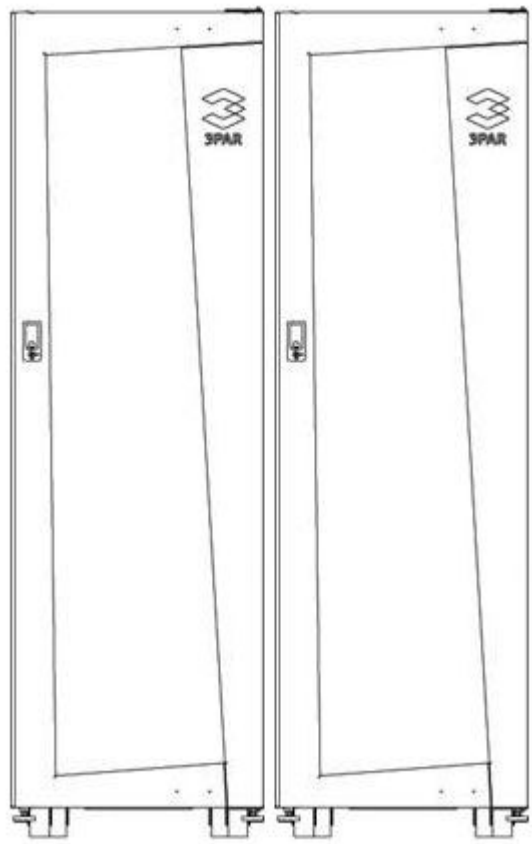
Overview

With the introduction of the HP 3PAR StoreServ 10000 Storage with Thin Built In™, HP 3PAR remains the first storage vendor to incorporate thin capabilities into array hardware. The two new HP 3PAR® Gen4 ASIC in each HP 3PAR StoreServ 10000 Controller Node provides hyper-efficient, silicon-based engines that drive simple, on-the-fly storage optimizations to maximize capacity utilization while delivering high service levels. The revolutionary innovations of HP 3PAR StoreServ 10000 Storage make it the heir to HP 3PAR T-Class Storage.



HP 3PAR StoreServ 10000 Storage

What's New

- HP 3PAR StoreServ 10000 Storage RoHS directive compliance
- New Serial Access SCSI drives (SAS) in HP 3PAR StoreServ 10000 Storage
- New design cabinets that support HP Standard three phase PDUs
- Increase in maximum raw capacity supported in the HP 3PAR StoreServ 10000 Storage:
  - 1.1 PB on HP 3PAR StoreServ 10400
  - 2.2 PB on HP 3PAR StoreServ 10800

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

Overview

Summary	10400	10800
Number of Controller Nodes	2 or 4	2, 4, 6, or 8
HP 3PAR Gen4 ASICs	4 or 8	4, 8, 12 or 16
Management Processors	4 - 8 Quad-Core 2.83 GHz	4 - 16 Quad-Core 2.83 GHz
Total Cache	96 - 192 GB	192 - 768 GB
Control Cache	32 - 64 GB	64 - 256 GB
Data Cache	64 - 128 GB	128 - 512 GB
Maximum Host Ports	96 ports	192 ports
Fibre Channel Host Ports[1]	0 - 96 ports	0 - 192 ports
10Gb/s iSCSI Host Ports[10]	0 - 16 ports	0 - 32 ports
Built-in Remote Copy (RCIP) Ports[11]	2 - 4 ports	2 - 8 ports
Number of Drives	16[2] - 960 drives	16[2] - 1,920 drives
Raw Capacity (approx.)[3]	4.84 - 1100 TB[4]	4.84 - 2200 TB[4]

Capacity Details		
RAID Levels	RAID 0, 1, 5, MP[5]	RAID 0, 1, 5, MP[5]
RAID 5 Data to Parity Ratios	2:1 - 8:1	2:1 - 8:1
RAID 6 Data to Parity Ratios	6:2, 14:2	6:2, 14:2
Drive Capacities (approximate GB[4]) (RAID levels, parity ratios, and drive capacities all mixable within the same Storage System)	100 SSD[6], 200 SSD[6], 300 FC, 600 FC, 300 SAS[7], 450 SAS[7], 900 SAS[7], 2000 SAS[7], 1000 NL[8], 2000 NL[8]	100 SSD[6], 200 SSD[6], 300 FC, 600 FC, 300 SAS[7], 450 SAS[7], 900 SAS[7], 2000 SAS[7], 1000 NL[8], 2000 NL[8]
Number of Drive Chassis (Each Drive Chassis holds up to 40 drives in 4U)	2[8] - 24 chassis	2[8] - 48 chassis

NOTE: Support for SAS drives on HP 3PAR StoreServ 10000 Storage is currently available with HP 3PAR OS version 3.1.2 only. SAS drive support for HP 3PAR OS 3.1.1 will be available in the future. SAS drives are not compatible with prior versions of the HP 3PAR OS.

