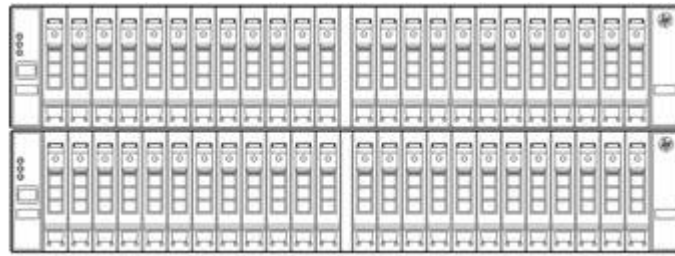


Overview

HP 3PAR StoreServ 7450 Storage is the only all-flash array in the industry that delivers the performance advantages of a purpose-built, flash-optimized architecture without compromising resiliency, efficiency, or data mobility. A flash-optimized architecture reduces the performance bottlenecks that can choke general-purpose disk arrays that have been retrofitted with solid-state disks (SSDs). However, unlike other purpose-built flash arrays, the 3PAR StoreServ 7450 doesn't require you to introduce an entirely new architecture into your environment to achieve flash-optimized performance. As a result, you don't have to sacrifice rich, Tier-1 data services, quad 4-node resiliency, advanced functionality, or enterprise-class efficiency, or seamless data mobility between systems.

HP 3PAR StoreServ 7450 storage delivers performance without compromises.



HP 3PAR StoreServ 7450 Storage

What's New

- HP 3PAR Thin Deduplication Software provides efficient, silicon-based inline deduplication that increases capacity efficiency, protects flash performance, and extends flash media life*
- HP 3PAR Thin Clones Software increases capacity efficiency for server virtualization environments by instantly creating virtual machine clones without increasing storage capacity consumption*
- New higher capacity and lower cost 1.92 TB cMLC available
- The HP 3PAR 6-Nines Guarantee ensures 99.9999% data availability when you purchase any new 4-node HP 3PAR StoreServ storage array
- Standard Five-year warranty on 480GB and 920GB MLC and 1.92 TB cMLC SSDs to protect your flash storage investments
- 3PAR Online Import feature enhancement to add support for data migration from legacy EMC CX4 or EMC VNX Storage using an easy-to-use and scriptable command interface tool.
- 3PAR Peer Motion feature enhancement to add support for orchestration of 3PAR Peer Motion using HP 3PAR Peer Motion Utility, which is an easy-to-use and scriptable command interface tool.

NOTE:

*Will be available in a future release, refer to the HP 3PAR Software Products QuickSpecs document for more details

Overview

Summary	3PAR StoreServ 7450
Number of Controller Nodes	2 or 4
HP 3PAR Gen4 ASICs	2 or 4
Processors	2 - 4 eight-core 2.3 GHz
Cache	64 - 128 GB
Maximum Host Ports	24 ports
Fibre Channel Host Ports	4 - 24 ports
10Gb/s iSCSI and FCoE Host Ports	0 - 8 ports
Maximum Initiators Supported	1024 or 2048
2U Controller Enclosure SAS Drive Capacity	24
Number of Solid State Drives	8 ¹ - 240
Raw Capacity (approx.) ²	0.8 - 460.8 TB ³

Capacity Details	3PAR StoreServ 7450
RAID Levels	RAID 0, 1, 5, 6
RAID 5 Data to Parity Ratios	2:1 - 8:1
RAID 6 Data to Parity Ratios	4:2, 6:2, 8:2, 10:2, 14:2
Drive Capacities (approximate GB ³) (RAID levels, parity ratios, and drive capacities all mixable within the same Storage System)	100GB SSD4, 200GB SSD, 400GB SSD, 480GB SSD, 920GB SSD, 1.92TB cMLC SSD
Number of Add-on Drive Enclosures (Each Drive Enclosure holds up to 24 drives in 2U for small form factor drives and 4U for large form factor drives)	0 - 8 enclosures

NOTES:

¹ The minimum drive quantity is permitted as long as the total raw capacity is at least 0.8 TB.

² Maximum raw capacity currently supported with solid state drives.

³ For storage capacity, 1 GB = 1,000,000,000 bytes and 1 TB = 1,000 GB.

⁴ SSDs are Solid State Drives.

NOTE: Specifications are subject to change without notice.

Host OS Support

Citrix® XenServer® | HP-UX® | HP OpenVMS | IBM® AIX®

Microsoft® Windows® Server, including Microsoft® Hyper-V™

Oracle® Linux® (UEK and RHEL compatible kernels) | Oracle® Solaris

Red Hat® Enterprise Linux® | Red Hat® Enterprise Virtualization

SUSE® Linux Enterprise | Ubuntu | VMware vSphere™

For the latest information on supported operating systems refer to Single Point of Connectivity Knowledge for HP Storage Products (SPOCK): <http://www.hp.com/storage/spock>

Features

Accelerated

HP 3PAR StoreServ 7450 Storage provides hundreds of thousands of IOPS to allow the highest level of performance for any application environment. With 3PAR system wide striping, data and I/O for each volume are striped widely across all system resources including CPUs, Ports, Cache and Drives. This wide striping enables the system to deliver accelerated performance levels (all resources supporting each volume) while avoiding any single point of bottleneck. Even a small volume can leverage the performance of hundreds of flash devices and all the system's controller nodes for optimal performance. In addition, the massively parallel architecture allows 3PAR to serve the IOPS at sub-millisecond latency levels, enabling high quality IOPS for each of the applications running on HP 3PAR 7450 storage system.

Quality of Service - With HP 3PAR Priority Optimization, you can consolidate multiple workloads on high-performing HP 3PAR 7450 Storage system without compromising on performance of their key applications. A highly automated approach allows you to quickly and easily assign a minimum goal for I/O per second, bandwidth and latency to protect mission critical applications in enterprise environments. Or assign performance thresholds on workloads with lower service level requirements. This capability allow you to consolidate more applications on less infrastructure while delivering predictable performance to meet even the most demanding service level requirements.

Efficient

Reduce capacity requirements and extend flash media lifespan to lower costs. Stretch your Flash media investment for improved return on investment. 3PAR StoreServ is the only platform to guarantee to reduce your capacity requirements by 50%. 3PAR StoreServ can also extend the life of your Flash media by providing additional media endurance.

Get thin and stay thin - Thin technologies unique to the HP 3PAR StoreServ family can reduce capacity requirements by 50%. Purchase only what you need, as you need it so you can focus resources on growing your business, not maintaining your storage. Additionally, the HP 3PAR ASIC with Thin Built In features an efficient, silicon-based zero-detection mechanism. This unique hardware capability gives HP 3PAR StoreServ Storage the power to remove allocated but unused space without impacting performance.

Data center virtualization - Increase virtualization return on investment. Double virtual machine density on your physical servers, spend up to 90 percent less time managing your storage, and support your virtualization deployment with 50 percent less storage capacity. HP 3PAR StoreServ is built from the ground up to deliver performance that exceeds the demands of virtualized data centers along with transformative levels of simplicity, agility, and efficiency.

Do more with less -HP 3PAR StoreServ 7450 Storage delivers hundreds of thousands of IOPS at under 1ms latency with less equipment to house, far fewer disks to power and cool, less hardware to retire after it has reached its end of life, and a reduced carbon footprint.

Bulletproof

Eliminate downtime for performance-critical applications - A unique suite of persistent technologies power HP 3PAR StoreServ 7450 Storage in delivering high availability and Tier 1 resiliency to performance critical applications. Achieve higher service levels for more users and applications with less infrastructure. Deliver higher performance levels, greater availability, and next-generation functionality to multiple user groups and applications from a single storage system.

High Availability - With the Get 6-Nines Guarantee, HP ensures 99.999% data availability with all HP 3PAR StoreServ 7450 systems giving you the peace of mind that your performance critical applications are back with Tier-1 resiliency Intelligent data striping across all available enclosures provides HA Cage, the ability to maintain availability even when a whole drive enclosure fails. HP 3PAR Persistent Cache in four node configurations eliminates performance impacts that result from unplanned component failures, making it a must-have for maintaining service levels in the virtual data center-a feature that you can't get from any all-flash storage platform built with 2-controllers architecture.

Features

Futureproof

Move data seamlessly across systems and sites to balance performance and cost - HP 3PAR StoreServ platform is autonomic (or effortless), and delivers polymorphic simplicity from midrange to high end to flash. Federated data mobility is yet another example of Polymorphic Simplicity. Simply and non-disruptively shift data between any model HP 3PAR StoreServ system without additional management layers or appliances. This helps balance cost and performance to meet service-level requirements at the lowest cost while increasing business agility and minimizing risk. HP 3PAR Peer Motion enables you to move applications that require flash-performance on 7450 at the right time without impacting its availability. This seamless application movement on and off of flash storage enables you to put your investment into flash technology to its most optimum usage. Simply and non-disruptively shift data between any model HP 3PAR StoreServ system without additional management layers or appliances.

Service and Support, HP Care Pack, and Warranty Information

Warranty

3 Year, On-site Warranty Service for hardware components. 7x24 4-hour remote response with next business day on-site response

The warranty on the following HP 3PAR StoreServ 7000 SSD product numbers is five years, parts only:

HP 3PAR StoreServ M6710 480GB 6G SAS SFF(2.5in) MLC 5yr Wty Solid State Drive E7W54B

HP 3PAR StoreServ M6720 480GB 6G SAS LFF(3.5in) MLC 5yr Wty Solid State Drive E7W55B

HP 3PAR StoreServ M6710 920GB 6G SAS SFF(2.5in) MLC 5yr Wty Solid State Drive E7W24B

HP 3PAR StoreServ M6720 920GB 6G SAS LFF(3.5in) MLC 5yr Wty Solid State Drive E7W25B

HP 3PAR StoreServ M6710 1.92TB 6G SAS SFF(2.5in) cMLC 5yr Wty Solid State Drive E7Y57A

Warranty on other HP 3PAR StoreServ 7000 SSDs excluding the ones listed above is 3 years, parts only.

HP warrants only that the Software media will be free of physical defects for a period of ninety (90) days from delivery.

For more information about HP's Global Limited Warranty and Technical Support, visit:

<http://www.hp.com/products/storageworks/warranty>

Service and Support

Technology Services for increased uptime, productivity and ROI

Trust HP storage technology experts for every level of service and support. Our integrated portfolio of services for storage help customers reduce costs, optimize data, streamline storage management, and improve backup and recovery. Capitalizing on HP Storage Systems' capabilities requires a service partner who understands your increasingly complex environment. Team with the people who know HP infrastructure hardware and software best—the experienced professionals at HP Services.

Protect your business beyond warranty

Warranty protects against manufacturer defects, however warranty uplifts, such as HP Care Pack Services protect the business-by reducing downtime risks and providing operational consistency for mission-critical and standard business computing.

NOTE: SSDs have a limited number of writes that can occur before reaching the SSD's write endurance limit. This limit is generally high enough so wear out will not occur during the expected service life of an HP 3PAR StoreServ under the great majority of configurations, IO patterns, and workloads. HP 3PAR StoreServ tracks all writes to SSDs and can report the percent of the total write endurance limit that has been used. This allows any SSD approaching the write endurance limit to be proactively replaced before they are automatically spared out. An SSD has reached the maximum usage limit once it exceeds its write endurance limit. Following the product warranty period, SSDs that have exceeded the maximum usage limit will not be repaired or replaced under HP support contracts.

What HP Storage Technology Services can do for you

HP Storage Technology Services can help you design, deploy, test, integrate, support, and manage IT and infrastructure solutions. HP storage lifecycle support services offers a full spectrum of customer care—from technology support to complex migrations to complete managed services.

Choose the right level of support, deployment and integration services

HP support recommendations are designed to help you enhance technology operations and lower

Service and Support, HP Care Pack, and Warranty Information

risk-and make it easier for you to seek the right balance between affordability and service-level commitments. Depending on your individual support needs, choose from three levels of care that cover the entire lifecycle to better address your needs—Optimized Care, Standard Care, and Basic Care. If none of our support recommendations meet your needs, we can tailor a service solution for your unique support requirements. Only HP brings together deep expertise, proactive and business critical support and a strong partner network—together with, a full set of infrastructure services designed to power a Converged Infrastructure

Optimized Care - delivers best performance and stability through deployment and proactive management practices

HP Critical Service - This service delivers 24x7 monitoring of your environment, making it the right choice when uninterrupted uptime is essential. We implement improvement projects to mitigate risks and reduce incidents to maximize uptime. If outages do occur, they will be addressed immediately through access to our dedicated critical support escalation resources, with a six-hour call-to-repair commitment from our mission-critical call center.

Additional Option:

10 Proactive Select credits per year per array - HP Proactive Select is a flexible way to purchase services to fit your particular environment or situation. Working with an HP Account Support Manager, you select a package of services in the form of services credits that include proactive services spanning many technologies and processes, such as on-site firmware upgrades, health checks, assessments, and education. You tailor the service delivery to improve time to production, optimize performance, or build in continuous improvements.

Standard Care - maintains high level of uptime, along with expert help to cut the cost and complexity of implementation and support

HP Proactive Care 24x7- for a higher return on your storage investment, Proactive Care delivers hardware and software support services designed specifically for your technology; rapid access to Advanced Solution Center Specialists plus, Firmware/Software management and best practice advice. Customers can optimize the return on their IT investment and realize the advantage of running their business critical applications on virtualized infrastructure. Plus, HP Proactive Select 20 credits per year, select from an extensive menu of consultancy and technical services, such as onsite firmware upgrades, health checks, assessments, and education.

Additional Option:

HP Proactive Care Personalized Support - The HP Proactive Care Personalized Support option allows for an increased personalization of the Proactive Care support experience through the assignment of an Account Service Manager (ASM) who provides IT best practice advice to help address IT issues and projects. The ASM will develop an annual support plan, provide four days of operational and technical advice, and conduct semi-annual support reviews to ensure the Proactive Care service deliverables address the customer's priorities. This option is only available for Proactive Care customers and may be purchased once per environment.

HP Personalized Support Additional Day - Customers who require more time than is provided by the Personalized Support option can elect to purchase additional days through the Personalized Support Additional Day option. The time may be used to provide extra support reviews and/or more operational & technical advice.

Basic Care - Minimum recommended support

HP Proactive Care 24x7 - for a higher return on your storage investment, Proactive Care delivers hardware and software support services designed specifically for your technology; rapid access to Advanced Solution Center Specialists plus, Firmware/Software management and best practice advice. Customers can optimize the return on their IT investment and realize the advantage of running their business critical applications on virtualized infrastructure. Plus, 10 credits per year, select from an extensive menu of consultancy and technical services, such as onsite firmware upgrades, health checks, assessments, and education.

Additional Option:

HP Proactive Care Personalized Support - The HP Proactive Care Personalized Support option allows for an increased personalization of the Proactive Care support experience through the assignment of an Account Service Manager (ASM) who provides IT best practice advice to help

Service and Support, HP Care Pack, and Warranty Information

address IT issues and projects. The ASM will develop an annual support plan, provide four days of operational and technical advice, and conduct semi-annual support reviews to ensure the Proactive Care service deliverables address the customer's IT priorities. This option is only available for Proactive Care customers and may be purchased once per environment.

