

Overview

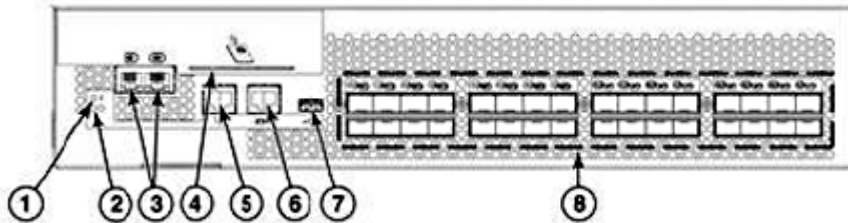
Managing operational risk by protecting valuable digital assets has become increasingly critical in today's enterprise IT environments. In addition to achieving compliance with regulatory mandates and meeting industry standards for data confidentiality, IT organizations must also protect against potential litigation and liability following a reported breach.

The HP Encryption SAN Switch scales non-disruptively, providing 48 to 96 Gbit/sec of encryption processing power to meet the needs of the most demanding environments with flexible, on-demand performance. It also is tightly integrated with HP StorageWorks Secure Key Manager which provides centralized enterprise-class key management systems across distributed environments. The HP Secure Key Manager enable simple yet secure key sharing between multiple sites for a variety of uses. The capabilities of the HP Secure Key Manager and its integration with Encryption SAN Switch enable secure and automated key sharing between multiple sites ensuring transparent access to encrypted data.

The storage fabric enables centralized management to support nearly every aspect of the data center, from server environments and workstations to edge computing and backup environments. As a result, it is an ideal place to standardize and consolidate a holistic data-at-rest security strategy. Organizations can also implement this type of best-practice methodology in other parts of the data center, helping to protect data throughout the enterprise.

The Encryption SAN Switch is based on industry standards for data-at-rest encryption to provide centralized, scalable encryption services that seamlessly integrate into existing B-Series Fabric OS® (FOS) environments.

The B-Series fabric-based approach to data encryption scales to meet performance requirements and provides a centralized point of management for storage security and key management. Deployment is simple and non-disruptive: Organizations can encrypt data from any switch port without reconfiguring the fabric.



HP StorageWorks Encryption San Switch

- | | |
|--|-------------------------------|
| 1. Status Led | 5. RJ-45 GE management port |
| 2. Power led | 6. RJ-45 serial console port |
| 3. RJ-45 GE ports (for clustering and re-keying) | 7. USB port |
| 4. Smart Card reader | 8. Fibre Channel ports (0-31) |

Features and Benefits

Key Features and Benefits

- High-performance, scalable fabric-based encryption to enforce data confidentiality and privacy requirements
- Unparalleled encryption processing at up to 96 Gbit/sec to support heterogeneous enterprise data centers
- Integration with HP Secure Key Manager enable secure and automated key sharing between multiple sites ensuring transparent access to encrypted data
- Industry-standard AES-256 encryption algorithms for disk on a single security platform for SAN environments
- Frame Redirection technology that enables easy, non-intrusive deployment of fabric-based security services
- Plug-in encryption services available to all heterogeneous servers, including virtual machines, in data center fabrics
- Scalable performance with on-demand encryption processing power to meet regulatory mandates for protecting data

Models

HP StorageWorks Encryption SAN Switch Model	HP StorageWorks Encryption SAN Switch	AR944A
	HP Encryption SAN Switch Performance Upgrade LTU	TA666A

Product Highlights

- HP Encryption SAN Switch**
- High-performance, scalable fabric-based encryption to enforce data confidentiality and privacy requirements
 - Simplifies enterprise SAN deployment by combining higher edge switch port density with exceptional scalability, performance and reliability
 - Delivers 32-ports in a 2U enclosure
 - Meets enterprise level availability requirements with redundant, hot pluggable components, no-single-points-of-failure within the switch
 - Provides 1 Gb, 2 Gb, 4Gb, 8Gb/s* performance
 - Employs optional Inter-Switch Link (ISL) Trunking to provide a high-speed data path between switches which enables a high speed data path between 8Gb/s switches up to 64 Gbit/sec

* Full 8Gb/s end to end storage performance requires 8 Gb/s HBAs, 8Gb/s controllers, and 8Gb/s switches. 8Gb/s ISL performance can be obtained between two 8Gb/s switches.