[1] Each port is full bandwidth 8 Gbit/s Fibre Channel capable
[2] Recommended minimum is 32 drives which results in a 9.6 TB minimum raw capacity.
[3] Maximum raw capacity currently supported with any and all drive types
[4] For storage capacity, 1 GB = 1,024,000,000 bytes and 1 TB = 1,000 GB
[5] RAID MP is HP 3PAR Fast RAID 6 Technology
[6] SSDs are Solid State Drives
[7] SAS drives are Serial Access SCSI Drives
[8] NL drives are Nearline (Enterprise SATA) disks
[9] Recommended minimum is 4 drive chassis per pair of controller nodes
[10] Each port is full bandwidth 10 Gbit/s iSCSI capable
[11] Two built-in 1-GbE RCIP ports per node pair; maximum of 8 usable; RCFC works out of the FC Host ports
NOTE: Specifications are subject to change without notice.

Overview

Host OS Support

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

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

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

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

SUSE® Linux® Enterprise | VMware vSphere™

* Registered Release

For 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

Get Thin and Stay Thin

The revolutionary, zero-detect capable HP 3PAR Gen4 ASIC is a hyper-efficient storage optimization engine designed to power "fat-to-thin" volume conversions in silicon while preserving superior performance levels. Fat-to-thin volume conversions boost capacity utilization by removing allocated but unused space from traditional, "fat" storage volumes.

With the HP 3PAR Gen4 ASIC's built-in, hardware-based zero-detection capabilities, migration of "fat" volumes from other storage platforms to new "thin" volumes on HP 3PAR Storage is achieved with the greatest speed possible and without the application disruption of software-based implementations. The HP 3PAR Gen4 ASIC's enables the automatic migration of data from sparsely used pages to enable 128MB regions to be reclaimed for re-use by other volumes. With conversions taking place at the hardware level, more parallel memory transactions are possible and system performance is not impacted like it is with software-based approaches to volume optimization. Thin Built In capabilities within HP 3PAR StoreServ 10000 Storage also power the ongoing, automated optimization of thin provisioned volumes on HP 3PAR Storage, so thin volumes stay thin.

Building Block for Cloud Computing

Building a converged infrastructure to support cloud and self-service computing models requires a high degree of virtualization that places new demands on storage. With their distinct architectural advantages, thin hardware capabilities, and superior performance, HP 3PAR P10000 Storage is purpose-built to meet the demands of highly virtualized environments. HP 3PAR P10000 Storage gives enterprises and service providers the agility to respond quickly to changing business needs while maintaining the resiliency that "always-on" businesses demand.

Start Thin. HP 3PAR Thin Provisioning Software

HP 3PAR Thin Provisioning Software improves storage system efficiency and optimizes capacity utilization system-wide. It does this by addressing the problem of capacity over-allocation through eliminating the need to dedicate storage capacity on a per-application basis. Since its introduction, HP 3PAR Thin Provisioning Software has given HP 3PAR Storage clients the ability to meet Green IT targets and reduce capacity purchases. Thin Provisioning makes this possible by cutting SAN costs, floor space requirements, and energy expenses by up to 75% and decreasing administration time by up to 90%. It does this by allowing organizations to purchase only the disk capacity they actually need, only as they actually need it through eliminating the need for up-front capacity allocation and dedicating resources to individual applications. This prevents clients from paying to power, house, and cool disks that they may not need for months or years to come, or may never actually need.

Get Thin. HP 3PAR Thin Conversion Software

With HP 3PAR Thin Conversion Software, a technology refresh no longer requires a terabyte-for-terabyte replacement, but instead offers the opportunity to eliminate 70-80% of the legacy capacity in a client's storage environment, simply and rapidly. Leveraging the zero-detection capability built into the HP 3PAR ASIC, the new Gen4 ASIC combined with HP 3PAR Thin Conversion Software, still effectively and rapidly "thin" a heterogeneous data center to one-quarter of its original size or less while preserving service levels, and without impacting production workloads. The new ASIC enables the automatic migration of data from sparsely used pages to enable 128MB regions to be reclaimed for re-use by other volumes, driving efficient use of space beyond what was available with the Gen3 ASIC. This solution not only makes a technology refresh more affordable, but it reduces up-front capital costs as well as ongoing operational and environmental costs associated with powering, cooling, and housing storage equipment. It also provides space and power consumption relief for data centers approaching maximum density.