HP Personalized Support Additional Day - Customers who require more time than is provided by the Personalized Support option can elect to purchase additional days through the Personalized Support Additional Day option. The time may be used to provide extra support reviews and/or more operational & technical advice.

Implementation

Installation:

Whichever level of care you select, consider our Installation and Startup Services for a smooth implementation.

HP 3PAR StoreServ 7000 Storage Installation and Startup Service - For smooth startup, this service provides you with deployment of your HP 3PAR StoreServ 7000 Storage, ensuring proper installation into your storage environment and helping you realize the maximum benefit from your storage investment.

<http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA4-2568ENW.pdf>

Related Services

HP Storage Data Migration Service- HP expertise and tools help you migrate data across your data center or around the globe. Take the burden of migration off your shoulders and put it in the capable hands of expert HP storage migration consultants. Our proven approach helps orchestrate the complete data migration and consolidation process while maintaining consistent data availability during the transfer process.

<http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA3-0774ENW.pdf>

HP Enhanced Implementation Service for SANs - HP delivers complete design and implementation services for Fibre Channel, FCoE, FCIP, SAS, and iSCSI storage area network (SAN) connectivity components. This service includes three levels of support based on the type of environment, ranging from simple to more complex. A trained service specialist guides the implementation of the storage switches in the SAN environment according to HP quality standards.

<http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-8527EN.pdf>

HP Data Replication Solution Service for 3PAR Virtual Copy- HP Data Replication Solution Service for HP 3PAR Virtual Copy Software helps create, manage and configure local replication data mirroring and snapshot capabilities of 3PAR storage systems. This service enables snapshots and mirroring to facilitate data restores, minimize downtime for backups, perform application testing, support data mining use with decision-support tools.

<http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA4-0217ENW.pdf>

HP Data Replication Solution Service for 3PAR Remote Copy- HP Data Replication Solution Service for 3PAR Remote Copy Software configures real-time data mirroring between local and remote 3PAR storage systems to safeguard critical business information. Provides scalable deployment of HP Remote Copy Software real-time data mirroring between a local and a remote 3PAR storage system.

<http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA3-8627ENW.pdf>

<http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA0-9431ENW.pdf>

HP 3PAR 7000 Replication Software Suite Installation and Startup Service - Provides implementation of the HP 3PAR 7000 Replication Software Suite product. Replication Suite includes 3PAR Remote Copy, 3PAR Virtual Copy, and 3PAR Peer Persistence. The service is designed to help get HP 3PAR 7000 Replication Software Suite up and running quickly and to provide a demonstration of the product's key features using sample or test data only.

<http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA4-2570ENW.pdf>

Service and Support, HP Care Pack, and Warranty Information

HP 3PAR Peer Persistence Software Installation and Startup Service - Provides implementation of the HP 3PAR Peer Persistence Software product. The service is designed to help get HP 3PAR Peer Persistence up and running quickly and to provide a demonstration of the product's key features using sample or test data only.

<http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA4-2772ENW.pdf>

HP 3PAR Adaptive Optimization Policy Implementation Service - HP 3PAR Adaptive Optimization Policy Implementation Service provides analysis, recommendations, and implementation of HP 3PAR Adaptive Optimization policies to enable storage tiering using data collected from the HP 3PAR Storage system over time. With the assistance of a designated IT storage administrator, a service specialist works with the customer to implement Adaptive Optimization policies on the HP 3PAR Storage system to help deliver service level optimization for virtual and cloud data centers while reducing cost, increasing agility and minimizing risk.

<http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA2-3842ENW.pdf>

HP Storage Virtual Volume Design and Implementation Service- When redeploying an HP StorageWorks Disk Array, the HP Virtual Volume Design and Implementation Service provides the necessary activities required to design and implement a new virtual volume configuration.

<http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA2-3764ENN.pdf>

HP Thin Volume Conversion Service - Provides evaluation and execution of conversion from standard to thin provisioned virtual volumes for HP 3PAR Storage. A service specialist advises the customer on HP thin provisioning best practices, provides evaluation of potential disk capacity savings if target virtual volumes are converted, and plans and implements thin conversion processing. The service leverages 3PAR thin provisioning capabilities to help optimize storage capacity, reduce cost, increase agility and maintain performance.

<http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA2-3842ENW.pdf>

HP Performance Analysis Service for HP Disk Arrays - The service provides data collection, detailed I/O analysis and enhancement recommendations for HP 3PAR StoreServ Storage disk arrays, HP EVA P6000 Storage disk arrays and HP XP P9000 Storage disk arrays. HP Performance Analysis Service for HP Storage Disk Arrays provides a single engagement concerning the performance of a single HP 3PAR StoreServ Storage disk array, HP EVA P6000 Storage disk array and HP XP P9000 Storage disk array

<http://h20195.www2.hp.com/V2/GetPDF.aspx/5982-6668EN.pdf>

HP 3PAR Health Check Service- The HP 3PAR Health Check service is delivered as a single engagement, providing data collection, analysis, report creation, and a briefing session concerning the performance of a single HP 3PAR StoreServ Storage System. This health check service is best for HP 3PAR StoreServ Storage Systems that have been installed and are in normal production mode. It can also be used to establish a baseline for future reference to improve the effective use of your storage system.

<http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA4-3225ENW.pdf>

HP 3PAR Storage Assessment Service- The HP 3PAR Assessment Service is delivered remotely for a single HP 3PAR StoreServ Storage System and does not include performance analysis, testing, or modeling. The service requires that remote monitoring be enabled on the HP 3PAR StoreServ Storage System being assessed. The assessment findings are compared to HP best practices and a summary report is provided that includes recommendations intended to improve availability and ongoing management of your HP 3PAR StoreServ Storage System.

<http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA3-2346ENW.pdf>

HP 3PAR Storage Rebalance Service- The HP 3PAR Rebalance Service helps balance data across your HP 3PAR StoreServ Storage to take advantage of the capabilities of the array architecture. The service provides analysis, planning, and implementation of data movement and/or physical movement of drive magazines within the array.

<http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA4-0280ENW.pdf>

Service and Support, HP Care Pack, and Warranty Information

HP EVA to 3PAR Acceleration Service - The HP EVA to 3PAR Acceleration Service can help guide you or even execute data migration activities on your behalf that can not only optimize, but provide OPEX and CAPEX savings as a result of your journey from EVA to 3PAR. This service provides customers with an alternative DIY ("do-it-yourself") data migration option with guidance from TS Storage migration specialists. With the help of migration experts, this service allows customers to execute an EVA to 3PAR data migration at their own pace and lowered cost. <http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA4-4234ENW.pdf>

HP 3PAR Dynamic Optimization I&S - For Dynamic Optimization, implementation by HP of tasks required to balance the HP 3PAR storage system; the service provides the Customer with a product overview, advice, and suggested strategies for use of Dynamic Optimization, and extended/ongoing analysis and/or implementation of Dynamic Optimization strategies can be accommodated at additional cost

The Service has further been described in the HP 3PAR 7000 Software Installation and Startup Service Datasheet: <http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA4-2569ENW.pdf>

For more information www.hp.com/services/storage

To learn more on HP Storage Services, please contact your HP sales representative or HP Authorized Channel Partner

HP Care Pack Services are sold by HP and HP Authorized Service Partners:

- Services for customers purchasing from HP or an enterprise reseller are quoted using HP order configuration tools.
- Customers purchasing from a commercial reseller can find HP Care Pack Services at: www.hp.com/go/lookuptool

Configuration

Step 1 - Choose a Base configuration

HP 3PAR StoreServ 7450 configurations start with the selection of the Base. The Base includes controller nodes, bays for small form factor drives, and PCIe slots for host adapter cards. SAN Kits are also considered base configurations. The SAN Kits simplify ordering for SAN configurations with the array and extend the switch warranty to 3-years by including switches with an HP 3PAR StoreServ 7450 Storage Base.

HP 3PAR StoreServ 7450 Base Configurations

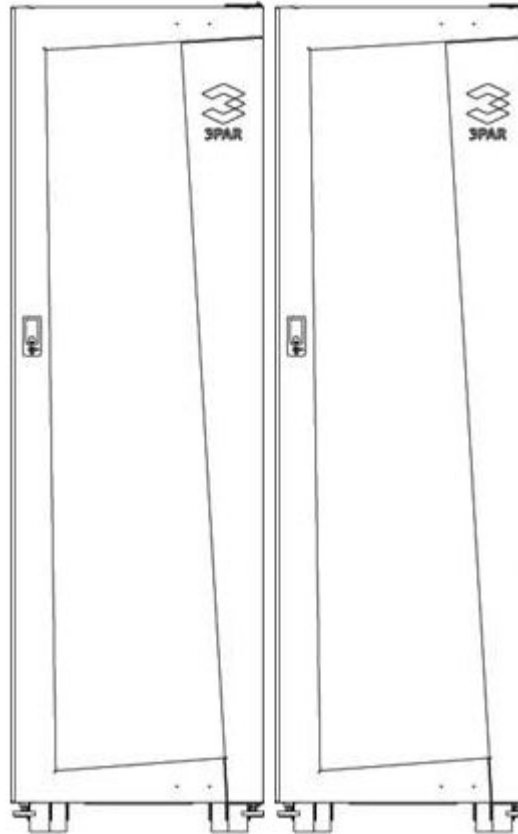
HP 3PAR StoreServ 7450 2-node Base	C8R35A
HP 3PAR StoreServ 7450 4-node Base	C8R37A
HP 3PAR StoreServ 7450 2-node Base for Storage Centric Rack	E7W52A
HP 3PAR StoreServ 7450 4-node Base for Storage Centric Rack	E7W53A

- A minimum of one (1) configuration base must be ordered.
- The HP 3PAR StoreServ 7450 2-node base configuration includes (2) controller nodes, 64 GB of cache, (24) small form factor drive bays, (4) built-in 8 Gb/sec FC ports, (4) 8Gb shortwave FC SFP, (2) PCIe adapter slots for host adapter cards - one slot per node, (4) 2m SAS cables, (2) 1U rack filler panels to reserve 2U of rack space above the 2-node Storage Base for a future upgrade to a 4-node configuration, (1) mounting rail kit, and power cords.
- The HP 3PAR StoreServ 7450 4-node base configuration includes (4) controller nodes, 128 GB of cache, (48) small form factor drive bays, (8) built-in 8 Gb/sec FC ports, (8) 8Gb shortwave FC SFP, (4) PCIe adapter slots for host adapter cards - one slot per node, (8) 2m SAS cables, (4) node link cables, (2) mounting rail kits, and power cords.
- All base configurations include built-in Gigabit Ethernet ports for management and Remote Copy over IP.
- ***Storage Centric Configuration**
 - The Storage Centric rack versions of HP 3PAR StoreServ 7450 are for CTO (factory Configure-To-Order) only. With a Storage Centric configuration, the storage system gets placed in the center of the rack so that future expansion of that storage system becomes easier.
 - In Storage Centric configurations, non-3PAR components, with the exception of certain StoreFabric Storage Networking switches, if added to the same order, get placed in a separate rack.

The following drawings show example configurations for a HP 3PAR StoreServ 7450 4-node in Storage Centric and non-Storage Centric configurations

HP 3PAR StoreServ 7450 4N Storage Centric configuration

Configuration



StoreServ 7450 4-node Storage system in a storage centric configuration in a HP Intelligent Series Rack

StoreServ 7450 4-node Storage system in a non-storage centric configuration in a HP Intelligent Series Rack

HP 3PAR StoreServ 7450 Upgrade Controller Node Pair

Use the HP 3PAR StoreServ 7450 Upgrade Node Pair to convert an existing previously installed HP 3PAR StoreServ 7450 2-node Storage Base into a 4-node configuration.

HP 3PAR StoreServ 7450 Upgrade Node Pair

C8R36A

- Used to upgrade the C8R35A HP 3PAR StoreServ 7450 2-node Storage Base to a 4-node configuration.
- One (1) pair of controller nodes beyond the base configuration is supported on the 3PAR StoreServ 7450.
- The 3PAR StoreServ 7450 Upgrade Node Pair includes (2) controller nodes, 64 GB of cache, (24) small form factor drive bays, (4) built-in 8 Gb/sec FC ports, (4) 8Gb shortwave FC SFP, (2) PCIe adapter slots for host adapter cards - one slot per node, (4) 2m SAS cables, (4) node link cables, (1) mounting rail kit, and power cords
- The upgrade node pair includes built-in Gigabit Ethernet ports for management and Remote Copy over IP.

Configuration

Step 2 - Choose Host Adapter

Host adapters can be ordered separately to be installed in the field or they can be factory configured into controller nodes. Host adapter cards provide the array with additional FC ports or with 10Gb/sec iSCSI/FCoE ports. The additional FC ports can be used for connection to hosts or used to connect to other HP 3PAR StoreServ Storage systems in a Remote Copy relationship. The iSCSI/FCoE ports permit host connection in iSCSI and FCoE environments.

NOTE: Host adapters used with HP 3PAR StoreServ 7450 are the same as the ones used with HP 3PAR StoreServ 7000 family.

HP 3PAR StoreServ 7000 Host Adapters

HP 3PAR StoreServ 7000 4-port 8Gb/sec Fibre Channel Adapter

QR486A

HP 3PAR StoreServ 7000 2-port 10Gb/sec iSCSI/FCoE Adapter

QR487A

- Used in the Storage Base products (C8R35A, and C8R37A) and the Upgrade Node Pair (C8R36A).
- Because the Storage Base products and the Upgrade Node Pair include built-in FC ports, the host adapter cards are optional.
- QR486A and QR487A include one adapter card each. Adapters must be purchased in pairs.
- The QR486A includes (4) 8 Gb/s shortwave FC SFPs and the QR487A includes (2) 10 Gb/s SFPs.
- Each node in a node pair (a node pair is composed of the two controller nodes in a single 2U enclosure) must have the same number and type of adapters. FC and iSCSI/FCoE adapters may not be intermixed in a node pair.
- The 4 ports of the FC adapter can be individually configured to connect to a host or to a remote array in an RC configuration.
- The two ports of the iSCSI/FCoE adapter can be individually configured by the user as iSCSI or FCoE.

Permitted Adapter Configurations										
Product	Nodes	A*	B*	C*	D	E	F*	G	H*	I*
C8R35A	Node 0	Empty	FC	iSCSI/FCoE						
	Node 1	Empty	FC	iSCSI/FCoE						
C8R36A	Node 2	Empty	FC	iSCSI/FCoE						
	Node 3	Empty	FC	iSCSI/FCoE						
C8R37A	Node 0	Empty	FC	iSCSI/FCoE	Empty	Empty	FC	iSCSI/FCoE	FC	iSCSI/FCoE
	Node 1	Empty	FC	iSCSI/FCoE	Empty	Empty	FC	iSCSI/FCoE	FC	iSCSI/FCoE
	Node 2	Empty	Empty	Empty	FC	iSCSI/FCoE	iSCSI/FCoE	FC	FC	iSCSI/FCoE
	Node 3	Empty	Empty	Empty	FC	iSCSI/FCoE	iSCSI/FCoE	FC	FC	iSCSI/FCoE

* Factory default configurations for given quantities of adapters.

NOTE: If the configuration includes Remote Copy over Fibre Channel it is recommended that optional Fiber Channel HBAs are purchased as the built in ports will not offer sufficient connectivity.

