

Overview

HPE 3PAR StoreServ 8000 Storage

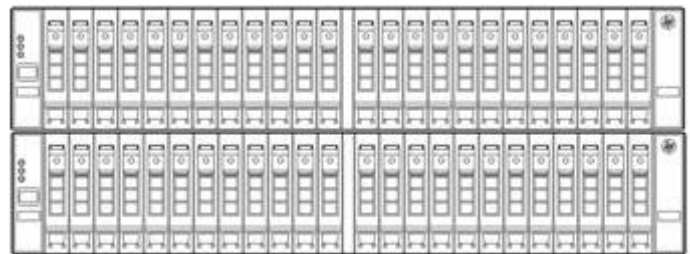
The HPE 3PAR StoreServ 8000 Storage offers enterprise Tier 1 storage at a midrange price. HPE 3PAR StoreServ 8000 Storage delivers the performance advantages of a purpose-built, flash-optimized architecture without compromising resiliency, efficiency, or data mobility. The new HPE 3PAR Gen5 Thin Express ASIC provides silicon-based hardware acceleration of thin technologies, including inline deduplication, to reduce acquisition and operational costs by up to 75% without compromising performance. With unmatched versatility, performance, and density, HPE 3PAR StoreServ 8000 Storage gives you a range of options that support true convergence of block and file protocols, all-flash array performance, and the use of spinning media to further optimize costs. HPE 3PAR StoreServ 8000 Storage offers rich, Tier-1 data services, quad-node resiliency, seamless data mobility between systems, high availability through a complete set of persistent technologies, and simple and efficient data protection with a flat backup to HPE StoreOnce Backup appliances. Four models are available: 8200, 8400, 8440, and 8450. You can start small and grow without painful upgrades down the road.

NOTE: For more information about the value of HPE 3PAR StoreServ 8000 Storage refer to the HPE 3PAR StoreServ 8000 Datasheet

HPE 3PAR StoreServ 8000 is storage made effortless.



HPE 3PAR StoreServ 8000 Storage
(2-Node Storage Base)



HPE 3PAR StoreServ 8000 Storage
(4-Node Storage Base)

What's New

- HPE 3PAR StoreServ 8200 Converged File/Block Starter Kit
- New 400GB MLC SSD drives
- New 4TB 7.2K and 3.84TB SSD FIPS 140-2 validated self-encrypting drives

Host OS Support

Citrix® XenServer® | HPE-UX® | IBM® AIX® | Microsoft® Windows® Server, including Microsoft® Hyper-V™ | Apple Mac OS

OpenVMS* | Oracle® Linux® (UEK and RHEL compatible kernels) | Oracle® Solaris | Ubuntu | VMware vSphere™

Overview

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

SUSE® Linux Enterprise | SUSE® Linux Virtualization | IBM Virtualization | Oracle VM

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

Summary	8200	8400	8440	8450
Number of Controller Nodes	2	2 or 4	2 or 4	2 or 4
HPE 3PAR Gen5 ASICs	2	2 or 4	2 or 4	2 or 4
Processors	2 x 6-core 2.2 GHz	2-4 x 6-core 2.2 GHz	2-4 x 10-core 2.4 GHz	2-4 x 10-core 2.4 GHz
Total Cache	832 GiB	1664 GiB	8384 GiB	384 GiB
Flash Cache (optional)	768 GiB	1536 GiB	8000 GiB	Not Applicable
On-Node Cache	64 GiB	128 GiB	384 GiB	384 GiB
Total Cache per node pair	832 GiB	832 GiB	4192 GiB	192 GiB
Flash Cache per node pair	768 GiB	768 GiB	4000 GiB	Not Applicable
On-Node Cache per node pair	64 GiB	64 GiB	192 GiB	192 GiB
Maximum Host Ports	12 ports	24 ports	24 ports	24 ports
16Gb/s Fibre Channel Host Ports	4 - 12 ports	4 - 24 ports	4 - 24 ports	4 - 24 ports
10Gb/s iSCSI Host Ports	0 - 4 ports	0 - 8 ports	0 - 8 ports	0 - 8 ports
10Gb/s FCoE Host Ports	0 - 4 ports	0 - 8 ports	0 - 8 ports	0 - 8 ports
1Gb/s Ethernet Adapter	0 - 8 ports	0 - 16 ports	0 - 16 ports	0 - 16 ports
10Gb/s Ethernet Adapter	0 - 4 ports	0 - 8 ports	0 - 8 ports	0 - 8 ports
Maximum Initiators Supported	2048	4096	4096	4096
Built-in 1GbE Ports ¹	2	2 - 4	2 - 4	2 - 4
2U Controller Node Drive Capacity	24	24	24	24
Number of Hard Disk Drives ²	6 – 240	6 – 576	6 – 960	Not Applicable
Number of Solid State Drives	6 – 120	6 – 240	6 – 480	6 – 480
Max Raw Capacity (approx.) ³	750 TiB ⁴	2400 TiB	3000 TiB	1843 TiB
Usable File Capacity ⁵	2 - 128TiB	2 - 256TiB	2 - 256TiB	2 - 256TiB

Overview

Capacity Details	8200	8400	8440	8450
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 (SSDs) ⁶	400 MLC SSD, 480 MLC SSD, 920 MLC SSD, 480 cMLC SSD, 1920 cMLC SSD, 3840 cMLC SSD			
Drive Capacities (HDD)	300 15K SAS ⁷ , 600 15K SAS 600 10K SAS, 1200 10K SAS, 1800 10K SAS 2000 7.2K NL ⁸ , 4000 7.2K NL, 6000 7.2K NL			Not Applicable
Number of Add-on Drive Enclosures ⁹	0 - 9 enclosures	0 - 22 enclosures	0 - 38 enclosures	0 - 18 enclosures

NOTE: Specifications are subject to change without notice.

¹Two built-in 1GbE ports per node pair can be used either for Remote Copy (RCIP) or for File Persona.

²Not applicable to HPE 3PAR StoreServ 8200 All-Flash Starter Kit and HPE 3PAR StoreServ 8400 All-Flash Starter Kit

³Maximum raw capacity currently supported with any and all drive types. The minimum supported raw capacity is equal to 8 * Min drive size available.

⁴For storage capacity, 1 GiB = 230 bytes and 1 TiB = 1,024 GiB

⁵Usable file capacity supported for HPE 3PAR File Persona Software Suite

⁶SSDs are Solid State Drives

⁷SAS drives are Serial Access SCSI Drives

⁸NL drives are Nearline (7200 RPM) Enterprise SAS drives

⁹Each Drive Enclosure holds up to 24 drives in 2U for small form factor (2.5") drives and 4U for large form factor (3.5") drives

HP 3PAR StoreServ 8000 Converged File/Block Starter Kit

HPE 3PAR StoreServ 8200 All-Flash Starter Kit

The HPE 3PAR StoreServ 8200 All-Flash Starter Kit is an all-flash version of the HPE 3PAR StoreServ 8200 that provides all-flash acceleration at entry-level price. The kit includes the HPE 3PAR StoreServ 8200 Storage System Base equipped with 8 x 480GB SFF cMLC SSD drives, the OS Suite, and Virtual Copy software. It also includes 3 year 24x7 Proactive Care Support. The HPE 3PAR StoreServ 8200 All-Flash Starter Kit has the same Drive LTUs cap (48) and maximum number of SSDs (120) as the HPE 3PAR StoreServ 8200.

Model	
HPE 3PAR StoreServ 8200 All Flash Starter Kit	M0S95A

The HPE 3PAR StoreServ 8200c All-Flash Starter Kit is an orderable part number that includes the following individual parts.

