

Overview

The HP StorageWorks Enterprise Virtual Array 5000 (EVA5000) is a high performance, high capacity and high availability "virtual" RAID storage solution for the high-end enterprise class marketplace that removes the time, space and cost boundaries of traditionally architected storage. The EVA5000 is designed for the data center where there is a critical need for improved storage utilization and scalability while meeting application specific demands for consistently high transaction I/O and MB data rate performance, seamless capacity expansion, instantaneous replication, and simplified storage administration.

The EVA5000 provides an enhanced service portfolio combining hardware and services into a single part number to rapidly deploy the EVA and maintain a solid storage platform. HP offers a full spectrum of complimentary EVA hardware and software product service solutions ranging from the new Foundation Service Solution, the base level of service included with every EVA, to Critical Service, HP's support for mission critical environments.

What's New

- EVA3000/5000 Series v4.0 Controller Media (VCS v4.0) provides support for:
 - Industry popular multipathing
 - Business Copy enhancements - 3-phase snapclone, instant restore and RSM Topology Manager
 - Availability enhancements

Models

Enterprise Virtual Array 5000 Models	EVA models are modular, scalable, no-single-point-of-failure solutions with disaster tolerance and business continuance support for storage consolidation on heterogeneous SANs.	
-C Models in 42U Graphite cabinets without loop switches Model 2C2D-C	EVA5000 2C2D-C, 60Hz, 42U (Graphite) NOTE: One M3220 3U Controller assembly with two HSV110 controllers, two M5314A 3U Dual-redundant FC Loop 14-bay disk enclosures, 42U Graphite Storage Cabinet. This EVA5000 includes Foundation Service Solution. Can be Factory Configured with additional drive enclosures. For configurations with more than four Drive enclosures the FC loop switches must be included. It can also be field upgraded up to a 2C12D configuration with the addition of drive enclosures and FC loop switches.	309620-B23
-C Models in 42U Graphite cabinets with loop switches Model 2C6D-C	EVA5000 2C2D-C, 50Hz, 42U (Graphite) NOTE: One M3220 3U Controller assembly with two HSV110 controllers, two M5314A 3U Dual-redundant FC Loop 14-bay disk enclosures, 42U Graphite Storage Cabinet. This EVA5000 includes Foundation Service Solution. Can be Factory Configured with additional drive enclosures. For configurations with more than four Drive enclosures the FC loop switches must be included. It can also be field upgraded up to a 2C12D configuration with the addition of drive enclosures and FC loop switches.	309620-B24
-C Models in 42U Graphite cabinets with loop switches Model 2C6D-C	EVA5000 2C6D-C, 60Hz, 42U (Graphite) NOTE: One M3220 3U Controller assembly with two HSV110 controllers, six M5314A 3U Dual-redundant FC Loop 14-bay disk enclosures, four 12-port FC loop switches, 42U Graphite Storage Cabinet This EVA5000 includes Foundation Service Solution.	283198-B23
Model 2C12D-C	EVA5000 2C6D-C, 50Hz, 42U (Graphite) NOTE: One M3220 3U Controller assembly with two HSV110 controllers, six M5314A 3U Dual-redundant FC Loop 14-bay disk enclosures, four 12-port FC loop switches, 42U Graphite Storage Cabinet This EVA5000 includes Foundation Service Solution.	283198-B24
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42U Graphite utility cabinets for use with EVA5000-C above	EVA 42U Graphite Utility Cabinet, 60Hz NOTE: 42U Graphite Storage Cabinet, (M5314A 3U Dual-redundant FC Loop 14-bay disk enclosures FC interconnect cables are purchased separately).	289191-B23
42U Graphite utility cabinets for use with EVA5000-C above	EVA 42U Graphite Utility Cabinet, 50Hz NOTE: 42U Graphite Storage Cabinet, (M5314A 3U Dual-redundant FC Loop 14-bay disk enclosures FC interconnect cables are purchased separately).	289191-B24

Product Highlights

Unique Customer Benefits/Value

- Leading edge HP Continuous Access EVA perform point-in-time local replication with highly available Fibre Channel (FC) multi-path support, dual FC fabric nearline data protector and campus, metro or continental SAN extensions.
- Outstanding self-tuning performance insures consistency in meeting application Service Level Agreements, allowing your users/clients to accomplish more in less time, scale capacity on-demand and minimize data administration overhead.
- State-of-the-art controller software helps improve performance, increases disk utilization efficiency, and allows for easy dynamic storage expansion, all of which helps lower costs.
- High density packaging and support of more disks per controller pair in a 42U graphite cab and 35 TB usable capacity with 240 disks per controller pair and a utility cab to further reduces floor space and lowers costs.
- Virtually Capacity- Free Snapshot (Vsnap) function can save storage administrators significant disk space and improve disk utilization efficiency.
- Virtually Instantaneous Snapclone copy capability allows immediate use of the clone copy and can save customers significant savings of time.
- For enhanced versatility and cost effectiveness EVA provides support for Snapclones between high performance disks and the FATA disks.
- The HP StorageWorks Business Copy EVA comes complete with an improved User Interface and support for Virtually Capacity Free Snapshot (Vsnap) function, which can save customers significant disk space and improve disk utilization efficiency.
- HP StorageWorks Business Copy EVA includes Virtually Instantaneous Snapclone copy capability allowing immediate use of the clone copy and can provide customers significant time savings.
- The EVA allows for increased flexibility and improved capacity utilization by supporting changing the Vraid type with Cross Vraid Snapshot and Snapclone, within the same disk group and Cross Vraid Snapclone across disk groups. Cross Vraid Snapclone also supports changing the Vraid type when Snapcloning from a high performance disk group to a FATA disk group.
- Ordering of complete integrated configurations with a single part number, plus disk drives and, VCS controller firmware, is easy and helps ensure that the storage solution completely meets the customer requirements when it arrives.
- Easy to use management tools, which allows management of larger SAN configurations with more servers and more storage solutions, reduces management time up to 15x and substantially lowers costs.
- Through the EVA's no charge ISEE remote monitoring capabilities, the EVA has the ability to provide self-monitoring and diagnosis and it will transmit status information to an HP service center for proactive problem resolution.
- Business application specific solutions, in line with HP Information Lifecycle Management strategy, that support your business goals and help with the challenge of data management:
 - Rapid Backup for mySAP Business Suite on EVA
 - Disaster Tolerance Solution for mySAP Business Suite on EVA
- The EVA service portfolio provides simple combinations of hardware and services needed to rapidly deploy the EVA product and maintain a solid EVA storage platform:
 - EVA Foundation Services solution quickly deploys a highly available Enterprise Virtual Array storage platform into production and delivers ongoing hardware and VCS support.
 - EVA, Proactive Service Solution helps bring your array online and delivers the proactive and reactive support required to maintain a stable, storage platform over time. The additional features provided in this service level, such as change management and ongoing advice and assistance enhance the return on your storage investment.
 - The new EVA Enhanced Proactive Service Solution takes the features of the Proactive Service Solution even further by offering SAN Solution Services at deployment.
 - HP Critical Service (CS) for EVA is a comprehensive support solution designed for businesses running mission critical applications which cannot tolerate downtime without significant business impact. HP Critical Service provides the right combination

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of proactive and reactive services designed to maximize availability and performance. This includes a 6-hour call to repair commitment. Availability is limited. Certain qualifications are required for eligibility.

Fibre Channel (FC) Technology

EVA takes advantage of the benefits of FC in distance, performance and connectivity. The use of optical Fibre cabling allows distances between connected segments of a SAN to be up to 500 meters @ 1 Gb; 300 meters @ 2 Gb using short wave multi-mode cable and up to 10 kilometers (6.21 miles) @ 1 Gb when using long wave cable. The EVA5000 with VCS is 2 Gb enabled on each FC path, but will also support 1 Gb FC paths for backwards compatibility. Storage Area Networks (SANs) can be constructed using 8, 16, 32 or 64-port FC switches for fabric connectivity (currently up to a maximum of 20 FC Switches supported).

The EVA5000 can support up to 240 FC disk drives for a maximum useable capacity of 35TB (49TB raw with Vraid 5 and 72TB raw with Vraid 1) at 2 Gb transfer rates using four FC loops arranged in dual redundant FC loop configurations.

Enterprise Virtual Array Product Packaging

EVA solutions are built with storage assembly enclosure packaging. The packaging consists of a 3U FC Vraid dual controller assembly, the HP StorageWorks Enclosure Model 3220, and 3U 14-bay FC drive enclosures, Model 5314 or m5314A. The controller and drive enclosures are independent of each other to allow a wide range of configuration options. The EVA pre-defined models are designed to address medium to high capacity needs as well as high performance options in commercial environments. The models are available in 42U graphite cabinets.

High Storage Density

The high density configuration can provide 35 TB usable capacity using 250GBFATA or 300GB High Performance disk drives (disk and controller enclosures included) with a footprint of only 6.6 square feet (2.012 square meter) of floor space in 42U graphite cabinets. The EVA5000 also can be configured using the EVA5000 utility cabinet or with two EVA5000 and one utility cabinet for a footprint of only 19.8 square feet (6.04 square meters). The EVA is a fully wired solution, which reduces installation time and provides carefree on-site deployment. The internal design of the cabinet allows easy serviceability ensuring high availability.

