

Overview

HP Encryption SAN Switch

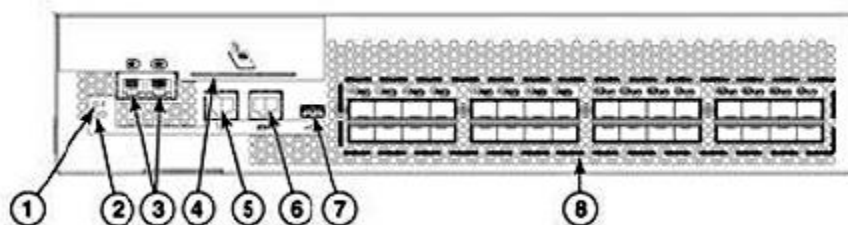
Managing operational risk by protecting valuable digital assets has become increasingly critical in today's enterprise IT environments. In addition to achieving compliance with regulatory mandates and meeting industry standards for data confidentiality, IT organizations must also protect against potential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

The HP Encryption SAN Switch scales non-disruptively, providing 48 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 Secure Key Manager and HP Enterprise Secure Key Manager which provide centralized enterprise-class key management systems across distributed environments. The HP Secure Key Manager and HP Enterprise 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 the HP Enterprise Secure Key Manager and their integration with the 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 of the Encryption SAN switch is non-disruptive: Organizations can encrypt data from any switch port without reconfiguring the fabric.



HP 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) |

What's New

- New RoHS compliant HP SAN switches

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

Features and Benefits

Key Features and Benefits

- High-performance, scalable fabric-based encryption to enforce data confidentiality and privacy requirements
- Encryption processing at up to 48 Gbit/sec to support heterogeneous enterprise data centers
- Integration with HP Secure Key Manager or HP Enterprise Secure Key Manager enables secure and automated key sharing between multiple sites ensuring transparent access to encrypted data
- Industry-standard AES-256 encryption algorithms for disk and tape 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

NOTE: Encryption with the HP Encryption SAN Switch and the HP Encryption FC Blade is not fully supported with Thin Provisioned LUNs in storage arrays. HP recommends LUNs to be encrypted are fully provisioned. For LUNs that are already thin provisioned and then encryption enabled, be aware that enabling First Time Encryption (FTE) or Re-Key will make the LUN fully provisioned. This is applicable to any array in general.

QuickSpecs

HP Encryption SAN Switch

Models

HP Encryption SAN Switch HP Encryption SAN Switch
Model

AR944B

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.

NOTE: 1Gb/s performance can be achieved only when a 4Gb SFP is configured with the Encryption SAN switch

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

Smart Cards Smart Cards are optional credit card-sized cards that contain a CPU and persistent memory. Smart cards can be used as security devices. With the Encryption SAN Switch, smart cards can be used to do the following:

- Control user access to the Management application security administrator roles.
- Control activation of encryption engines.
- Securely store backup copies of master keys.

The use of smart cards provides the highest level of security. When smart cards are used, the master key is split and written on up to five cards, and the cards may be kept and stored by up to five individuals, and all are needed to restore the master key.

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- 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

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

-
- Cabinet Support**
- 22U, 36U, and 42U; 5000, 9,000 and 10,000 and 10,000 G2 series Cabinets and Intelligent Series racks are supported
- NOTE:** To order factory integration, add 0D1 after the part number on your sales order.

Software Components, Standard, Base Models

Encryption Provides 48 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

Product Highlights

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.

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. SAN Network Advisor Enterprise enables EGM functionality.

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.

Server Application Optimization

Server Application Optimization (SAO) improves overall application performance for physical servers and virtual machines. SAO, when deployed with Brocade Fibre Channel HBAs, extends Brocade Adaptive Networking from the Brocade SAN fabric to the server infrastructure. This delivers application-level, fine-grain Quality of Service (QoS) management to the HBAs and related server applications.

NOTE: Server Application Optimization (SAO) is included by default in the switch firmware and does not require a separate license

NOTE: SAO requires Brocade HBA installed in the server

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:

- Fabric Vision
- Fabric Watch
- Advanced Performance Monitor
- Extended Fabric

Product Highlights

- ISL Trunking

Fabric Vision

Fabric Vision offers innovative diagnostic, monitoring and management capabilities to help accelerate new application deployments, address SAN problems before they impact operations and reduce operational costs. It includes

- **Monitoring and Alerting Policy Suite:** A policy-based monitoring tool with pre-built rules and automation that simplifies fabric-wide threshold configuration and monitoring.
- **Flow Vision:** A comprehensive tool that enables administrators to identify, monitor, and analyze specific application data flows without using taps to ensure optimized performance
- **Health and performance dashboard:** A single customizable screen displayed in HP SAN Network Advisor that contains all critical SAN information for convenient review and analysis