Quantity	Component	
1	HP 3PAR StoreServ 8200 2-node Field Integrated Storage Base	K2Q36A
8	HP 3PAR 8000 480GB SAS cMLC SFF SSD	K2P88A
1	HP 3PAR 8200 Operating System Suite Base LTU	L7B45A
8	HP 3PAR 8200 Operating System Suite Drive LTU	L7B46A
1	HP 3PAR 8200 Virtual Copy Base LTU	L7B57A
8	HP 3PAR 8200 Virtual Copy Drive LTU	L7B58A
1	OS Media Kit	BD362AAE / BD363AAE

HPE 3PAR StoreServ 8400 All-Flash Starter Kit

The HPE 3PAR StoreServ 8400 All-Flash Starter Kit is an all-flash version of the HPE 3PAR StoreServ 8400 that provides all-flash acceleration at entry-level price in a 4-node scalable system. The kit includes the HPE 3PAR StoreServ 8400 2-Node Storage System Base equipped with 8 x 480GB SFF cMLC SSD drives, the OS Suite, and Virtual Copy software. It also includes 3 year 24x7 Proactive Care Support. The HPE 3PAR StoreServ 8400 All-Flash Starter Kit has the same Drive LTUs cap (168) and maximum number of SSDs (240) as the HPE 3PAR StoreServ 8400.

Model	
HPE 3PAR StoreServ 8400 All-Flash Starter Kit	M0T18A

The HPE 3PAR StoreServ 8400 All-Flash Starter Kit is an orderable part number that includes the following individual parts.

HP 3PAR StoreServ 8000 Converged File/Block Starter Kit

Quantity	Component	
1	HP 3PAR StoreServ 8400 2-node Field Integrated Storage Base	H6Y96A
8	HP 3PAR 8000 480GB SAS cMLC SFF SSD	K2P88A
1	HP 3PAR 8400 Operating System Suite Base LTU	L7B69A
8	HP 3PAR 8400 Operating System Suite Drive LTU	L7B70A
1	HP 3PAR 8400 Virtual Copy Base LTU	L7B81A
8	HP 3PAR 8400 Virtual Copy Drive LTU	L7B82A
1	OS Media Kit	BD362AAE / BD363AAE

NOTE: It is possible to add more SSDs, drive enclosures (and any other 8000 accessory), and software to the HPE 3PAR StoreServ 8200/8400 All-Flash Starter Kit quote. Each of the nested components will appear as separate parts on the quote and will be priced accordingly

HPE 3PAR StoreServ 8200 Converged File/Block Starter Kit

The HPE 3PAR StoreServ 8200 Converged File/Block Starter Kit is a converged file/block version of the HPE 3PAR StoreServ 8200 that is twice as easy to manage, has 40% better density, and is more attractively priced than other comparable unified storage arrays. The kit includes the HPE 3PAR StoreServ 8200 Storage System Base equipped with 8 x 600GB 10K SFF HDDs and 12 x 2TB 7.2K LFF HDDs, a LFF SAS Drive Enclosure, 2 x 2-port 10GbE adapters, the OS Suite, Replication Suite, and 16 x File Persona 1TB LTUs. It also includes 3 year 24x7 Proactive Care Support. The HPE 3PAR StoreServ 8200 Converged File/Block Starter Kit has the same Drive LTUs cap (48) and maximum number of HDDs/SSDs (240/120) as the HPE 3PAR StoreServ 8200.

Model

HPE 3PAR StoreServ 8200 Converged File/Block Starter Kit

M0T74A

The HPE 3PAR StoreServ 8200 Converged File/Block Starter Kit is an orderable part number that includes the following individual parts.

Quantity	Component	
1	HP 3PAR StoreServ 8200 2N Fld Int Base	K2Q36A
1	HP 3PAR 8200 OS Suite Base LTU	L7B45A
20	HP 3PAR 8200 OS Suite Drive LTU	L7B46A
1	HP 3PAR 8200 Replication Suite Base LTU	L7B49A
20	HP 3PAR 8200 Replication Ste Drive LTU	L7B50A
16	HP 3PAR 8200 File Persona Ste 1TB LTU	BD440A
8	HP 3PAR 8000 600GB SAS 10K SFF HDD	K2P99A
12	HP 3PAR 8000 2TB SAS 7.2K LFF HDD	K2P95A
1	HP 3PAR 8000 LFF(3.5in) SAS Drive Encl	H6Z27A
2	HP 3PAR 8000 2-pt 10Gb Eth Adapter	E7Y70A
1	OS Media Kit	BD362AAE / BD363AAE

HP 3PAR StoreServ 8000 Converged File/Block Starter Kit

NOTE: It is possible to add more HDDs/SSDs, drive enclosures (and any other 8000 accessory), and software to the HPE 3PAR StoreServ 8200 Converged File/Block Starter Kit quote. Each of the nested components will appear as separate parts on the quote and will be priced accordingly

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 all HPE 3PAR StoreServ 8000 Solid State Drives is 5 years, parts only. Please refer to the HPE 3PAR StoreServ 8000 Drives section for the complete list of SSD SKUs. The warranty on all other HPE 3PAR StoreServ 8000 drives (SAS performance and Nearline SAS) is 3 years, parts only. Hewlett Packard Enterprise 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 Hewlett Packard Enterprise's Global Limited Warranty and Technical Support, visit: <http://www.hpe.com/products/storageworks/warranty>

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 HPE 3PAR StoreServ under the great majority of configurations, IO patterns, and workloads. HPE 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 Hewlett Packard Enterprise support contracts.

Service and Support

Technology Services for increased uptime, productivity and ROI
Trust HPE 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 HPE Storage Systems' capabilities requires a service partner who understands your increasingly complex environment. Team with the people who know Hewlett Packard Enterprise infrastructure hardware and software best—the experienced professionals at HPE Services.

Protect your business beyond warranty

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

What HPE Storage Technology Services can do for you

HPE Storage Technology Services can help you design, deploy, test, integrate, support, and manage IT and infrastructure solutions. HPE 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

Hewlett Packard Enterprise support recommendations are designed to help you enhance technology operations and lower risk—and make it easier for you to seek the right balance between affordability and service-level commitments. Depending on

Service and Support, HP Care Pack, and Warranty Information

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 Hewlett Packard Enterprise 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

HPE Proactive Care Advanced 24x7 - This service builds and incorporates on Proactive Care Service and also gives customers personalized technical and operational advice from an assigned, local Account Support Manager for personalized technical collaboration, flexible access to specialist skills to help optimize business critical IT, and enhanced Critical Incident Management to help so the business is not affected if there is a system or device outage.

Additional Option:

3 Year (or) 1 Year HPE Proactive Select Credits, HPE Data Sanitization Tier 1 Service

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

HPE 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, HPE Proactive Select 20 credits per year, select from an extensive menu of consultancy and technical services, such as health checks, assessments, and education.

Additional Option:

3 Year (or) 1 Year HPE Proactive Select Credits, HPE Data Sanitization Tier 1 Service

Basic Care - Recommended support

HPE 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.

Additional Option:

3 Year (or) 1 Year HPE Proactive Select Credits, HPE Data Sanitization Tier 1 Service

HPE Proactive Select is a flexible way to purchase services to fit your particular environment or situation. Working with a Hewlett Packard Enterprise 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.

Implementation

Installation:

Whichever level of care you select, consider our Installation and Startup Services for



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a smooth implementation.

HPE 3PAR StoreServ 8000 Storage Installation and Startup Service - For smooth startup, this service provides you with deployment of your HPE 3PAR StoreServ 8000 Storage, ensuring proper installation into your storage environment and helping you realize the maximum benefit from your storage investment.

<http://h71028.www7.hpe.com/ERC/downloads/4AA5-8035ENW.pdf>

Related Services

HPE Storage Transformation Workshop - Explore data management transformation journey to business-aligned visions, aligning your specific situation and Hewlett Packard Enterprise's experiences.