In an ideal world, all storage volumes would start thin using HP 3PAR Thin Provisioning Software. But in some cases, starting thin has not been an option, particularly when it comes to data stored on legacy arrays from traditional storage vendors. HP 3PAR Thin Conversion Software uses a virtualization mapping engine for space reclamation called the HP 3PAR Thin Engine, together with the unique hardware capabilities of the HP 3PAR Gen4 ASIC to extend the benefits of thin provisioning to existing storage volumes. In tandem with the HP 3PAR Gen4 ASIC, Thin Conversion enables inline, wire speed "fat-to-thin" conversions compatible with any host volume. HP 3PAR Utility Storage is the only storage platform to offer this built-in, hardware-accelerated, fat-to-thin conversion capability. With HP 3PAR Thin Conversion Software, clients can rapidly and non-disruptively shrink storage footprint, reduce storage TCO, and meet Green IT targets.

Stay Thin. HP 3PAR Thin Persistence Software and Thin Copy Reclamation

To realize the ultimate efficiency and cost-saving benefits of starting thin or getting thin, storage also needs to stay thin. An industry first, HP 3PAR Thin Persistence Software ensures that thin volumes on the array stay as lean and efficient as possible. Thin Persistence Software accomplishes this by using the HP 3PAR Thin Engine with the system's built-in zero-detect capability to reclaim unused space associated with deleted data. With Thin Persistence, space reclamation on HP 3PAR arrays takes place simply, quickly, and without disruption to production workloads.

Thin Copy Reclamation is an HP 3PAR Operating System Software feature that performs a similar function to HP 3PAR Thin Persistence Software, but uses the HP 3PAR Thin Engine to reclaim unused space from thin copies (virtual copy snapshots and remote copies) rather than thin volumes.

On average, HP 3PAR Storage clients already purchase 60% less capacity than with traditional storage arrays. With HP 3PAR Thin Persistence and Thin Copy Reclamation, customers can improve this average capacity savings by another 10% for a total savings of up to 70%. Volumes and snapshots can now stay thin to help sustain Green IT targets, defer the cost of purchasing raw capacity to handle new data growth,

and keep costs down without the need to purchase special host-based software or retaining professional services.

HP 3PAR Peer Motion Software

HP 3PAR Peer Motion Software is a non-disruptive, do-it-yourself data migration tool for enterprise Storage Area Networks. With Peer Motion, HP 3PAR Storage customers can load balance I/O workloads across systems at will, perform technology refresh seamlessly, cost-optimize asset lifecycle management, and lower technology refresh capital expenditure. Unlike traditional block migration approaches, Peer Motion enables customers to migrate storage volumes between any HP 3PAR Storage online, non-disruptively, and without complex planning or dependency on extra tools. Peer Motion leverages HP 3PAR Thin Built In™ technology to power the simple and rapid conversion of inefficient, "fat" volumes on source arrays to more efficient, higher-utilization "thin" volumes on the destination HP 3PAR Storage.. Peer Motion Manager is an add-on application that orchestrates all stages of the data migration lifecycle to ensure data migration is simple and fool-proof.

HP Storage Management Pack for Microsoft System Center

The HP Management Pack for Systems Center Operations Manager provides seamless integration with Microsoft Systems Center Operations Manager and now System Center Essentials by integrating predefined discovery and state monitoring policies, event processing rules and tasks, and diagram and topology views for the storage system.

For more information:
http://h18000.www1.hp.com/products/quickspecs/14249_na/14249_na.html

HP Storage Management Pack can be downloaded free from the following website:
https://h20392.www2.hp.com/portal/swdepot/displayProductInfo.do?productNumber=SCOM

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.

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.