Multi-Vendor Platform

Support for industry-leading Operating System platforms including: HP-UX, Tru64 UNIX®, OpenVMS, Microsoft® Windows 2000 (Advanced Server), Windows Server 2003, SUN Solaris, IBM-AIX, Linux, VMware and NetWare.

No-Single-Point-of-Failure

EVA's redundant architecture and value added software eliminates single points of failure from server to storage in clustered or single server configurations with multiple pathing.

Disaster Tolerant Replication (Software option)

HP StorageWorks Continuous Access EVA (CA EVA) provides disaster tolerant replication across a Fibre Channel SAN. CA EVA performs real-time replication between HP StorageWorks Enterprise Virtual Arrays. CA EVA provides the highest level of FC SAN data protection to customers in order to meet disaster tolerant business continuity implementation goals. Through the use of MAN/WAN Fibre Channel SAN extensions, CA EVA provides 24x7 protections against disaster like scenarios, in campus, metro or continental networks. Thus, enabling business protection against unforeseen events.

HP StorageWorks Disaster Tolerant Solution for mySAP Business Suite on EVA offers a business continuance solution for SAP environments, where data integrity and value added functionality are high priorities. Best practices for implementing remote mirroring of an SAP database as part of an overall data protection strategy with SAP applications can be found at:

<http://h18006.www1.hp.com/products/storageworks/solutions/dtmysapeva/index.html>.

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Local Replication Solutions (Software option)

The HP StorageWorks Business Copy EVA and Business Copy Upgrade is a local replication application for the EVA5000. It incorporates Virtually Capacity-free Snapshot and Snapclone capabilities with an excellent user interface to assist the storage administrator. This product is indispensable for critical data center operations such as non-disruptive backups, frequent snapshots of high value databases, and data mining. The bottom line benefits include improved disk capacity utilization and increased business continuity, data availability, and productivity savings.

HP OpenView Storage Volume Growth provides the ability to easily expand basic disk volumes on Windows 2000 or Windows Server 2003 systems without disrupting the application environment or impact the user's data. This host based product supplements the volume expansion capabilities of the EVA providing a complete end-to-end solution.

EVA iSCSI Solution

A powerful solution which provides iSCSI connectivity to an EVA without the need to install extensive Fibre Channel infrastructure. The iSCSI EVA solution brings the powerfully simple EVA, with industry leading disk utilization and ease of use, to the iSCSI market. EVA in an iSCSI environment offers all the standard high availability features and can be connected to both an iSCSI network as well as a Fibre Channel SAN. The EVA product family includes the data replications offerings of Business Copy EVA and Continuous Access EVA. Basic Business Copy local data replication and basic Continuous Access remote replication functionality, within the EVA, can be used for data acquired over the iSCSI link.

For companies that have not had the resources or expertise to deploy a Fibre Channel Storage Area Network architecture, they can now deploy an iSCSI EVA storage solution that connects application hosts to storage using an Ethernet-based network. This solution enables companies to realize better storage utilization, simplified management, and resulting cost savings that can be achieved from consolidating storage and centralizing management while leveraging their existing Ethernet infrastructure as a storage network.

Consisting of an EVA, HP ProLiant DL380 G4 or DL585 Storage Server and the HP ProLiant iSCSI Feature Pack this product combination creates an iSCSI storage solution that is capable of hosting application storage (block), file, and print services on a single platform. The iSCSI Feature Pack is powerful and easy-to-use software that adds iSCSI target functionality to HP ProLiant Storage Server (NAS) devices. Unlike environments with separate file, print, email, and database servers, or environments using proprietary technologies, this approach delivers single-platform manageability, easy scalability, and centralized backup. It provides investment protection by enabling low-cost storage consolidation using industry-standard hardware and software on existing Ethernet infrastructure. The DL380 and DL585 ProLiant Storage Servers are the perfect platforms from which to run Command View EVA, you can stretch your investment even further when you combine iSCSI connectivity, EVA management and NAS file and print serving capabilities in the same server.

The HP iSCSI Storage Server solution is ideal for small or medium businesses that wish to take advantage of the simplification of storage consolidation and are application-focused on Microsoft® Exchange, Microsoft® SQL, or Oracle Database. It is easy-to-use and affordable, yet delivers powerful functionality usually reserved for higher-priced and more complex storage architectures.

For more information:

<http://h18006.www1.hp.com/products/storage/software/inas/smbconsolidation.html>

<http://h18006.www1.hp.com/products/storage/software/inas/index.html>

<http://h18006.www1.hp.com/storage/storageservers.html>

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EVA with HP Systems Insight Manager

EVA with HP Systems Insight Manager

Enclosed as an accessory with all StorageWorks arrays is HP Systems Insight Manager (SIM). HP SIM is the foundation for HP's unified server-storage strategy -- it is packaged as a no-cost, customer installable management application and is derived from the heritage of Compaq Insight Manager, HP Tootools, and HP Servicecontrol. HP SIM runs on HP Windows, Linux, and HP-UX and provides discovery and identification, fault management, security administration, asset reporting, and centralized configuration management across heterogeneous servers, storage and infrastructure. HP SIM is easily extensible, integrating other HP management products and value-add plug-ins such as the ProLiant Essentials, Integrity Essentials, and Server Essentials.

HP SIM relies on industry standards like SMI-S, SNMP, SSH, WBEM, and WMI to detect and report heterogeneous device attributes. HP SIM may also be configured to launch array specific applications for configuration, reporting and replication. For more information on HP Systems Insight Manager see:

<http://www.docs.hp.com/en/netsys.html>

Clustered Server and High Availability System Support

Dual and multi-node cluster support is provided for host level fault tolerance and high system availability. See the Operating System, Cluster and High Availability Compatibility table for operating system specific support.

Multi-Server Shared Support for Storage Consolidation

Heterogeneous and homogeneous host support provides the ability to share storage between multiple servers. The EVA provides storage access control (i.e. Selective Storage Presentation or LUN masking) assuring that a host cannot access data belonging to a different host. SAN-based data zoning is also supported.

Single-pathing (Single HBA per host)

Single-pathing (or single HBA per host) support is provided for all supported operating systems (but may be version dependent). Use of single-pathing, which does not offer a redundant path option, should be used with care. Failure of the single HBA will result in loss of access for that host until the HBA is replaced.

Enclosure Capacity

The EVA5000 provides one of the highest density disk storage solutions in the industry with up to 168 disk drives per cabinet along with a pair of controllers and 3U additional space for options. The 42U Graphite EVA5000 cabinets support up to twelve 3U 14-bay M5314A FC disk enclosures for a maximum EVA5000 cabinet capacity of 35 TB usable and up to 70 TB raw disk capacity (depending on Vraid type used) using 250 GB FATA or 300 GB high performance drives and an M3220 controller assembly containing a pair of HSV110 controllers. An expansion cabinet allows users up to 240 disks per EVA5000.

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Utility Pricing solutions for StorageWorks EVA HP offers a spectrum of offerings allowing customers to align their payments according to the usage of storage capacity.

- For customers requiring assistance in managing their storage infrastructure, Managed Storage Solution (MSS) meets that need while providing the option to acquire storage on a utility model. Customers have the ability to choose other options like Backup/Restore, Data Availability, Local Copy and Remote Copy services. All these capabilities are offered at a \$/GB/Month fee.
- For customers whose need is best described by predictable growth, Pay per forecast (PPF), offered from HP Financial Services, is an ideal fit. It is a step lease based solution where the payments are structured upfront according to the customer's forecasted growth.
- For EMEA customers with predicable growth that need ease of acquisition of capital equipment, Capacity-based Payments offered by HP should be proposed.
- For even further demanding financial needs of customers, HP Financial Services are ready to craft a customized solution for them.

Please contact your local HP representative for further information

EVA5000 Capabilities

- Support for up to 240 disk drives per controller pair.
- Up to 14 devices per disk enclosure (168 devices per 42U EVA cabinet and up to 240 with a utility cabinet).
- Support for dual-ported 2 Gb FC disk drives and dual-ported Fibre Attached Technology Adapted (FATA) drives.
- Management of up to 512 virtual disks (256 per HBA) ranging in size from 1 GB to 2 TB per virtual disk.
- Dynamic capacity expansion (allocate capacity in 1 GB increments)
NOTE: Requires Host Operating System Support.
- Virtual disk data load leveling (non-disruptive background activity).
- Distributed sparing of disk capacity.
- Support for Continuous Access EVA remote replication (synchronous and asynchronous).
- Support for Business Copy EVA Snapshot (Vsnap) and Snapclone.
- Dual redundant controller operation for increased fault tolerance
- Multiple Bus Failover Support using industry popular multiple path software
- Battery Back-up.
- Asynchronous Disk Swap (hot swap).
- Clustered Server Support.
- Mirrored Write-Back Cache Support.
- Read-Ahead and Adaptive Read Caching Support.
- Virtual RAID Arrays (Vraid0, Vraid1, Vraid5).
- Support for changing Vraid type using Vsnap or Snapclone within a disk group or Snapclone across disk groups
- Non-disruptive VCS software upgrade capability (online upgrades or enhanced rolling upgrades).
- Supports connection of up to 256 hosts.
- Multi-Vendor Platform Support.
- Controller Password Protection for Configuration Control.
- Selective Storage Presentation and SAN-based Data Zoning (through switches).
- Command View EVA GUI Interface for management and monitoring (manages up to 16 EVAs).