<http://h20195.www2.hpe.com/V2/GetPDF.aspx/4AA4-9541ENW.pdf>

HPE Storage Modernization Service - Modernize your storage to take better advantage of physical or virtualized server environments.

<http://h20195.www2.hpe.com/V2/GetPDF.aspx/4AA3-4620ENW.pdf>

HPE StoreServ Integration Service - Integrate your new HPE 3PAR StoreServ system so that it is agile, performs effectively, and scales to rapid growth.

<http://h20195.www2.hpe.com/V2/GetPDF.aspx/4AA4-9254ENW.pdf>

HPE Storage Data Migration Service - Hewlett Packard Enterprise 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 HPE 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.hpe.com/V2/GetPDF.aspx/4AA3-0774ENW.pdf>

HPE QuickStart Service for HPE 3PAR StoreServ Storage - Choose the most effective, appropriate methods for configuring and migrating to a HPE 3PAR platform.

<http://www8.hpe.com/us/en/services/services-detail.html?compURI=tcm:245-826727&pageTitle=Consulting-Services&contentView=business>

HPE EVA to HPE 3PAR Acceleration Service - The HPE EVA to HPE 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 HPE EVA to HPE 3PAR StoreServ. 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 HPE EVA to HPE 3PAR StoreServ data migration at their own pace and lowered cost.

<http://h20195.www2.hpe.com/V2/GetPDF.aspx/4AA4-4234ENW.pdf>

HPE 3PAR StoreServ 8000 Software Installation and Startup Service - Designed to provide a smooth startup, HPE 3PAR 8000 Software Installation and Startup Service provides deployment of your HPE 3PAR 8000 storage software, helping to ensure proper installation in your storage environment as well as helping you increase the benefit from your storage investment. Complementing your new HPE 3PAR 8000 storage software, HPE 3PAR 8000 Software Installation and Startup Service provides

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the necessary activities required to help you deploy your licensed HPE 3PAR 8000 software products into operation.

<http://h71028.www7.hpe.com/ERC/downloads/4AA5-8036ENW.pdf>

HPE SAN Deployment Service - Hewlett Packard Enterprise 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 Hewlett Packard Enterprise quality standards.

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

HPE 3PAR Replication Software Suite Installation and Startup Service - Provides implementation of the HPE 3PAR Virtual Copy, Remote Copy, Peer Persistence and Cluster Extension components of the HPE 3PAR Replication Software Suite product. The service is designed to help get HPE 3PAR 8000 Replication Software Suite up and running quickly and to provide a demonstration of the product's key features using sample or test data only. HPE 3PAR 8000 Replication Suite includes HPE 3PAR Remote Copy, HPE 3PAR Virtual Copy, HPE 3PAR Peer Persistence, and HPE 3PAR Cluster Extension. The HPE 3PAR Cluster Extension Implementation service is available separately.

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

HPE Data Replication Solution Service for HPE 3PAR Virtual Copy - HPE Data Replication Solution Service for HPE 3PAR Virtual Copy Software helps create, manage and configure local replication data mirroring and snapshot capabilities of HPE 3PAR StoreServ 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.hpe.com/V2/GetPDF.aspx/4AA3-8107ENW.pdf>

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

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

HPE 3PAR Adaptive Optimization Policy Implementation Service - HPE 3PAR Adaptive Optimization Policy Implementation Service provides analysis, recommendations, and implementation of HPE 3PAR Adaptive Optimization policies to enable storage tiering using data collected from the HPE 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 HPE 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.hpe.com/V2/GetPDF.aspx/4AA2-3842ENW.pdf>

HPE Storage Virtual Volume Design and Implementation Service - When

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

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

HPE Thin Volume Conversion Service - Provides evaluation and execution of conversion from standard to thin provisioned virtual volumes for HPE 3PAR Storage. A service specialist advises the customer on HPE 3PAR 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.hpe.com/V2/GetPDF.aspx/4AA2-3842ENW.pdf>

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

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

HPE 3PAR Health Check Service - The HPE 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 HPE 3PAR StoreServ Storage System. This health check service is best for HPE 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.hpe.com/V2/GetPDF.aspx/4AA4-3225ENW.pdf>

HPE 3PAR Storage Rebalance Service - The HPE 3PAR Rebalance Service helps balance data across an HPE 3PAR StoreServ Storage array 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.hpe.com/V2/GetPDF.aspx/4AA4-0280ENW.pdf>

For more information <http://www.hpe.com/services/storage>

To learn more on HPE Storage Services, please contact your Hewlett Packard Enterprise sales representative or Hewlett Packard Enterprise Authorized Channel Partner. HPE Care Pack Services are sold by Hewlett Packard Enterprise and Hewlett Packard Enterprise Authorized Service Partners:

- Services for customers purchasing from Hewlett Packard Enterprise or an enterprise reseller are quoted using Hewlett Packard Enterprise order

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configuration tools.

- Customers purchasing from a commercial reseller can find HPE Care Pack Services at: <http://www.hpe.com/go/lookuptool>

Configuration Information

Step 1 - Choose a Base configuration

HPE 3PAR StoreServ 8000 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.

HPE 3PAR StoreServ 8000 Base Configurations

Factory Integrated in HPE rack	HP 3PAR StoreServ 8200 2-node Storage Base	K2Q35A
	HP 3PAR StoreServ 8400 2-node Storage Base	H6Y95A
	HP 3PAR StoreServ 8400 4-node Storage Base	H6Z01A
	HP 3PAR StoreServ 8440 2-node Storage Base	H6Y97A
	HP 3PAR StoreServ 8440 4-node Storage Base	H6Y98A
	HP 3PAR StoreServ 8450 2-node Storage Base	H6Z17A
	HP 3PAR StoreServ 8450 4-node Storage Base	H6Z23A
Factory Integrated in HPE rack in a Storage Centric Configuration	HP 3PAR StoreServ 8200 2-node Storage Base for Storage Centric Rack	K2Q37A
	HP 3PAR StoreServ 8400 2-node Storage Base for Storage Centric Rack	H6Z12A
	HP 3PAR StoreServ 8400 4-node Storage Base for Storage Centric Rack	H6Z03A
	HP 3PAR StoreServ 8440 2-node Storage Base for Storage Centric Rack	H6Z09A
	HP 3PAR StoreServ 8440 4-node Storage Base for Storage Centric Rack	H6Z14A
	HP 3PAR StoreServ 8450 2-node Storage Base for Storage Centric Rack	H6Z20A
	HP 3PAR StoreServ 8450 4-node Storage Base for Storage Centric Rack	H6Z25A
Field Integrated	HP 3PAR StoreServ 8200 2-node Field Integrated Storage Base	K2Q36A
	HP 3PAR StoreServ 8400 2-node Field Integrated Storage Base	H6Y96A
	HP 3PAR StoreServ 8400 4-node Field Integrated Storage Base	H6Z02A
	HP 3PAR StoreServ 8440 2-node Field Integrated Storage Base	H6Z07A
	HP 3PAR StoreServ 8440 4-node Field Integrated Storage Base	H6Z13A
	HP 3PAR StoreServ 8450 2-node Field Integrated Storage Base	H6Z18A
	HP 3PAR StoreServ 8450 4-node Field Integrated Storage Base	H6Z24A