Fabric Vision will be included by default in all HP StoreFabric B-series Fibre Channel switches and Directors bundled with Power Pack+ (with FOS 7.2.0a and later). In all other cases, Fabric Vision can be enabled on HP StoreFabric B-series Fibre Channel switches and Directors in any one of the following ways

- Application of the Fabric Vision LTU (FOS 7.2.0a and later)
- Application of the Power Pack+ LTU (FOS 7.2.0a and later)
- Upgrading existing Switch/Director loaded with Power Pack+ to FOS 7.2.0a or later
- Upgrading existing Switch/Director loaded with both Advanced Performance Monitor (APM) and Fabric Watch (FW) licenses to FOS 7.2.0a or later

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

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.

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.

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.

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

Product Highlights

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.

SAN Network Advisor Professional

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

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

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

SMB customers that initially start off with SAN Network Advisor Professional and have a small SAN environment may over time feel the need for an enterprise-class product (SAN Network Advisor Enterprise) as their environments start to grow in size and complexity, and as they start to uptake more enterprise-class functionality (such as Fibre Channel Routing, FCIP, etc.). A non-disruptive upgrade path is available from SAN Network Advisor Professional to SAN Network Advisor Enterprise. HP SAN Network Advisor Enterprise and Professional+ are the enterprise-class products that support FOS products as well as FOS and M-EOS products together. SAN Network Advisor Enterprise provides complete SN8000B 8-Slot Director and DC SAN Backbone Director management including enterprise-class features/environments such as FICON, Fibre Channel Routing, FCIP, adaptive networking, etc while HP SAN Network Advisor Professional+ provides the same feature set except for support for the SN8000B 8-Slot Director, DC SAN Backbone Director, and FICON.

SAN Network Advisor Enterprise and Professional+

HP SAN Network Advisor Enterprise delivers unprecedented scalability, up to 24 fabrics and 9,000 switch ports, while HP SAN Network Advisor Professional+ scales to 4 SAN Fabrics and 2560 switch ports. To accommodate growth, there is an upgrade available to SAN Network Advisor Enterprise from SAN Network Advisor Professional Plus.

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

Service and Support, HP Care Pack, and Warranty Information

Warranty

(2-2-2) 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 surer 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/services/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.

HP Foundation Care 24x7 connects you to HP 24 hours a day, seven days a week for assistance on resolving issues - hardware onsite response within four hours and software call back within two hours after opening your case. Three years' coverage recommended with HP Care Pack Service.

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

Service and Support, HP Care Pack, and Warranty Information

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 #
AR944B	Encryption SAN Switch	3-Year HP Support Plus 24	HA110A3#4SB	Contact your HP sales rep or Channel Partner for assistance
AR944B	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

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

Service and Support, HP Care Pack, and Warranty Information

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.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/services/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>

Configuration Information

Step 1 - Base Configuration

Select one:

HP Encryption SAN Switch

HP Encryption SAN Switch

NOTE: Requires optical transceivers listed below**Part Number**

AR944B

Step 2 - Options

	Model Description	Part Number																
8 Gb Transceivers	HP 8Gb Shortwave B-series Fibre Channel 1 Pack SFP+ Transceiver	AJ716B																
	HP 8Gb Long Wave B-series 10km Fibre Channel 1 Pack SFP+ Transceiver	AJ717A																
	<table border="1"> <thead> <tr> <th>Distance</th> <th>OM2 Cable</th> <th>OM3 Cable</th> <th>PremierFlex Cable</th> </tr> </thead> <tbody> <tr> <td>8Gb performance:</td> <td>50 meters</td> <td>150 meters</td> <td>150 meters</td> </tr> <tr> <td>4Gb performance:</td> <td>150 meters</td> <td>270 meters</td> <td>380 meters</td> </tr> <tr> <td>2Gb performance:</td> <td>300 meters</td> <td>500 meters</td> <td>500 meters</td> </tr> </tbody> </table>	Distance	OM2 Cable	OM3 Cable	PremierFlex Cable	8Gb performance:	50 meters	150 meters	150 meters	4Gb performance:	150 meters	270 meters	380 meters	2Gb performance:	300 meters	500 meters	500 meters	
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8Gb performance:	50 meters	150 meters	150 meters															
4Gb performance:	150 meters	270 meters	380 meters															
2Gb performance:	300 meters	500 meters	500 meters															
4 Gb Transceivers	HP 4Gb Short Wave B-series Fibre Channel 1 Pack SFP Transceiver	AJ715A																
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4Gb performance:	150 meters	270 meters	380 meters															
2Gb performance:	300 meters	500 meters	500 meters															
1Gb performance:	500 meters	860 meters	860 meters															
	HP 4Gb Long Wave B-series 30km Fibre Channel SFP Transceiver 1 Pack	AN211A																
Smart Cards	HP DC Backbone Switch Encryption Key Manager 10-pack Smart Card	AR950A																
USB	HP B-series 2G USB Drive	AK864B																
Optical Cables	HP PremierFlex OM4+ Fiber Optic Cables																	
	HP Premier Flex LC/LC Multi-mode OM4 2 fiber 1m Cable	QK732A																
	HP Premier Flex LC/LC Multi-mode OM4 2 fiber 2m Cable	QK733A																
	HP Premier Flex LC/LC Multi-mode OM4 2 fiber 5m Cable	QK734A																
	HP Premier Flex LC/LC Multi-mode OM4 2 fiber 15m Cable	QK735A																
	HP Premier Flex LC/LC Multi-mode OM4 2 fiber 30m Cable	QK736A																
	HP Premier Flex LC/LC Multi-mode OM4 2 fiber 50m Cable	QK737A																
OM3 LC-LC type cables																		
	HP LC to LC Multi-mode OM3 2-Fiber 0.5m 1-Pack Fiber Optic Cable	AJ833A																
	HP LC to LC Multi-mode OM3 2-Fiber 1.0m 1-Pack Fiber Optic Cable	AJ834A																

Configuration Information

HP LC to LC Multi-mode OM3 2-Fiber 2.0m 1-Pack Fiber Optic Cable	AJ835A
HP LC to LC Multi-mode OM3 2-Fiber 5.0m 1-Pack Fiber Optic Cable	AJ836A
HP LC to LC Multi-mode OM3 2-Fiber 15.0m 1-Pack Fiber Optic Cable	AJ837A
HP LC to LC Multi-mode OM3 2-Fiber 30.0m 1-Pack Fiber Optic Cable	AJ838A
HP LC to LC Multi-mode OM3 2-Fiber 50.0m 1-Pack Fiber Optic Cable	AJ839A

Step 3 - Optional Software

Software for Encryption SAN Switch	HP SAN Network Advisor Enterprise Software LTU	TC352A
	HP SAN Network Advisor Professional Plus Software LTU	TC353A
	HP SAN Network Advisor Professional Plus Upgrade LTU	TC354A

NOTE: HP SAN Network Advisor Enterprise and Professional+ are single-point SAN management platforms that provide the essential functions for efficiently configuring, monitoring, dynamically provisioning, and managing multiple SAN fabrics on a daily basis.

NOTE: Due to the complexity of Encryption Switch or Blade installation, the purchase of HP SAN Network Advisor, either the Enterprise version or Professional+ version, is highly recommended. The use of the Graphical User Interface (GUI) provided by SAN Network Advisor will greatly simplify the installation of the B-series Encryption Switch or Encryption Blade, as well as provide for easier management of multiple fabrics containing these encryption products.

HP B-series High End Switch Power Pack+ E-LTU	T5523AAE
NOTE: The Power Pack+ Software Bundle kit includes Fabric Vision, Fabric Watch, ISL Trunking, Extended Fabric and Advanced Performance Monitor.	(Physical License - T5523A)

NOTE: Adaptive Networking and Server Application Optimization features are included by default in the switch firmware (FOS 7.2.0a or later) and do not require a separate license

HP 8/16Gb High End Switch Fabric Vision E-LTU	TC511AAE (Physical License - TC511A)
HP B-series Mid/High End Extended Fabric E-LTU	J4V63AAE (Physical License - 313458-B21)
HP B-series Mid/High End SAN Switch Fabric Watch E-LTU	J4V62AAE (Physical License - 313454-B21)
HP B-series Mid/High End SAN Switch Advanced Performance Monitoring E-LTU	J4V60AAE (Physical License - 313450-B21)
HP B-series Mid/High End SAN Switch ISL Trunking E-LTU	J4V61AAE (Physical License - 313452-B21)
HP 8/80 and Encryption Switch Integrated Routing E-LTU	T5529AAE (Physical License - T5529A)

NOTE: Some HP B-series software licenses are now available through the Electronic Delivery (E-Delivery) mechanism. The E-Delivery software licenses with new part

Configuration Information

numbers listed in this document are functionally equivalent to the corresponding physical licenses with different part numbers. Some software licenses in this document are represented by two part numbers, the first of which is the E-Delivery version (ending with AAE) and the second is the physical version.