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Calculating EVA Capacity								
Vraid Type	Raw	Useable	Number of 146 GB Disks	Number of 250 GB (FATA) Disks	Number of 300 GB Disks	EVA 5000 2C12D (max. drives in single cab)	EVA 5000 2C18D (max. drives using an expansion cab)	EVA3000 2C4D
Raid 5	49 TB	35 TB	341	199	166			
Raid 1	79 TB	35 TB	545	319	266			
EVA MAX Drive Count						168	240	56

10K rpm Drive Support The EVA5000 supports 36 GB, 72 GB, 146 GB, and 300 GB 10K rpm dual-ported 2 Gb FC disk drives at full-rated transfer rates. An EVA controller pair will support up to 240 disk drives of single or mixed drive capacities and types (high performance and FATA) up to a useable capacity of 35TB (49TB raw with Vraid 5 and 72TB raw with Vraid 1. Total maximum raw capacity will vary based upon the redundancy (Vraid) selected.

VCS v3.020 controller software is the minimum required software to support the 300 GB disks.

15K rpm Drive Support The EVA5000 supports 36 GB, 72 GB, and 146 GB 15K rpm dual ported 2 Gb FC disk drives at full rated transfer rates. An EVA5000 controller pair will support up to 240 disk drives of single or mixed drive capacities. VCS 3.020 controller software is the minimum required software to support the 146 GB 15K rpm disk drives.

FATA Drive Support The EVA5000 supports 250 GB dual ported 2 Gb Fibre Attached Technology Adapted (FATA) disks. An EVA5000 controller pair will support up to 240 total disk drives. The EVA5000 can be configured with any combination of FATA and high performance disk drives up to a maximum of 35 TB of useable (49TB raw with Vraid 5 and 72TB raw with Vraid 1)capacity. Total raw capacity will vary based upon the redundancy (Vraid) selected.

VCS v3.020 controller software is the minimum required software to support the 250 GB FATA disks. Minimum of eight FATA drives are required when using FATA disks in a configuration.

Fibre Channel Switch Support Support for 8-, 16-, 32- and 64-port FC switches (up to twenty) operating at 1 Gb and 8- 16-, 32- and 64-port FC SAN switches operating at 2 Gb allow the full benefits of a storage area network (SAN), providing exceptional connectivity while increasing the effective bandwidth of the network. Supported SAN features include Zoning for communication isolation and Inter-Switch Links (hops) up to 10 km. The EVA5000 supports 2 Gb FC.

Transfer Speeds The EVA5000 has two FC ports per HSV110 controller. Each controller-to-host interface is 2 Gb enabled. With dual 2 Gb host interfaces per controller, the controllers are capable of 8 Gb aggregate data transfer rates. The controllers are also compatible with 1 Gb and 2 Gb FC switches, HBAs, servers and other storage solutions. Each HSV110 controller pair interfaces with up to 240 disk drives over four 2 Gb FC-AL loops for an aggregate data transfer rate of 8 Gb. The loops are arranged in redundant pairs connecting to up to 120 disk drives per loop pair. The redundant pair allows for load balancing between each loop and redundancy, should any loop become inoperable.

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Easy Installation

The EVA5000 predefined models ship from the factory fully configured! After unpacking, they can be plugged into power sources, connected to the FC SAN, enabled and configured with a management server running Microsoft® Windows® or an existing HP OpenView Storage Management Appliance and Command View and they are ready for use. In addition, installation and start-up services are part of the EVA5000 Foundation Service Solution warranty.

See the Command View EVA specifications at:

<http://h18006.www1.hp.com/products/storage/software/cmdvieweva/index.html> for support information.

Fault Tolerance

Redundant drive enclosure power supplies, blowers, controllers, cache battery backup, distributed hot spare disks and a multi-level Vraid architecture (Vraid0 - no redundancy, Vraid1 - high redundancy and Vraid5 - medium redundancy levels) ensure fault tolerance against system outages and data loss.

Fault Recovery - HP Continuous Access EVA for Disaster Tolerance Applications

HP StorageWorks Continuous Access EVA remote copy functionality is a storage-based application that performs replication between HP StorageWorks Enterprise Virtual Arrays. CA EVA utilizes HP's leading edge technologies to perform point-in-time local replication, highly available Fibre Channel (FC) multi-path support, dual FC fabric, nearline data protector and campus, metro or continental SAN extensions.

URL: <http://h18006.www1.hp.com/storage/software.html>.

HP StorageWorks Disaster Tolerant Solution for mySAP Business Suite on EVA offers a business continuance solution for SAP environments, where data integrity and value added functionality are high priorities. Best practices for implementing remote mirroring of an SAP database as part of an overall data protection strategy with SAP applications can be found at:

<http://h18006.www1.hp.com/products/storageworks/solutions/dtmysapeva/index.html>.

High Availability

All EVA5000 models provide redundant cooling, power redundancy and environmental monitoring. Drives and most solution components are hot swappable. Each solution is configured with dual controllers that operate in dual redundant mode. Each controller has a pair of Fibre Channel (FC) host ports. In the event of a path failure, the alternate path to the controller can be utilized with the use of multi-path software in the Operating System or in Secure Path software. The M5314A FC drive enclosure also supports dual redundant FC loops that provide load balancing and redundant paths should either FC loop become unavailable. The M5314A also has a mini FC hub on each FC loop; so that the FC loop can be re-routed should the next enclosure (disk or controller) in the loop become unavailable.

Hot Pluggable Support The M5314A FC Drive Enclosure supports hot plug (power on) removal or insertion of FC high performance disk drives and FATA disk drives.

Integration

All EVA5000 models are 2 Gb FC Switched Fabric "enabled" and can operate on 2 Gb or 1 Gb FC Switched Fabric SANs. They can co-exist in the same FC SAN with EVA3000/MA6000/MA8000/EMA12000/EMA16000 FC and RA8000/ESA12000 FC storage solutions.

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Manageability

A management server running Microsoft® Windows or an existing Storage Management Appliance is required to manage EVA models. Command View EVA provides the capability to manage the EVA5000. This powerful tool provides an easy mechanism to manage a large number of EVA3000, EVA4000, EVA5000, EVA6000 and EVA8000 units in a SAN configuration. Command View EVA is purchased separately from the VCS media kit.

For more information on Command View EVA:

<http://h18006.www1.hp.com/products/storage/software/cmdvieweva/index.html>

Performance

Fibre Channel host connections provide up to 200 MB/s bandwidth for each path. Each controller has two Fibre Channel host ports (four ports in a redundant pair of controllers) assuring the availability of bandwidth for the most stringent applications. In addition, up to 2.5 GB of cache per controller pair ensures high performance. Mirrored write caching capability maintains optimal performance while assuring data integrity in the event of a failure.

Scalability

A Storage Management Appliance can manage up to 16 EVA3000 and EVA5000 controller pairs in any one fabric. An EVA5000 controller pair will support up to 256 host connections (up to 1024 HBAs). An EVA5000 will scale up to 168 disks in a single cabinet. With the addition of an optional utility cabinet, an EVA5000 will scale up to 240 disks. Configure to Order (CTO) options allow even greater flexibility and scalability. Enterprise Virtual Array 5000 2C6D-C customers can configure their new EVA5000 units from HP manufacturing with up to four additional drive enclosures for a total of 10 drive enclosures. (A 2C12D-C should be ordered if a customer wants 12 drive enclosures shipped integrated from manufacturing, not 2C6D-C with six additional drive enclosures.) Existing 2C2D, 2C6D, 2C6D-A, 2C2D-B, 2C6D-B, 2C2D-C or 2C6D-C customers can also purchase additional drives and enclosures to be installed on-site by HP Global Services.

Servers Supported – Single and Clustered

HP servers (HP-UX, ProLiant, AlphaServers)
X86 servers
Dell Servers
SUN servers
IBM servers
Bull Escala Servers

EVA5000 Required Software

EVA3000/5000 Series v4.0 Controller Media Kit

The HSV100 controller (for the EVA5000) utilizes VCS v4.0 firmware, and Continuous Access EVA and Business Copy EVA as optional value added software. For host connections, select the Operating System kit from the web site appropriate for your operating system and VCS version you are using.

NOTE: As a convenience for customers the EVA5000 ships with VCS v3.028 pre-installed. EVA3000/5000 Series v4.0 Controller Media Kit contains both v4.0 and v3.028 firmware allowing the customer to choose the VCS version supporting their multipathing configuration.

NOTE: HP Command View EVA v4.1 is required to operate with the components of the EVA3000/5000 Series v4.0 Controller Media (VCS v4.0) kit. This kit is sold separately from the VCS kit. For more information on this product please see:

<http://h18006.www1.hp.com/products/storage/software/cmdvieweva/index.html>

NOTE: Choosing industry popular multipathing support with VCS v4.0 may require operating system and or HBA changes. Customers desiring to run VCS at v4.0 should indicate this when they contact HP Customer Services for installation assistance.