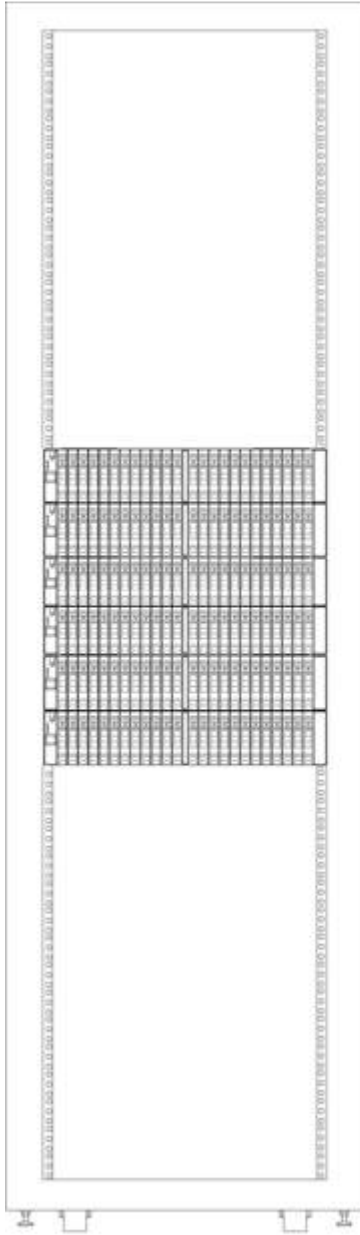
- A minimum of one (1) configuration base must be ordered for each array.
- The HPE 3PAR StoreServ 8000 base configuration includes (2 or 4) controller nodes, (24) small form factor drive bays

Configuration Information

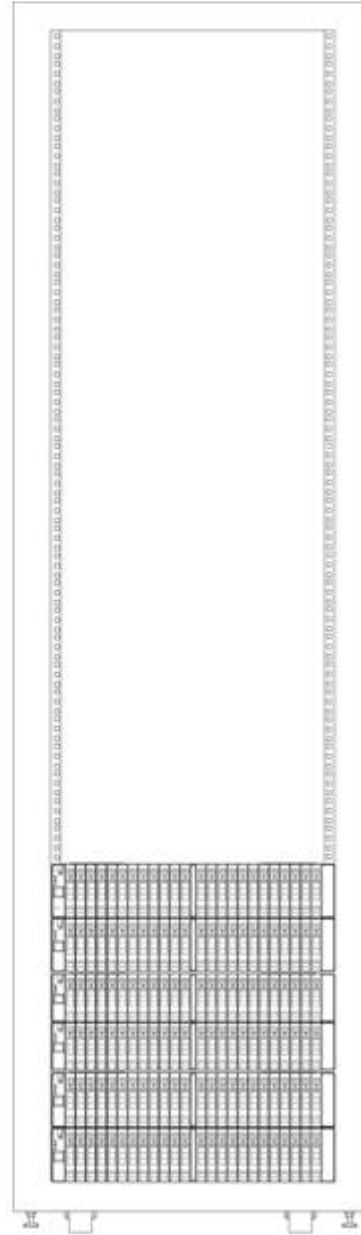
- per node pair, (4) built-in 16 Gb/sec FC ports per node pair, (4) 16Gb shortwave FC SFP per node pair, (2) PCIe adapter slots for host adapter cards per node pair (one slot per node), (2) 2m SAS cables per node pair, (1) mounting rail kit per node pair, and power cords.
- The HPE 3PAR StoreServ 8000 2-node base configuration also includes (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
 - All base configurations include (1) built-in 1GbE port for management and (1) 1GbE port for either Remote Copy over IP or File Persona, per node.
 - The Storage Centric rack versions of HPE 3PAR StoreServ 8000 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 diagrams show a HPE 3PAR StoreServ 8000 4N Storage System in Storage Centric and non-Storage Centric configurations

Configuration Information



StoreServ 8000 4-node Storage system in a storage centric configuration in a HPE Intelligent Series Rack



StoreServ 8000 4-node Storage system in a non-storage centric configuration in a HPE Intelligent Series Rack

HPE 3PAR StoreServ 8000 Upgrade Controller Node Pair

Use the HPE 3PAR StoreServ 8000 Upgrade Node Pair to convert an existing previously installed HPE 3PAR StoreServ 8000 2-node Storage Base into a 4-node configuration.

HP 3PAR StoreServ 8400 Upgrade Node Pair

H6Z06A

Configuration Information

HP 3PAR StoreServ 8440 Upgrade Node Pair	H6Z08A
HP 3PAR StoreServ 8450 Upgrade Node Pair	H6Z19A

- H6Z06A is used to upgrade a HPE 3PAR StoreServ 8400 2-node Storage Base into a 4-node configuration.
- H6Z08A is used to upgrade a HPE 3PAR StoreServ 8440 2-node Storage Base into a 4-node configuration.
- H6Z19A is used to upgrade a HPE 3PAR StoreServ 8450 2-node Storage Base into a 4-node configuration.
- One (1) pair of controller nodes beyond the base configuration is supported on the 3PAR StoreServ 8000.
- The 3PAR StoreServ 8000 Upgrade Node Pair includes (2) controller nodes, (24) small form factor drive bays, (4) built-in 16 Gb/sec FC ports, (4) 16Gb shortwave FC SFP, (2) PCIe adapter slots for host adapter cards (one slot per node), (2) 2m SAS cables, (4) node link cables, (1) mounting rail kit, and power cords
- The upgrade node pair includes (2) built-in 1GbE ports for management and (2) 1GbE ports for either Remote Copy over IP or File Persona.

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, with 10Gb/s iSCSI/FCoE ports, or with 1GbE/s and 10Gb/s Ethernet ports. The additional FC ports can be used for connection to hosts or used to connect to other HPE 3PAR StoreServ Storage systems in a Remote Copy relationship. The iSCSI/FCoE ports permit host connection in iSCSI and FCoE environments. The Ethernet ports can be used only with the HPE 3PAR File Persona Software Suite for File services connectivity.

HPE 3PAR StoreServ 8000 Host Adapters

HP 3PAR StoreServ 8000 4-port 16Gb Fibre Channel Adapter	H6Z00A
HP 3PAR StoreServ 8000 2-port 10Gb iSCSI/FCoE Adapter	H6Z10A
HP 3PAR StoreServ 8000 4-port 1Gb Ethernet Adapter	H6Z05A
HP 3PAR StoreServ 8000 2-port 10Gb Ethernet Adapter	E7Y70A

- The host adapter cards are optional because the Storage Base products and the Upgrade Controller Node Pair include built-in FC ports.
- Ethernet Adapters (H6Z05A and E7Y70A) can be used exclusively with the HPE 3PAR File Persona Software Suite.
- The 16Gb/s Fiber Channel Adapter (H6Z00A) includes (4) 16Gb/s shortwave FC SFP+. The 10Gb/s iSCSI/FCoE Adapter (H6Z10A) includes (2) 10Gb/s shortwave SFP+. The 10Gb/s Ethernet Adapter (E7Y70A) includes (2) 10Gb/s SR SFP+.
- Each node in a node pair (a node pair is composed of the two controller nodes in a single 2U enclosure) must have

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the same number and type of adapters: FC, iSCSI/FCoE, and Ethernet 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.

Adapter Configurations permitted on HPE 3PAR StoreServ 8000 2-node systems

Product	Nodes	A	B	C	D				
2-node Storage Base	Node 0 Node 1	Empty Empty	FC FC	iSCSI/FCoE iSCSI/FCoE	Eth Eth				
Upgrade Node Pair	Node 2 Node 3	Empty Empty	FC FC	iSCSI/FCoE iSCSI/FCoE	Eth Eth				

Adapter Configurations permitted on HPE 3PAR StoreServ 8000 4-node systems

Product	Nodes	A	B	C	D	E	F	G	H
4-node Storage Base	Node 0	Empty Empty Empty Empty	FC FC	iSCSI/FCoE iSCSI/FCoE	Eth Eth	Empty Empty FC FC	Empty Empty iSCSI/FCoE iSCSI/FCoE	Empty Empty Eth Eth	FC FC iSCSI/FCoE iSCSI/FCoE
	Node 1		Empty	Empty	Empty				
	Node 2		Empty	Empty	Empty				
	Node 3		Empty	Empty	Empty				
		I	J	K	L	M	M	O	P
	Node 0	iSCSI/FCoE iSCSI/FCoE FC FC	FC FC Eth Eth	Eth Eth FC FC	iSCSI/FCoE iSCSI/FCoE Eth Eth	Eth Eth iSCSI/FCoE iSCSI/FCoE	FC FC FC FC	iSCSI/FCoE iSCSI/FCoE iSCSI/FCoE iSCSI/FCoE	Eth Eth Eth Eth
	Node 1								
	Node 2								
	Node 3								

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.