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 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-plus, 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-Designed for environments where downtime cannot be tolerated, HP monitors your environment around-the-clock, 365 days a year. We implement improvement projects to mitigate risks and reduce incidents. If outages do occur, they are addressed immediately with access to our dedicated critical support escalation resources.
http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA0-1613ENW.pdf

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

HP Proactive 24 Service-This is the right choice for environments where some downtime is acceptable. HP helps manage your IT environment for improved performance, stability, and availability. Your incidents are addressed 24x7, with a maximum 4-hour onsite response 365 days a year.
http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-9842EN.pdf

Service and Support, HP Care Pack, and Warranty Information

Basic Care - Minimum recommended support

3-Year HP Support Plus 24-This service provides support for environments where some downtime is expected. HP provides around-the-clock hardware and software support onsite, including third-party support. We also provide cost-saving software updates and monitor ongoing operations through the latest remote tools. http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-6638EN.pdf

Implement right from the start

Whichever level of care you select, it includes:

HP 3PAR Storage Installation and Startup Service - HP installs and tests your hardware and software onsite, including configuration. We deliver a custom tailored storage deployment, properly integrated into your environment. http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA3-2345ENW.pdf

3PAR Remote Support Tools

Support Recommendations include fully integrated remote supported - core design and fabric of 3PAR industry benchmark remote support systems. Site-specific data used both proactively and reactively with real-time monitoring and information extraction tools.
http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA3-4141ENW.pdf

Additional services to meet your needs

HP Storage Data Migration - Proven expertise and tools help you migrate data across your data center or around the globe. http://h20195.www2.hp.com/V2/GetPDF.aspx/5982-4107EN.pdf

HP Enhanced Implementation Service for SANs - HP delivers complete design and implementation services for Fibre Channel, FCoE, FCIP, SAS, and iSCSI SAN connectivity components.
http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-8527EN.pdf

HP 3PAR Storage Assessment Service - We offer customized technical and operational guidance for an HP 3PAR Storage infrastructure, along with recommendations to help improve availability levels and ongoing environment management. http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA3-2346ENW.pdf

HP QuickStart Service for HP 3PAR Storage - Choose the most effective, appropriate methods for configuring and migrating to a HP 3PAR platform. http://www8.hp.com/us/en/services/services-detail.html?compURI=tcm:245-826727&pageTitle=Consulting-Services&contentView=business

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

HP 3PAR StoreServ 10000 Base Configurations

Configurations supporting single phase power

HP 3PAR StoreServ 10400 16GB Control/32GB Data Cache NEMA Rack Config Base	QR584C
HP 3PAR StoreServ 10400 16GB Control/32GB Data Cache IEC Rack Config Base	QR632C
HP 3PAR StoreServ 10400 16GB Control/32GB Data Cache Rackmount Config Base	QR633C
HP 3PAR StoreServ 10800 32GB Control/64GB Data Cache NEMA Rack Config Base	QR585C
HP 3PAR StoreServ 10800 32GB Control/64GB Data Cache IEC Rack Config Base	QR637C

- A minimum of one (1) configuration base must be ordered
- The base configuration for NEMA/IEC includes two Controller Nodes, one 2-meter Cabinet, service processor
- The Rackmount Configuration Base (QR633C) includes two Controller Nodes, rackmount kit (for backplane, controllers and service processor), service processor. A rackmount kit must be ordered separately for each drive chassis (see Drive section below). These rackmount kits are strictly for new installations into non-HP 3PAR racks.
- The 10400 base configuration includes total cache: 32GB control / 64GB data
- The 10800 base configuration includes total cache: 64GB control / 128GB data
- The base configuration and node configurations, shown in the section below, have built-in Gigabit Ethernet ports for management and Remote Copy over IP
- The base configurations do not include adapters (beyond embedded ports), drive chassis, drives, cables or expansion cabinets. These are to be ordered separately
- NEMA stands for the National Electrical Manufacturers Association. IEC stands for the International Electrotechnical Commission
  - With respect to HP 3PAR StoreServ 10000, NEMA (National Electrical Manufacturers Association) and IEC (International Electrotechnical Commission) refer to the plug types used. Generally, NEMA plugs are used in North America and IEC plugs are used everywhere else. There are exceptions, e.g., NEMA plugs are used in Japan.
  - The NEMA connector plug type used on the HP 3PAR StoreServ 10000 NEMA is the L6-30P with 1+1 redundant. The NEMA receptacles used on the 10000 NEMA are the L6-30R with 1+1 redundant
  - The IEC connector plug type used on the HP 3PAR StoreServ 10000 IEC is the IEC 60309, blue 30/32A, 2P+E with 1+1 redundant. The IEC receptacles used on the 10000 IEC are the IEC 60309, blue 30/32A, 2P+E with 1+1 redundant

Configurations supporting three phase power

HP 3PAR StoreServ 10400 16GB Control/32GB Data Cache Rack Config Base	QW978A
HP 3PAR StoreServ 10400 16GB Control/32GB Data Cache Rackmount Config Base	QR633C
HP 3PAR StoreServ 10800 32GB Control/64GB Data Cache Rack Config Base	QW979A