Configuration

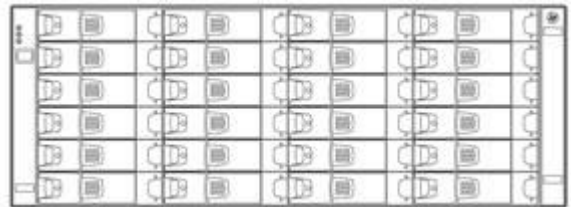
Step 3 - Choose Drive Enclosures

Add drive enclosures to expand the configuration and to add large form factor drives to the configuration. Drive enclosures can be ordered separately for installation in the field, or they can be factory configured in a rack. Drive enclosures are optional. Because the Storage Base products and the Upgrade Node Pair include small form factor drive bays, the minimum configuration does not require any additional drive enclosures. For larger configurations, attach drive enclosures. Each drive enclosure includes 24 drive bays. The HP 3PAR StoreServ 7450 supports up to four (4) added drive enclosures per node pair. The two drive enclosure types can be intermixed in a single array.

NOTE: Drive enclosures used with HP 3PAR StoreServ 7450 are the same as the ones used with HP 3PAR StoreServ 7000 family.



HP M6710 2.5 inch 2U SAS Drive Enclosure



HP M6720 3.5 inch 4U SAS Drive Enclosure

Drive Enclosures

HP M6710 2.5 inch 2U SAS Drive Enclosure

QR490A

HP M6720 3.5 inch 4U SAS Drive Enclosure

QR491A

- Each drive enclosure includes 24 drive bays, (2) IO modules, (2) 1m SAS cables, (1) mounting rail kit, and power cables.
- The M6710 2U drive enclosure provides 24 SFF drive bays arranged in a single row.
- The M6720 4U drive enclosure provides 24 LFF drive bays, arranged in four (4) columns of six (6) slots each.
- Minimum of zero (0) drive enclosures, maximum of four (4) attached to C8R35A.
- Minimum of zero (0) drive enclosures, maximum of (8) attached to C8R37A.
- Drive enclosures are connected in daisy chains from the SAS ports of the controller nodes.
- The best practice is to balance the drive enclosures across the SAS ports, remembering that the controller node enclosures include (24) drives attached to the SAS port labeled DP-1.
- The best practice when including LFF and SFF drive enclosures in the same array is to arrange them in the rack so that all of the 2U enclosures that belong to one node pair are together and all of the 4U enclosures for that node pair are together. When connecting the backend SAS cables, intermix the M6710 and M6720 enclosures on each SAS port.
- With a four node configuration, the best practice is to attach the same number of drive enclosures to each node pair.
- To achieve highest availability in multi-enclosure configurations, configure a minimum of two (2) enclosures per node pair for RAID 1, a minimum of four (4) enclosures per node pair if RAID 5 is included, and a minimum of three (3) enclosures per node pair if RAID 6 is included. Include enclosures containing node pairs in the count with the M6710 enclosures.
- Drive bays that are not filled with a drive must be covered with a drive blank to preserve proper air flow.
- If future capacity upgrades are expected, include enough Drive Enclosures so that there are some empty bays in each enclosure after all drives are added.

Step 4 (a) - Choose Encryption (if needed)

Configuration

At the time of initial system purchase, it must be decided if that system is supposed to be an encrypted system. Encryption functionality, once turned ON, cannot be turned OFF on a given StoreServ system. If an encrypted system is desired, only encrypted drives shall be included on the order along with the encryption LTU.

The HP 3PAR StoreServ Data Encryption enables the encryption for all the data that is stored on the internal drives of the 3PAR StoreServ Storage. The 3PAR Encryption solution encrypts the data so that data cannot be read off a drive that is removed from the 3PAR Storage. In the event of a failure of the drive or the theft of a drive, the proper authentication key is required to be entered to gain access to the data stored within the drive. This method of encryption allows the user the comfort knowing all data contained on the drive is protected against internal and external risks. Organizations within the healthcare industry, financial services and public sectors are increasingly required to protect their sensitive information (patient records, personal identifying information, and intellectual property) from threats like unauthorized insider access, accidental disclosure, or theft.

NOTE: Encryption Drives used with HP 3PAR StoreServ 7450 are the same as the ones used with HP 3PAR StoreServ 7000 family.

HP 3PAR StoreServ Data Encryption

HP 3PAR StoreServ 7450 Data at Rest Encryption LTU	BC985A
HP 3PAR StoreServ 7450 Data at Rest Encryption E-LTU	BC985AAE
HP 3PAR StoreServ M6710 400GB 6Gb SAS SFF(2.5-in) MLC Encrypt Solid State Drive	C8R57A

- A StoreServ system can either have encrypted or non-encrypted drives, not a mixture of both. So, if encrypted drive(s) listed above have been chosen for a configuration, you may skip directly to step 5.
- All configuration rules listed under step 4 (b) apply to an encrypted system as well.
- Only one data encryption license (LTU) is required to enable encryption on a 3PAR StoreServ system.
- Once encryption is enabled on the 3PAR StoreServ Storage, it cannot be disabled.
- The local key manager is included in the 3PAR Inform OS. There is not a separately orderable partnumber for the local key manager

Step 4 (b) - Choose Drives

Drives are orderable at the time the array is purchased, or can be added in the future when additional capacity is required. Unlike other HP 3PAR StoreServ Storage systems where drives are sold in magazines of four, HP 3PAR StoreServ 7000 drives are sold as single drives. Note that these drives are only compatible with the M6710 and M6720 drive enclosures.

NOTE: SSD Drives used with HP 3PAR StoreServ 7450 are the same as the ones used with HP 3PAR StoreServ 7000 family.

HP 3PAR StoreServ 7000 SAS SSD Drives

HP M6710 100GB 6G SAS SFF (2.5-inch) SLC Solid State Drive	QR502A
HP M6710 200GB 6G SAS SFF (2.5-inch) SLC Solid State Drive	QR503A
HP M6720 100GB 6G SAS LFF (3.5-inch) SLC Solid State Drive	QR506A
HP M6720 200GB 6G SAS LFF (3.5-inch) SLC Solid State Drive	QR507A
HP 3PAR StoreServ M6710 400GB 6Gb SAS SFF(2.5in) MLC Solid State Drive	QR504A
HP 3PAR StoreServ M6720 400GB 6Gb SAS LFF(3.5in) MLC Solid State Drive	QR508A
HP 3PAR StoreServ M6710 480GB 6G SAS SFF(2.5in) MLC 5yr Wty Solid State Drive	E7W54B
HP 3PAR StoreServ M6720 480GB 6G SAS LFF(3.5in) MLC 5yr Wty Solid State Drive	E7W55B
HP 3PAR StoreServ M6710 920GB 6G SAS SFF(2.5in) MLC 5yr Wty Solid State Drive	E7W24B
HP 3PAR StoreServ M6720 920GB 6G SAS LFF(3.5in) MLC 5yr Wty Solid State Drive	E7W25B

Configuration

HP 3PAR StoreServ M6710 1.92TB 6G SAS SFF(2.5in) cMLC 5yr Wty Solid State Drive

E7Y57A

- The minimum recommended initial quantity is eight (8) drives* per node pair
- Minimum upgrade quantity is 4 drives per node pair or 2 drives per enclosure, whichever is larger. Best practice is to run Autonomic Rebalance (also known as tunesys) after adding the drives.
- All node enclosures must contain either zero (0) or an even number of drives. All drive enclosures must contain an even number of drives, with a minimum of two.
- Minimum raw capacity is 0.8TB per node pair.
- Best practice is to add equal numbers of drives to all enclosures compatible with the drive type being added.
- With a four node configuration, the best practice is to attach the same number and type of drives to each node pair.
- Small Form Factor (SFF)-specific configuration practices
 - SFF drives may be loaded into the Storage Base enclosures, the Upgrade Node Pair enclosure and the M6710 drive enclosure.
 - SFF drives must be loaded in pairs of identical drives, beginning with the leftmost slot, slot 0, and filling to the right, leaving no empty slots between drives.
- Large Form Factor (LFF)-specific configuration practices
 - LFF drives may be loaded into the M6720 drive enclosure.
 - LFF drives must be loaded in pairs of identical drives starting at the bottom of a column, leaving no empty slots between drives in the column. It is permitted to have empty columns between columns containing drives. Different columns do not have to contain the same number of drives.
 - An all LFF drive configuration is permitted, leaving the Storage Base Enclosure empty.
- SSD specific configuration practices
 - SSD-only configurations are permitted.
 - Maximum of 120 SSDs per node pair.
 - The SFF and LFF SSDs allow the user to create SSD volumes that stripe across SFF and LFF enclosures.
- * 8 drives support RAID 1 and RAID 5. For RAID 6 choose 12 drives.

Step 5 - Choose Service Processor Implementation

The HP 3PAR Service Processor monitors the HP 3PAR StoreServ 7450 and enables remote monitoring and remote servicing of the array. The key capabilities of the Service Processor is to:

- Enable rapid, proactive response to issues
- Provide a secure communication channel between the customer's data center and HP 3PAR Central for:
 - Remote Online Software Upgrade; upgrade software with no application disruption
 - Remote Diagnostics; key diagnostic information maintained centrally on a historical basis
 - Remote Serviceability; provides fast predictive response and remediation

Each HP 3PAR StoreServ 7000 requires its own Service Processor. The Service Processor functions as the communication interface between a customer's IP network and HP 3PAR Central by managing all service-related communications. The Service Processor leverages the industry-standard HTTP over Secure Sockets Layer (HTTPS) protocol to secure and encrypt data communication.

Virtual Service Processor

The Service Processor can be deployed either as a Virtual Service processor or a Physical Service Processor. A Virtual Service Processor (VSP) is included free with the 3PAR Base Operating System. The Virtual Service Processor can be installed on a that is provided by the customer before installation that, meet the following specifications:



Configuration

- VMware vSphere 4.1 and above
- Server listed in VMware Compatibility Guide and with the following features
 - 1GB RAM (minimum for the VSP Virtual Machine)
 - 320GB free disk space (NOTE: Virtual SP storage must not reside on the array it is managing.)
 - DVD ROM or DVD RW
 - 1Gb Ethernet port

The customer must provide any hardware required to host the remote support software when deploying a Virtual Service Processor. For scheduled service calls, the customer shall make the Virtual Service Processor available to HP for remedial activities at the agreed-upon time. The customer is responsible for maintaining the appropriate HP 3PAR Remote Support Technology with a secure connection to HP and any passwords required to access the local network and Virtual Service Processor. The customer is responsible for providing all necessary resources in accordance with the HP 3PAR Service Processor Release Notes in order to enable the delivery of the service and options. Please contact a local HP representative for further details on requirements, specifications, and exclusions.

Physical Service Processor

If a physical Service Processor is desired, order the following product:

HP 3PAR 7000 Service Processor QR516B

The physical Service Processor is a dedicated storage appliance located within the storage rack providing close proximity to the HP 3PAR StoreServ 7000 Storage. The physical Service Processor is fully supported and maintained by HP Services. The physical Service Processor has serial port connectivity that provides maintenance access for trouble shooting capabilities. If a VMware server is not available to run the virtual Service Processor, the physical Service Processor is the alternative choice for remote monitoring and remote service.

HP 3PAR Policy Server

HP 3PAR Policy Server works to implement customer-configurable remote service access policies. Installed on a customer-provided host, Policy Server provides the customer with ultimate flexibility and control to allow or deny outbound communication or remote service connections to and from an HP 3PAR StoreServ Storage system. Policy Server also serves as the centralized point for collecting and storing audit logs of all diagnostic data transfers and authorized remote service connections to and from all configured HP 3PAR Storage systems. HP 3PAR Policy Server provides the following benefits:

- The customer has complete control over policy administration.
- A centralized policy administration for all HP 3PAR Storage systems is provided.
- A centralized audit log to facilitate security audits is provided.

HP 3PAR Policy Manager Software LTU TE400B

Step 6 - Choose Cables for host connection and remote copy connection

The optical cables listed below support 8 Gb/s FC and 10 Gb/s iSCSI/FCoE for host connect (FC and iSCSI/FCoE) and for Remote Copy connections (FC only). The copper1GbE cables are used for Remote Copy over IP and for connection to the Management Port.

Cables

FC and 10GbE	HP 3PAR 4m 50/125 (LC-LC) Fiber Cable	QL281B
	HP 3PAR 6m 50/125 (LC-LC) Fiber Cable	QR631A
	HP 3PAR 10m 50/125 (LC-LC) Fiber Cable	QL266B
	HP 3PAR 25m 50/125 (LC-LC) Fiber Cable	QR593A
	HP 3PAR 50m 50/125 (LC-LC) Fiber Cable	QL267B
	HP 3PAR 100m 50/125 (LC-LC) Fiber Cable	QL268B
	HP Premier Flex LC/LC Multi-mode OM4 2 fiber 1m Cable	QK732A

Configuration

	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
1GbE	HP 4.3m/14ft CAT5 RJ45 M/M Ethernet Cable	C7536A
	HP 7.6m/25ft CAT5 RJ45 M/M Ethernet Cable	C7537A
	HP 15.2m/50ft CAT5 RJ45 M/M Ethernet Cable	C7542A

Step 7 - Choose Racking Options

The HP 3PAR StoreServ 7450 is compatible with most industry standard 4-post EIA 19 inch racks with square mounting holes, including the HP Intelligent Series Rack and the HP 10000 G2 Series Rack. The HP 3PAR StoreServ 7450 can be factory configured and shipped in a rack or shipped without a rack for field integration into an existing rack. The rack used for factory integration is the HP Intelligent Series Rack.

HP Rack and Rack Options

Factory Integration Select a rack to house your HP 3PAR StoreServ 7450.

NOTE: The HP Intelligent Series Rack is the only series supported for factory configuration.

Primary Configuration Rules The HP 3PAR StoreServ 7450 will be configured into an HP Intelligent Series Rack with the appropriate power distribution units (PDUs). If other products such as servers or back-up products are included in the cab, a different PDU will be added (if required) or can be chosen from a list of appropriate offerings shown in the configuration tool. The HP Intelligent Series Rack must be purchased for factory configuration. Additional 3PAR StoreServ 7450 controller node enclosures and drive enclosures may be ordered for multiple subsystem integration at the factory.

The 3PAR StoreServ 7450 is also supported in HP 10000 G2 Series racks for field installation.

When calculating available U-space, assume that no space will be placed between the mounted components. For redundancy, order PDUs in quantities of two. Refer to the Configuration and User Guide in the Information Library at the Rack Solutions webpage.

HP Intelligent Series Racks **NOTE:** The number of components that will fit in a rack varies and is determined by the interior U-space of the rack.

HP 647 1075mm Shock Intelligent Series Rack	BW912A
HP 47U 1075mm Side Panel Kit	BW915A
HP 642 1075mm Shock Intelligent Series Rack	BW904A
HP 42U 1075mm Side Panel Kit	BW906A
HP 636 1075mm Shock Intelligent Series Rack	BW896A
HP 36U 1075mm Side Panel Kit	BW898A
HP 622 1075mm Pallet Intelligent Series Rack (22U) (available in a later release)	BW893A

For more information on the HP rack offerings, please see the following URL:

<http://h18004.www1.hp.com/products/servers/platforms/rackandpower.html>.

For more information on rack options, see:

<http://www.hp.com/products/rackoptions>.