NOTE: Ethernet Adapters can be used only with the HPE 3PAR File Persona Software Suite for File services connectivity

Step 3 - Choose Drive Enclosures

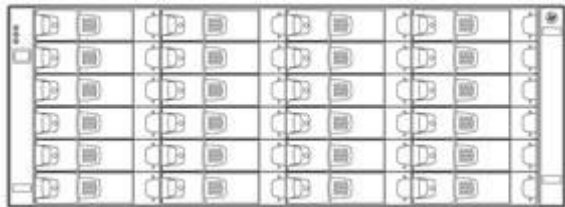
Add drive enclosures to expand the configuration and to add large form factor drives to the configuration. Drive enclosures can be ordered separately for installation in the field, or they can be factory configured in a rack. Drive enclosures are optional. Because the Storage Base products and the Upgrade Node Pair include small form factor drive bays, the minimum configuration does not require any additional drive enclosures. For larger

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configurations, attach drive enclosures. Each drive enclosure includes 24 drive bays. The two drive enclosure types can be intermixed in a single array. The HPE 3PAR StoreServ 8200 supports up to nine (9) added drive enclosures. The HPE 3PAR StoreServ 8400 supports up to twenty-two (22) added drive enclosures. The HPE 3PAR StoreServ 8440 supports up to thirty-eight (38) added drive enclosures. The HPE 3PAR StoreServ 8450 supports up to eighteen (18) added drive enclosures.



HPE 3PAR StoreServ 8000 SFF(2.5in) SAS Drive Enclosure



HPE 3PAR StoreServ 8000 LFF(3.5in) SAS Drive Enclosure

Drive Enclosures

HP 3PAR StoreServ 8000 SFF(2.5in) SAS Drive Enclosure	H6Z26A
HP 3PAR StoreServ 8000 LFF(3.5in) SAS Drive Enclosure	H6Z27A
HP 3PAR StoreServ 8000 SFF(2.5in) Field Integrated SAS Drive Enclosure	E7Y71A
HP 3PAR StoreServ 8000 LFF(3.5in) Field Integrated SAS Drive Enclosure	E7Y72A

- Each drive enclosure includes 24 drive bays, (2) IO modules, (2) 1m SAS cables, (1) mounting rail kit, and power cables.
- The 2U SAS drive enclosure provides 24 SFF drive bays arranged in a single row.
- The 4U drive enclosure provides 24 LFF drive bays, arranged in four (4) columns of six (6) slots each.
- 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 2U and 4U SAS enclosures on each SAS port.

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- With a four node configuration, the best practice is to attach the same number of drive enclosures and drive types 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 2U SAS 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 - Choose Drives

Drives are orderable at the time the array is purchased, or can be added in the future when additional capacity is required. HPE 3PAR StoreServ 8000 drives are sold as single drives. Note that these drives are only compatible with the HPE 3PAR StoreServ 8000 SAS Drive Enclosures.

HPE 3PAR StoreServ 8000 SAS Drives

HPE 3PAR SSDs	HP 3PAR StoreServ 8000 400GB SAS MLC SFF(2.5in) Solid State Drive	N9Y06A
	HP 3PAR StoreServ 8000 480GB SAS MLC SFF(2.5in) Solid State Drive	K2Q95A
	HP 3PAR StoreServ 8000 480GB SAS cMLC SFF(2.5in) Solid State Drive	K2P88A
	HP 3PAR StoreServ 8000 480GB SAS cMLC LFF(3.5in) Solid State Drive	K2Q96A
	HP 3PAR StoreServ 8000 1.92TB SAS cMLC SFF(2.5in) Solid State Drive	K2P89A
	HP 3PAR StoreServ 8000 3.84TB SAS cMLC SFF(2.5in) Solid State Drive	K2P91A
HPE 3PAR SAS HDDs (Performance HDDs)	HP 3PAR StoreServ 8000 300GB SAS 15K SFF(2.5in) Hard Drive	K2P97A
	HP 3PAR StoreServ 8000 600GB SAS 15K SFF(2.5in) Hard Drive	K2P98A
	HP 3PAR StoreServ 8000 600GB SAS 10K SFF(2.5in) Hard Drive	K2P99A
	HP 3PAR StoreServ 8000 1.2TB SAS 10K SFF(2.5in) Hard Drive	K2P93A



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	HP 3PAR StoreServ 8000 1.8TB SAS 10K SFF(2.5in) Hard Drive	K2P94A
HPE 3PAR NL SAS HDDs	HP 3PAR StoreServ 8000 2TB SAS 7.2K SFF(2.5in) Hard Drive	M0S92A
	HP 3PAR StoreServ 8000 2TB SAS 7.2K LFF(3.5in) Hard Drive	K2P95A
	HP 3PAR StoreServ 8000 4TB SAS 7.2K LFF(3.5in) Hard Drive	K2P87A
	HP 3PAR StoreServ 8000 6TB SAS 7.2K LFF(3.5in) Hard Drive	K2P96A

- For each drive type installed in the array, the minimum recommended initial quantity is eight (8) drives per node pair for SSD and SAS performance HDDs, and twelve (12) drives per node pair for Nearline HDDs.

NOTE: 8 drives support RAID 1 and RAID 5.
For RAID 6 choose 12 drives.

- 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.
- RAID 6 is strongly recommended for Nearline drives.
- All node enclosures must contain either zero (0) or an even number of the same type of drives (FC, NL, SSD).
- All drive enclosures must contain an even number of drives, with a minimum of two.
- A 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 2U SAS 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

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practices

- LFF drives may be loaded into the 4U SAS 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.
- Intermixing SSDs and spinning media in a LFF drive enclosure is allowed as long as each drive type is installed in even pairs in the same 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.

HPE 3PAR FIPS Encrypted SSD/HDD	HP 3PAR StoreServ 8000 920GB SAS MLC SFF(2.5in) FIPS Encrypted Solid State Drive	K2P90A
	HP 3PAR StoreServ 8000 1.92TB SAS cMLC SFF(2.5in) FIPS Encrypted Solid State Drive	K2R27A
	HP 3PAR StoreServ 8000 3.84TB SAS cMLC SFF(2.5in) FIPS Encrypted Solid State Drive	M0T66A
	HP 3PAR StoreServ 8000 600GB SAS 15K SFF(2.5in) FIPS Encrypted Hard Drive	K2P92A
	HP 3PAR StoreServ 8000 1.2TB SAS 10K SFF(2.5in) FIPS Encrypted Hard Drive	K2P85A
	HP 3PAR StoreServ 8000 4TB SAS 7.2K LFF(3.5in) FIPS Encrypted Hard Drive	N9Y05A
	HP 3PAR StoreServ 8000 6TB SAS 7.2K LFF(3.5in) FIPS Encrypted Hard Drive	K2P86A
HPE 3PAR Encryption License	HP 3PAR 8200 Data Encryption LTU	L7B67A
	HP 3PAR 8200 Data Encryption E-LTU	L7B67AAE
	HP 3PAR 8400 Data Encryption LTU	L7B91A
	HP 3PAR 8400 Data Encryption E-LTU	L7B91AAE
	HP 3PAR 8440 Data Encryption LTU	L7C15A
	HP 3PAR 8440 Data Encryption E-LTU	L7C15AAE
	HP 3PAR 8450 Data Encryption LTU	L7C39A
	HP 3PAR 8450 Data Encryption E-LTU	L7C39AAE