Configuration Support <http://h18000.www1.hp.com/products/storageworks/san/documentation.html>

- High-availability features**
- Integrated redundant, hot swappable cooling fans and power supplies
 - Enhanced Fault Detection Logic
 - Parity protection on all data paths and system memory

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- Advanced Fabric Services**
- Data-at-rest encryption
 - Hardware and Software Enforced Zoning
 - Frame Filtering
 - Built-in Web browser management tools
-

- Cabinet Support**
- HP StorageWorks (22U, 36U and 42U) 9000 and 10000 G1 Series, (25U, 33U and 41U) HP System/e, and the new 42U HP 10000 G2 Series
- NOTE:** To order factory integration, add 0D1 after the part number on your sales order.
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Software Components, Standard, Base Models

Encryption Scales non-disruptively providing 48 to 96 Gbit/sec of data at rest encryption processing power to meet the needs of the most demanding environments with flexible, on-demand performance.

Frame Filtering An ASIC based capability that enables new applications and features. The switch has the ability to "view" the first 64 bytes of the Fibre Channel frame. At this time, Frame Filtering enables advanced capabilities such as Advanced Zoning and Advanced Performance Monitoring.

Advanced Zoning WWN Zoning and Access Control are enforced by hardware that provides the same simple administration previously enforced only with software. Administrators can organize a physical fabric into logical groups and prevent unauthorized access by devices outside the Zone.

Product Highlights

Web Tools

Web Tools is an intuitive and easy-to-use graphical interface that enables organizations to monitor and manage SAN fabrics. Tasks can be performed through a Java-capable Web browser from a standard laptop, desktop PC or workstation from any location within the enterprise.

EGM

Enhanced Group Management (EGM) is a FOS license that is included with all B-Series switches and enables multi-switch operations. It helps automate operations across multiple switches to save time and streamline repetitive operations, which are typically prone to error. EGM drives consistency across fabrics, while minimizing the risk associated with potential downtime due to configuration mismatches. EGM provides streamlined troubleshooting for more effective fabric monitoring and diagnosis. Data Center Fabric Manager Enterprise enables EGM functionality.

Software Components, Optional

Encryption SAN Switch Power Pack+ Software Bundle

The Power Pack+ Software Bundle is an optional software bundle for the Encryption SAN Switch. It includes the following:

- Adaptive Networking
 - Fabric Watch
 - Advanced Performance Monitor
 - Extended Fabric
 - ISL Trunking
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Adaptive Networking

Adaptive Networking (AN) is an optional 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.

Product Highlights

Fabric Watch	Fabric Watch is an optional license which 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.
Advanced Performance Monitor	<p>This optional 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.</p> <p>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.</p>
Extended Fabric	Optional license which 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 optional license logically groups up to eight E-ports to provide a high bandwidth trunk between two switches. Each 8Gb switch needs its own license. The switch operating system views the trunk as a single, high bandwidth resource (up to 64Gb) when routing connections between 8G switches. Connections are load-balanced across the individual links, which comprise the logical trunk group.
Encryption Disk Performance Upgrade	The Encryption processing power is scalable, and may be increased by purchasing and installing an Encryption Disk Performance Upgrade license. The Encryption SAN Switch 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 a Encryption Disk Performance Upgrade. When the performance upgrade license is applied, encryption processing power of up to 96 Gb/s is available.
Integrated Routing	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. 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.

Product Highlights

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, Encryption, 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.

Service and Support, HP Care Pack, and Warranty Information

Warranty	<p>(2-2-2) Hardware Warranty - Two-year on-site warranty, 24x7, 4-hour remote response, installation not included.</p> <p>NOTE: The hardware warranty covers firmware and embedded non-saleable software. Saleable software carries its own warranty, see below.</p> <p>Software Warranty - HP warrants only that the software media will be free of physical defects for a period of ninety (90) days from delivery.</p> <p>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.</p>
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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.