For more information on PDUs, see:

<http://h18004.www1.hp.com/products/servers/proliantstorage/power-protection/pdu.html>.

Configuration

HP PDU Pivot Kit	<p>HP EVA PDU Pivot Kit</p> <p>Used to reclaim 2U of space in an HP Intelligent Series Rack with HP 3PAR StoreServ 7000 configurations. This kit allows the PDUs to be placed in the back of the rack without requiring any rack U space.</p> <p>NOTE: The use of the PDU Pivot Kit is strongly recommended and is the default option when orders are configured, as it will save 2U of valuable rack space.</p> <p>NOTE: 0D1 will appear after this part number to indicate factory integration where appropriate.</p>	AG730A
Performance Optimized Data Centers	<p>HP 3PAR StoreServ 7450 Storage is qualified for use in HP Performance Optimized Data Centers. Go to www.hp.com/go/POD for more information.</p>	
Non-HP rack and power requirements	<p>The Storage Bases, the Upgrade Node Pair, and the Drive Enclosures include mounting rails that are compatible with industry standard 4-post EIA 19 inch racks with square mounting holes. For detailed information on determining compatibility of a non-HP rack, please review the information included in the HP 3PAR StoreServ 7450 User Guide.</p>	

Expansion Options

HP provides a variety of SAS cable kits to allow expansion of the HP3PAR StoreServ 7450. Note that the Storage Base products, the Upgrade Node Pair and the Drive Enclosures all include SAS cables. Most configurations will not require a SAS expansion cable kit.

SAS expansion cable kit	<p>HP 6 Meter Expansion Cable Kit</p> <p>If an HP 3PAR StoreServ 7450 needs to be expanded into an adjacent rack, one 6 meter SAS expansion cable kit is required for every node pair that must access drive enclosures in the expansion rack. Each 6 meter SAS expansion cable kit contains four 6 meter SAS cables.</p>	AP879A
	<p>HP 2 Meter Expansion Cable Kit</p> <p>If an HP 3PAR StoreServ 7450 needs to be expanded within the same rack, but the new drive enclosure must be located some distance from the nearest existing drive enclosure within the same rack, one or two 2 meter SAS expansion cable kits is needed, depending on configuration. Each 2 meter SAS expansion cable kit contains two 2 meter SAS cables.</p>	AW566A
	<p>HP 1 Meter SAS Expansion Cable Kit</p> <p>The 1 meter SAS expansion cable kit is provided for cases where a shorter SAS cable is required. Each 1 meter SAS expansion cable kit contains two 1 meter SAS cables.</p> <p>NOTE: The 2-node Storage Bases and Upgrade Node Pair come with four 2 meter SAS cables each and the 4-node Storage Base comes with eight 2 meter SAS cables. The Drive Enclosures come with two 1 meter SAS cables each.</p>	QR514A

Step 8 - Choose Software

HP provides an extensive selection of features for HP 3PAR StoreServ Storage. All of the features available on the HP 3PAR StoreServ 10000 Storage system are also available on the HP 3PAR StoreServ 7450 Storage system, the result of a common architecture that spans from small and medium businesses to the largest global enterprise. For convenient ordering, the 3PAR StoreServ 7450 provides the features in Suites.

Two types of software licensing methods are employed with the HP 3PAR StoreServ 7450. Some software titles are licensed per system; other titles are licensed by drive. With system-based licensing one license covers the whole array, independent of configuration or capacity. Drive-based licensing, in contrast, is licensed per installed drive. A software title with drive-based licensing includes two Licenses to Use (LTU), a Base LTU that enables the software feature for the system and a Drive LTU that licenses the use of one drive. For each software title, purchase one Base LTU per title per array, and one Drive LTU, for every drive, that is installed in the array, independent of drive type.

Configuration

For more information regarding HP 3PAR software see <http://h18006.www1.hp.com/storage/solutions/3par/software.html>.

HP 3PAR 7450 Operating System Software Suite (Required)

HP 3PAR OS SW Suite - 3PAR Operating System, System Setup and Management Software HP 3PAR 7450 Operating System Software Suite is the foundation software of HP 3PAR StoreServ 7450 Storage, combining advanced virtualization capabilities with simple storage management, high efficiency, and world class performance. The included comprehensive thin provisioning capabilities allow your storage to start thin, get thin and stay thin. System Tuner and Autonomic Rebalance help maintain high performance over time. Migrating your existing data from HP EVA, EMC CX4 or EMC VNX Storage and 3PAR systems to HP 3PAR StoreServ 7450 is easy with the included 180 day Online Import license. HP 3PAR SmartStart Software, included in the suite, guides you through the configuration of the service processor, HP 3PAR StoreServ Storage and the application hosts - making storage setup quick and easy. HP 3PAR 7450 Operating System Software Suite is a required purchase. It uses drive-based licensing. For more information see www.hp.com/go/3PAR.

HP 3PAR 7450 Operating System Software Suite Base Media LTU	BC890B
HP 3PAR 7450 Operating System Software Suite Base E-LTU	BC890BAE
HP 3PAR 7450 Operating System Software Suite Drive LTU	BC891A
HP 3PAR 7450 Operating System Software Suite Drive E-LTU	BC891AAE

HP 3PAR 7450 Replication Software Suite

HP 3PAR 7000 Replication Software Suite - Local Replication, Remote Replication and Transparent Failover The HP 3PAR Replication Software Suite offers automatic replication, transparent failover and Point-in-Time (PIT) copies enabling seamless disaster recovery for critical data. These features provide an agile, efficient and simple solution to protect against the unpredictable. This suite is ideal for virtualized data centers demanding data availability and business continuity 24x7. HP 3PAR 7450 Replication Software Suite consists of HP 3PAR Remote Copy Software, HP 3PAR Peer Persistence Software and HP 3PAR Virtual Copy Software, which are also available separately. Replication Software Suite uses drive-based licensing. For more information see

NOTE: The Peer Persistence feature provides transparent failover in VMware cluster environments and requires the Remote Copy feature as a prerequisite.

HP 3PAR 7450 Replication Software Suite Base LTU	BC892A
HP 3PAR 7450 Replication Software Suite Base E-LTU	BC892AAE
HP 3PAR 7450 Replication Software Suite Drive LTU	BC893A
HP 3PAR 7450 Replication Software Suite Drive E-LTU	BC893AAE

NOTE: If the configuration includes Remote Copy over Fibre Channel it is recommended that optional Fiber Channel HBAs are purchased as the built in ports will not offer sufficient connectivity

HP 3PAR 7450 Security Software Suite

HP 3PAR 7000 Security Software Suite HP 3PAR 7450 Security Software Suite provides secure administrative segregation of users and hosts, allowing individual user groups and applications to confidently share a 3PAR StoreServ 7450 system. It also allows you to secure volumes and copies so they cannot be deleted, even by a 3PAR StoreServ 7450 user with the highest level privileges. When coupled with reservationless, non-duplicative, read-only virtual copies (snapshots), the Virtual Lock feature enables you to retain frozen, point-in-time copies of your data to assist internal data retention and simplify compliance with internal governance procedures. HP 3PAR 7450 Security Software Suite consists of HP 3PAR Virtual Domains Software and HP 3PAR Virtual Lock Software, which are also available

Configuration

separately. Security Software Suite uses drive-based licensing.

HP 3PAR 7450 Security Software Suite Base LTU	BC908A
HP 3PAR 7450 Security Software Suite Base E-LTU	BC908AAE
HP 3PAR 7450 Security Software Suite Drive LTU	BC909A
HP 3PAR 7450 Security Software Suite Drive E-LTU	BC909AAE

HP 3PAR 7450 Data Optimization Software Suite

HP 3PAR 7450 Data Optimization Software Suite - Rebalance, Redistribute, and Refresh The HP 3PAR 7450 Data Optimization Software Suite makes sure that data is on the right storage asset at the right time. This suite rebalances, redistributes and refreshes storage non-disruptively with features that provide autonomic storage tiering and dynamic data mobility, reducing cost and increasing agility. HP 3PAR 7450 Data Optimization Software Suite consists of HP 3PAR Priority Optimization, HP 3PAR Dynamic Optimization, HP 3PAR Adaptive Optimization and HP 3PAR Peer Motion (providing federation capability for data mobility), which are also available separately. Data Optimization Software Suite uses drive-based licensing. For more information see

NOTE: The Adaptive Optimization feature requires [HP 3PAR Reporting Software Suite as a prerequisite](#).

HP 3PAR 7450 Data Optimization Software Suite V2 Base LTU	BD272A
HP 3PAR 7450 Data Optimization Software Suite V2 Base E-LTU	BD272AAE
HP 3PAR 7450 Data Optimization Software Suite V2 Drive LTU	BD273A
HP 3PAR 7450 Data Optimization Software Suite V2 Drive E-LTU	BD273AAE

HP 3PAR 7450 Reporting Software Suite

HP 3PAR Reporting Software Suite - Historical Performance and Capacity Management Tool The HP 3PAR 7450 Reporting Software Suite includes System Reporter, a historical performance and capacity management tool for storage reporting, monitoring, and troubleshooting. Also included is 3PARInfo, a command line tool that allows you to view HP 3PAR StoreServ Storage configuration information. Reporting Software Suite uses system-based licensing. For more information see

HP 3PAR 7450 Reporting Software Suite LTU	BC914B
HP 3PAR 7450 Reporting Software Suite E-LTU	BC914BAE

HP 3PAR Application Software Suite for Oracle

HP 3PAR Application Software Suite for Oracle - Application Protection The HP 3PAR Application Software Suite for Oracle provides everything you need for protecting Oracle databases, including Recovery Manager for Oracle and Oracle Space Reclamation capabilities. Recovery Manager for Oracle is an extension to 3PAR Virtual Copy that intelligently creates, manages, and presents time-consistent snapshot images of Oracle® databases for rapid application recovery, near-continuous data protection, data sharing, and non-disruptive backup. Application Software Suite for Oracle uses system-based licensing. For more information see.

NOTE: [HP 3PAR Virtual Copy Software is a prerequisite, purchased independently or in the HP 3PAR Replication Software Suite.](#)

HP 3PAR 7450 Application Software Suite Oracle Media LTU	BC918B
HP 3PAR 7450 Application Software Suite for Oracle E-LTU	BC918BAE

HP 3PAR Application Software Suite for SQL

HP 3PAR Application Software Suite for SQL - Application Protection The HP 3PAR Application Software Suite for SQL protects Microsoft® SQL databases with Recovery Manager for Microsoft® SQL and the 3PAR VSS Provider software. 3PAR Recovery Manager for Microsoft® SQL Server is an extension to 3PAR Virtual Copy that eases costs and administration by providing rapid, affordable online recovery of Microsoft® SQL Server databases from multiple, highly granular point-in-time snapshots. Quickly recover a database to a

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known point in time, speeding up a variety of operations including rapid recovery of the production SQL server. Application Software Suite for SQL uses system-based licensing. For more information see

NOTE: HP 3PAR Virtual Copy Software is a prerequisite, purchased independently or in the HP 3PAR Replication Software Suite.

HP 3PAR 7450 Application Software Suite SQL Media LTU

BC917B

HP 3PAR 7450 Application Software Suite for SQL E-LTU

BC917BAE

HP 3PAR Application Software Suite for Exchange

HP 3PAR Application Software Suite for Exchange - Application Protection

The HP 3PAR Application Software Suite for Exchange provides you the essentials for protecting your Microsoft Exchange data, including Recovery Manager for Exchange and the VSS Provider software. Recovery Manager for Exchange is an extension to 3PAR Virtual Copy that intelligently creates and manages snapshots that can be used to quickly restore Exchange instances or databases (or non-disruptively back them up to tape) for near-continuous data protection. Application Software Suite for Exchange uses system-based licensing. For more information see

<http://h18006.www1.hp.com/storage/software/3par7000/as-exchange/index.html>.

NOTE: HP 3PAR Virtual Copy Software is a prerequisite, purchased independently or in the HP 3PAR Replication Software Suite.

HP 3PAR 7450 Application Software Suite Exchange Media LTU

BC916B

HP 3PAR 7450 Application Software Suite for Exchange E-LTU

BC916BAE

HP 3PAR Application Software Suite for VMware

HP 3PAR Application Software Suite for VMware - Application Protection

The HP 3PAR Application Software Suite for VMware provides everything you need to make your VMware environment more agile and efficient-including Recovery Manager for VMware, Host Explorer for VMware, VASA support, and three essential plug-ins: the VMware Site Replication Manager (SRM) Adapter, the 3PAR VAAI plug-in, and the 3PAR management plug-in for VMware View. Application Software Suite for VMware uses system-based licensing. For more information see.

NOTE: HP 3PAR Virtual Copy Software is a prerequisite, purchased independently or in the HP 3PAR Replication Software Suite.

HP 3PAR 7450 Application Software Suite VMware Media LTU

BC915B

HP 3PAR 7450 Application Software Suite for VMware E-LTU

BC915BAE

HP 3PAR Application Software Suite for Microsoft Hyper-V

HP 3PAR Application Software Suite for Hyper-V - Application Protection

The HP 3PAR Application Software Suite for Hyper-V provides you the essentials for protecting your Microsoft Hyper-V environment, including Recovery Manager for Hyper-V and the VSS Provider software. Recovery Manager for Hyper-V is an extension to 3PAR Virtual Copy that intelligently creates and manages snapshots that can be used to quickly restore Hyper-V VMs (or non-disruptively back them up to tape) for near-continuous data protection. Application Software Suite for Hyper-V uses system-based licensing.

NOTE: HP 3PAR Virtual Copy Software is a prerequisite, purchased independently or in the HP 3PAR Replication Software Suite.

HP 3PAR 7450 Application Software Suite for Hyper-V Media LTU

BD190B

HP 3PAR 7450 Application Software Suite for Hyper-V E-LTU

BD190BAE

HP Cluster Extension Software

HP Cluster Extension Software- High Availability

HP Cluster Extension Software (CLX) offers protection against application downtime from fault, failure, or site disaster by extending a local cluster between data centers over metropolitan distance. CLX reinstates critical applications at a



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remote site within minutes or seconds after an adverse event. CLX integrates with the OS clustering software (such as MS Cluster Service in Windows) and the remote mirroring software on storage (such as HP 3PAR Remote Copy Software on HP 3PAR systems) to automate failover and failback between sites. This dual integration enables the cluster service to verify the status of the storage as well as the server cluster; thus allowing the correct failover and failback decisions to be made which minimize downtime, and accelerates recovery without human intervention. Thus the Cluster Extension Software can help customers achieve 'zero' RPO and RTO in minutes or seconds. For more information, including how Cluster Extension Software is licensed, see <http://h18006.www1.hp.com/storage/software/ces/index.html>.

Step 9 - Choose Options for Storage Networking

HP's comprehensive portfolio of Storage Area Network infrastructure products and solutions are designed to meet a range of storage networking needs from small and midsized businesses to the largest corporate enterprises. HP StoreFabric storage networking SAN Solutions deliver scalability, performance, and broad interoperability required for critical data and applications.

For additional details on SAN infrastructure components and options and storage compatibility information, please visit: <http://hp.com/go/san> or select from the part numbers below.