- An encrypted HPE 3PAR StoreServ array, i.e. any HPE 3PAR StoreServ array that has the HPE 3PAR Data Encryption license activated or intended to be activated, must have only self-



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- encrypted drives installed.
- A non-encrypted HPE 3PAR StoreServ array can have a mix of encrypted and non-encrypted drives.
- Customers have option to turn on encryption, non-disruptively, at any time, even after data has been written to the system.
- FIPS 140-2 Validated Self-Encrypting Drives (SEDs) have been certified by the U.S. National Institute of Standards and Technology (NIST) and Canadian Communications Security Establishment (CSE) as meeting the Level 2 security requirements for cryptographic modules as defined in the Federal Information Processing Standards (FIPS) 140-2 Publication
- Strengthen the DAR solution with an optional FIPS 140-2 Level-2 validated external key manager. Supports KMIP 1.1 for key management communications
- Supports HPE Enterprise Secure Key Manager 4.0 and SafeNet KeySecure k460 and k150 centralized key management
- A data encryption license (LTU) is required to enable encryption on the array. One encryption license is required for each encrypted array.
- Once encryption is enabled on the HPE 3PAR StoreServ Storage, it cannot be disabled.
- The local key manager is included in the HPE 3PAR OS. There is not a separately orderable part number for the local key manager.

Step 5 - Choose Service Processor Implementation

The HPE 3PAR Service Processor remotely monitors the HPE 3PAR StoreServ 8000 and enables remote servicing of the array. The key capabilities of the Service Processor are to:

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

Each HPE 3PAR StoreServ 8000 requires its own Service Processor. The Service Processor functions as the communication interface between a customer's IP network and HPE 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.

The Service Processor can be deployed either as a virtual Service Processor (VSP) or a physical Service

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Processor. A virtual Service Processor is included free with the base HPE 3PAR Operating System. The virtual Service Processor can be installed on a customer-provided VMware or Microsoft Hyper-V system that meets the following specifications:

- Virtualization operating system
 - VMware vSphere ESXi 4.1, 5.0, 5.1, 5.5
 - Microsoft Hyper-V Server 2008 R2, 2012 or 2012 R2
- Server features
 - 2 GB RAM (minimum for the VSP Virtual Machine)
 - 256 GB free disk space (minimum for the VSP Virtual Machine)
NOTE: VSP storage must not reside on the array it is managing.
 - DVD ROM or DVD RW
 - 1 Gb Ethernet port
 - For VSP on VMware, the server must be listed in the VMware Compatibility Guide
 - For VSP on Hyper-V, the server must be listed on the Windows Server Catalog

Physical Service Processor

The physical Service Processor is a dedicated storage appliance located within the storage rack providing close proximity to the HPE 3PAR StoreServ 8000 Storage. The physical Service Processor is fully supported and maintained by HPE 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. The physical Service Processor is available in two version: with Single Power Supply and with Redundant Power Supply.

Service Processor	HP 3PAR StoreServ SPS Service Processor	K2R28A
	HP 3PAR StoreServ RPS Service Processor	K2R29A

HPE 3PAR Policy Server

HPE 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 HPE 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 HPE 3PAR Storage systems. HPE 3PAR Policy Server provides the

- The customer has complete control over policy administration.
- A centralized policy administration for all HPE 3PAR Storage systems is provided.
- A centralized audit log to facilitate security audits is provided.
- Up to 100 3PAR systems can be managed with a single 3PAR Policy Server license
- Policy Server 6.1.5 can be run on a Virtual Machine. For the latest information on supported hypervisors, refer to Single Point of Connectivity Knowledge for HPE Storage Products (SPOCK):
<http://www.hpe.com/storage/spock>

HP 3PAR Policy Manager Software LTU	TE400B
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Step 6 - Choose Cables for host connection and remote copy connection

Cables are required on the HPE 3PAR StoreServ 8000 Storage for drive enclosure connections and for host connectivity. Copper SAS cables are required for connecting the drive enclosures to the nodes on the same rack and for daisy chaining between adjacent drive enclosures. Storage Base products, the Upgrade Node Pair and the Drive Enclosures all include Copper SAS cables. SAS Active Optical Cables are required if an HPE 3PAR StoreServ 8000 needs to be expanded into an adjacent rack, to connect drive enclosures in adjacent racks to the nodes in the base rack. OM4 Fiber Cables are required for host connectivity, Remote Copy and Peer Motion. The copper 1GbE cables are used for Remote Copy over IP and for connection to the Management Port.

Cables

SAS Active Optical Cables	HP 10m Mini SAS High Density Active Optical Cable	E7V95A
	HP 25m Mini SAS High Density Active Optical Cable	E7V96A
OM4 Cables	HP Premier Flex LC/LC Multi-mode OM4 2 fiber 1m Cable	QK732A
	HP Premier Flex LC/LC Multi-mode OM4 2 fiber 2m Cable	QK733A
	HP Premier Flex LC/LC Multi-mode OM4 2 fiber 5m Cable	QK734A
	HP Premier Flex LC/LC Multi-mode OM4 2 fiber 15m Cable	QK735A
	HP Premier Flex LC/LC Multi-mode OM4 2 fiber 30m Cable	QK736A
	HP Premier Flex LC/LC Multi-mode OM4 2 fiber 50m Cable	QK737A
Copper 1GbE cables	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 HPE 3PAR StoreServ 8000 is compatible with most industry standard 4-post EIA 19 inch racks with square mounting holes, including the HPE Intelligent Series Rack and the HPE 10000 G2 Series Rack. The HPE 3PAR StoreServ 8000 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 HPE Intelligent Series Rack.

HPE Rack and Rack Options

Factory Integration	Select a rack to house your HPE 3PAR StoreServ 8000. NOTE: The HPE Intelligent Series Rack is the only series supported for factory configuration.
Primary Configuration Rules	The HPE 3PAR StoreServ 8000 will be configured into an HPE 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 HPE Intelligent Series Rack must be purchased for factory configuration. Additional 3PAR StoreServ 8000 controller node enclosures and drive enclosures may be ordered for multiple subsystem integration at the factory. The 3PAR StoreServ 8000 is also supported in HPE 10000 G2 Series racks for field installation. When calculating available U-space, assume that no space will be placed

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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.

HPE 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 47U 600mm x 1075mm Enterprise Shock Rack	BW912A
HP 47U 1075mm Side Panel Kit	BW915A
HP 42U 600mm x 1075mm Enterprise Shock Rack	BW904A
HP 42U 1075mm Side Panel Kit	BW906A
HP 36U 600mm x 1075mm Enterprise Shock Rack	BW896A
HP 36U 1075mm Side Panel Kit	BW898A
HP 42U 600mm x 1200mm Enterprise Shock Rack	BW908A
HP 42U 1200mm Side Panel Kit	BW909A

For more information on the HPE rack offerings, please see the following URL:
<http://h18004.www1.hpe.com/products/servers/platforms/rackandpower.html>.

For more information on rack options, see:
<http://www.hpe.com/products/rackoptions>.

For more information on PDUs, see:
<http://h18004.www1.hpe.com/products/servers/proliantstorage/power-protection/pdu.html>.

HPE PDU Pivot Kit HP EVA PDU Pivot Kit AG730A
 Used to reclaim 2U of space in an HPE Intelligent Series Rack with HPE 3PAR StoreServ 8000 configurations. This kit allows the PDUs to be placed in the back of the rack without requiring any rack U space.

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.

NOTE: 0D1 will appear after this part number to indicate factory integration where appropriate.