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

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

Service and Support, HP Care Pack, and Warranty Information

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	Alternate Care Pack Services Product #
AR944A	Encryption SAN Switch	3-Year HP Support Plus 24	HA110A3#4SB	Contact your HP sales rep or Channel Partner for assistance
AR944A	Encryption SAN Switch	HP SAN Solution Service	Contact your HP sales rep or Channel Partner for assistance	Contact your HP sales rep or Channel Partner for assistance
TA666A	Encryption SAN Switch	3-Year HP Support Plus 24	HA110A3#4SC	Contact your HP sales rep or Channel Partner for assistance
TA666A	Encryption SAN Switch Performance Upg	HP SAN Solution Service	Contact your HP sales rep or Channel Partner for assistance	Contact your HP sales rep or Channel Partner for assistance

Service and Support, HP Care Pack, and Warranty Information

Related Services

HP Assessment Service for SANs The HP Assessment Service for SANs offers customized technical and operational guidance to customers employing HP storage subsystems and the interconnecting storage area network (SAN) infrastructure. In a typical engagement, HP or one of our authorized business partners will perform a detailed discovery using HP's proprietary toolset to gain an understanding of the configuration of your storage devices and SAN topology.

The findings from this process will be compared to HP best practices and industry standards as defined by IT Service Management (ITSM) disciplines. The results of the evaluation will be quickly and efficiently processed into information you can leverage. This information, in the form of a comprehensive HP SAN Assessment report, will be summarized by HP or one of our authorized business partners with recommendations that are intended to improve availability levels and ongoing management of your storage and SAN environment.

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

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.

Service and Support, HP Care Pack, and Warranty Information

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.www2.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+	Encryption SAN Switch	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	Data Centers
Port Bandwidth	8Gbit/sec	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	512 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	32 Enabled 32 Max	Up to 192	Up to 384
SFP	B-series	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	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	Optional Upgrade	Included with Power Pack+ or Optional Upgrade	Included with Power Pack+
Form factor	1U	1U	1U	2U	2U	7U	14U
Zoning Software	Yes (Included)	Yes (Included)	Yes (Included)	Yes (Included)	Yes (included)	Yes (Included)	Yes (Included)
Hot plug, redundant power supplies	No	No	Yes	Yes	Yes	Yes	Yes
Hot plug fans	No	No	Yes	Yes	Yes	Yes	Yes

QuickSpecs

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

Configuration Information

Step 1 - Base Configuration

Select one:

Model	Model Description	Part Number
HP Encryption SAN Switch	Encryption SAN Switch with 32 active ports; 48 Gbit/sec of encryption processing power; rackmount kit; accessory kit (enterprise safety and regulatory information, installation guide, rack-mounting instructions), power cords, serial cable, base software of Advanced Fabric OS, Advanced Web Tools, EGM, and Advanced Zoning NOTE: Requires optical transceivers listed below	AR944A
HP Encryption SAN Switch Disk Performance Upgrade	Disk Performance upgrade to 96 Gbit/sec of encryption processing power	TA666A

Step 2 - Options

Select each type of required options with quantities specified:

	Model Description	Quantity	Part Number												
8 Gb Transceivers	HP 8Gb Short Wave B-Series FC SFP+ 1 Pack	1	AJ716A												
	HP 8Gb Long Wave B-Series 10km FC SFP+ 1 Pack	1	AJ717A												
	<table border="1"> <thead> <tr> <th>Distance</th> <th>OM2 Cable</th> <th>OM3 Cable</th> </tr> </thead> <tbody> <tr> <td>8Gb performance:</td> <td>50 meters</td> <td>150 meters</td> </tr> <tr> <td>4Gb performance:</td> <td>150 meters</td> <td>270 meters</td> </tr> <tr> <td>2Gb performance:</td> <td>300 meters</td> <td>500 meters</td> </tr> </tbody> </table>	Distance	OM2 Cable	OM3 Cable	8Gb performance:	50 meters	150 meters	4Gb performance:	150 meters	270 meters	2Gb performance:	300 meters	500 meters		
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8Gb performance:	50 meters	150 meters													
4Gb performance:	150 meters	270 meters													
2Gb performance:	300 meters	500 meters													
4 Gb Transceivers	HP 4Gb Short Wave B-Series FC SFP 1 Pack	1	AJ715A												
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	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	1	AK870A												
	HP 4Gb Long Wave B-Series FC SFP 1 Pack - 30km	1	AN211A												
USB	2Gb USB Device	1	AK864A												
Optical Cables	OM2 LC-LC type cables														
	2 m LC-LC Multi-Mode Fibre Channel Cable	1	221692-B21												
	5 m LC-LC Multi-Mode Fibre Channel Cable	1	221692-B22												
	15 m LC-LC Multi-Mode Fibre Channel Cable	1	221692-B23												
	30 m LC-LC Multi-Mode Fibre Channel Cable	1	221692-B26												
	50 m LC-LC Multi-Mode Fibre Channel Cable	1	221692-B27												
	OM3 LC-LC type cables														
	.5 m LC-LC Multi-Mode OM3 Fibre Channel Cable	1	AJ833A												
	1 m LC-LC Multi-Mode OM3 Fibre Channel Cable	1	AJ834A												
	2 m LC-LC Multi-Mode OM3 Fibre Channel Cable	1	AJ835A												