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EVA User Interface Command View EVA v4.1 is REQUIRED to operate with VCS V4.0 and must be separately purchased from the VCS kit.
 For more information on this product please see:
<http://h18006.www1.hp.com/storage/software.html>
NOTE: Command View EVA v3.3 and V4.0 are compatible with VCS V3.028 at the versions original functionality levels. For full support of VCS V3.028 Command View EVA v4.1 is required. The EVA5000 will not operate without Command View.

Supported Software HP StorageWorks Business Copy EVA (BC); HP StorageWorks Fast Recovery Solutions (FRS); HP OpenView Storage Area Manager suite; HP OpenView Storage Volume Growth; HP OpenView Storage Virtual Replicator; and HP StorageWorks Secure Path for HP-UX. Visit the HP storage software website - <http://h18006.www1.hp.com/storage/software.html> - for additional information.

EVA and Value-added Software Compatibility

Model	VCS Firmware	Command View EVA	Continuous Access	Business Copy
EVA3000 & EVA 5000	VCS v3.0d (VCS V3.025) for HSV110 (includes V3.014 and V3.020)	Command View EVA v4.0	Continuous Access EVA5000 v1.1, V1.0 License	Business Copy EVA5000 v2.2, V3.0 license
EVA3000 & EVA5000	VCS v3.0e (VCS v3.028) VCS for EVA3000/5000	Command View EVA v4.1*	Continuous Access EVA3000 v1.1, v1.0, License	Business Copy EVA3000 v3.0 license
EVA3000 & EVA5000	VCS v4.0 for EVA3000/5000	Command View EVA 4.1	Continuous Access EVA3000 v2.1License	Business Copy EVA3000 v3.1 license

*NOTE: Command View EVA V4.0 are compatible with VCS V3.028 at the versions original functionality levels. For full support of VCS V3.028 Command View EVA v4.1 is required.

Operating Systems, Cluster and High Availability Compatibility with VCS v4.0

Operating System	Versions Supported	Cluster Server or High Availability Software	HA Version Supported	Failover Software
Microsoft Windows	Windows 2000 Server SP4, Update Roll Up 1 for SP4 Windows 2000 Advanced Server SP4, Update Roll Up 1 for SP4 Windows 2003 Standard Edition (32/x64 & IA64) (and SP1) Windows 2003 Enterprise Edition (32/x64& IA64) (and SP1) Windows 2003 DataCenter Edition (IA64) SP1 Available Q106	Microsoft Cluster Server (MSCS) is provided for ProLiant servers and other x86 platforms	(Clustering Supported Operating Systems) Windows 2000 Advanced Server SP4, Update Roll Up 1 for SP4 Windows 2003 Enterprise Edition (32/x64 & IA64) (and SP1) Windows 2003 DataCenter Edition (IA64) Available Q106	MPIO DSM Full Feature v1.0 for Windows (Available on HP web)

Product Highlights

HP-UX	v11i v1 (PA-RISC) v11i v2 (PA-RISC & Integrity)	HP ServiceGuard VERITAS Foundation Suite/HA	11.15 11.16 11.17 3.5 (v11i v1)	PV-Links, Native in OS Secure Path V3.0F SP1 for HP-UX VERITAS DMP 3.5 DMP(v11i v1)
Linux	Red Hat EL Advanced Server 2.1(x86 32-bit, Integrity) - U7 or later Red Hat EL Advanced Server 3.0 (x86 32- & 64-bit, Integrity)- U5 or later Red Hat EL Advanced Server 4.0 (x86 32- & 64-bit, Integrity) U2 or later United Linux 1.0 (x86 32-bit, Integrity) - UL1.0/SLES8 SP4 SUSE/SLES9 (x86 32-& 64-bit, Integrity) SP2	HP ServiceGuard for Linux*	A.11.15 supports SLES8 SP4 A11.16 supports RHEL 4 U1, RHEL3 U5 and SLES 9 SP1 A.11.14 supports RHEL2.1 U5	Qlogic Failover driver 7.05. 00p8 or later for Redhat EL AS 2.1 & 3.0 and United Linux 1.0 Qlogic Failover driver 8.00.02p11 or later for Redhat EL AS 4.0 and SUSE/SLES9
HP Tru64 UNIX	v5.1B-2 v5.1B-3	HP TruClusters	5.1b	Native in OS
HP OpenVMS	7.3-2 (Alpha) 8.2 (Alpha and Integrity IA64) 8.2-1 (Integrity IA64)	OpenVMS Clusters	7.3-2 (Alpha) 8.2 (Alpha and Integrity IA64) 8.2-1 (Integrity IA64)	Native in OS
Sun Solaris	8 9 10	SunCluster VERITAS Foundation Suite/HA	3.1 4.0	MPxIO for Solaris, Native in OS VERITAS DMP 3.5, 4.0
IBM AIX	5.2 5.3	HACMP	5.1, 5.2	MPIO for IBM AIX, Native in OS
Novell NetWare	5.1 6.5	NetWare cluster server	1.01 1.7	MPIO for NetWare, Native in OS
VMware	ESX 2.5.2 (GSX & WSX Application support)			MPIO for VMware, Native in OS
<p>*NOTE: Service Guard certification matrix available at: ftp://ftp.compaq.com/pub/solutions/enterprise/ha/linux/svcguard-certmatrix.pdf</p>				

Cabinet Density

The EVA5000 models are available in a 42U graphite storage cabinet. Up to 168 disks can be housed in a single cabinet frame. Using the expansion cabinet with two individual EVA5000 2C12D models, a single EVA5000 solution can scale to 480 disks and two controller pairs in a combined 3 cabinet footprint of just 19.8 square feet (6.035 square meters) in 42U graphite cabs.

Power Distribution

Pre-configured solutions are equipped with suitable 0U Power-Distribution Units according to the voltage used in the country. These PDUs allow redundant power and are located in the bottom and back of the cabinet for power cable entrance by the floor. The PDUs are 220/240V only and are 0U high with a total of two AC power cords extending outside the cabinet.

Total Cost of Ownership

The EVA5000 has one of the highest density disk storage solutions in the industry. Additionally, the unique virtual architecture allows up to twice the normal effective capacity utilization of traditionally architected storage offerings. And with the virtually Capacity-Free Snapshot (Vsnap), FATA disk drives and the ability to change Vraid types significant duplicate capacity requirements can be eliminated resulting in fewer/smaller storage acquisitions.

Service and Support, HP Care Pack, and Warranty Information

EVA5000 Product Warranty

The Foundation Service Solution is included with every EVA5000. Factory warranty includes 3-year hardware support, with 4-hour response on a 24x7 basis as well as 3-year, 24x7 VCS phone-in support and updates. In addition, the EVA Foundation Service Solution includes Array Installation and Startup Service.

Maintenance releases, bug fixes and patches for VCS will be available to warranty/support customers on the HP web site at

<http://h18006.www1.hp.com/products/sanworks/softwaredrivers/vcs/index.html>.

In countries where available, your HP Limited Warranty includes Customer Self Repair warranty services. Please refer to HP's Limited Warranty Statement for further details:

<http://h18006.www1.hp.com/products/storageworks/warranty.html>

For additional information on foundation services, EVA product warranty and add-on options warranties, please refer to the URL listed below: http://www.hp.com/hps/index_support.html.

If you have specific questions about service and support contact your local HP representative. Contact information for your local area can be found at:

http://welcome.hp.com/country/us/eng/contact_us.html.

EVA Solution Bundles

The EVA5000 offers three different product bundles, which incorporate the EVA product and support within a single product SKU. Choosing the right support level to fit your needs is a key factor for maintaining the EVA data availability and performance you need.

HP EVA Foundation Solution

- The EVA Foundation Solution bundle includes:
 - Three full years of 24x7 hardware on-site support with a 4-hour response commitment
 - Three full years of 24x7 VCS telephone support with 2-hour telephone response commitment
 - Three full years of VCS update service
 - Array Installation and Startup which includes:
 - Array deployment
 - Installation Verification Testing (IVT)
 - Brief customer orientation session

Please see the EVA foundation services information for your country or contact your local HP sales organization for further details see

<http://www.hp.com/services>.

HP EVA Proactive Solution

The EVA Proactive Solution bundle includes all aspects of the EVA Foundation Solution bundle above, as well as 3 years of HP Proactive 24 support. Proactive 24 support is designed to help customers avoid potential problems. P24 for the array includes:

- Assigned Account Manager
- Documented Account Support Plan
- Quarterly activity reporting
- Semi-annual support planning meetings
- Ongoing Account and Change Management Storage/SAN firmware recommendations

HP EVA Enhanced Proactive Solution

The EVA Enhanced Proactive Solution bundle includes all aspects of the EVA Proactive Solution bundle above, as well as SAN Solution Service. SAN Solution Service is the deployment offer designed to implement SANs. The deployment elements of SAN Solution Service vary depending on various factors. The deployment components included with each EVA Enhanced Proactive Solution Service model number are as follows:

- For the 2C2D models - Single engagement of SAN Solution Deployment Service for a SAN resident in a single building with up to 32 SAN ports, and 6 hosts on 1 Operating system platform.

