and cost savings due to a reduction of physical components, significant simplification of the SAN environment, outstanding performance and easier deployments.

Through advances in technology, Brocade Fibre Channel switching technology has been physically designed to plug into the back of the HP BladeSystem p-Class and the BladeSystem c-Class, resulting in a zero-footprint integrated SAN solution. Cabling between components that once had to be done manually by IT staff is now integrated into the HP BladeSystems, reducing time-to-deploy and administrative man hours.

These space-saving switches provide:

- Simplicity:
 - Plug and play
 - Faster deployment
 - Fewer elements to manage with reductions in SFPs, cables and rack space
 - Simpler SAN environment
 - Integrated design with blade enclosure to decrease complexity and reduce costs (zero footprint, shared power and cooling and elimination of external cabling)

- Flexibility
 - Fully compatible with HP StorageWorks B-Series and Brocade switches
 - Standards-based
 - Interoperable
 - Multi-speed support with 1 Gb, 2 Gb or 4 Gb/s auto-sensing
 - Broad range of management options, SMI-compliant
 - Redundancy for high availability requirements, up to 2 switches/enclosure in the p-Class and up to 6 switches/enclosure in the c-Class
 - Support for hot code activation for non-disruptive firmware updates
 - Unmatched scalability
 - Higher levels of reliability
- Value
 - Outstanding 4 Gb/s performance
 - Support for Brocade trunking, providing up to 16 Gb of direct SAN connectivity in a single logical ISL pipe
 - Affordability
 - Investment protection
 - Lower deployment costs from reduced cables, SFPs and rack space

The HP StorageWorks 4/256 SAN Director and 4/256 Power Pack SAN Director are industry leading director-class switches that deliver high-availability and outstanding performance in a modular and flexible architecture. They provide the foundation for an enterprise SAN that integrates seamlessly into an always-on Internet infrastructure.

HP StorageWorks 4/256 SAN Director and 4/256 SAN Director Power Pack

The HP StorageWorks 4/256 SAN Director and the HP StorageWorks 4/256 SAN Director Power Pack provide high-availability and high-performance features required in mission-critical data center SAN implementations. With up to 384 ports of connectivity in a single domain, the 4/256 SAN director offers flexible scalability for large core-to-edge SAN architectures. The accelerated 4 Gb/s redundant processors and new advance routing enable the 4/256 SAN director to deliver next-generation performance with faster fabric services and unique investment protection. The 4/256 SAN Director hardware and software architectures support “five-nines” availability with hot-swappable FRUs and redundant central processors. Reliability and availability features helps to facilitate non-disruption when upgrading hardware and software.

The 4/256 SAN Director Power Pack includes the 4/256 Director switch with specially priced value-added management software. The new director lowers the total cost of ownership (TCO) of deploying and operating SAN infrastructures. With higher port density than previous directors, the 4/256 delivers more efficient use of expensive data center floor space. The director is 1, 2, or 4 Gb/s auto-sensing and protects customer investment by being fully backward compatible with the entire B-Series family of fabric switches and director switches. These high performance switches achieve:

- **Control**—Provides multi-switch fabric tools for easy configuration and monitoring convenient Power Pack options.
- **Efficiency**—Offers up to 384 x 1, 2 and 4 Gb/s universal auto-sensing ports in a 14U rack-mount enclosure.
- **Superior performance**—Provides leading-edge 4 Gb/s performance with 16-port, 32-port and 48-port 4 Gb/s blades for superior scalability; integrates fully with HP’s System Insight Manager (SIM) and Storage Essentials software suites.
- **Investment protection**—Provides standards-based interoperability with existing FC switches and integrates seamlessly into 1, 2 or 4 Gb/s fabrics.
- **Advanced availability**—Supports “five-nines” availability with such advantages as hot-swappable field-replaceable units (FRUs), redundant control processors, stable failover and concurrent hardware and software upgrades.
- **Flexibility**—Power Pack software tools provide the capability to monitor for hot spots and proactively address potential issues; Power Pack includes ISL Trunking, Fabric Watch, Extended Fabric and Advanced Performance Monitoring.
- **Expandable capability**—The new MP Router blade adds the ability to link devices across Fibre Channel fabrics plus provide GigE links within the chassis. This is the first special purpose blade for the SAN Director 4/256.