- A minimum of one (1) configuration base must be ordered
- The base configuration includes two Controller Nodes, one 2-meter Cabinet, service processor
- The Rackmount Configuration Base (QR633C) includes two Controller Nodes, rackmount kit (for backplane, controllers and service processor), service processor. A rackmount kit must be ordered separately for each drive chassis (see Drive section below). These rackmount kits are strictly for new installations into non-HP 3PAR racks.
- The 10400 base configuration includes total cache: 32GB control / 64GB data

Configuration

- The 10800 base configuration includes total cache: 64GB control / 128GB data
- The base configuration and node configurations, shown in the section below, have built-in Gigabit Ethernet ports for management and Remote Copy over IP
- The base configurations do not include adapters (beyond embedded ports), drive chassis, drives, cables or expansion cabinets. These are to be ordered separately
- The base configuration and expansion rack PDUs are selected based on the Country and three phase selection option.
- PDUs can be NEMA which stands for the National Electrical Manufacturers Association or IEC which stands for the International Electrotechnical Commission
  - NEMA and IEC PDUs differ from each other based on Ampere ratings and the plug types used. Generally, NEMA based PDUs are used in North America and IEC based PDUs are used everywhere else. There are exceptions, e.g., NEMA based PDUs are used in Japan, Taiwan and Philippines.
  - The NEMA PDU SKUs used are 252663-D74 for single phase (not supported currently) and AF511A for three phase
  - The IEC PDU SKUs used are 252663-B33 for single phase (not supported currently) and AF518A for three phase
  - Refer to http://h18006.www1.hp.com/products/quickspecs/11041_na/11041_na.html for detailed specifications regarding these PDUs

HP 3PAR StoreServ 10000 Controller Node Configurations

HP 3PAR StoreServ 10400 2.8-GHz 16GB Control/32GB Data Cache Controller Node	QR586C
HP 3PAR StoreServ 10800 2.8-GHz 32GB Control/64GB Data Cache Controller Node	QR638C
HP 3PAR StoreServ 10400 2.8-GHz 16GB Control/32GB Data Cache Upg Controller Node	QR603C
HP 3PAR StoreServ 10800 3PAR 2.8-GHz 32GB Control/64GB Data Upgr Controller Node	QR640C

- One (1) pair of Controller Nodes beyond the base configuration is supported on the 10400
- One (1), two (2) and three (3) pairs of Controller Nodes beyond the base configuration is supported on the 10800
- The 10400 Controller Nodes includes total cache: 32GB control / 64GB data
- The 10800 Controller Nodes includes total cache: 64GB control / 128GB data
- The node configurations and base configuration, shown in the section above, have built-in Gigabit Ethernet ports for management and Remote Copy over IP

HP 3PAR StoreServ 10000 Disk Adapters

HP 3PAR StoreServ 10000 4-Port 8Gb/s Fibre Channel Adapter	QR591A
HP 3PAR StoreServ 10000 4-Port 8Gb/s Fibre Channel Upgrade Adapter	QR608A

- Two (2) required per node or four (4) per node pair
- Disk Adapters must be ordered in addition to the base configurations and controller node configurations

HP 3PAR StoreServ 10000 Host Adapters

Configuration

HP 3PAR StoreServ 10000 4-Port 8Gb/s Fibre Channel Adapter	QR591A
HP 3PAR StoreServ 10000 4-Port 8Gb/s Fibre Channel Upgrade Adapter	QR608A
HP 3PAR StoreServ 10000 2-Port 10Gb/s Converged Network Adapter	QR630A
HP 3PAR StoreServ 10000 2-Port 10Gb/s Converged Network Upgrade Adapter	QR610A

- QR630A and QR610A enable 10Gb/s iSCSI through a CNA

HP 3PAR StoreServ 10000 Drive Chassis

HP 3PAR StoreServ 10000 40-disk Drive Chassis	QR592C
HP 3PAR StoreServ 10000 40-Disk Upgrade Drive Chassis	QR609C
HP 3PAR StoreServ 10000 Rackmount Kit for 40-disk Drive Chassis	QR598A

- When ordering QR633C, one QR598A must be ordered for each QR592C ordered
- When adding Drive Chassis to a system with QR633C, one QR598A must be ordered for each QR609C ordered