Configuration Information

5 m LC-LC Multi-Mode OM3 Fibre Channel Cable	1	AJ836A
15 m LC-LC Multi-Mode OM3 Fibre Channel Cable	1	AJ837A
30 m LC-LC Multi-Mode OM3 Fibre Channel Cable	1	AJ838A
50 m LC-LC Multi-Mode OM3 Fibre Channel Cable	1	AJ839A
LC-SC for between a 1 Gb and a 2 Gb device		
2 m LC-SC Multi-Mode Fibre Channel Cable	1	221691-B21
5 m LC-SC Multi-Mode Fibre Channel Cable	1	221691-B22
15 m LC-SC Multi-Mode Fibre Channel Cable	1	221691-B23
30 m LC-SC Multi-Mode Fibre Channel Cable	1	221691-B26
50 m LC-SC Multi-Mode Fibre Channel Cable	1	221691-B27

Step 3 - Optional Software

Software for Encryption SAN Switch	Data Center Fabric Manager Enterprise	T5542A
	HP B-series SAN Switch Power Pack+ Upgrade LTU	T5523A
	NOTE: The Power Pack+ Software Bundle kit includes Adaptive Networking, Fabric Watch, ISL Trunking, Extended Fabric, and Advanced Performance Monitor.	
	Adaptive Networking	T5526A
	Extended Fabric	313458-B21
	Fabric Watch	313454-B21
	Advanced Performance Monitor	313450-B21
	ISL Trunking	313452-B21
	HP B-series SAN Switch Integrated Routing LTU	T5529A

Step 4 - Key Management

- Add Key Management for creating, distributing, authenticating, and storing encryption keys to ensure proper use
- See the HP StorageWorks Secure Key Manager QuickSpecs at: <http://www.hp.com/go/keymanagement>

Technical Specifications

System Architecture	Fibre Channel ports	32 ports, universal (E, F, and FL)
	Scalability	Full fabric architecture: http://h18006.www1.hp.com/products/storageworks/san/documentation.html
	Certified maximum	Refer to SAN Design Guide for current configuration information: http://h18006.www1.hp.com/products/storageworks/san/documentation.html
	Ethernet Ports	Two redundant 1000Base Ethernet ports for clustering and I/O synchronization during rekeying
	Smart Cards	Master key recovery cards
	Interoperability	Core Switch 2/64, SAN Switch 2/32, SAN Director 2/128; 4/256 SAN Director; 4/64 SAN Switch; 4/32 SAN Switch; 4/8 SAN Switch; 4/16 SAN Switch; 8/8 SAN Switch, 8/24 SAN Switch, 8/8 40 SAN Switch; 8/80 SAN Switch, DC04 SAN Director, DC SAN Backbone Director, Brocade 4Gb SAN Switch for HP p-Class BladeSystem; Brocade 4Gb SAN Switch for HP c-Class BladeSystem; HP 400 MP-Router; and HP MP-Router
	Encryption	AES256-XTS block cipher for disk encryption (IEEE 1619- compliant)
	Data rekeying	Online or offline conversion of data from cleartext to ciphertext; manual or automated rekeying sessions
	Crypto scalability	Up to 256 target devices; 1024 host ports per encryption
	Crypto engine	Maximum 96 Gbit/sec hardware processing for disk*
	Fibre Channel performance	1.063 Gbit/sec line speed, full duplex; 2.125 Gbit/sec line speed, full duplex; 4.25 Gbit/sec line speed, full duplex; 8.5 Gbit/sec line speed, full duplex. Auto-sensing of 1 Gbit/sec, 2 Gbit/sec, 4 Gbit/sec, and 8 Gbit/sec port speeds; optionally programmable to fixed port speed. Speed-matching between 1, 2, 4, and 8 Gbit/sec ports.
	ISL Trunking	Frame-based trunking with up to eight 8Gb ports per ISL trunk; up to 64 Gbit/sec throughput per ISL trunk
	Aggregate bandwidth	512 Gbit/sec full duplex (32 ports x 8.5 Gbit/sec x 2)
	Maximum frame size	2112-byte payload
	Classes of service	Class 2 (unencrypted traffic), Class 3, (encrypted and unencrypted), and Class F (inter-switch frames)
	Port types	FL_Port, F_Port, E_Port, EX_Port, M_Port (Mirror Port).
	Data traffic types	Fabric switches supporting unicast, multicast (255 groups), and broadcast
	Media types	Hot-pluggable, B-Series Branded Small Form Factor Pluggable (SFP), LC connector; Short-Wave Laser (SWL), Long-Wave Laser (LWL); Extended Long-Wave Laser (ELWL); distance depends on fiber-optic cable and port speed. Supports SFP (4/2/1 Gbit/sec) and/or SFP+ (8/4/2 Gbit/sec) optical transceivers.
	USB	One USB port for system log file downloads or firmware upgrades
	Fabric services	Simple Name Server (SNS), Registered State Change Notification (RSCN), NTP v3, Reliable Commit Service (RCS), Dynamic Path Selection (DPS), Advanced Zoning (default zoning, port/WWN zoning, broadcast zoning), N_Port ID Virtualization (NPIV), FDMI, Management Server, FSPF, Enhanced Group Management, IPFC, Frame Redirection, Port Fencing, BB credit recovery
		Optional fabric services: Fabric Watch, Extended Fabrics, ISL Trunking, Advanced Performance Monitoring, Adaptive Networking (per-data flow QoS, Ingress Rate Limiting, Traffic Isolation, Fabric Dynamics Profiling, and Integrated Routing)