Service and Support, HP Care Pack, and Warranty Information

- For the 2C6D - Single engagement of SAN Solution Deployment Service for a SAN resident in a single building or one campus environment with up to 64 SAN ports, and 14 hosts on 2 operating system platforms.
- For the 2C12D - Single engagement of SAN Solution Deployment Service for a SAN resident in a single building or one campus environment with up to 96 SAN ports, and 22 hosts on 2 operating system platforms.

EVA Support Options offered at no charge	EVA Remote Support Tools	As a no charge option*, HP will install remote service tools for any EVA under warranty or service support. These tools will enable self-monitoring and diagnosis. The EVA will transmit status information to an HP service center for proactive problem resolution. * NOTE: Contact your local Services department for more details.
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EVA Support Options offered ala-carte	HP Proactive Essentials (PE)	Support designed to enhance the EVA Foundation Solution with essential aspects of proactive support for the array including: <ul style="list-style-type: none">• Assigned Account Manager• Semi-annual support planning meetings• Ongoing account and change management• Storage/SAN firmware recommendations Proactive Essentials support for the SAN is recommended for SAN switch connected to an EVA3000/5000.
	HP Proactive 24 Service (P24)	<ul style="list-style-type: none">• This level of support will enhance the EVA Foundation Solution with proactive support designed to help customers avoid potential problems. P24 for the array includes: Assigned Account Manager• Documented Account Support Plan• Quarterly activity reporting• Semi-annual support planning meetings• Ongoing Account and Change Management• Storage/SAN firmware recommendations Proactive 24 support for the SAN is available and recommended for SANs with over 64 switch ports
	HP Critical Services (CS)	Critical Service is designed for Business Critical environments. Critical Service enhances the EVA Foundation Solution with the following elements to maximize uptime. <ul style="list-style-type: none">• Business Collaboration & Technical Advice• Account Support Plan• Annual Availability Checkup• Quarterly Support Activity Review• Quarterly Support Planning and Review Sessions• Quarterly OS/OE Patch Analysis and Management• Quarterly Storage/SAN Firmware and Software Analysis and Management• Technical Services• Annual Storage High Availability Assessment• Site Environmental Survey• Electronic Information Support• Software Updates• Education Planning Assistance Assigned Customer Support Team <ul style="list-style-type: none">• Account Support Consultant• Remote Support Account Advocate• Hardware Support Specialist

Service and Support, HP Care Pack, and Warranty Information

Rapid Reactive Support

- Critical Response
- Dedicated Phone Number
- Immediate Response/Intervention by HP-certified hardware and software specialists
- Dispatch of HA-trained hardware specialists for critical hardware problems
- Six-hour hardware Call-to-Repair Commitment
- Accelerated Escalation Management
- Enhanced Parts Inventory Management

Flexible Call Submittal

HP Mission Critical Partnership

HP Mission Critical Partnership (MCP) is the highest level of Mission Critical Support available from HP. It is designed to enable an IT department to meet its most demanding commitments and to support your key mission-critical applications or critical IT services where specific service-level agreements (SLAs) have been made to end users or clients. HP Mission Critical Partnership is ideal where any disruption to the IT infrastructure would have an impact on the financial position or market credibility of your company or IT department.

Other services to be considered with the Enterprise Virtual Array solution

SAN Solution Service

HP SAN Solution Service provides for the implementation of Fibre Channel switches in a Storage Area Network (SAN) environment. The tier and level of SAN Solution Service is determined by the size and complexity of the SAN environment.

HP Data Replication Solution Service – for Continuous Access EVA Implementation

HP Data Replication Solution Services provides implementation and verification of the Continuous Access (CA) feature of the EVA storage array. The service is offered at three service levels, ranging from basic installation to more comprehensive implementation that can be tailored to meet the specific needs of your storage environment.

Availability Assessment Services for SAN

The HP Availability Assessment Service for SAN is designed to help a customer understand and enhance the high availability characteristics of a new storage area network (SAN). The customer's SAN infrastructure will be reviewed at a high level and a report produced identifying key issues affecting the availability of the SAN to end-users. Areas of risk will be identified and recommendations made to start addressing those risks. The availability that can be expected from the proposed HP SAN hardware and software will be modeled, along with a single what-if variation based on recommendations resulting from the risk analysis.

Availability Management Services for SAN

The Availability Management Service for SAN applies an established proactive and best practice approach to assist customers in the ongoing maintenance of availability levels in their SAN infrastructure. This service complements the standard remedial and added value software and hardware services by providing a focus on the key areas of IT Management best practices to sustain and align the availability of the customer's business critical systems requirements.

HP Data Migration Service

For Open Systems, Mainframe and Mixed environments you can safely transport your information from your retired storage hardware to a new EVA. Move your business critical data without the concern of interrupting your day-to-day operations. Help eliminate unexpected surprises and complexities with the total solution, the HP Data Migration Service. Speed up the process and increase the efficiency of migrating your information across a data center or around the globe, using LAN, WAN, or SAN connectivity, with the assistance of our highly trained storage experts.

HP Storage Optimization Service

Our storage specialists and technical site assessors will collaborate with your designated IT storage administration staff to gain a thorough understanding of your business needs and heterogeneous storage environment. Focusing specifically on areas of exposure in your EVA

Service and Support, HP Care Pack, and Warranty Information

HP Oracle9/RAC express service (US and Canada only)

storage/SAN environment, we will document in detail the architecture of the storage/ SAN configuration, including hosts; SAN interconnect devices, and any application-critical storage devices. Using industry-leading best practices as the framework, our storage specialists will identify potential weaknesses that may adversely affect the SAN/storage environment. We will deliver a comprehensive report that details your existing storage architecture and provides recommendations for improving efficiency and performance and evolving your storage environment to support your business needs.

HP and Oracle address the customer need for highly integrated solutions by providing a solution, which minimizes unplanned and planned downtime to the levels required by the most demanding business applications, such as SAP and PeopleSoft. HP Oracle9i RAC express service should be purchased en lieu of SAN Solution Service. As part of the HP Oracle9i RAC solution service, the install and configuration normally provided by the SAN Solution Service is performed by HP's solution architects and consultants in addition to the following tasks:

- Evaluate the business objectives for the Oracle9i RAC solution and make recommendations for additional platform clustering software as applicable given your availability requirements
- Tailor the service to your exact needs
- Evaluate the application environment for compatibility and best performance with the Oracle9i RAC solution
- Evaluation and examination of the application and data model for scalability and performance
- Architect and design the Oracle9i RAC database cluster
- Install, configure and customize Oracle9i RAC software per the design
- Optionally provide integration with enterprise management solutions such as HP OpenView using the Oracle SPI
- Optionally provide integration with enterprise backup solutions for HP (Data Protector), Legato (Networker) and VERITAS (Netbackup)
- Optionally provide integration with HP's market leading partitioning and resource and workload management tools (PRM and WLM)
- Optionally provide performance tuning or capacity planning, including tuning of the database parameters, transactions, operating system and storage devices
 - Test the implemented environment against predefined failure scenarios
 - Provide engagement management for coordination of HP consultants
 - Provide mentoring and documentation for the new high availability environment

Service and Support, HP Care Pack, and Warranty Information

HP EVA Training

Training for the Enterprise Virtual Array is now offered as part of HP comprehensive curriculum of HP Storage, Storage Management, and IT Service Management courses. These courses will provide the training required to realize the full potential of your HP EVA Virtual Array storage solutions, optimize your systems and SAN for highest efficiency, and achieve better return on your IT investments.

HP has over 25 years experience in delivering effective product education through delivery methods designed to meet your company's needs.