HP 3PAR StoreServ 10000 Drives

HP 3PAR SAS HDDs	HP 3PAR StoreServ 10000 4x300GB 6Gb/s SFF 15K SAS Drive Magazine	QW902A
	HP 3PAR StoreServ 10000 4x450GB 6Gb/s SFF 10K SAS Drive Magazine	QW903A
	HP 3PAR StoreServ 10000 4x900GB 6Gb/s SFF 10K SAS Drive Magazine	QW905A
	HP 3PAR StoreServ 10000 4x2TB 6Gb/s LFF 7.2K SAS Drive Magazine	QW907A
	HP 3PAR StoreServ 10000 4x300GB 6Gb/s SFF 15K SAS Drive Upgrade Magazine	QW908A
	HP 3PAR StoreServ 10000 4x450GB 6Gb/s SFF 10K SAS Drive Upgrade Magazine	QW909A
	HP 3PAR StoreServ 10000 4x900GB 6Gb/s SFF 10K SAS Drive Upgrade Magazine	QW911A
	HP 3PAR StoreServ 10000 4x2TB 6Gb/s LFF 7.2K SAS Drive Upgrade Magazine	QW913A
HP 3PAR SSDs	HP 3PAR StoreServ 10000 4x100GB 4Gb/s LFF Solid State Drive Magazine	QR619C
	HP 3PAR StoreServ 10000 4x200GB 4Gb/s LFF Solid State Drive Magazine	QR620C
	HP 3PAR StoreServ 10000 4x100GB 4Gb/s LFF Solid State Drive Upgrade Magazine	QR624C
	HP 3PAR StoreServ 10000 4x200GB 4Gb/s LFF Solid State Drive Upgrade Magazine	QR625C
HP 3PAR FC HDDs	HP 3PAR StoreServ 10000 3PAR 4x300GB 4Gb/s LFF 15K Fibre Channel Drive Magazine	QR621C
	HP 3PAR StoreServ 10000 3PAR 4x600GB 4Gb/s LFF 15K Fibre Channel Drive Magazine	QR622C
	HP 3PAR StoreServ 10000 4x300GB 4Gb/s 15K Fibre Channel Drive Upgrade Magazine	QR626C
	HP 3PAR StoreServ 10000 4x600GB 4Gb/s 15K Fibre Channel Drive Upgrade Magazine	QR627C
HP 3PAR NL HDDs	HP 3PAR StoreServ 10000 4x1TB 4Gb/s LFF 7.2K SATA Drive Magazine	QR676C
	HP 3PAR StoreServ 10000 4x2TB 4Gb/s LFF 7.2K SATA Drive Magazine	QR623C
	HP 3PAR StoreServ 10000 4x1TB 4Gb LFF 7.2K SATA Drive Upgrade Magazine	QR677C
	HP 3PAR StoreServ 10000 4x2TB 4Gb/s LFF 7.2K SATA Drive Upgrade Magazine	QR628C

HP 3PAR Cables

Configuration

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 3PAR StoreServ 10000 optional Cabinets

HP 3PAR StoreServ 10000 2-Meter Expansion Rack (three phase PDU)	QW982A
HP 3PAR StoreServ 10000 2-Meter Expansion NEMA Rack (single phase PDU)	QR596A
HP 3PAR StoreServ 10000 2-Meter Expansion IEC Rack (single phase PDU)	QR639A
HP 3PAR StoreServ 10400 Standalone Rackmount Kit	QR678A

* **NOTES:**

- QR678A can only be ordered as an upgrade part to a system containing QW978A only
- The strict use of QR678A is for relocating either QW978A to a non-HP 3PAR rack.
- When ordering QR678A, one QR598A must be ordered for each QR592C ordered
- When adding Drive Chassis to a system with QR678A, one QR598A must be ordered for each QR609C ordered

Storage Networking Options

Fibre Channel Host Bus Adapters	**Brocade Fibre Channel HBAs**	
	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 SAN Switch	AM866B