The HP StorageWorks Multi-Protocol Routers enable large organizations to derive more value from the SAN infrastructure by providing the ability to connect SAN islands and share resources, without the risk, cost and complexity of merging them into a single large fabric.

For many organizations, the storage infrastructure has evolved into a set of multiple disconnected SAN islands, increasing complexity and costs. The HP StorageWorks B-Series Multi-Protocol Routers enable organizations to derive more value from the SAN infrastructure by providing the ability to connect SAN islands and share resources, without the risk and complexity of merging them into a single large fabric, both for FCIP and native Fibre Channel connectivity. The resulting modular SAN design provides a more scalable, flexible and stable infrastructure that is not limited by distance, increasing the business value of the SAN infrastructure.

The HP B-Series MP Routers provide two types of SAN services: (1) FC-FC Subnet Routing Service for SAN island consolidation and (2) FCIP Tunneling Service for SAN extension over distance. These services provide new options for connecting SAN islands and extending SAN benefits over multiple networks, to larger SAN sizes and across longer distances. Key advantages of this approach include:

- Simplifying SAN design, implementation and management through centralization
- Providing a seamless and dependable way to share resources across multiple SANs without the complexity of physically merging those SANs
- Creating a more unified SAN environment with easier interconnection and support for SANs and SAN resources purchased from different storage vendors
- Reducing disruptions created by events such as data migration, storage or server consolidation, migration to production environments, and application rebalancing between fabrics
- Extending those benefits over long distances with high-performance FCIP services

The HP StorageWorks 400 Multi-Protocol Router offers these benefits in the convenient packaging of a stand-alone product. By being an option for the industry-leading HP StorageWorks 4/256 SAN Director, the HP MPR blade is able to provide these SAN services with the performance and high-availability characteristics of the director platform. The ability to offer these benefits in multiple form factors provides outstanding flexibility to meet multiple customer requirements.

More specifically, the HP MP Routers:

- **Improve the value of SANs**
 - Reduce the cost and effort of SAN design, implementation and management
 - Enable greater utilization of data networks
 - Integrate with HP B-Series products and management tools for investment protection
- **Provide outstanding scalability and operational flexibility**
 - Hierarchical routing architectures for increased SAN scalability (supports thousands of ports and thousands of shared devices)
 - Maintenance of fabric isolation for improved operational stability
 - Non-disruptive integration to the SAN environment
- **Deliver superior performance**
 - Industry's leading 4 Gb/s FC routing services
 - Performance-enhanced FCIP services with compression and up to 8 FCIP tunnels per gigabit Ethernet port
 - Ability to run applications at line-rate speeds

Technical specifications



HP StorageWorks MSA SAN Switch 2/8



HP StorageWorks 4/8 Base SAN Switch



HP StorageWorks 4/8 SAN Switch

Hardware features	Array embedded blade leverages power and cooling features of MSA, four SFPs included, feature set common with SAN Switch product line, Firmware version 3.x	Rack-mount Kit Firmware version 5.x	Rack-mount Kit Firmware version 5.x
Power supply/fans	Fixed power supply	Fixed power supply	Fixed power supply
Form factor	Embedded SAN switch	1U	1U
Port types	Universal self-configuring ports (F, FL, E)	Universal self-configuring ports (F, FL, E)	Universal self-configuring ports (F, FL, E)
Software features	<ul style="list-style-type: none"> • Advanced Zoning • WebTools • QuickLoop 	<ul style="list-style-type: none"> • Advanced Zoning • WebTools 	<ul style="list-style-type: none"> • Advanced Zoning • WebTools • Full Fabric
Fabric	Eight 2 Gb/s ports: one to controller, seven user accessible, no e-ports restricted	1-Switch Fabric Limit upgradeable to Full Fabric	Full Fabric

What's included*	<p>HP StorageWorks MSA SAN Switch 2/8—Switch, four SFPs, accessory kit (enterprise safety and regulatory information, installation guide, plenum), Advanced Zoning and WebTools</p> <p>All other HP StorageWorks SAN switches and directors—Switch, accessory kit (rack-mount kit, enterprise safety and regulatory information, installation guide, plenum), Advanced Zoning and WebTools, serial cable, standard and PDU power cords</p>		
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* SFP should be ordered separately for the 4/8 SAN Switch models.