Fibre Channel

Brocade Fibre Channel HBAs

Host Bus Adapters

HP 81B 8Gb 1-port PCIe Fibre Channel Host Bus Adapter	AP769B
HP 82B 8Gb 2-port PCIe Fibre Channel Host Bus Adapter	AP770B
HP 41B 4Gb 1-port PCIe Fibre Channel Host Bus Adapter	AP767B
HP 42B 4Gb 2-port PCIe Fibre Channel Host Bus Adapter	AP768B

Emulex Fibre Channel HBAs

HP 81E 8Gb 1-port PCIe Fibre Channel Host Bus Adapter	AJ762B
HP 82E 8Gb 2-port PCIe Fibre Channel Host Bus Adapter	AJ763B
HP FC2142SR 4Gb 1-port PCIe Fibre Channel Host Bus Adapter	A8002B
HP FC2242SR 4Gb 2-port PCIe Fibre Channel Host Bus Adapter	A8003B

QLogic Fibre Channel HBAs

HP 81Q 8Gb 1-port PCIe Fibre Channel Host Bus Adapter	AK344A
HP 82Q 8Gb 2-port PCIe Fibre Channel Host Bus Adapter	AJ764A
HP FC1142SR 4Gb 1-port PCIe Fibre Channel Host Bus Adapter	AE311A
HP FC1242SR 4Gb 2-port PCIe Fibre Channel Host Bus Adapter	AE312A

Fibre Channel Switches

HP B-series

8 Gb Fibre Channel Switches

HP 8/8 Base (0) e-port SAN Switch	AM866B
HP 8/8 (8) Full Fabric Ports Enabled SAN Switch	AM867B
HP 8/24 Base (16) Full Fabric Ports Enabled SAN Switch	AM868B
HP 8/40 Base (24) Full Fabric Ports Enabled SAN Switch	AM869B
HP 8/40 Power Pack+ (24) Full Fabric Ports Enabled SAN Switch	AM870B
HP 8/80 Base (48) Full Fabric Ports Enabled SAN Switch	AM871B
HP 8/80 Power Pack+ (48) Full Fabric Ports Enabled SAN Switch	AM872B

16 Gb Fibre Channel Switches

HP SN3000B 16Gb 24-port/12-port Active Fibre Channel Switch	QW937A
HP SN3000B 16Gb 24-port/24-port Active Fibre Channel Switch	QW938A
HP SN6000B 16Gb 48-port/24-port Active Fibre Channel Switch	QK753B
HP SN6000B 16Gb 48-port/48-port Active Fibre Channel Switch	QR480B

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HP SN6000B 16Gb 48-port/24-port Active Power Pack+ Fibre Channel Switch	QK754B
HP SN6000B 16Gb 48-port/48-port Active Power Pack+ Fibre Channel Switch	QR481B
8 Gb and 16 Gb Director Switches	
HP SN8000B 8-Slot Power Pack+ SAN Backbone Director Switch	QK710B
HP SN8000B 4-Slot Power Pack+ SAN Director Switch	QK711B
HP SN8000B 4-Slot SAN Director Switch	QK712B
HP DC SAN Backbone Director Switch	AK857C
HP DC04 SAN Director Switch	AR478B
HP DC04 Power Pack+ SAN Director Switch	AR479B
FCoE, Extension and Embedded Switches	
HP 1606 FCIP 4-pt Enabled 8Gb FC 2-pt Enabled 1GbE Base Switch	AP862B
HP 1606 FCIP 16-pt Enabled 8Gb FC 6-pt Enabled 1GbE Full Switch	AP863B
HP 1606 FCIP 16-pt Enabled 8Gb FC 6-pt Enabled 1GbE Power Pack+ Switch	AP864B
HP 2408 FCoE 24-pt 10GbE 8-pt 8Gb FC Base Converged Network Switch	AP801B
HP 2408 FCoE 24-10GbE 8-8Gb FC Power Pack+ Converged Network Switch	AP802B
Brocade 8/12c SAN Switch for BladeSystem c-Class	AJ820B
Brocade 8/24c SAN Switch for BladeSystem c-Class	AJ821B
Brocade 8/24c Power Pack+ SAN Switch for BladeSystem c-Class	AJ822B
HP H-series	
HP 8/20q Fibre Channel 8-ports Active Switch	AQ233B
NOTE: 8 device ports active, upgradeable to 20 device ports active	
HP 8Gb Simple SAN Connection Kit	AK241B
NOTE: 8 device ports active, upgradeable to 20 device ports active	
HP 8/20q Fibre Channel Switch	AK242B
NOTE: 16 switch ports active, upgradeable to 20 device ports active	
HP SN6000 Stackable 8Gb 24-port Single Power Fibre Channel Switch	AW575B
NOTE: 20 device ports active/4 stacking (ISL) ports active	
HP SN6000 Stackable 8Gb 24-port Dual Power Fibre Channel Switch	AW576B
NOTE: 20 device ports active/4 stacking (ISL) ports active	
HP SN6000 Stackable 12-port Single Power FC Switch	BK780B
NOTE: 8 device ports/4 stacking (ISL) ports active, upgradeable to 20 device ports active	
HP C-series	
HP SN8000C 13-Slot Supervisor 2A Fabric 3 Director Switch	QW927A
HP SN8000C 6-Slot Supervisor 2A Director Switch	AE388C
HP SN8000C 9-Slot Supervisor 2A Director Switch	AE389C
HP SN6000C 8Gb 16-port Fibre Channel Switch	AW585A
HP SN6000C 8Gb 32-port Fibre Channel Switch	AW586A
Cisco MDS 8/12c Fabric Switch for HP BladeSystem c-Class	AW563A
Cisco MDS 8/24c Fabric Switch for HP BladeSystem c-Class	AW564A
Cisco MDS 9124 8-ports Active Fabric Switch	AG646A
Cisco MDS 9124 16-ports Active Fabric Switch	AG647A
Cisco MDS 9222i Multiservice with 0 SFP Transceiver Modular Fabric Switch	AG851B
HP Intelligent Infrastructure Analyzer Software LTU	TC400A

HP Intelligent Infrastructure Analyzer Software (IIAS)



Configuration

HP Intelligent Infrastructure Analyzer Software (IIAS)	HP Intelligent Infrastructure Analyzer Software E-LTU An online monitoring and diagnostic solution intended to manage the physical layer of a Storage Area Network (SAN) consisting of HP B-series and/or H-series Fibre Channel switches and directors. It uses industry-standard protocols (such as SNMP, SMI-S, Telnet) to monitor the physical layer across the SAN and to diagnose changes/events in Small Form-factor Pluggable (SFP) transceiver states/characteristics. It also presents the SAN topology, inventory and diagnostic information to the user in real-time.	TC400AAE
HP Virtual Connect	HP 3PAR StoreServ 7000 Storage supports direct attach with HP Virtual Connect FlexFabric. Please refer to SPOCK for HP Virtual Connect information. http://h20272.www2.hp.com/index.aspx	
PremierFlexOM4 cable options	HP Premier Flex LC/LC Multi-mode OM4 2 fiber 1m Cable HP Premier Flex LC/LC Multi-mode OM4 2 fiber 2m Cable HP Premier Flex LC/LC Multi-mode OM4 2 fiber 5m Cable HP Premier Flex LC/LC Multi-mode OM4 2 fiber 15m Cable HP Premier Flex LC/LC Multi-mode OM4 2 fiber 30m Cable HP Premier Flex LC/LC Multi-mode OM4 2 fiber 50m Cable	QK732A QK733A QK734A QK735A QK736A QK737A
OM3 FC LC-LC cables options	HP LC to LC Multi-mode OM3 2-Fiber 0.5m 1-Pack Fiber Optic Cable HP LC to LC Multi-mode OM3 2-Fiber 1.0m 1-Pack Fiber Optic Cable HP LC to LC Multi-mode OM3 2-Fiber 2.0m 1-Pack Fiber Optic Cable HP LC to LC Multi-mode OM3 2-Fiber 5.0m 1-Pack Fiber Optic Cable HP LC to LC Multi-mode OM3 2-Fiber 15.0m 1-Pack Fiber Optic Cable HP LC to LC Multi-mode OM3 2-Fiber 30.0m 1-Pack Fiber Optic Cable HP LC to LC Multi-mode OM3 2-Fiber 50.0m 1-Pack Fiber Optic Cable	AJ833A AJ834A AJ835A AJ836A AJ837A AJ838A AJ839A

Step 10 - Federation / Data Migration

HP provides several ways to migrate your data from older arrays. Peer Motion provides federation with other 3PAR arrays, which includes the ability to migrate data to HP 3PAR StoreServ 7450 Storage.

(Peer Motion is part of the HP 3PAR 7450 Data Optimization Software Suite). Peer Motion Software is also available as a standalone license

HP 3PAR Peer Motion Software	HP 3PAR 7450 Peer Motion Base LTU HP 3PAR 7450 Peer Motion Drive LTU	BC906A* BC907A*
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* Insert AE at the end of a part number for an electronic LTU (XXXXXAAE). E-Delivery should be ordered with any Standalone or Upgrade software order.

Online Import allows you to easily migrate data from HP EVA, EMC CX4 or EMC VNX Storage arrays to the HP 3PAR StoreServ 7450, a 180-day Online Import license is built into the HP 3PAR 7450 Operating System Software Suite. Additional licenses are available to order.

HP 3PAR Online Import Software	HP 3PAR 7450 Online Import 180 day LTU	BD195A*
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* Insert AE at the end of a part number for an electronic LTU (XXXXXBAE). E-Delivery should be ordered with any Standalone or Upgrade software order.

In addition HP supports the MPX200.

HP MPX200 Multi-protocol and Heterogeneous Data Migration

The HP MPX200 Multiprotocol Router provides support for HP 3PAR StoreServ 7000 and 10000 as well as 3PAR F/T, including 1GbE iSCSI and 10GbE iSCSI and FCoE target support. MPX200 iSCSI provides an alternative option for HP 3PAR storage systems if you don't want to dedicate native iSCSI ports on your array. The MPX200 also facilitates the

Configuration

sharing of iSCSI/FCoE connectivity simultaneously for HP 3PAR storage systems from the same MPX200. For Data Migration the MPX200 provides high performance migration from P6000/EVA to HP 3PAR storage systems and simplifies Data Migration from third party storage such as IBM and EMC to HP 3PAR. The MPX200 is an ideal solution enabler for HP 3PAR customers. <http://www.hp.com/go/mpx200>

MPX200 Multifunction Router	HP MPX200 1GbE Base Multifunction Router	AP771B
	HP MPX200 Multifunction Router 1GbE Upgrade Blade	AP772B
	HP MPX200 10-1GbE Base Multifunction Router	AP773B
	HP MPX200 Multifunction Router 10-1GbE Upgrade Blade	AP774B
	HP 42B 4Gb 2-port PCIe Fibre Channel Host Bus Adapter	AP768B
FCIP Software	HP MPX200 Half Chassis FCIP License	TA766A
	HP MPX200 Full Chassis FCIP License	TA767A
Data Migration Software	HP MPX200 1TB Full Chassis Data Migration License	TA762A
	HP MPX200 5TB Full Chassis Data Migration License	TA763A
	HP MPX200 Full Chassis 1 Array Data Migration License	TA764A

Step 11- Adding a File Controller

If file services are needed to on HP 3PAR StoreServ 7450 storage system, a file controller can be added. These models come with factory-installed drives and the Microsoft Windows Storage Server 2012 Standard Edition or Windows Storage Server 2012 R2 Standard Edition operating system pre-installed

Choose a Pre-configured Model

HP 3PAR StoreServ File Controller			Part Number
			E7X02A
Specifications	Operating System	Microsoft Windows Storage Server 2012 R2, Standard	
	Processor	Intel® Xeon® E5-2609v2 (2.50GHz/4-core/10MB/80W) Processor	
	Memory	16 GB (4 x 4GB)	
	Storage Controller	Smart Array P420i with 1 GB FBWC Controller with internal SAS port for O/S drives)	
	Internal Storage	2 x 300GB 6G SAS 10K 2.5" ENT hot-plug SFF HDDs (O/S mirror)	
	Expansion Slots	3 x PCIe (6 with option PCIe Riser)	
	Network Ports	4 x 1GbE	
	Form Factor	2U Rack	

HP 3PAR StoreServ File Controller			Part Number
			C8S69A
Specifications	Operating System	Microsoft Windows Storage Server 2012, Standard	
	Processor	Intel® Xeon® E5-2609 (2.40GHz/4-core/10MB/80W) Processor	
	Memory	16 GB (4 x 4GB)	
	Storage Controller	Smart Array P420i with 1 GB FBWC Controller with internal SAS port for O/S drives)	
	Internal Storage	2 x 450GB 6G SAS 10K 2.5" ENT hot-plug SFF HDDs (O/S mirror)	
	Expansion Slots	3 x PCIe (6 with option PCIe Riser)	
	Network Ports	4 x 1GbE	
	Form Factor	2U Rack	

Configuration

Add a second processor

Intel® Xeon® E5-2609v2 (2.5GHz/4-core/10MB/80W) Processor Kit	715222-B21
NOTE: For E7X02A only	
Intel® Xeon® E5-2609 (2.40GHz/4-core/10MB/80W) Processor Kit	662252-B21
NOTE: For C8S69A only	

Add More Memory

NOTE: HP recommends that you add the same type memory to the product that is shipped standard with the product.

NOTE: HP memory from previous generation servers are not fully compatible with Smart Memory features in Gen8 Servers.

Registered DIMMs (RDIMMs)

HP 4GB (1x4GB) Single Rank x4 PC3L-12800R (DDR3-1600) Registered CAS-11 Low Voltage Memory Kit	713981-B21
NOTE: For E7X02A only	

HP 4GB (1x4GB) Single Rank x4 PC3L-10600R (DDR3-1333) Registered CAS-9 Low Voltage Memory Kit	647893-B21
NOTE: For C8S69A only	

NOTE: All DDR3 memory option kits consist of one DIMM per kit. For detailed memory configuration rules and guidelines, please use the Online DDR3 Memory Configuration Tool: www.hp.com/go/ddr3memory-configurator.

NOTE: PC3L is a low voltage memory.

See the HP ProLiant Gen 8 QuickSpecs for information on memory configurations. http://h18004.www1.hp.com/products/quickspecs/14212_div/14212_div.html

Add 3PAR StoreServ File Controller v2 Performance Kit

HP 3PAR StoreServ File Controller 1Gb Performance Kit	E7X04A
NOTE: This kit adds the second Intel® Xeon® E5-2609v2 Processor, an additional 16GB (4 x 4GB) of Memory, and a 1GbE 4 port NC365T Adapter to the 3PAR File Controller v2	
HP 3PAR StoreServ File Controller 10Gb Performance Kit	E7X05A
NOTE: This kit adds the second Intel® Xeon® E5-2609v2 Processor, an additional 16GB (4 x 4GB) of Memory, and a 10GbE 2 port 560SFP+ Adapter to the 3PAR File Controller v2	

Add additional options

NOTE: Multifunction Server Adapters support the installed Microsoft Windows Server Scalable Networking Pack, which enables TCP Chimney offload, Receive-side Scaling (RSS), and Network Direct Memory Access (NetDMA) features.