HP 8/8 SAN Switch	AM867B
HP 8/24 SAN Switch	AM868B
HP 8/40 SAN Switch	AM869B
HP 8/40 Power Pack SAN Switch	AM870B
HP 8/80 SAN Switch	AM871B
HP 8/80 Power Pack SAN Switch	AM872B
16 Gb Fibre Channel Switches	
HP SN3000B 16Gb 24/12 FC Switch	QW937A
HP SN3000B 16Gb 24/24 FC Switch	QW938A
HP SN6000B 16Gb 48/24 FC Switch	QK753B
HP SN6000B 16Gb 48/48 FC Switch	QR480B
HP SN6000B 16Gb 48/24 Power Pack+ FC Switch	QK754B
HP SN6000B 16 Gb 48/48 Power Pack+ FC SWitch	QR481B
8 Gb and 16 Gb Director Switches	
HP SN8000B 8-Slot Power Pack+ SAN Backbone Director	QK710B
HP SN8000B 4-slot Power Pack+SAN Director	QK711B
HP SN8000B 4-slot SAN Director	QK712B
HP DC SAN Backbone Director Power Pack+	AK857C
HP DC04 SAN Director	AR478B
HP DC04 SAN Director, Power Pack+	AR479B
Extension and Embedded Switches	
HP 1606 Extension SAN Base Switch	AP862B, AP863B
HP 1606 Extension SAN Power Pack+ Switch	AP864B
Brocade 8/12c SAN Switch for HP BladeSystem c-Class	AJ820B
Brocade 8/24c SAN Switch for HP BladeSystem c-Class	AJ821B
Brocade 8/24c SAN Switch for HP BladeSystem c-Class Power Pack+	AJ822B
HP H-series	
HP 8/20q Fibre Channel 8-ports Active Switch **NOTE:** 8 device ports active, upgradeable to 20 device ports active	AQ233B
HP 8Gb Simple SAN Connection Kit **NOTE:** 8 device ports active, upgradeable to 20 device ports active	AK241B
HP 8/20q Fibre Channel Switch **NOTE:** 16 switch ports active, upgradeable to 20 device ports active	AK242B
HP SN6000 Stackable 8Gb 24-port single power Fibre Channel Switch **NOTE:** 20 device ports active/4 stacking (ISL) ports active	AW575B
HP SN6000 Stackable 8Gb 24-port dual power Fibre Channel Switch **NOTE:** 20 device ports active/4 stacking (ISL) ports active	AW576B
HP SN6000 Stackable 8 Gb 12-port Single Power Fibre Channel Switch **NOTE:** 8 device ports/4 stacking (ISL) ports active, upgradeable to 20 device ports active	BK780B
HP C-series	

Configuration

HP SN8000C 13-Slot Supervisor 2A Fabric 3 Director Switch	QW927A
HP SN8000C 6-Slot Supervisor 2A Director Switch - MDS 9506	AE388C
HP SN8000C 9-Slot Supervisor 2A Director Switch - MDS 9509	AE389C
HP SN6000C Fibre Channel Switch - MDS 9148	AW585A,AW586A
Cisco MDS 8Gb Fabric Switch for HP BladeSystem c-Class	AW563A,AW564A
Cisco MDS 9124 8-Ports Active Fabric Switch	AG646A
Cisco MDS9124 16-Ports Active Fabric Switch	AG647A
Cisco MDS 9222i Multiservice Fabric Switch	AG851B

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.

Technical Specifications

Physical Specifications

2-Meter Cabinet supporting single phase power

Dimensions (width x height x depth)	23.6 x 76.5 x 36 in	60 x 194.3 x 91.3 cm
Service Clearance (front and back)	Front/Rear: 36 in / 30 in	Front/Rear: 91.4 cm / 76.2 cm
Weight (not populated)	439.8 lb	195.5 kg
Maximum Weight (fully populated)	1,880 lb	852.8 kg
Maximum Weight per Leveling Foot	470 lb	213.2 kg
Maximum Load per Leveling Foot	149.6 lb/sq in	10.5 kg/sq cm

2-Meter Cabinet supporting three phase power

Dimensions (width x height x depth)	23.6 x 76.5 x 36 in	60 x 194.3 x 91.3 cm
Service Clearance (front and back)	Front/Rear: 36 in / 30 in	Front/Rear: 91.4 cm / 76.2 cm
Weight (not populated)	472.1 lb	214.1 kg
Maximum Weight (fully populated)	1,912.3 lb	867.4 kg
Maximum Weight per Leveling Foot	478.1 lb	216.8 kg
Maximum Load per Leveling Foot	199.2 lb/sq in	14 kg/sq cm

Component Weights

V400 Base Configuration[1]	654.1 lb	296.7 kg
V800 Base Configuration[1]	747.1 lb	338.9 kg
10400 Base Configuration[7]	686.4 lb	311.3 kg
10800 Base Configuration[7]	779.4 lb	353.5 kg
2 Controller Nodes (fully populated)	133 lb	60.4 kg
Drive Chassis (fully populated)	180 lb	81.6 kg
Service Processor	13.3 lb	6.0 kg

Supported Host FC Connections

FC Connector Type from Storage System to Host Port	LC to LC
FC Cable Core Diameter	OM3
Connector Boot Length	standard