Non-HPE rack and power requirements 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-HPE rack, please review the information included in the HPE 3PAR StoreServ 8000 Site Planning Guide

Step 8 - Choose Software

HPE provides an extensive selection of features for HPE 3PAR StoreServ Storage. All of the features available on the HPE 3PAR StoreServ 20000 Storage system are also available on the HPE 3PAR StoreServ 8000 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 8000 provides the features in Suites.

Two types of software licensing methods are employed with the HPE 3PAR StoreServ 8000. 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

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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, up to a cap, for every drive, that is installed in the array, independent of drive type. For the HPE 3PAR StoreServ 8200 the Drive LTUs cap at 48. For the HPE 3PAR StoreServ 8400 the Drive LTUs cap at 168. For the HPE 3PAR StoreServ 8440 the Drive LTUs cap at 320. For the HPE 3PAR StoreServ 8450 the Drive LTUs cap at 168. After reaching the cap, you do not need to purchase any more Drive LTUs for that title.

For more information regarding HPE 3PAR software see

<http://h18006.www1.hpe.com/storage/solutions/3par/software.html>

For more information regarding HPE 3PAR 8000 software SKUs see:

<http://h20195.www2.hpe.com/v2/GetPDF.aspx/c04199812.pdf>

HPE 3PAR Operating System Software Suite (Required)

Required for all new HPE 3PAR StoreServ systems, this foundational software suite gives you everything you need to get up and running quickly and efficiently. Powered by HPE 3PAR ASIC, HPE 3PAR StoreServ's Thin Technologies which include HPE 3PAR Thin Provisioning, HPE 3PAR Thin Persistence, HPE 3PAR Thin Conversion and HPE 3PAR Thin Deduplication, form the base of this software suite. Performance acceleration is assured with HPE 3PAR Adaptive Flash Cache by reducing application response time.

Network simplification and security are covered with VLAN tagging. Simplified management is offered by HPE 3PAR Operating System, HPE 3PAR StoreServ Management Console, HPE 3PAR Host Explorer and HPE SmartStart software designed to get you off to a quick start with your new HPE 3PAR StoreServ system; HPE 3PAR System Reporter and HPE 3PARInfo software are designed to track performance and capacity utilization trends for multiple HPE 3PAR StoreServ Systems. Other highlights of this suite include HPE 3PAR Full Copy, autonomic rebalancing capabilities that help you optimize the use of future capacity expansions, and support for standard multipathing software for high availability in clustered environments. A one year license for online import is included to enable migration from HPE EVA, EMC CLARiiON CX4, EMC VNX/VNX2, EMC VMAX (VMAX, VMAX SE, VMAX 10K, 20K, 40K) or HDS NSC, USP, USP V, USP VM.

HPE 3PAR Replication Software Suite

This suite bundles HPE 3PAR Virtual Copy with HPE 3PAR Remote Copy software, both also sold separately for all HPE 3PAR StoreServ models. HPE 3PAR Virtual Copy software protects and shares data affordably with rapid recovery using reservation-less, non-duplicative, copy-on-write snapshots. HPE 3PAR Remote Copy offers simple and cost effective data protection for efficient multi-tenant disaster recovery. Also, included in this bundle is Peer Persistence which ensures transparent automatic failover over metropolitan distances using Remote Copy Synchronous mode. The Suite also includes HPE 3PAR Cluster Extension Software which enables automatic failover across data centers using Remote Copy Asynchronous mode.

HPE 3PAR Data Optimization Software Suite

This software bundle combines HPE 3PAR Dynamic Optimization, HPE 3PAR Adaptive Optimization, HPE 3PAR Priority Optimization and HPE 3PAR Peer Motion software together. HPE 3PAR Dynamic Optimization delivers the required service levels for the lowest possible cost throughout the data lifecycle. HPE 3PAR Adaptive Optimization improves storage utilization by enabling cost-optimized storage tiering. HPE 3PAR Priority Optimization assures service levels with QoS controls for mission critical applications. HPE 3PAR Peer Motion enables load balancing at will wherein,



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movement of data and workloads between arrays is initiated without impacting applications, users or services. The four software titles bundled in this suite are also sold separately for all HPE 3PAR StoreServ models.

HPE 3PAR File Persona Software Suite

This software suite enables file protocol services and an Object Access API to extend the spectrum of primary storage workloads natively addressed by HPE 3PAR StoreServ Storage Systems, with Converged Controllers. With this solution, the architectural benefits of HPE 3PAR StoreServ Storage can be extended to the following use cases: enterprise file sync and share; home directory consolidation; group, departmental and corporate shares; and custom cloud applications.

HPE 3PAR Security Software Suite

This software suite bundles HPE 3PAR Virtual Domains and HPE 3PAR Virtual Lock software. With this suite, you can segregate access and deliver robust storage services for different applications and user groups with additional security attached to the retention of storage volumes.

HPE 3PAR Application Software Suite for Hyper-V

Protect your Microsoft Hyper-V environment with HPE 3PAR Recovery Manager for Microsoft Hyper-V and the HPE 3PAR VSS Provider software, included in this software bundle.

HPE 3PAR Application Software Suite for Exchange

This bundle gives you the essentials for use with Microsoft Exchange, including HPE 3PAR Recovery Manager for Exchange and the HPE 3PAR VSS Provider software.

HPE 3PAR Application Software Suite for Oracle

Everything you need for protecting Oracle databases, including HPE 3PAR Recovery Manager for Oracle and Oracle space reclamation capabilities.

HPE 3PAR Application Software Suite for SQL

Protect Microsoft SQL databases with HPE 3PAR Recovery Manager for Microsoft SQL and the HPE 3PAR VSS Provider software.

HPE StoreOnce Recovery Central Manager

By combining the performance of snapshots with the protection of backups, this software integrates HPE 3PAR StoreServ with HPE 3PAR StoreOnce Backup Systems to provide a converged availability and flat backup service that augments traditional backup processes. With this automated, non-intrusive software, the simplicity and performance of local and remote snapshots can be combined with the reliability and cost effective retention of deduplicated backups

HPE StoreFront Remote SaaS Portal

The HPE StoreFront Remote SaaS Portal provides proactive tools and integrated data collection from the HPE 3PAR StoreServ Storage arrays that call home to deliver unique insights and analytics all in one dashboard. Identify capacity and performance issues early through intuitive capacity and performance trend analysis

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and forecasting. These valuable analytics help maximize asset utilization and optimize the datacenter with recommendations and remedial actions when issues arise. Users can log into <http://www.storefrontremote.com> to claim their arrays and get access for free.

Step 9 - Choose File Controller

With HPE 3PAR StoreServ File Controller you get an efficient, bulletproof, and effortless way to provide file storage from HPE 3PAR StoreServ Storage. 3PAR StoreServ File Controller saves you time and money by supporting hundreds to thousands of concurrent users and diverse file workloads. It also has non-intrusive data deduplication that provides an average 50-60% in space savings. It provides security through features such as built-in encryption, sophisticated access controls, online snapshots, and the ability to run endpoint protection and backup software onboard so that data is protected at rest and in flight. HPE 3PAR StoreServ File Controllers are clustered file gateway configurations with transparent failover and online rolling maintenance updates that deliver continuous availability of data to users, servers, and applications. With a straightforward and consistent management experience, it also provides robust capabilities for demanding 24 x 7 file storage environments.