HP Networking

Gigabit Ethernet adapters

HP NC112T PCI Express Gigabit Server Adapter	503746-B21
HP NC365T 4-port Ethernet Server Adapter	593722-B21
HP Ethernet 1Gb 4-port 331T Adapter	647594-B21
HP Ethernet 1Gb 2-port 361T Adapter	652497-B21
HP Ethernet 1Gb 2-port 332T Adapter	615732-B21

10 Gigabit Ethernet Adapters

NOTE: A minimum of two Gigabytes (2 GB) of server memory is required per each adapter.

NOTE: Direct Attach Cable (DAC) for copper environments or fiber transceivers and cables for fiber-optic environments must be purchased separately.

Configuration

	HP NC523SFP 10Gb 2-port Server Adapter	593717-B21
	HP Ethernet 10Gb 2-port 530SFP Adapter	652503-B21
	HP Ethernet 10Gb 2-port 530T Adapter	656596-B21
	HP Ethernet 10Gb 2-port 560SFP+ Adapter	665249-B21
	HP NC552SFP 10Gb 2-port Ethernet Server Adapter	614203-B21
HP Infiniband	QLogic InfiniBand 4X QDR PCI-E G2 Dual Port HCA	583211-B21
	HP InfiniBand 4X QDR ConnectX-2 PCIe G2 Dual Port HCA	592520-B21
	NOTE: For the following two InfiniBand Adapters, only 1 FlexibleLOM can be added to the server, which is selected in Step 2 for the "Configuration Information - Factory Integrated Models" section. These two options are for upgrade or change from original configuration.	
	NOTE: FLR Indicates new HP FlexibleLOM Adapter series.	
	HP Infiniband FDR/Ethernet 10Gb/40Gb 2-port 544FLR-QSFP Adapter	649282-B21
	HP Infiniband QDR/Ethernet 10Gb 2-port 544FLR-QSFP Adapter	649283-B21
	HP InfiniBand FDR 2-port 545QSFP Adapter	702211-B21
	NOTE: 10Gb Ethernet requires the use of the QSFP to SFP+ adapter P/N 655874-B21.	
	NOTE: Please see the QuickSpecs for additional information: http://h18000.www1.hp.com/products/quickspecs/13078_div/13078_div.html	
HP Optical Drives	HP 12.7mm Slim SATA DVD-ROM JackBlack Optical Drive	652232-B21
	HP 12.7mm Slim SATA DVD-RW JackBlack Optical Drive	652235-B21
HP I/O Expansion Options	HP DL380p/385p/560 Gen8 3 Slot PCI-E Riser Kit	653206-B21
	NOTE: When populating the second optional riser slot, the second processor must be installed.	
HP Security	HP Trusted Platform Module Option	488069-B21
	NOTE: The TPM (Trusted Platform Module) is a microcontroller chip that can securely store artifacts used to authenticate the server platform. These artifacts can include passwords, certificates and encryption keys. Windows® BitLocker™ Drive Encryption (BitLocker) is a data protection feature available in Windows Server® 2008. BitLocker leverages the enhanced security capabilities of a Trusted Platform Module (TPM) version 1.2. The TPM works with BitLocker to help protect user data and to ensure that a server running Windows Server 2008 has not been tampered with while the system was offline. For more information about TPM, including a white paper, go to: www.hp.com/go/TPM .	
	NOTE: The TPM key is unique to every TPM deployed server and must be retained. Misplacing or losing the key could result in data loss.	
HP 3PAR StoreServ File Controller is designed and optimized for connection to 3PAR StoreServ Storage and uses HBAs, rather than additional Storage Controllers.		
NOTE: HBAs are not included standard. HBA selection is left as your choice based on existing SAN infrastructure.		
HP Fibre Channel	Storage Fibre Channel HBA	
	NOTE: For the complete listing of Fibre Channel Host Bus Adapters for Windows 2000, Windows Server 2003 and Linux, please see: http://h18006.www1.hp.com/storage/saninfrastructure/hba.html	
	Brocade Fibre Channel HBAs	
	HP 82B 8Gb 2-port PCIe Fibre Channel Host Bus Adapter	AP770B
	Emulex Fibre Channel HBAs	
	HP 82E 8Gb 2-port PCIe Fibre Channel Host Bus Adapter	AJ763B
	HP SN1000E 16Gb 2-port PCIe Fibre Channel Host Bus Adapter	QR559A
	HP StoreFabric SN1100E 16Gb Dual Port Fibre Channel Host Bus Adapter	C8R39A
	QLogic Fibre Channel HBAs	
	HP 82Q 8Gb 2-port PCIe Fibre Channel Host Bus Adapter	AJ764A

Configuration

HP StoreFabric SN1000Q 16GB 2-port PCIe Fibre Channel Host Bus Adapter	QW972A
Converged Network Adapter	
HP CN1100E Dual Port Converged Network Adapter	BK835A
HP CN1000Q Dual Port Converged Network Adapter	BS668A
HP StoreFabric CN1100R Dual Port Converged Network Adapter	QW990A

Add a Power Cord

The HP 3Par StoreServ File Controller comes standard with at least one rack (IEC-IEC) PDU power cord. If you wish to use wall outlet power instead, you can choose a country- or region-specific power cord.

3Par StoreServ File Controller	HP C13 - Nema 5-15P US/CA 110V 10Amp 1.83m Power Cord	AF556A
	HP C13 - GB-1002 CN 250V 10Amp 1.83m Power Cord	AF557A
	HP C13 - IRAM -2073 AR 250V 10A 2.5m Power Cord	AF558A
	HP C13 - Nema 5-15P TH/PH 250V 10Amp 1.83m Power Cord	AF559A
	HP C13 - KSC- 8305 KR 250V 10Amp 1.83m Power Cord	AF560A
	HP C13 - CNS-690 TW 110V 13Amp 1.83m Power Cord	AF561A
	HP C13 - IS-1293 IN 240V 6Amp LV 2.0m Power Cord	AF562A
	HP C13 - AS3112-3 AU 250V 10Amp 2.5m Power Cord	AF569A
	HP C13 - SEV 1011 CH 250V 10Amp 1.83m Power Cord	AF565A
	HP C13 - DK-2.5A DK 250V 10Amp 1.83m Power Cord	AF566A
	HP C13 - CEE-VII EU 250V 10Amp 1.83m Power Cord	AF568A
	HP C13 - SI-32 IL 250V 10Amp 1.83m Power Cord	AF564A
	HP C13 - CEI-23-50 IT/CL 250V 10Amp 1.83m Power Cord	AF571A
	HP C13 - JIS C8303 JP 100V 12Amp 2.0m Power Cord	AF572A
	HP C13 - BS-1363A UK/HK/SG 250V 10Amp 1.83m Power Cord	AF570A
	HP C13 - SABS-164 ZA 250V 10Amp 2.5m Power Cord	AF567A
	HP C13 - NBR-14136 BR 250V 10Amp 1.83m Power Cord	AF591A

Features and Benefits

HP 3PAR StoreServ 7450 Product Dimensions, and Weight

Physical Dimensions	Height in/mm/U	Width in/mm	Depth in/mm	Max Weight lb/kg
42U Intelligent Series Rack	79.0/2006.6	23.5/597.8	42.7/1125.2	243/110 (empty)
HP 3PAR StoreServ 7450 2-node Storage Base (no host adapters, no drives)	3.46/87.95/2	19/483	26.6/676.1*	47.7/21.6
HP 3PAR StoreServ 7450 2-node Storage Base (with two host adapters, no drives)	3.46/87.95/2	19/483	26.6/676.1*	48.7/22.1
HP 3PAR StoreServ 7450 4-node Storage Base (no host adapters, no drives)	6.925/175.9/4	19/483	26.6/676.1*	97.8/44.4
HP 3PAR StoreServ 7450 4-node Storage Base (with four host adapters, no drives)	6.925/175.9/4	19/483	26.6/676.1*	99.8/45.3
HP M6710 2.5 inch 2U SAS Drive Enclosures (without drives)	3.46/87.95/2	19/483	24.8/630.7	33.5/15.2
HP M6720 3.5 inch 4U SAS Drive Enclosures (without drives)	6.89/175/4	19/483	24.9/631.4	42.9/19.5
SFF SAS drive with carrier	3.42/86.85**	0.78/19.9**	896/227.7	0.7/0.32 (varies by type)
LFF SAS drive with carrier	1.18/30.0**	4.36/110.84**	8.67/220.26	1.9/0.86 (varies by type)

* includes length of ejector handles

** includes RFI clips

Power Requirements

Input Voltage (VAC)	100 - 240 VAC
Frequency (Hz)	50 - 60

Component	Idle (watts / BTU/hr)	Transactional (watts / BTU/hr)
Node Pair (7450), no drives, no add-on host adapters	344 / 1173	363 / 1238
4-port 8Gb/sec Fibre Channel Adapter	24 / 81.7	32.6 / 111
2-port 10Gb/sec iSCSI/FCoE Adapter	34 / 115.8	40 / 136.4
HP M6710 2.5 inch 2U SAS Drive Enclosure, no drives	150 / 512 (average)	150 / 512 (average)
HP M6720 3.5 inch 4U SAS Drive Enclosure, no drives	164 / 559 (average)	164 / 559 (average)
100GB SLC SSD	1.4 / 4.8	2.2 / 7.5
200GB SLC SSD	1.4 / 4.8	2.1 / 7.2
400GB MLC SSD	2.2 / 7.5	3.7 / 12.6

Features and Benefits

Environmental Specifications

Operating Temperature	41° to 104° F (5° to 40° C) - Reduce rating by 1° F for each 1000 ft altitude (1.8° C/1,000 m)
Shipping Temperature	32° to 140° F (0° to 60° C)
Altitude (ft/m) max.	10,000 ft / 3,048 m
Shipping Altitude (ft/m) max.	40,000ft/ 12,192 m
Humidity	10% to 90% non condensing
Shipping Humidity	10% to 90% non condensing
Operating Vibration	0.25 G, Sine, 5-500 Hz, 0.1 Grms, Random 10-100Hz
Non-operating Vibration	0.5 G, 5 - 500 Hz, Sine
Operating Shock	2 G, 11ms, half-sine
Non-operating Shock	10 G, 11ms, half-sine
Maximum Air Flow	Storage Base and Upgrade Node Pair - 109 CFM per enclosure M6710 Drive Enclosure - 105 CFM M6720 Drive Enclosure - 109 CFM

Electromagnetic Compatibility

CISPR 22:2008/ EN55022:2010 Class A
 CISPR 24:2010/ EN 55024:2010
 IEC 61000-3-2:2005/ EN 61000-3-2:2006 +A1:2009 +A2:2009
 IEC/ EN 61000-3-3:2008
 AS/NZS CIPSR 22: 2009 Class A
 CNS 13438:2006 Class A
 47 CFR Part 15 Subpart b Class A
 ICES-003 Issue 4 Class A
 V-3/2012.04 Class A
 RRA Notice No. 2011-24 (2011.12.23) Class A
 RRA Notice No. 2011-25 (2011.12.23)

Acoustics

Sound pressure level measured per ISO 7779 specifications during normal operating fan conditions, from a minimum of 4,000 RPM to a maximum of 10,000 RPM

Fan Speed (RPM)	7450 2 node Storage Base	7450 4 node Storage Base	M6710 2.5" 2U SAS Drive Enclosure	M6720 3.5" 4U SAS Drive Enclosure
Typical	72	74	66	67
Maximum	93	97	85	88

Typical operations assume 20 degrees centigrade ambient with a fan speed of 4000 RPM.

Safety

IEC 60950-1:2005 (2nd Edition)
 EN 60950-1:2006 +A11:2009
 EN 62479:2010
 CNS 14336-1 2nd Edition
 UL 60950-1 2nd Ed.
 CAN/CSA C22.2 No. 60950-1

Certifications / Markings

cTUVus Mark
 TUV T-mark (EN 60950)
 CE Mark
 FCC Class A
 IC Class A
 VCCI Class A
 BSMI Class A
 KCC
 GOST-R
 C-Tick
 WEEE
 China RoHS
 EU RoHS

Features and Benefits

NOTE: Specifications are subject to change without notice. Acoustics and power consumption for the node pair has been measured with Gold efficiency PCM.

Overview

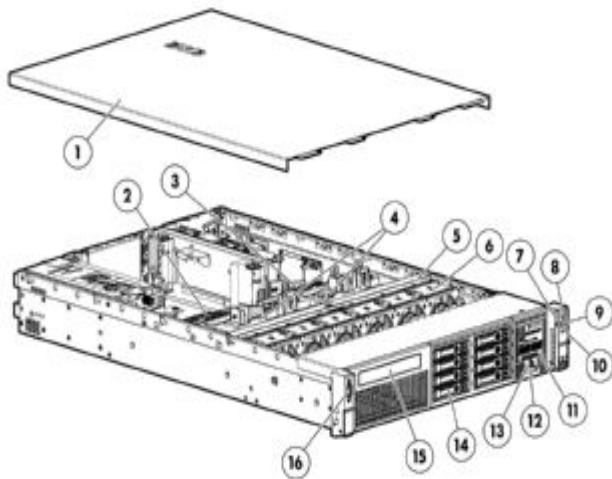
HP 3PAR StoreServ File Controller v2 is a new converged storage capability on the HP 3PAR StoreServ Storage platform. It adds support for file services to the 3PAR StoreServ. The HP 3PAR StoreServ File Controller v2 is designed to deliver efficient, secure, and highly available file capability that supports hundreds to thousands of concurrent users.

- New 3PAR StoreServe File Controller v2

The HP 3PAR StoreServ File Controller v2 sets the standard for performance and expandability for file services for the 3PAR StoreServ platform. It leverages the 3PAR StoreServ Storage data services and extends the benefits to file workloads. Please refer to the respective sections for details on the data services.

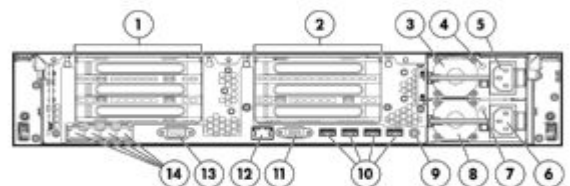
Models

HP 3PAR StoreServ File Controller v2 (WSS2012 R2)	E7X02A
HP 3PAR StoreServ File Controller 1Gb Performance Kit	E7X04A
NOTE: This kit adds the second Intel® Xeon® E5-2609v2 Processor, an additional 16GB (4 x 4GB) of Memory, and a 1GbE 4 port NC365T Adapter to the 3PAR File Controller v2	
HP 3PAR StoreServ File Controller 10Gb Performance Kit	E7X05A
NOTE: This kit adds the second Intel® Xeon® E5-2609v2 Processor, an additional 16GB (4 x 4GB) of Memory, and a 10GbE 2 port 560SFP+ Adapter to the 3PAR File Controller v2	
HP 3PAR StoreServ File Controller (WSS2012)	C8S69A



Front View:

1. Quick removal access panel
2. Second Intel Processor
3. First Intel Processor
4. 24 DIMM slots: DDR3 Registered (RDIMM), Load Reduced (LRDIMM), or Unbuffered (UDIMM) memory
5. Air Baffle
6. Hot-plug fans, full N+1 redundancy
7. Health LED
8. Power On /Standby button and system power LED button
9. USB connector
10. Unit ID LED



Rear View:

1. PCIe 3.0 Slots 1, 2, 3-PCIe 2.0 top to bottom
2. N/A
3. Power supply 1
4. Power supply 1 Power LED
5. Power supply 1 Power connection (with Intelligent PDU communication)
6. Power supply 2 Power connection (with Intelligent PDU communication)
7. Power supply 2 Power LED
8. Power supply 2
9. Unit ID LED/Button
10. USB connectors (4)

Overview

- | | | | |
|-----|---|-----|---|
| 11. | Systems Insight Display | 11. | Video connector |
| 12. | Asset Tag | 12. | iLO connector |
| 13. | USB connector | 13. | Serial connector |
| 14. | Drive Bays | 14. | FlexibleLOM ports (Shown: 4 ports 1Gb each /Optional:
2 ports 10Gb each) |
| 15. | Optional Slim Optical Bay (SATA DVD-RW /ROM
Optical Drive) | | |
| 16. | Video connector | | |

Features and Benefits

Efficient: Save money and time

The HP 3PAR StoreServ File Controller v2 supports thousands users concurrently accessing their files.