- Printed job aids
- Self-paced online training
- The HP Virtual Classroom, allowing many kinds of training, presentation and ad hoc collaboration to take place online across long distances, providing individualized attention without the cost and time away from the workplace associated with classroom training
- Traditional classroom training at HP sites, or at the locations of HP partners
- Classroom training delivered at customer locations
- Customized education, based on HP's standard courses but with customer-specified timelines, topics and or levels of detail

For more information about our courses see: http://www.education.hp.com/storage_array.htm

Family Information

Model	EVA5000 2C2D-C	EVA5000 2C6D-C	EVA5000 2C12D-C	EVA5000 8C8D-C HTPC
Drive Interface	Dual ported 2 Gb FC-AL	Dual ported 2 Gb FC-AL	Dual ported 2 Gb FC-AL	Dual ported 2 Gb FC-AL
Controller Software	VCS v4.0	VCS v4.0	VCS v4.0	VCS v4.0
Cache per controller	1.25 GB	1.25 GB	1.25 GB	1.25 GB
RAID Support	Vraid0, Vraid1 and Vraid5	Vraid0, Vraid1 and Vraid5	Vraid0, Vraid1 and Vraid5	Vraid0, Vraid1 and Vraid5
Channels	Four 2 Gb FC-AL	Four 2 Gb FC-AL	Four 2 Gb FC-AL	Sixteen 2 Gb FC-AL
Maximum Drives per cabinet	28	84	168	112
Maximum drives with optional utility cabinet	Not available	Not available	240	Not applicable
Maximum drives with optional CTO M5314A drive enclosures	168	168	Not applicable	Not applicable
Maximum Capacity per cabinet*	1.0 TB (36 GB disks) 2.0 TB (72 GB disks) 4.0 TB (146 GB disks) 7.0 TB (250 GB disks) 8.0 TB (300 GB disks)	3.1 TB (36 GB disks) 6.2 TB (72 GB disks) 12.2 TB (146 GB disks) 21TB (250 GB disks) 24.4 TB (300 GB disks)	6.2 TB (36 GB disks) 12.3 TB (72 GB disks) 24.5 TB (146 GB disks) Maximum 35 TB useable up to 50 TB raw (based upon disks (250 GB or 300 GB) and Vraid used)	4.0 TB (36 GB disks) 8.0 TB (72 GB disks) 16.0 TB (146 GB disks) 28.0 TB (250 GB disks) 33.4 TB (300 GB disks)
Maximum Capacity with optional utility cabinet*	Not available	Not available	8.7 TB (with 36 GB disks) 17.5 TB (with 72 GB disks) Maximum 35.0 TB useable and up to 72 TB raw (based upon disks (250GB or 300 GB) and Vraid used)	Not applicable
Maximum capacity with optional CTO M5314A drive enclosures*	6.2 TB (with 36 GB disks) 12.3 TB (with 72 GB disks) 24.5 TB (with 146 GB disks) Maximum 35 TB useable, up to 67 TB raw (based upon disks (or 400 GB) and Vraid used)	6.2 TB (with 36 GB disks) 12.3 TB (with 72 GB disks) 24.5 TB (with 146 GB disks) Maximum 35 TB useable up to 67 TB raw (based upon disks (400 GB) and Vraid used)	Not applicable	Not applicable
Redundant Controllers	Yes	Yes	Yes	Yes
Drive Capacities	36 GB 10K rpm 72 GB 10K rpm 146 GB 10K rpm 300 GB 10K rpm 36 GB 15K rpm 72 GB 15K rpm 146 GB 15K rpm 250 GB FATA	36 GB 10K rpm 72 GB 10K rpm 146 GB 10K rpm 300 GB 10K rpm 36 GB 15K rpm 72 GB 15K rpm 146 GB 15K rpm 250 GB FATA	36 GB 10K rpm 72 GB 10K rpm 146 GB 10K rpm 300 GB 10K rpm 36 GB 15K rpm 72 GB 15K rpm 146 GB 15K rpm 250 GB FATA	36 GB 10K rpm 72 GB 10K rpm 146 GB 10K rpm 300 GB 10K rpm 36 GB 15K rpm 72 GB 15K rpm 146 GB 15K rpm 250 GB FATA

*NOTE: Useable disk capacity varies based upon the redundancy utilized by the customer (Vraid level used).

Configuration Information and Configuration Rules

Enterprise Virtual Array The EVA5000 is a scalable, no-single-point-of-failure, modular solution, with disaster tolerance and business continuance for storage consolidation on heterogeneous SANs.

Step 1 – Modular Solutions—Base and Expansion Configurations

Expansion Models	Select one	
-C Models in 42U Graphite cabinets without loop switches Model 2C2D-C	EVA5000 2C2D-C, 60Hz, 42U (Graphite) NOTE: 42U graphite storage cabinet, M3220 Controller assembly with dual HSV110 controllers, two M5314A dual FC loop 14-bay drive enclosures. When upgrading the 2C2D, the FC loop switches (336880-B21 for 2C2D-C models) are mandatory with the addition of the 5th shelf and above. It can be field upgraded up to a 2C12D-C configuration with the addition of drive enclosures and FC loop switches.	309620-B23
	EVA5000 2C2D-C, 50Hz, 42U (Graphite) NOTE: 42U graphite storage cabinet, M3220 Controller assembly with dual HSV110 controllers, two M5314A dual FC loop 14-bay drive enclosures. When upgrading the 2C2D, the FC loop switches (336880-B21 for 2C2D-C models) are mandatory with the addition of the 5th shelf and above. It can be field upgraded up to a 2C12D-C configuration with the addition of drive enclosures and FC loop switches.	309620-B24
-C Models in 42U Graphite cabinets with loop switches Model 2C6D-C	EVA5000 2C6D-C, 60Hz, 42U (Graphite) NOTE: 42U graphite storage cabinet, M3220 Controller assembly with dual HSV110 controllers, six M5314A dual FC loop 14-bay drive enclosures, four FC loop switches.	283198-B23
	EVA5000 2C6D-C, 50Hz, 42U (Graphite) NOTE: 42U graphite storage cabinet, M3220 Controller assembly with dual HSV110 controllers, six M5314A dual FC loop 14-bay drive enclosures, four FC loop switches.	283198-B24
Model 2C12D-C	EVA5000 2C12D-C, 60Hz, 42U (Graphite) NOTE: 42U graphite storage cabinet, M3220 Controller assembly with dual HSV110 controllers, 12 M5314A dual FC loop 14-bay drive enclosures four FC loop switches.	283199-B23
	EVA5000 2C12D-C, 50Hz, 42U (Graphite) NOTE: 42U graphite storage cabinet, M3220 Controller assembly with dual HSV110 controllers, 12 M5314A dual FC loop 14-bay drive enclosures four FC loop switches.	283199-B24
EVA Utility Cabinet	EVA 42U Graphite Utility Cabinet, 60Hz NOTE: 42U EVA5000 Cabinet, (M5314A 3U Dual-redundant FC Loop 14-bay disk enclosures FC interconnect cables are purchased separately). NOTE: 42U Graphite utility cabinets for use with Model EVA5000C above.	289191-B23
	EVA 42U Graphite Utility Cabinet, 50Hz NOTE: 42U EVA5000 Cabinet, (M5314A 3U Dual-redundant FC Loop 14-bay disk enclosures FC interconnect cables are purchased separately). NOTE: 42U Graphite utility cabinets for use with Model EVA5000C above.	289191-B24

Configuration Information and Configuration Rules

Step 2 – Required Options (For Pre-Defined Models)

HP StorageWorks Enterprise Virtual Array FC Factory Installed Drives	*NOTE: Four disk drives, either size/type, are required per disk enclosure per system - 24 for 2C6D, 48 for 2C12D, 24 for 0C6D, and 48 for 0C12D.	Not for use in EMEA	EMEA Only
	300 GB 10K rpm dual-port 2 Gb FC-AL 1-inch (2.54 cm) drive	364622-B23*	364622-B22*
	146 GB 10K rpm dual-port 2 Gb FC-AL 1-inch (2.54 cm) drive	293556-B23*	293556-B22*
	72 GB 10K rpm dual-port 2 Gb FC-AL 1-inch (2.54 cm) drive	238921-B23*	238921-B22*
	146 GB 15K rpm dual-port 2 Gb FC-AL 1-inch (2.54 cm) drive	364621-B23*	364621-B22*
	72 GB 15K rpm dual-port 2 Gb FC-AL 1-inch (2.54 cm) drive	293568-B23*	293568-B22*
	250 GB FATA disk dual-port 2 Gb FC-hybrid 1-inch (2.54 cm) drive	364437-B23*	364437-B22*

NOTE: OD1 will appear after these part number (xxxxxx-B22) and xxxxxx-B23) on your sales order indicating factory integration. The OD1 modifier is available against xxxxxx-B22 parts in EMEA only.

HP StorageWorks Enterprise Virtual Array FC Add-On Drives	Worldwide	
	300 GB 10K rpm dual-port 2 Gb FC-AL 1-inch (2.54 cm) drive	364622-B22
	146 GB 10K rpm dual-port 2 Gb FC-AL 1-inch (2.54 cm) drive	293556-B22
	72 GB 10K rpm dual-port 2 Gb FC-AL 1-inch (2.54 cm) drive	238921-B22
	146 GB 15K rpm dual-port 2 Gb FC-AL 1-inch (2.54 cm) drive	364621-B22
	72 GB 15K rpm dual-port 2 Gb FC-AL 1-inch (2.54 cm) drive	293568-B22
	250 GB FATA disk dual-port 2 Gb FC-hybrid 1-inch (2.54 cm) drive	364437-B22

NOTE: Before selecting the FC cables to connect between the controllers and the SAN switches, please check to see what kind of connectors are on the switches that will be connected to the controllers. New switches (SAN Switch 2/16, 2/16-EL and 2/8-EL and SAN Director 64) utilize a Small Form-Factor Profile (SFP) connector. The SFP connector can support 2 Gb I/Os and/or 1Gb I/Os, but the device connected to it may not currently be enabled for 2 Gb. The SFP connector is also referred to as an LC connector (not SC). The older large form factor 1 Gb connector is also referred to as an SC connector.