For ordering information, please see QuickSpecs: www.hp.com/go/QuickSpecs

Technical specifications



HP StorageWorks 4/16 SAN Switch



HP StorageWorks 4/16 SAN Switch Power Pack

Hardware features	Rack-mount Kit Firmware version 5.x	Rack-mount Kit Firmware version 5.x
Power supply/fans	Fixed power supplies, fans	Fixed power supplies, fans
Form factor	1U	1U
Port types	Universal self-configuring ports (F, FL, E)	Universal self-configuring ports (F, FL, E)
Software features	<ul style="list-style-type: none"> • Advanced Zoning • WebTools • Full Fabric 	<ul style="list-style-type: none"> • Advanced Zoning • WebTools • Power Pack: <ul style="list-style-type: none"> Advanced Performance Monitoring Fabric Watch ISL Trunking Extended Fabric
Fabric	Full Fabric	Full Fabric
What's included*	All other HP StorageWorks SAN switches and directors —Switch, accessory kit (rack-mount kit, enterprise safety and regulatory information, installation guide, plenum); Advanced Zoning and WebTools; serial cable; standard and PDU power cords	

* SFP should be ordered separately for the 4/16 SAN Switch models.

For ordering information, please see QuickSpecs: www.hp.com/go/QuickSpecs

Technical specifications



	HP StorageWorks SAN Switch 4/32	HP StorageWorks SAN Switch 4/32 Power Pack	HP StorageWorks SAN Switch 4/64	HP StorageWorks SAN Switch 4/64 Power Pack
Hardware features	Rack-mount Kit Firmware version 5.x	Rack-mount Kit Firmware version 5.x	Rack-mount Kit Firmware version 5.x	Rack-mount Kit Firmware version 5.x
Power supply/fans	Redundant, hot-swappable, removable power supplies and cooling units	Redundant, hot-swappable, removable power supplies and cooling units	Redundant, hot-swappable, removable power supplies and cooling units	Redundant, hot-swappable, removable power supplies and cooling units
Form factor	1U	1U	2U	2U
Port types	<ul style="list-style-type: none"> • Universal self-configuring ports (E, F and FL) • 16 installed, 32 ports maximum with 8-port upgrades 	<ul style="list-style-type: none"> • Universal self-configuring ports (E, F and FL) • 32 installed, 32 ports maximum 	<ul style="list-style-type: none"> • Universal self-configuring ports (E, F and FL) • 32 ports active, 64 ports maximum with 16-port upgrades 	<ul style="list-style-type: none"> • Universal self-configuring ports (E, F and FL) • 32 ports active, 64 ports maximum with 16-port upgrades
Software features	<ul style="list-style-type: none"> • Advanced Zoning • WebTools • Full Fabric 	<ul style="list-style-type: none"> • Advanced Zoning • WebTools • Full Fabric • Power Pack: <ul style="list-style-type: none"> Advanced Performance Monitoring Extended Fabric Fabric Watch ISL Trunking 	<ul style="list-style-type: none"> • Advanced Zoning • WebTools • Full Fabric 	<ul style="list-style-type: none"> • Advanced Zoning • WebTools • Full Fabric • Power Pack: <ul style="list-style-type: none"> Advanced Performance Monitoring Extended Fabric Fabric Watch ISL Trunking

What's included* **All other HP StorageWorks SAN switches and directors**—Switch, accessory kit (rack-mount kit, enterprise safety and regulatory information, installation guide); Advanced Zoning and WebTools; serial cable; standard and PDU power chords power cords

* SFP should be ordered separately for the 4/32 and 4/64 SAN Switch models.