NOTE: HP SAN Network Advisor software will no longer be shipped as a DVD to customers. Instead, customers will be able to access and download the software from HP's Product Download web site.

Step 4 - Key Management

- Add Key Management for creating, distributing, authenticating, and storing encryption keys to ensure proper use
- See the HP Secure Key Manager QuickSpecs at: http://h17007.www1.hp.com/us/en/products/network-security/HP_Enterprise_Secure_Key_Manager/index.aspx

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, DCO4 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 48 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)
	FIPS certification	FIPS 140-2 Level 3-compliant package
	Options	SFP media, USB Device
Management	Management software supported	Telnet, HTTP, LDAP, Syslog, SCP, auditing, IP filtering; SNMP v1/v3 (FE MIB, Fibre Channel Management MIB); Advanced Web Tools; HP SAN Network Advisor; SMI-S compliant, SMI-S scripting toolkit, Administrative Domains

QuickSpecs

HP Encryption SAN Switch

Technical Specifications

	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 SAN Network Advisor
	Diagnostics	POST and embedded online/offline diagnostics, including RAStrace logging, environmental monitoring, non-disruptive daemon restart, FCping and Pathinfo (FC traceroute), Port Mirroring (SPAN port)
	Key management	HP Secure Key Manager, HP Enterprise Secure Key Manager
Mechanicals	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)
	System Weight	22.4 kg (49.4 lbs) with two power supply FRUs, without SFP/SFP+ transceivers
Environment	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 11ms. 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

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

QuickSpecs

HP Encryption SAN Switch

Summary of Changes

Date	Version History	Action	Description of Change:
10-Jun-2014	From Version 21 to 22	Changed	Text format was changed in Configuration Information section
09-Dec-2013	From Version 20 to 21	Changed	Product descriptions were revised throughout Configuration Information.
15-Oct-2013	From Version 19 to 20	Added	Server Application Optimization (SAO) and Fabric Vision were added to Product Highlights.
22-Mar-2013	From Version 18 to 19	Changed	Configuration Information: Updated Optical Cables section.
01-Feb-2013	From Version 17 to 18	Removed	Removed text within the Key Features Section, as well as removed the Note from within the Software Components, Standard, Base Models section.
12-Oct-2012	From Version 16 to 17	Changed	Change made to URL in Service and Support, HP Care Pack, and Warranty Information section.
14-Sep-2012	From Version 15 to 16	Changed	Changes were made in Overview, Models, Service and Support, HP Care Pack, and Warranty Information and Technical Specifications sections.
13-Aug-2012	From Version 14 to 15	Changed	Changes made throughout the QuickSpec.
21-May-2012	From Version 13 to 14	Changed	Updated the following: Additional Options added AJ816B
06-Apr-2012	From Version 12 to 13	Changed	Cabinet Support was revised in Product Highlights
02-Dec-2011	From Version 10 to 12	Changed	Cabinet Support was revised in Product Highlights Family Information was removed OM2 LC-LC type cables were removed from Optical Cables Adaptive Networking was removed from Software for Encryption SAN Switch
12-Aug-2011	From Version 9 to 10	Changed	Step 4 was revised.
22-Jul-2011	From Version 8 to 9	Changed	Introduction, Key Features and Benefits, Step 4 and Key Management in Technical Specifications were revised.
08-Jul-2011	From Version 6 to 8	Changed	SAN Network Advisor Professional and SAN Network Advisor Enterprise and Professional + were added and HP Data Center Fabric Manager (DCFM) and Data Center Fabric Manager Enterprise were removed from Product Highlights Step 3 was revised in Configuration Information
09-Jun-2011	From Version 5 to 6	Removed	Removed "StorageWorks" throughout the document.
25-Feb-2011	From Version 4 to 5	Added	Smart Cards was added throughout.
27-Sep-2010	From Version 3 to 4	Added	PremierFlex Cable was added to Step 2
13-Aug-2010	From Version 2 to 3	Added	Note was added to HP Encryption Switch and Encryption HP StorageWorks Data Center Fabric Manager (DCFM) was added to Software Components, Optional Data Center Fabric Manager Professional + was added to Step 3
10-Apr-2009	From Version 1 to 2	Changed	Changed the Part number for HP Encryption SAN Switch in Step 1 of the Configuration Information section, added Encryption Disk Performance Upgrade to the Product Highlights section and removed 48-80 port from Step 3 of the Configuration Information section.

Summary of Changes

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