For more details on the specifications and data services offered by the HPE 3PAR StoreServ File Controller please refer to the following link: <http://www8.hpe.com/h20195/v2/GetHtml.aspx?docname=c04637524>

Technical Specifications

Physical Dimensions	Width in/mm	Depth in/mm	Height in/mm/U	Weight lb/kg
36U 1075mm Intelligent Series Rack	23.54/597.9	44.3/1125.2	68.84/1748.6	428/195
42U 1075mm Intelligent Series Rack	23.54/597.9	44.3/1125.2	79/2006.6	451/205
42U 1200mm Intelligent Series Rack	23.54/597.9	51.19/1300.2	79/2006.6	531/241
47U 1075mm Intelligent Series Rack	23.54/597.9	44.3/1125.2	88.53/2248.7	483/220
HPE 3PAR StoreServ 8200 2N Storage Base (no host adapters, no drives)	19/483	26.6/676.1*	3.46/87.95/2	47.7/21.6
HPE 3PAR StoreServ 8200 2N Storage Base (with two host adapters, no drives)	19/483	26.6/676.1*	3.46/87.95/2	48.7/22.1
HPE 3PAR StoreServ 8400 2N Storage Base (no host adapters, no drives)	19/483	26.6/676.1*	3.46/87.95/2	47.7/21.6
HPE 3PAR StoreServ 8400 2N Storage Base (with two host adapters, no drives)	19/483	26.6/676.1*	3.46/87.95/2	48.7/22.1
HPE 3PAR StoreServ 8400 4N Storage Base (no host adapters, no drives)	19/483	26.6/676.1*	6.925/175.9/4	97.8/44.4
HPE 3PAR StoreServ 8400 4N Storage Base (with four host adapters, no drives)	19/483	26.6/676.1*	6.925/175.9/4	99.8/45.3
HPE 3PAR StoreServ 8440 2N Storage Base (no host adapters, no drives)	19/483	26.6/676.1*	3.46/87.95/2	47.7/21.6
HPE 3PAR StoreServ 8440 2N Storage Base (with two host adapters, no drives)	19/483	26.6/676.1*	3.46/87.95/2	48.7/22.1
HPE 3PAR StoreServ 8440 4N Storage Base (no host adapters, no drives)	19/483	26.6/676.1*	6.925/175.9/4	97.8/44.4
HPE 3PAR StoreServ 8440 4N Storage Base (with four host adapters, no drives)	19/483	26.6/676.1*	6.925/175.9/4	99.8/45.3
HPE 3PAR StoreServ 8450 2N Storage Base (no host adapters, no drives)	19/483	26.6/676.1*	3.46/87.95/2	47.7/21.6



Technical Specifications

HPE 3PAR StoreServ 8450 2N Storage Base (with two host adapters, no drives)	19/483	26.6/676.1*	3.46/87.95/2	48.7/22.1
HPE 3PAR StoreServ 8450 4N Storage Base (no host adapters, no drives)	19/483	26.6/676.1*	6.925/175.9/4	97.8/44.4
HPE 3PAR StoreServ 8450 4N Storage Base (with four host adapters, no drives)	19/483	26.6/676.1*	6.925/175.9/4	99.8/45.3
HPE 3PAR StoreServ 8000 SFF(2.5in) SAS Drive Enclosure (without drives)	19/483	24.8/630.7	3.46/87.95/2	33.5/15.2
HPE 3PAR StoreServ 8000 LFF(3.5in) SAS Drive Enclosure (without drives)	19/483	24.9/631.4	6.89/175/4	42.9/19.5
SFF SAS drive with carrier	0.78/19.9**	896/227.7	3.42/86.85**	0.7/0.32 (varies by type)
LFF SAS drive with carrier	4.36/110.84**	8.67/220.26	1.18/30.0**	1.9/0.86 (varies by type)
Service Processor				37.48/17

Power Requirements

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

Component	Idle (watts / BTU/hr)	Transactional (watts / BTU/hr)
Node Pair (8200 or 8400), no drives, no add-on host adapters	236 / 803	398 / 1357
Node Pair (8440 or 8450), no drives, no add-on host adapters	344 / 1173	363 / 1238
4-port 16Gb/s Fibre Channel Adapter	18.61 / 63.5	19.13 / 65.3
2-port 10Gb/s iSCSI/FCoE Adapter	34 / 115.8	40 / 136.4
2-port 10Gb/s Ethernet Adapter	5.69 / 19.4	5.71 / 19.5
4-port 1Gb/s Ethernet Adapter	1.97 / 6.7	1.97 / 6.7
8000 SFF(2.5in) SAS Drive Enclosure, no drives	150 / 512 (average)	150 / 512 (average)
8000 LFF(3.5in) SAS Drive Enclosure, no drives	164 / 559 (average)	164 / 559 (average)
300GB 15K Small Form Factor HDD	6.7 / 22.9	6.9 / 23.1
600GB 15K Small Form Factor HDD	7.0 / 24.0	7.3 / 25.1
600 GB 10K Small Form Factor HDD	6.3 / 21.4	7.4 / 25.2
1.2TB 10K Small Form Factor HDD	6.2 / 21.1	8.2 / 27.9
1.8TB 10K Small Form Factor HDD	7.3 / 24.8	7.5 / 25.6

Technical Specifications

1 TB 7.2k Small Form Factor NL HDD	2.95 / 10.1	3.84 / 13.1
2TB 7.2K Small Form Factor NL HDD	6.1 / 20.8	7.2 / 24.6
2TB 7.2K Large Form Factor NL HDD	7.5 / 25.6	10.6 / 36.1
4TB 7.2K Large Form Factor NL HDD	9.1 / 31.1	13.1 / 44.6
6TB 7.2K Large Form Factor NL HDD	11.9 / 40.7	14.3 / 48.74
400GB Small Form Factor MLC SSD	3.3/11.3	5.8/19.8
480GB Small Form Factor MLC SSD	2.2 / 7.5	5.5 / 18.7
480GB Small Form Factor cMLC SSD	3.2 / 11	7.1 / 24.4
480GB Large Form Factor cMLC SSD	1.8 / 6.1	6.7 / 22.9
920GB Small Form Factor MLC FIPS SSD	2.2 / 7.5	5.5 / 18.7
1920GB Small Form Factor cMLC SSD	3.5 / 11.9	8.9 / 30.5
3840GB Small Form Factor cMLC SSD	3.4 / 11.6	11.0 / 37.5

Environmental Specifications⁴

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 8000 SFF(2.5in) SAS Drive Enclosure - 105 CFM 8000 SFF(2.5in) SAS 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 5 Class A
 V-3/2014.04
 RRA Notice No. 2014-8 (2014.06.23) & 2014-37 (204.06.23) Class A
 RRA Notice No. 2014-9 (2014.06.23) & 2014-38 (2014.06.23)

Acoustics Sound pressure	Fan	8200/8400	8400 4N	8440 2N	8440 4N	8000 2U	8000 4U
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Technical Specifications

level measured per ISO 7779 specs during normal operating fan conditions, from a minimum of 3,000 RPM to a maximum of 10,000 RPM	Speed (RPM)	2N Storage Base	Storage Base	Storage Base	Storage Base	SAS Drive Enclosure	SAS Drive Enclosure
	Minimum	63.8	67.2	72	74	62.6	61.3
	Maximum	93.4	96.5	93	97	85.4	88
Safety	IEC 60950-1:2005 (2nd Edition); Am 1:2009 EN 60950-1:2006 +A11:2009+A12 EN 62479:2010 CNS 14336-1 2nd Edition UL 60950-1 2nd Ed. CAN/CSA C22.2 No. 60950-1						





4 Specifications are subject to change without notice.

Certifications / Markings


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

Summary of Changes

Date	Version History	Action	Description of Change:
04-Dec-2015	From Version 3 to 4	Changed	Added HPE 3PAR StoreServ 8200 Converged File/Block Starter Kit. Added new drives (400GB MLC SSD, 3.84TB FE SSD, 4TB NL FE HDD).
02-Oct-2015	From Version 2 to 3	Added	Added The HPE StoreFront Remote SaaS Portal
28-Sept-2015	From Version 1 to 2	Changed	Changes made throughout the Quickspecs
24-Aug-2015	Version 1	Created	Create first version



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