For ordering information, please see QuickSpecs: www.hp.com/go/QuickSpecs

Technical specifications



Brocade 4 Gb SAN Switch for HP BladeSystem p-Class



Brocade 4 Gb SAN Switch for HP BladeSystem p-Class Power Pack

Hardware features	(1) 4 Gb SAN switch, (2) 4 Gb industry-standard hot-pluggable small form factor short wave optical transceivers, (1) re-timer card, (1) serial cable, (1) mini USB-to-serial adapter, Firmware version 5.x	(1) 4 Gb SAN switch, (2) 4 Gb industry-standard hot-pluggable small form factor short wave optical transceivers, (1) re-timer card, (1) serial cable, (1) mini USB-to-serial adapter, Firmware version 5.x
Power supply/fans	Integrated design with BladeSystem, with shared power and cooling resources	Integrated design with BladeSystem, with shared power and cooling resources
Form factor	Reduced octal cube design (4.5 x 3.5 x 1.5 inches); plugs into the back of the HP BladeSystem p-Class, resulting in a zero-footprint solution	Reduced octal cube design (4.5 x 3.5 x 1.5 inches); plugs into the back of the HP BladeSystem p-Class, resulting in a zero-footprint solution
Port types	<ul style="list-style-type: none"> • Universal self-configuring ports (E, F, FL) • 8 internal; 4 external 	<ul style="list-style-type: none"> • Universal self-configuring ports (E, F, FL) • 8 internal; 4 external
Software features	<ul style="list-style-type: none"> • Advanced Zoning • WebTools 	<ul style="list-style-type: none"> • Advanced Zoning • WebTools • Full Fabric • Power Pack: <ul style="list-style-type: none"> Advanced Performance Monitoring Extended Fabric ISL Trunking Fabric Watch
What's included*	Brocade 4 Gb SAN Switch for HP BladeSystem p-Class —SAN switch, two 4 Gb SFPs, one re-timer card, one serial cable, one mini USB-to-serial adapter, WebTools license, Zoning license, one-year warranty, and 8 x 5, next-business-day response support	

* Power Pack additionally includes: Fabric Watch, ISL Trunking, Advanced Performance Monitoring, Extended Fabrics

For ordering information, please see QuickSpecs: www.hp.com/go/QuickSpecs

Technical specifications



Brocade 4 Gb SAN Switch for HP BladeSystem c-Class

Performance	4 Gbps
Maximum ports	24
Minimum ports	12
Aggregate switch bandwidth	192 Gbps (end-to-end)
Protocol support	Fibre Channel
Blade type supported	HP BladeSystem c-Class
High-availability features	Redundant switches per BladeSystem for high availability
Management features	WebTools; Advanced Zoning; Power Pack: ISL Trunking, Advanced Performance Monitoring, Fabric Watch, Extended Fabrics
Form factor	Embedded
Media types	Small form-factor pluggable (SFP) transceivers
Upgradeability	Scalable licensing for 12 additional ports for 12-port model; maximum 24 ports. Power Pack upgrade for full fabric models
Models available	12-Port Full Fabric, 24-Port Full Fabric, 24-Port Full Fabric Power Pack
Optional software	ISL Trunking, Advanced Performance Monitoring, Extended Fabrics, Fabric Watch, Fabric Manager Enterprise Edition, Fabric Manager Base (10 Domains edition), Secure Fabric OS
Dimensions (HxWxD)	11 x 1.13 x 7.63 inches
Product weight (lbs)	Approx. 2.85 lb
Warranty (parts, labor, on-site)	1-1-1
What's included*	One 4 Gb SAN Switch with up to 16 internal ports and up to 8 fabric ports enabled; two or four short wave 4 Gb SFPs; WebTools license; Zoning license; full fabric connectivity; documentation; Power Pack model includes licensed Power Pack software features.

* Power Pack additionally includes: Fabric Watch, ISL Trunking, Advanced Performance Monitoring, Extended Fabrics

For ordering information, please see QuickSpecs: www.hp.com/go/QuickSpecs

Technical specifications



HP StorageWorks SAN Director 4/256



HP StorageWorks SAN Director 4/256 Power Pack

Hardware features	Rack-mount Kit, industry-standard hot-pluggable small form factor optical transceivers, 16-port Director Blade (A7990A), 32-port Director Blade (A7991A), Firmware version 5.x, 48-port Director Blade (AG561A)	Rack-mount Kit, industry-standard hot-pluggable small form factor optical transceivers, 16-port Director Blade (A7990A), 32-port Director Blade (A7991A), Firmware version 5.x, 48-port Director Blade (AG561A)
Power supply/fans	Two hot-swappable power supplies and three hot-swappable cooling units	Two hot-swappable power supplies and three hot-swappable cooling units
Form factor	14U	14U
Port types	<ul style="list-style-type: none"> • Universal self-configuring ports (F, FL, E) • 384 ports maximum with 48-port FC blades 	<ul style="list-style-type: none"> • Universal self-configuring ports (F, FL, E) • 384 ports maximum with 48-port FC blades
Software features	<ul style="list-style-type: none"> • Advanced Zoning • WebTools • Full Fabric 	<ul style="list-style-type: none"> • Advanced Zoning • WebTools • Full Fabric • Power Pack: <ul style="list-style-type: none"> Advanced Performance Monitoring Extended Fabrics Fabric Watch ISL Trunking

What's included* **All other HP StorageWorks SAN switches and directors**—Switch, accessory kit (rack-mount kit, enterprise safety and regulatory information, installation guide); Advanced Zoning and WebTools, serial cable, standard and PDU power cords

* SFP should be ordered separately for the 4/256 SAN Directors and any of its blades.