FC cable – 1 Gb to 2 Gb (LC to SC)	(The 2 Gb GBICs on the ports of the EVA5000 HSV110 controllers are a smaller form factor than 1 Gb GBICs. One of these cables (either LC to SC or LC to LC) is required per FC port of each HSV110 controller. Four required per HSV110 controller pair.)	
	FC Short Wave 2-Meter Cable, LC/SC (1 Gb to 2 Gb)	221691-B21
	FC Short Wave 5-Meter Cable, LC/SC (1 Gb to 2 Gb)	221691-B22
	FC Short Wave 15-Meter Cable, LC/SC (1 Gb to 2 Gb)	221691-B23
	FC Short Wave 30-Meter Cable, LC/SC (1 Gb to 2 Gb)	221691-B26
	FC Short Wave 50-Meter Cable, LC/SC (1 Gb to 2 Gb)	221691-B27

FC cable – 2 Gb to 2 Gb (LC to LC)	(The 2 Gb GBICs (SFP – Small Form-Factor Profile) on the ports of the EVA5000 HSV110 controllers are a smaller form factor than 1 Gb GBICs. One of these cables (either LC to SC or LC to LC) is required per FC port of each HSV110 controller. Four required per HSV110 controller pair.)	
	2-meter LC-LC Multi-Mode Fibre Cable	221692-B21
	5-meter LC-LC Multi-Mode Fibre Cable- This is the recommended cab-to-cab cable for interconnecting drive enclosures in an expansion cab to FC loop switches in an adjacent cab.	221692-B22
	15-meter LC-LC Multi-Mode Fibre Cable	221692-B23
	30-meter LC-LC Multi-Mode Fibre Cable	221692-B26
	50-meter LC-LC Multi-Mode Fibre Cable	221692-B27

Configuration Information and Configuration Rules

Controller Firmware One VCS media kit is required per HSV110 controller pair. Command View EVA v4.1 is required. **OPTIONAL SOFTWARE** for use with the EVA5000 can be found at the following URL: <http://h18006.www1.hp.com/storage/software.html>.
EVA3000/5000 Series v4.0 Controller Media Kit (VCS media kit is required) T3588D

High Availability Software Industry popular multiple path software is supported on the EVA3000. This software is used to manage multiple paths between hosts and storage systems. It enables high availability through path management and I/O load balancing. Multiple Path support is available for the following Operating Systems:

- Full feature MPIO DSM for Windows
- Native pvlincs for HP-UX
- Veritas DMP for HP-UX
- QLogic Failover driver for Linux
- Native MPxIO for Solaris
- Veritas DMP for Solaris
- Native MPIO for AIX
- Native failover with OpenVMS
- Native failover with Tru64
- Native MPIO for NetWare
- Native MPIO for VMware

HP StorageWorks Secure Path Software is used to manage multiple paths between hosts and storage systems. Secure Path enables high availability through robust path management and optimizes performance with I/O load balancing. Secure Path support is available for HP-UX. Refer to <http://h18004.www1.hp.com/products/sanworks/secure-path/index.html> for ordering information and ordering information.

Management Server One storage management server or an existing Storage Management Appliance in the SAN (see below) is required per SAN fabric containing an Enterprise Virtual Array. See the Command View QuickSpecs for detailed support and configuration information: <http://h18006.www1.hp.com/products/storage/software/cmdvieweva/index.html>

SAN components The HP StorageWorks SAN integrates best-in-class networking components to deliver a complete connectivity platform for end-to-end network storage solutions. HP's fabric portfolio includes: HBA's, directors, switches, SAN extenders, NAS heads, iSCSI routers, and fabric software. HP SAN Infrastructure components deliver the network storage infrastructure for the Adaptive Enterprise. For details on SAN infrastructure components and storage compatibility information please visit: <http://www.hp.com/go/san>.

Step 3 – Configure-to-Order, Required

If you do not wish to have optional components such as additional drive enclosures, switches or drives assembled at the factory, simply list your selections on your sales order without the CTO factory integration part number

CTO Factory integration part number

North America and Latin America

258158-888

Configuration Information and Configuration Rules

Step 4 –Optional Components and Software

Optional Software for EVA5000

Remote Replication Software

HP StorageWorks Continuous Access EVA (is a controller-based application that performs real-time replication between HP StorageWorks Enterprise Virtual Arrays. The solution is enhanced to perform remote replication, and deliver high data availability and performance to users on Fibre Channel based campus, metro or continental Storage Area Networks (SANs). Continuous Access EVA provides customers with the highest level of storage data protection capabilities to meet their business continuity implementation goals. Customers can achieve a competitive advantage by combining disaster-tolerant solutions and disaster-tolerant managed services into their planning and daily routines, ensuring the data's security, availability and integrity. Continuous Access EVA delivers local copy with Business Copy EVA and virtualization interoperability protect against disaster like scenarios, saving time and money while maintaining the flow of information across the enterprise. Continuous Access EVA is an irreplaceable component for protecting any business. Continuous Access EVA is sold by utilized capacity. Please see the product URL for ordering information and part numbers. <http://h18006.www1.hp.com/storage/software.html>.

Local Replication Software

HP StorageWorks Business Copy EVA is a local replication software product for the EVA5000 arrays providing snapshot and clone set-up and management. Business Copy EVA creates point-in-time copies of storage volumes, called Business Continuance Volumes (BCV's) using the snapshot and cloning capabilities of the array firmware and provides multi-array local mirror management. Business Copy EVA combines the former VCS snapshot product license together with an improved management capability, formerly known as Enterprise Volume Manager (EVM) into a single orderable product. Additional features of the new product include licensing based on replicated (not total raw) capacity and a new improved management interface. Business Copy EVA is sold by utilized capacity.

Please see the product URL for ordering information and part numbers:

<http://h18006.www1.hp.com/storage/software.html>.

HP StorageWorks Rapid Backup for mySAP Business Suite on EVA enhances backup procedures of SAP applications on the HP StorageWorks Enterprise Virtual Arrays. This solution minimizes the impact on operations during backup to minutes - no matter which database size is in use. More information can be found at:

<http://h18006.www1.hp.com/products/storageworks/solutions/rbmysapeva/index.html>.

SAN Components

The HP StorageWorks SAN integrates best-in-class storage networking components to deliver a complete connectivity platform for end-to-end network storage solutions. HP's fabric portfolio includes: HBA's, directors, switches, SAN extenders, NAS heads, iSCSI routers, and fabric software. HP SAN Infrastructure components deliver the network storage infrastructure for the Adaptive Enterprise.

For details on SAN infrastructure components and storage compatibility information please visit:

<http://www.hp.com/go/san>.

FC Drive Enclosures

Select M5314A drive enclosures to expand any Enterprise Virtual Array. Drive enclosures for new Enterprise Virtual Arrays are installed by HP manufacturing. Drive enclosures for existing Enterprise Virtual Arrays are installed on-site by HP Global Services. It is recommended that drive enclosures be added in pairs to a maximum of 12 per cabinet. The M5314A is compatible with the EVA3000/4000/5000/6000/8000s

M5314A Drive enclosure for all EVAs

M5314A FC Drive Enclosure

AD542A

NOTE: 0D1 will appear after this part number on your sales order when factory integration is indicated.

Configuration Information and Configuration Rules

Enterprise Virtual Array Fibre Channel Expansion Panel M5314A dual FC loop 14-bay drive enclosure with mounting hardware for racks. The EVA5000 2C2D and 2C6D customers have the option of having their EVA5000 units upgraded to an EVA5000 2C12D on site by purchasing M5413A dual FC loop 14-bay drive enclosures and one EVA5000 FC Patch Panel for their 2C6D Enterprise Virtual Arrays (patch panel only applies to 2C6D and not 2C6D-A/B/C). This upgrade is performed on the customer site by HP field services. The patch panel is needed when an expansion cabinet is to be supported.
NOTE: These patch panels do not apply to -A -B or -C models.

Enterprise Virtual Array Graphite Utility Cabinet The EVA5000 customers have the option to mount supporting SAN equipment, the SAN Appliance and/or supported SAN Switches, in the utility cabinet.

EVA 42U Graphite Utility Cabinet, 60Hz (with two 0U PDUs and eight power strips)	289191-B23
EVA 42U Graphite Utility Cabinet, 50Hz (with two 0U PDUs and eight power strips)	289191-B24

Enterprise Virtual Array Expansion Cabinet Example Configurations

Expansion Cabinet Components	0C6D	0C12D	Description
289191-B23	1	1	EVA 42U Graphite Utility Cabinet, 60Hz
289191-B24	1	1	EVA 42U Graphite Utility Cabinet, 50Hz
336881-B21	1	2	Can bus to Can bus cable
344819-B21	6	12	M5314A FC Drive Enclosure
345580-B21	6	12	Cable Kit, Expansion Cab Drive Shelf

Enterprise Virtual Array Cable Management Kits The EVA5000 2C6D models employ some cable management hardware to help keep the FC cables neat and to help maintain the proper bend radius. Some of this same cable management hardware, plus some additional hardware, is being made available for use with the 42U Utility cab (or other utility cabs) where SAN switches with many FC cables can benefit from the cable management hardware. The three kits, with some helpful hints for use, are listed below.