Non-intrusive variable chunk de-duplication delivers an average 50-60% space savings, and included evaluation tool facilitates capacity planning.

Consolidate multiple diverse file protocols (NFS: v2, v3, v4.1 | SMB: 2.0, 2.1, 3.0 | WebDAV | FTP/FTPS | HTTP/HTTPS) as well as IT services (e.g. print, DNS, DHCP) in a single platform.

Hosted BranchCache reduces your branch office WAN usage by automatically caching frequently accessed headquarter datacenter files.

Straightforward and consistent management experience that provides storage management for both file and block based workloads.

Bulletproof: Protect your data and organization always

Built in file system encryption and optional BitLocker Drive Encryption secures data at rest while SMB Encryption protects data in flight.

File Classification Infrastructure facilitates sophisticated access controls and support for Active Directory Rights Management Services protects files no matter where they go.

Online snapshots enable users to directly recover files and prior file versions.

Broad support for onboard endpoint protection (antivirus) software eliminates the need to purchase additional external infrastructure.

Broad support for agent-based data protection enhances the ability to meet backup and recovery SLAs.

Effortless: Simple to Manage and Monitor

Turnkey clustered controller configurations with transparent failover for SMB and NFS provide continuous availability.

Cluster aware updates enable online maintenance.

File system online self-healing, online verification, and precise and rapid repair massively reduce downtime from file corruption.

HP Active Health System, mirrored OS disks, RAID for data disks, redundant fans and power, and advanced memory protection maximize uptime.

Three year onsite parts and labor warranty for the system, and one year of software telephone support.

Standard Features

Operating System

Microsoft Windows Storage Server 2012 R2, Standard Edition

- Windows Storage Server 2012 R2 (WSS2012 R2) includes a robust range of file serving and storage capabilities. It addresses heterogeneous file workload environments and enables more efficient storage utilization. It allows for a flexible mix of configurations and includes advanced data management tools. WSS2012 leverages your Windows Server management skill sets and tools including Active Directory, PowerShell and System Center.
- SMB 3.0: Leverage high performance continually available file shares to deliver feature-rich storage for continuously available file services, business-critical applications and virtual servers using advanced new functionality.
- New VHDX Standard: Deploy larger capacity virtual storage that can grow to 16 terabytes, is more resilient against corruption, and provides more efficient usage of new 4 KB sector hard disks with the new VHDX virtual storage standard.
- Live Storage Migration: Maintain maximized service-level availability even while moving virtual machine storage between host servers independent of the actual virtual machine.
- SMB Multi-channel: Enable aggregation of network bandwidth and network fault tolerance when multiple paths are available between SMB clients and file servers.
- NFS v4.1: For Windows Storage Server 2012 R2, Server for NFS has been updated to support continuous availability. These improvements make it possible to reliably store and run VMware ESX on a virtual machine that is running Windows Server 2012 by using the NFS protocol to share files. Additional improvements in failover clustering take advantage of better resilience to hardware and software outages that may afflict individual cluster nodes. At the same time, failover clustering isolates VMware ESX hypervisor hosts from intermittent glitches during failovers.
- Data Deduplication: Data deduplication enables Windows Storage Server 2012 R2 to store more data in less physical space and achieve storage efficiency that is significantly higher than was possible in previous releases of Windows Storage Server that used Single Instance Storage (SIS) or NTFS file system compression. Data deduplication uses variable size chunking and compression, which deliver optimization ratios of 2:1 for general file servers and up to 20:1 for virtualization data. Evaluate your savings with the Deduplication Evaluation Tool.
Volume Shadow Copy Service: Creates point-in-time copies (snapshots) of files and folders at predetermined time intervals that can then be accessed from client computers.
- VSS for Remote SMB File Shares: Leverage proven Volume Shadow Copy Service (VSS) to offload snapshot and backup operations to remote storage from VSS hardware providers within Hyper-V virtual machines.
- Hosted Branch Cache: Using client/server architecture, Windows 7 and above client computers can cache content on the local network via the Hosted Cache running on the 3PAR StoreServ File Controller. Other clients who need the same content retrieve it directly from the Hosted Cache.
- DFS Namespaces: Enables you to group shared folders that are located on different servers into one or more logically structured namespaces. Each namespace appears to users as a single shared folder with a series of subfolders. However, the underlying structure of the namespace can consist of numerous file shares that are located on different servers and in multiple sites.
- Distributed File System Replication (DFS-R): Enables you to efficiently replicate folders (including those referred to by a DFS namespace path) across multiple servers and sites. DFS Replication uses a compression algorithm known as remote differential compression (RDC). RDC detects changes to the data in a file, and it enables DFS Replication to replicate only the changed file blocks instead of the entire file.
- Work Folders: With Work Folders users can store and access work files on personal computers and devices, often referred to as bring-your-own device (BYOD), in addition to corporate PCs. Users gain a convenient location to store work files, and they can access them from anywhere. Organizations maintain control over corporate data by storing the files on centrally managed file servers, and optionally specifying user device policies such as encryption and lock-screen passwords. Work Folders can be deployed with existing

Standard Features

deployments of Folder Redirection, Offline Files, and home folders. Work Folders stores user files in a folder on the server called a sync share. You can specify a folder that already contains user data, which enables you to adopt Work Folders without migrating servers and data or immediately phasing out your existing solution.

- File Server Resource Manager (FSRM): File Server Resource Manager is a set of features that allow you to manage and classify data that is stored on file servers. File Server Resource Manager includes the following features:
 - Storage reports: Storage reports are used to help you identify trends in disk usage and how your data is classified. You can also monitor a selected group of users for attempts to save unauthorized files.
 - File Classification Infrastructure: File Classification Infrastructure provides insight into your data by automating classification processes so that you can manage your data more effectively. You can classify files and apply policies based on this classification. Example policies include dynamic access control for restricting access to files, file encryption, and file expiration. Files can be classified automatically by using file classification rules or manually by modifying the properties of a selected file or folder.
 - File Management Tasks: File Management Tasks enables you to apply a conditional policy or action to files based on their classification. The conditions of a file management task include the file location, the classification properties, the date the file was created, the last modified date of the file, or the last time the file was accessed. The actions that a file management task can take include the ability to expire files, encrypt files, or run a custom command.
 - Quota management: Quotas allow you to limit the space that is allowed for a volume or folder, and they can be automatically applied to new folders that are created on a volume. You can also define quota templates that can be applied to new volumes or folders.
 - File screening management: File screens help you control the types of files that user can store on a file server. You can limit the extension that can be stored on your shared files. For example, you can create a file screen that does not allow files with an MP3 extension to be stored in personal shared folders on a file server.
- Initial Configuration Tasks Wizard: Simplifies and accelerates new device deployment by presenting basic system settings on your first boot.
- Server Manager
- Print Management Console: Manage multiple printers (license for unlimited printer support) from a single console, whether locally or over the WAN
- Unlimited Client Access Licenses (CALs) included

NOTE: Windows Storage Server 2012 R2 and Windows Server 2012 R2 are built on the same code base. Applications certified for Windows Server are expected to have the same application compatibility profile on Windows Storage Server. Windows Storage Server 2012 R2 and Windows Server 2012 R2 have the same application frameworks, services and plumbing to support running the full breadth of Window-compatible applications. Applications that rely upon certain roles that are removed from Windows Storage Server 2012 R2, such as fax server, active directory domain controller or terminal services will not be able to leverage those roles. Independent Software Vendors (ISVs) ultimately decide what versions and editions of Windows are supported by their products and users should review ISV compatibility and support information before purchasing. HP StoreEasy customers should review the End User License Agreement (EULA) to see the types of applications that are permitted for installation. All versions of Windows Storage Server can join Active Directory domains, but cannot be a domain controller.

More information on Windows Storage Server 2012 R2, Standard Edition can be found here:
<http://www.microsoft.com/en-us/server-cloud/windows-storage-server/default.aspx>
<http://technet.microsoft.com/en-us/library/jj643303>

Standard Features

Processor / Cache Memory	Intel® Xeon® E5-2609v2 (2.50GHz/4-core/10MB/80W) Processor (3PAR StoreServ File Controller v2) Intel® Xeon® E5-2609 (2.40GHz/4-core/10MB/80W) Processor (3PAR StoreServ File Controller)
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Memory	Type Standard DIMM Sockets	DDR3 Registered (RDIMM) standard 16GB (4 x 4GB) 24
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Network Controller	NIC Ports Controller	4 HP Ethernet 1Gb 4-port 331FLR Adapter
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HP 3PAR StoreServ File Controller v2

Expansion Slots

Primary Riser (Standard)	Expansion Slots #	Technology	Bus Width**	Connector Width	Bus Number*	Form Factor	Notes
	1	PCIe 3.0	X16	X16	7	Full Length, Full Height Slot	Proc 1
	2	PCIe 3.0	X8	X8	10	Half Length, Full Height Slot	Proc 1
	3	PCIe 2.0	X4	X8	13	Half Length, Full Height Slot	Chipset

* Default bus assignment (in decimal). Inserting cards with PCI bridges may alter the actual bus assignment number

** Indicates the number of physical electrical lanes running to the connector.

NOTE: When populating the second optional riser slot, the second processor must be installed.

NOTE: All slots support up to 150w PCIe cards, but an additional Power Cord Option is required (PN 669777-B21). See Option Section below for offering.

PCIe Riser (Optional 3-slot)	Expansion Slots #	Technology	Bus Width**	Connector Width	Bus Number*	Form Factor	Notes
	4	PCIe 3.0	X16	X16	16	Full Length, Full Height Slot	Proc 2
	5	PCIe 3.0	X8	X8	20	Half Length, Full Height Slot	Proc 2
	6	PCIe 3.0	X4	X8	23	Half Length, Full Height Slot	Proc 2

* Default bus assignment (in decimal). Inserting cards with PCI bridges may alter the actual bus assignment number

** Indicates the number of physical electrical lanes running to the connector.

NOTE: When populating the second optional riser slot, the second processor must be installed.

NOTE: All slots support up to 150w PCIe cards, but an additional Power Cord Option is required (669777-B21). See Option Section below for offering

Standard Features

Storage Controller	NOTE: HP 3PAR StoreServ File Controller includes a storage controller designed for internal drives housing the O/S mirror only; an HBA is required to address connectivity to the 3PAR StoreServ Storage array.
Controller(s)	HP Smart Array P420i/1GB with FBWC
RAID	Needed for internal drive mirror only
<hr/>	
Storage	Hard Drives
	Internal
	Eight 2.5" (Small Form Factor) hot-plug bays
	<ul style="list-style-type: none">• 2 x 300GB 6G SAS 10K SFF HDDs for OS mirror (3PAR File Controller v2)• 2 x 450GB 6G SAS 10K SFF HDDs for OS mirror (3PAR File Controller)
	External
	3PAR StoreServ Storage using Fibre Channel
<hr/>	
Power Supply	2 x 460 Watts Platinum
<hr/>	
Power Cords	NOTE: The HP 3PAR StoreServ File Controller is primarily connected to PDU's in data center racks so they now ship standard with only a PDU 6-foot C-14 to C13 power cord (142258-001). If a user wishes to power a system using a 110V receptacle see Power Cord option section for more options.
<hr/>	
System Fans	(4) (N+1 redundancy standard)
<hr/>	
Form Factor	2U Rack form factor
<hr/>	
Host Bus Adapter (HBA) Support	HP 3PAR StoreServ File Controller is designed to be connected to a HP 3PAR StoreServ Storage array by adding a recommended Fibre Channel HBA.

Service and Support, HP Care Pack, and Warranty Information

Warranty

3 Year, On-site Warranty Service. 7x24 4-hour remote response with next business day on-site response.

HP warrants only that the Software media will be free of physical defects for a period of ninety (90) days from delivery.

Services Included with the Product One year of HP Software Support, standard 9x5 business hours (software advisory and remedial software telephone support, new version license rights, and media and documentation distribution service).

For increased uptime, productivity and ROI-HP Care Pack packaged services for Storage

These days, you need to get the most out of your storage investment-you can't afford not to. When you buy HP storage products and solutions, it's also a good time to think about what levels of service and support you may need. To help take the worry out of deploying, designing, maintaining, and managing your environment, we've designed a portfolio of service options that are as: flexible, reliable and scalable as your storage. Unlike storage-only vendors, we take a holistic approach to your entire environment, bridging storage, servers, blades, software and network infrastructures with our HP Care Pack packaged services for Storage.

Protect your business beyond the warranty

When it comes to robustness and reliability, standard warranties on today's computing equipment have matured just as the technologies have matured. Good news on some fronts-but also a source of potential problems and subsequent consequences that come from depending on standard warranties alone. Standard warranty protects against product defects and some causes of downtime- but not the business. By using a standard approach to warranty uplifts, such as HP Care Pack Services, you can reduce downtime risks and be more certain of operational consistency for both mission-critical and standard business computing. Simply put, HP Care Pack Services normalize the warranty of combined products - helping you proactively guard against unplanned downtime.

Extending warranties with HP Care Pack Services

For cost-effective upgrading or extending your standard warranty, HP Care Pack Services offer a suite of standard reactive hardware and software support services that are sold separately, or combined as with our Foundation Care 24x7 services. The portfolio also provides a combination of proactive and reactive services, such as Proactive 24 Service and Critical Service. In addition, with HP Proactive Select we offer an innovative approach to service delivery that gives you the flexibility to acquire the specific proactive services you need today, then add services as your needs evolve. HP Proactive Select offers a broad set of technical or per-event type service options - including server, storage, and network, SAN device, and software, environment, installation and education services. Services that you can mix and match depending on your specific requirements, from preliminary planning and equipment delivery to installation, configuration, integration, and testing, through every level of ongoing support. Our HP Care Pack packaged services for Storage assures help when you need it most. And for many products, post-warranty HP Care Pack Services are available when your original warranty has expired.

HP Storage Services: Offering reliability, flexibility and value-just like your storage

HP Storage Services offers a full spectrum of customer care, from technology support to complex migrations to complete completely managed services. HP Factory Express provides customization, integration and deployment services for turnkey solutions. HP Education offers flexible, comprehensive training on storage networking, disk storage systems, and storage software to help your IT staff get the most out of your investments. And HP Financial solutions extend innovative financing and asset management programs to cost-effective buy, manage and eventually retire your older equipment.