For ordering information, please see QuickSpecs: www.hp.com/go/QuickSpecs

* Power Pack additionally includes: Fabric Watch, ISL Trunking, Advanced Performance Monitoring, Extended Fabrics

Technical specifications



HP StorageWorks B-Series Multi-Protocol (MP) Router Blade



HP StorageWorks 400 Multi-Protocol (MP) Router

Hardware features	Rack-mount Kit, industry-standard hot-pluggable small form factor optical transceivers, Firmware version 5.x	Rack-mount Kit, industry-standard hot-pluggable small form factor optical transceivers, Firmware version 5.x
Power supply/fans	N/A	Redundant power supplies
Form factor	Blade for director chassis	2U
Port types	<ul style="list-style-type: none"> • Fibre Channel (E, F, FL, EX) and Gigabit Ethernet • 18 ports (16 FC and 2 Ethernet) 	<ul style="list-style-type: none"> • Fibre Channel (E, F, FL, EX) and Gigabit Ethernet • 18 ports (16 FC and 2 Ethernet)
Software features	<ul style="list-style-type: none"> • Simple Name Server, Registered State Change Notification (RSCN) and iSCSI Gateway Service • Fabric services include the FC-FC Routing Service, FCIP Tunneling Service, Advanced Zoning and WebTools 	<ul style="list-style-type: none"> • Simple Name Server, Registered State Change Notification (RSCN) and iSCSI Gateway Service • Fabric services include the FC-FC Routing Service, FCIP Tunneling Service, Advanced Zoning and WebTools
What's included*	All other HP StorageWorks SAN switches and directors —Switch, accessory kit (rack-mount kit, enterprise safety and regulatory information, installation guide), Advanced Zoning and WebTools, serial cable, standard and PDU power cords	

* SFP should be ordered separately for the Multi-Protocol Routers.

For ordering information, please see QuickSpecs: www.hp.com/go/QuickSpecs

Warranty and included services

Hardware warranty

HP provides a one-year, hardware limited warranty, fully supported by a worldwide network of resellers and service providers. It includes one year parts; one year on-site (8 x 5, next-business-day response) and one year labor, 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 90 days from delivery. For more information about HP's Global Limited Warranty and Technical Support, visit: www.hp.com/products/storageworks/warranty.

HP Care Pack services

HP Care Pack Services offer upgraded service levels to extend and expand your standard product warranty with easy-to-buy, easy-to-use support packages that help you make the most of your hardware and software investments. They let you choose the support levels that meet your business requirements, from basic to mission-critical. They help you contain total cost of ownership.

HP Care Pack warranty extensions can be purchased along with HP products to cost-effectively upgrade or extend your warranty. For many products, post-warranty HP Care Pack Services are available when your original warranty has expired. For more information on these services, contact your local HP representative, authorized HP business partner, or visit: www.hp.com/go/storage/carepacks.

HP Factory Express

HP Factory Express is a portfolio of more than 50 flexible and robust pre-priced, customized and integrated factory configuration and deployment services—supporting HP products from the desktop to the data center with Microsoft® Windows®, Linux and HP-UX 11i.

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Additional HP support services

HP Services provides a broad spectrum of services to commercial and enterprise customers, including performance and availability services such as proactive mission-critical services, as well as support management services for deployment of the entire IT infrastructure, including HP and multi-vendor environments. For more information on these services, contact your HP representative, authorized HP business partner, or visit: www.hp.com/hps/storage.

Education services

HP offers a variety of training methods to fit your needs including traditional instructor-led courses at one of our 120 training centers worldwide, on-site training customized to your needs in your facility, or even Remotely Assisted Instruction Learning (RAIL) that combines the best of traditional classroom training (including its live instructor and labs) with the best of online training (no traveling required). And if you like learning on your own schedule, at your own pace, make use of e-learning opportunities on the award-winning HP IT Resource Center, a “learning community” with extensive on-demand resources that can be accessed 24 x 7. For more information on these services, contact your HP representative, authorized HP business partner, or visit: <http://education.hp.com/curr-storsan.htm>.

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