FC Cable Routing Spools	293357-B21
NOTE: 12 cable routing spools are included in the kit. This kit should be used in conjunction with the two "rail" kits below. One kit should be sufficient for a cabinet full of switches.	
Rail-to-Rail FC Cable Routing	293358-B21
NOTE: Two rail-to-rail routing brackets and 12 Velcro ties are included in the kit. This kit should be used with FC Loop Switches kit.	
Side-Rail FC Cable Routing HW	293359-B21
NOTE: Six side rail routing brackets with eight Velcro ties are included in the kit. This kit should be used on the newer SAN switches, the 2/x switches, the new SAN Director 64, and the new HP StorageWorks Core Switch 2/64. One kit should be sufficient for up to six (6) 2/16 SAN switches or one (1) 64-port Director or Core switch.	

Configuration Information and Configuration Rules

FC Loop Switch Kit	<p>The EVA5000 2C6D or 2C12D customers have the option to convert to a 2C6D-A or 2C12-A, with the installation, by trained Service Engineers, of the FC Loop Switch kit. This kit is also mandatory when upgrading the 2C2D to 5 shelves or higher.</p> <p>EVA8000 FC Loop Switch Option</p> <p>NOTE: This kit is compatible with the EVA5000. The EVA5000 2C6D and 2C12D customers have the option to convert to a 2C6D-A or a 2C12D-A, with the installation, by trained Service Engineers, of the FC loop Switch kit. This kit is also mandatory when upgrading the 2C2D-B or 2C2D-C to 5 shelves or higher. 2U spare space is required to install the FC Loop Switch Kit.</p>	AD553A
2 Gb SFP (Small Form-Factor Profile) Transceiver	<p>2 Gb SFP Fibre Channel Transceiver Kit</p> <p>NOTE: Used on switches with SFP Ports.</p>	221470-B21
Fibre Channel Cables, 1 Gb (used between 1 Gb switches and HBAs)	<p>FC Short Wave 2-Meter Cable</p> <p>FC Short Wave 5-Meter Cable</p> <p>FC Short Wave 15-Meter Cable</p> <p>FC Short Wave 30-Meter Cable</p>	<p>234457-B21</p> <p>234457-B22</p> <p>234457-B23</p> <p>234457-B24</p>

Technical Specifications

Controller Model	HSV110	
Controller Cache	1.25 GB per controller standard	
Battery Backup for Cache	Yes, up to 96 hours	
VCS Firmware	VCS v4.0 media kit for EVA3000/5000 (dual HSV100 and HSV110 controllers)	
Host Interface	Fibre Channel Switched Fabric	
Host Ports per Controller	Dual 2 Gb FC enabled (running at 1 Gb with 1 Gb switches and HBAs)	
Drive Interface	Four 2 Gb FC-AL ports per controller in redundant pairs	
RAID Levels	Vraid0, Vraid1, Vraid5	
Maximum Disks Supported	240 per Controller Pair (168 in one cabinet, expandable to 240 with an optional expansion cabinet.)	
Non-RAID JBOD Support	No	
Fibre Channel Switches	64, 32, 16, and 8-Port Optical	
O/S Support	Windows, HP Tru64 UNIX, HP OpenVMS, SUN Solaris, IBM AIX, HP-UX, Linux, NetWare, VMware	
	NOTE: See Operating System, Cluster and High Availability Compatibility matrix above for Operating System version detail.	
Sustained I/O and MB Throughput	Up to 141K IOPS and up to 700MB/s throughput per Controller Pair	
Redundant Blowers	Yes	
Environmental Monitoring Unit	Yes. Monitors Power and Temperature	
Regulatory approvals	UL, CSA, TUV, FCC, CE MARK, CTICK, BSMI, VCCI	
Management Software	Command View EVA v4.1 is used with a server in the SAN running Microsoft Windows or the Storage Management Appliance Software v2.1 running on the HP OpenView Storage Management Appliance (SMA). http://h18006.www1.hp.com/products/storage/software/cmdvieweva/index.html	
Disk Drives, Interface	Dual-port 2 Gb FC-AL	
Power Data (Domestic/Japan) – maximum configuration	AC plug type (quantity 2)	North America – 3 wire NEMA No. L6-30R, 30 amp (208 to 240V 60Hz 30A) Europe – 3 wire, 2 pole IEC 309, 30 amp, (220 to 240V 50Hz 32A)
	Number of phases	Single
	Rated current	17A @ 200V-240V AC, 60Hz total, 4.25 A per power cord
	BTU rating	11,604 BTU per hour
	Nominal airflow	660 cubic ft/minute
	Wattage	3600 Watts maximum
	Nominal Line Voltage	North America – 208 or 230V Europe – 230V Japan – 206V
	Range Line Voltage	187 to 256V
	Line Frequency	North America 60Hz, Europe 50Hz, Japan 50 or 60 Hz

NOTE: This data represents fully populated drive shelves with 10K rpm disk drives. Other drive types may vary slightly.

Technical Specifications

		208 Volts					230 Volts				
		2C12D	2C10D	2C8D	2C6D	2C2D	2C12D	2C10D	2C8D	2C6D	2C2D
Typical	Total System Wattage	3440	2906	2426	1960	766	3408	2898	2418	1946	774
	Total System BTU/hour	11748	9925	8285	6694	2616	11639	9897	8258	6646	2644
	Input Current (A) - Typical* per line	8.8	7.5	6.3	5.1	2.0	8.0	6.9	5.8	4.7	1.9
	In Rush Current (A)	528	451	363	280	132	586	500	403	311	147
Failover Mode	Input Current (A) - Maximum per line	15.5	13.1	10.8	8.3	3.3	14.0	12.1	9.5	7.5	3.1
This data represents fully populated drive shelves with 10K rpm disk drives. Other drive types may vary slightly. Typical is described as a system in normal steady state operation. (i.e both PDU's operating normally, the array reading/writing to disk drives in a production environment.)											
Maximum Input Current							20.0 amps on 2 power cords (AC failover condition)				

Operating Environment Operating Temperature 50° to 95° F (10° to 35° C)

NOTE: Reduce rating by 1°F for each 1000 ft altitude (1.8° C/1,000 m)

Shipping Temperature 40° to 150° F (-40° to 66° C)

Humidity 10% to 90% non-condensing

Shipping Humidity 5% to 90% non-condensing

Altitude Up to 8,000 ft (2,400 m)

Air Quality Not to exceed 500,000 particles per cubic foot of air at a size of 0.5 micron or larger

Physical Dimensions	Height in (cm)	Width in (cm)	Depth in (cm)	Max Weight lb (kg)	Req. Front Clearance in (cm)	Req. Rear Clearance in (cm)
EVA5000 2C2D-C (42U Graphite cab)	78.75 (200.03)	23.7 (60.2)	39.1 (99.3)	609 (277)	30 (76.2)	30 (76.2)
EVA5000 2C6D-C (42U Graphite cab)	78.75 (200.03)	23.7 (60.2)	39.1 (99.3)	917 (416)	30 (76.2)	30 (76.2)
EVA5000 2C12D-C (42U Graphite cab)	78.75 (200.03)	23.7 (60.2)	39.1 (99.3)	1349 (612)	30 (76.2)	30 (76.2)
EVA 5000 0C6D-C (42U Graphite cab)	78.75 (200.03)	23.7 (60.2)	39.1 (99.3)	817 (371)	30 (76.2)	30 (76.2)
EVA 5000 0C12D-C (42U Graphite cab)	78.75 (200.03)	23.7 (60.2)	39.1 (99.3)	1249 (567)	30 (76.2)	30 (76.2)
EVA 5000 Utility Cab (42U Graphite cab)	78.75 (200.03)	23.7 (60.2)	39.1 (99.3)	307 (140)	30 (76.2)	30 (76.2)
M5314A Drive Enclosure	5.25 (13.34)	19.0 (42.26)	20 (50.8)	71 (32.21)	n.a.	n.a.

Technical Specifications

Shipping Dimensions	Height in (cm)	Width in (cm)	Depth in (cm)	Max Loaded Weight (with packaging) lb (kg)
EVA 5000 2C2D-C (42U Graphite cab)	85.38 (216.9)	36.0 (91.44)	48.0 (121.92)	802 (365)
EVA 5000 2C6D-C (42U Graphite cab)	85.38 (216.9)	36.0 (91.44)	48.0 (121.92)	1110 (504)
EVA 5000 2C12D-C (42U Graphite cab)	85.38 (216.9)	36.0 (91.44)	48.0 (121.92)	1542 (700)
EVA 5000 Utility Cab (42U Graphite cab)	85.38 (216.9)	36.0 (91.44)	48.0 (121.92)	500 (227)
M5314A Drive Enclosure Kits	34.25 (87)	12.25 (31.12)	34.25 (87)	96 (43.54)
FC Loop Switch Kit (for 2C6D or 2C12D)	32.0 (81.28)	25.0 (63.5)	22.1 (56.1)	76 (34.5)
FC Cable Routing Spools	21.1 (53.6)	11.4 (28.96)	3.8 (9.65)	3 (1.4)
Rail-to-Rail FC Cable Routing	21.1 (53.6)	11.4 (28.96)	3.8 (9.65)	3 (1.4)
Side-Rail FC Cable Routing	14.6 (37.08)	8.8 (22.4)	4.0 (10.16)	2 (0.9)

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