HP Storage Services, the trusted business technology experts who manage your technology in action, because when technology works, business works. <http://www.hp.com/hps/storage>

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

HP Care Pack Services are sold by HP and HP Authorized Service Partners

- Services for customers purchasing from HP or an enterprise reseller are quoted using HP order configuration tools.
- Customers purchasing from a commercial reseller can find HP Care Pack Services at:
<http://www.hp.com/go/lookuptool>

Recommended HP Care Pack Services for optimal satisfaction with your HP product.

Recommended Support 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 Installation and Startup Service for 3PAR StoreServ File Controller

For smooth startup, HP Installation and Startup Service provides for deployment of your HP 3PAR StoreServ File Controller while helping you establish readily available access to and management of your critical data and applications. Leverage the full strength of HP Technology Services - customers can trust the services professionals at HP to work collaboratively with them, putting our strategic and technical know-how to work across their entire infrastructure.

- System installation and setup by a HP technical specialist
- Reduced implementation time and cost
- Verification prior to installation that all service prerequisites are met
- Availability of an HP service specialist to answer basic questions related to this service during the orientation session
- Potential expansion of the number of shares and hosts

<http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA2-6112ENL.pdf>

HP Proactive Select Service

HP Proactive Select Service improves your IT performance and manageability through the use of cost effective flexible services. HP provides technical expertise and best practices to accelerate ROI of your technology investment. Selectable proactive services span a wide range of technology and process services - a flexible way to purchase proactive services that fit your particular environment and situation.

HP Proactive Select Service is technology agnostic and purchased in addition to your choice of underlying reactive support.

- Access to a list of flexible and customizable proactive service activities
- Enhance customers' in-house IT team with complementary assistance from HP
- Improved time to solution
- Reduce business risk and project costs by accessing HP specialists
- Simplify IT operational procedures by leveraging HP best practices

<http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA2-3842ENN.pdf>

Service and Support, HP Care Pack, and Warranty Information

Optional HP Care Pack Services that will enhance your HP product experience.

Optional Services **HP Data Migration Service for Windows**

For customers who need to safely migrate Windows data within their TCP/IP networks with minimal impact to their operations:

You have a need to migrate data between Windows servers within your TCP/IP network. Or you have a need to migrate storage for your Windows servers. Or both. And you need to accomplish these migrations efficiently while minimizing risk at the same time.

HP Data Migration Service for Windows offers you a cost competitive and convenient way to accommodate data migration triggered by a need to refresh or consolidate storage, or to create different storage tiers. This service offers a migration cost in line with the costs of storage products in small and medium-sized storage environments. The service is delivered via a skilled HP service specialist with special consideration for data availability, integrity, and ongoing operational performance during the transfer process.

<http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA2-4734ENW.pdf>

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>

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

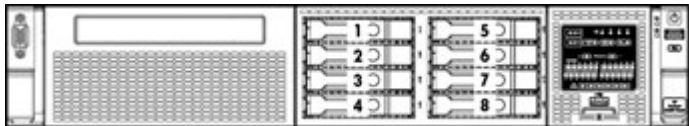
HP Services Awards

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://h20219.www2.hp.com/services/cache/433028-0-0-225-121.html>

Additional Services Information

For more information about HP Care Pack Services for Storage, please visit: <http://www.hp.com/hps/storageelf> 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>

Storage



1-8 Eight 3.5" (LFF) hot plug hard drive bays (File Controller ships with only two SAS drives for OS)

Technical Specifications

3PAR StoreServ File Controller

System Unit	Dimensions (H x W x D) SFF Drives: 3.44 x 17.54 x 27.50 in (8.73 x 44.55 x 69.85 cm) (with bezel)									
	Weight (approximate)	<table border="0"> <tr> <td style="padding-right: 20px;">Maximum (all hard drives, power supply, and processor installed)</td> <td style="padding-left: 20px;">61.00 lb (27.66 kg)</td> </tr> <tr> <td>Minimum (one hard drive, power supply, and processor installed)</td> <td>41.0 lb (18.59 kg)</td> </tr> </table>	Maximum (all hard drives, power supply, and processor installed)	61.00 lb (27.66 kg)	Minimum (one hard drive, power supply, and processor installed)	41.0 lb (18.59 kg)				
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	Input Requirements (per power supply)	<table border="0"> <tr> <td style="padding-right: 20px;">Rated Line Voltage</td> <td style="padding-left: 20px;">100 to 120 VAC 200 to 240 VAC</td> </tr> <tr> <td>Rated Input Current</td> <td>For 1200 W Power Supply: 10 A (at 100 VAC), 4.9 A (at 200 VAC) For 750 W Power Supply: 8.9 A (at 100 VAC), 4.3 A (at 200 VAC) For 460 W Power Supply: 5.5 A (at 100 VAC), 2.6 A (at 200 VAC)</td> </tr> <tr> <td>Rated Input Frequency</td> <td>50 to 60 Hz</td> </tr> <tr> <td>Rated Input Power</td> <td>For 1200 W Power Supply: 930 W (at 100 VAC), 1348 W (at 200 VAC) For 750 W Power Supply: 857 W (at 100 VAC), 824 W (at 200 VAC) For 460 W Power Supply: 526 W (at 100 VAC), 505 W (at 200 VAC)</td> </tr> </table>	Rated Line Voltage	100 to 120 VAC 200 to 240 VAC	Rated Input Current	For 1200 W Power Supply: 10 A (at 100 VAC), 4.9 A (at 200 VAC) For 750 W Power Supply: 8.9 A (at 100 VAC), 4.3 A (at 200 VAC) For 460 W Power Supply: 5.5 A (at 100 VAC), 2.6 A (at 200 VAC)	Rated Input Frequency	50 to 60 Hz	Rated Input Power	For 1200 W Power Supply: 930 W (at 100 VAC), 1348 W (at 200 VAC) For 750 W Power Supply: 857 W (at 100 VAC), 824 W (at 200 VAC) For 460 W Power Supply: 526 W (at 100 VAC), 505 W (at 200 VAC)
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	BTU Rating	<table border="0"> <tr> <td style="padding-right: 20px;">Maximum</td> <td style="padding-left: 20px;">For 1200 W Power Supply: 3530 BTU/hr (at 100 VAC), 4600 BTU/hr (at 200 VAC) For 750 W Power Supply: 2925 BTU/hr (at 100 VAC), 2812 BTU/hr (at 200 VAC) For 460 W Power Supply: 1794 BTU/hr (at 100 VAC), 1725 BTU/hr (at 200 VAC)</td> </tr> </table>	Maximum	For 1200 W Power Supply: 3530 BTU/hr (at 100 VAC), 4600 BTU/hr (at 200 VAC) For 750 W Power Supply: 2925 BTU/hr (at 100 VAC), 2812 BTU/hr (at 200 VAC) For 460 W Power Supply: 1794 BTU/hr (at 100 VAC), 1725 BTU/hr (at 200 VAC)						
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	Power Supply Output (per power supply)	<table border="0"> <tr> <td style="padding-right: 20px;">Rated Steady-State Power</td> <td style="padding-left: 20px;">For 1200 W Power Supply: 800 W (at 100 VAC), 900 W (at 120 VAC), 1200 W (at 200 to 240 VAC) For 750 W Power Supply: 750 W (at 100 to 120 VAC), 750 W (at 200 to 240 VAC) For 460 W Power Supply: 460 W (at 100 to 120 VAC), 460 W (at 200 to 240 VAC)</td> </tr> <tr> <td>Maximum Peak Power</td> <td>For 1200 W Power Supply: 800 W (at 100 VAC),</td> </tr> </table>	Rated Steady-State Power	For 1200 W Power Supply: 800 W (at 100 VAC), 900 W (at 120 VAC), 1200 W (at 200 to 240 VAC) For 750 W Power Supply: 750 W (at 100 to 120 VAC), 750 W (at 200 to 240 VAC) For 460 W Power Supply: 460 W (at 100 to 120 VAC), 460 W (at 200 to 240 VAC)	Maximum Peak Power	For 1200 W Power Supply: 800 W (at 100 VAC),				
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Technical Specifications

		900 W (at 120 VAC), 1200 W (at 200 to 240 VAC) For 750 W Power Supply: 750 W (at 100 to 120 VAC), 750 W (at 200 to 240 VAC) For 460 W Power Supply: 460 W (at 100 to 120 VAC), 460 W (at 200 to 240 VAC)
System Inlet Temperature	Operating	10° to 35°C (50° to 95°F) at sea level with an altitude derating of 1.0°C per every 304.8 m (1.8°F per every 1000 ft) above sea level to a maximum of 3048 m (10,000 ft), no direct sustained sunlight. Maximum rate of change is 10°C/hr (18°F/hr). The upper limit may be limited by the type and number of options installed. System performance may be reduced if operating with a fan fault or above 30°C (86°F).
	Non-operating	-30° to 60°C (-22° to 140°F). Maximum rate of change is 20°C/hr (36°F/hr).
Relative Humidity (non-condensing)	Operating	10% to 90% relative humidity (Rh), 28°C (82.4°F) maximum wet bulb temperature, non-condensing.
	Non-operating	10% to 90% relative humidity (Rh), 28°C (82.4°F) maximum wet bulb temperature, non-condensing.
Altitude	Operating	3048 m (10,000 ft). This value may be limited by the type and number of options installed. Maximum allowable altitude change rate is 457 m/min (1500 ft/min).
	Non-operating	9144 m (30,000 ft). Maximum allowable altitude change rate is 457 m/min (1500 ft/min).
Acoustic Noise	Listed are the declared A-Weighted sound power levels (LWAd) and declared average bystander position A-Weighted sound pressure levels (LpAm) when the product is operating in a 23°C ambient environment. Noise emissions were measured in accordance with ISO 7779 (ECMA 74) and declared in accordance with ISO 9296 (ECMA 109). The listed sound levels apply to standard shipping configurations. Additional options may result in increased sound levels. NOTE: The Listed sound levels apply to standard shipping configurations. Additional options may result in increased sound levels.	
	Idle	
		LWAd 4.1 B
		LpAm 25 dBA
	Operating	
		LWAd 4.3 B
		LpAm 27 dBA
Emissions Classification (EMC)	FCC Rating	Class A
	Normative Standards	CISPR 22; EN55022; EN55024; FCC CFR 47, Pt 15; ICES-003; CNS13438; GB9254; K22;K24; EN 61000-3-2; EN 61000-3-3; EN 60950-1; IEC 60950-1

Technical Specifications

NOTE: Product conformance to cited product specifications is based on sample (type) testing, evaluation, or assessment. This product or family of products is eligible to bear the appropriate compliance logos and statements.

NOTE: The Listed sound levels apply to standard shipping configurations. Additional options may result in increased sound levels.

HP iLO 4 On System Management	Architecture	PCI Express based health and remote management ASIC
	Processor	Embedded ARM processor core operating at 400MHz
	Upgradeability	Firmware upgradeable via Flash ROM
	Video Support	1920 x 1200 (16 bpp) DVR max resolution
	Interfaces	HP iLO Dedicated* Network connection (10/100/1000 Mbps) on ML, DL and SL systems *Optional Module on some servers HP iLO Shared Network connection (10/100/1000 Mbps) on ML, DL and SL systems HP iLO Network connection (10/100 Mbps) to Onboard Administrator (with 10/100/1000 Mbps uplink) to BladeSystem link is 1Gbps
	Memory	16 MB Flash 256 MB DDR 3 with ECC (112 MB after ECC and video)
	Operating System Support	For information on HP's Certified and Supported ProLiant Servers for OS and Virtualization Software and latest listing of software drivers available for your server including how to purchase from HP, please visit our OS Support Site at: http://www.hp.com/go/ossupport
	Client System Support	For information on Client System Support, please visit the HP iLO Feature Comparison Site at: www.hp.com/go/compareilo
	Client Browser Support	Microsoft Internet Explorer 9 NOTE: For customers using Protected Mode, please use the Java based version of Integrated Remote Console. Microsoft Internet Explorer 8 NOTE: For customers using Protected Mode, please use the Java based version of Integrated Remote Console. Microsoft Internet Explorer 7 Firefox Extended Support Release (ESR) 10 (on supported Windows and Linux systems) Firefox 3.6 (on supported Windows and Linux systems)
	Command Line Support	Secure Shell and serial port access Secure Socket Layer Secure Shell version 2
	Security	Advanced Encryption Standard (AES) and Triple Data Encryption Standard (3DES) on browser, CLP and XML scripting interface AES encryption of video RC4 encryption of video
	Directory Support Services	Active Directory v1.0 (Windows 2003)
	Driver Support	HP ProLiant iLO 4 Management Controller Driver Package
	Management protocols supported	SNMP, IPMI 2.0 (system and LAN interface), DMTF Systems Management Architecture for Server Hardware Command Line Protocol (SMASH CLP), HP RIBCL XML

Technical Specifications

HP Smart Array P420i Controller	Dimensions	Embedded
	Disk Drive and Enclosure Interface - Transfer rate	6Gb/s SAS (Serial Attached SCSI) 3Gb/s SATA (Serial ATA)
	SAS Connectors	2 internal 4X connectors
	Cache Memory Speed	512MB FBWC - DDR3-1333MHz with 40-bit wide bus, 1GB or 2GB FBWC DDR3-1333MHz with 72-bit wide bus
	Server Interface	x8 PCIe 3.0 provides 8GB/s maximum bandwidth
	SAS Speed	(8) 6Gb/s SAS links provide 4.8GB/s maximum bandwidth
	Cache Memory	Zero Memory RAID has no cache memory 40-bit 256MB ECC protected cache (battery upgrade available) 72-bit 512MB BBWC or 72-bit 512MB and 1G FBWC
	Logical Drives Supported	Zero Memory, Up to 2 logical volumes (8SFF or 4LFF physical drives) Up to 64 logical drives with cache
	Host Memory Addressing	64-bit, supporting greater than 4GB server memory space

HP Ethernet 1Gb 4-port 331FLR Adapter	HP Flexible Network Technology	HP Flexible Network Technology consists of replaceable network solutions to meet the customers require now or in the future.	
	Network Interface	10Base-T/100Base-TX/1000Base-TX	
	Compatibility	IEEE 802.3 10Base-T	
		IEEE 802.3ab 1000Base-T	
		IEEE 802.3ad 1000Base-TX	
		IEEE 802.1p 100Base-TX	
		IEEE 802.1q 100Base-TX	
	Data Transfer Method	PCI Express, four lanes (x4)	
	Controller	BCM5719	
	Network Transfer Rate	10Base-T (Half-Duplex)	10 Mb/s
10Base-T (Full-Duplex)		20 Mb/s	
100Base-TX (Half-Duplex)		100 Mb/s	
100Base-TX (Full-Duplex)		200 Mb/s	
1000Base-TX (Half and Full-Duplex)		2000 Mb/s	
Connector	Two RJ-45		
Cable Support	10Base-T	Categories 3, 4 or 5 UTP; up to 328 ft (100 m)	
	10/100/1000Base-TX	Category 5 or higher UTP; up to 328 ft (100 m)	

Technical Specifications

Environment-friendly Products and Approach

End-of-life Management and Recycling

Hewlett-Packard offers end-of-life HP product return, trade-in, and recycling programs in many geographic areas. For trade-in information, please go to: <http://www.hp.com/go/green>. To recycle your product, please go to: <http://www.hp.com/go/green> or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.

The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: <http://www.hp.com/go/green>. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.

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For drives, 1 TB = 1 trillion bytes. Actual formatted capacity is less.