Power and Heat

Single Phase Power Supply Requirements

Input Voltage (VAC)	220 (200 - 240)
Frequency (Hz)	50 - 60
Circuit Breaker Maximum	30 A per PDU[6] (de-rated to 24 A)
Power Connectors for 2-Meter Cabinet	(4) L6-30P with 1+1 redundant or (4) IEC 60309-32A (332P6S) with 1+1 redundant
Power Receptacles	(4) L6-30R with 1+1 redundant or (4) IEC 60309 with 1+1 redundant

Technical Specifications

Three Phase Power Supply Requirements

NEMA (North America, Taiwan, Philippines & Japan)

Input Voltage (VAC)	200 - 240 p-p
Frequency (Hz)	50 - 60
Circuit Breaker Maximum	48 A per PDU (de-rated to 27.71 A per phase)
Power Connectors for 2-Meter Cabinet	(2) IEC 309, 3-pole, 4-wire, BLUE, gnd clocked to 3:00 with 1+1 redundant
Power Receptacles	(2) Hubbell HBL460C9W or equivalent

IEC (International)

Input Voltage (VAC)	200 - 240 p-n; 380 - 415p-p
Frequency (Hz)	50 - 60
Circuit Breaker Maximum	32 A per phase per PDU
Power Connectors for 2-Meter Cabinet	(2) IEC 309, 4-pole, 5-wire, RED, gnd clocked to 6:00 with 1+1 redundant
Power Receptacles	(2) Hubbell C532C6S or equivalent

Maximum Potential Power Draw per 2-Meter Cabinet

Watts per Cabinet	9,984 watts / 34,075 BTU/h

Actual Power Draw / Heat Dissipation

Service Processor	317 watts / 1,082 BTU/h
Drive Chassis (without Drive Magazines)[2]	200 watts / 683 BTU/h

	Transactional[3] (watts / BTU/h)	**Idle (watts / BTU/h)**
4 x 100-GB SSD	9.8 / 33	5.5 / 19
4 x 200-GB SSD	10.3 / 35	7 / 24
4 x 300-GB SFF SAS Drive Magazine	39 / 132	34 / 117
4 x 450-GB SFF SAS Drive Magazine	29 / 99	24 / 81
4 x 900-GB SFF SAS Drive Magazine	31.5 / 107.5	23 / 80
4 x 2-TB LFF SAS Drive Magazine	47 / 160	35 / 119
4 x 300-GB FC Drive Magazine	75 / 256	57 / 195
4 x 600-GB FC Drive Magazine	76 / 258	65 / 222
4 x 2-TB NL Drive Magazine	62 / 211	38 / 131
Controller Node Pair	1,315 / 4,487	990 / 3,378
Example Full Cabinet Configuration (4-Node 10400; 4 Drive Chassis, 160 600-GB drives,1 service processor)	6,787 / 23,184	5,697 / 20,400

Technical Specifications

Environmental Specifications

Temperature (°F/°C), 0 - 3,000 ft / 0 - 914.4 m	50 - 104°F / 10 - 40°C
Temperature (°F/°C), 3,000 - 10,000 ft / 914.4 m - 3,048 m	50 - 95°F / 10 - 35°C
Altitude (ft/m) max.	10,000 ft / 3,048 m
Humidity (%), Non-condensing	20 - 80%
Raised Floor	Recommended
Emissions / RFI / EMI	FCC Class A, EN55022 Class A,EN55024: 1998, VCCI Class A
Safety	CE Mark, C-TUVus Mark, TUV GS Mark, CB Scheme with all country deviations
Energy Consumption Efficiency[5] (Japan Green Law)	0.011

[1] Includes 2-meter rack that supports single phase power and two controller nodes (fully populated)
[2] Up to 10 drive magazines (40 drives) of any combination of SAS, FC, NL, and up to 8 SSD magazines (32 SSD drives) per Drive Chassis
[3] Under maximum load
[4] Includes power and heat dissipation specifications for the Service Processor as follows: 317 Watts, 1082 BTU/hr, 100 - 240 VAC Input Voltage, 50 - 60 Hz Frequency, and (1) IEC-320 Power Receptacle
[5] Japan Green Law statement of compliance: The energy consumption efficiency value has been calculated per requirements for Category-N Magnetic Disk Drive Units by dividing the power consumption, measured according to the definition in the Law Concerning the Rational Use of Energy, by the storage capacity defined in the Energy Conservation Law. The efficiency value is based on a host-maximized 10800 configuration using 600GB drives.
[6] Power Distribution Unit
[7] Includes 2-meter rack that supports three phase power and two controller nodes (fully populated)
NOTE: Specifications are subject to change without notice.

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