Technical Specifications

Management	FIPS certification	FIPS 140-2 Level 3-compliant package
	Options	SFP media, USB Device
	Management software supported	Telnet, HTTP, LDAP, Syslog, SCP, auditing, IP filtering; SNMP v1/v3 (FE MIB, Fibre Channel Management MIB); Advanced Web Tools; HP Data Center Fabric Manager (DCFM); SMI-S compliant, SMI-S scripting toolkit, Administrative Domains
	Management protocols and access controls	SSL, SSH v2, HTTPS, RADIUS, Role-Based Access Control (RBAC)
	SAN security	DH-CHAP (between switches and end devices), port binding, switch binding, secure RPC, trusted switch, change tracking
	Management access	10/100/1000 Ethernet (RJ-45); in-band over Fibre Channel; serial port (RJ-45); USB; call-home integration enabled through DCFM
	Diagnostics	POST and embedded online/offline diagnostics, including RASttrace logging, environmental monitoring, non-disruptive daemon restart, FCping and Pathinfo (FC traceroute), Port Mirroring (SPAN port)
Mechanicals	Key management	HP Secure Key Manager
	Enclosure	Non-port to port side airflow; 2U, 19-inch EIA-compliant, power from non-port side
	Size	Width: 42.9 cm (16.9 in) Height: 8.7 cm (3.4 in) Depth: 64.8 cm (25.5 in)
Environment	System Weight	22.4 kg (49.4 lbs) with two power supply FRUs, without SFP/SFP+ transceivers
	Temperature	Operating: 0° to 40° C (32° to 104° F) Non-operating: -25° to 70° C (-13° to 158° F)
	Altitude	Operating: Up to 3000 meters (9842 feet) Storage: Up to 12 kilometers (39,370 feet)
	Shock	Operating: 20 g, 6 ms half-sine Non-operating: Half sine, 33G 11 ms. 3/eg Axis
Airflow	Maximum	76 CFM (cu. ft./min)
	Nominal	53 CFM
Power	Maximum output	347 Watts with 32 8Gb ports
	Nominal input voltage	85- 264 VAC, Universal
	Input line frequency	47 - 63 Hz
	Minimum input voltage	85 VAC
	Maximum input voltage	264 VAC
Configurations	Base crypto model	Encryption SAN Switch, 32 Fibre Channel ports, 48 Gbit/sec* maximum hardware encryption processing
	Advanced crypto model	Encryption SAN Switch, 32 Fibre Channel ports, 96 Gbit/sec* maximum hardware encryption processing

*Actual encryption performance levels vary based upon user environment and configuration

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