QuickSpecs
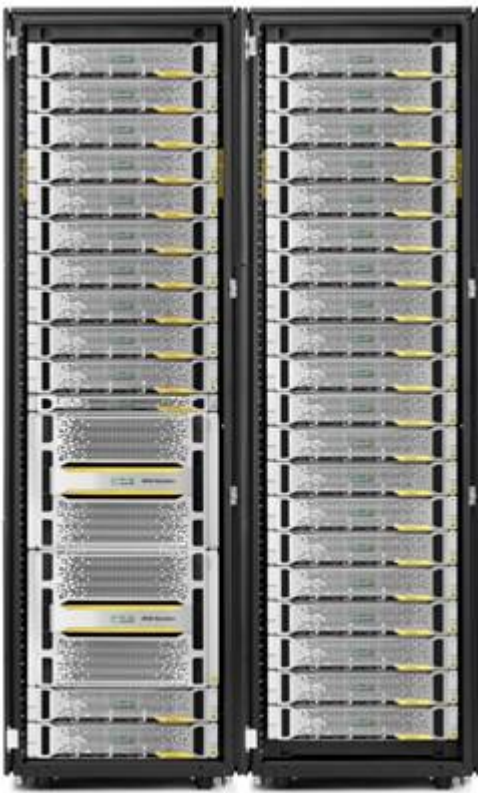
Overview

HPE 3PAR StoreServ 20000 Storage

The HPE 3PAR StoreServ 20000 Storage family offers enterprise flash arrays ready for massive consolidation of today's most demanding workloads with greater than 3 million IOPS for an 8-node system, sub-millisecond latencies, a 4X density advantage, and scalability to 24PB of usable capacity. The family's flash-first architecture features the HPE 3PAR Thin Express ASIC for silicon-based hardware acceleration of thin technologies, including inline deduplication to reduce acquisition and operational costs by up to 75% without compromising performance. With HPE Memory Driven Flash, a new class of enterprise storage that empowers data at the speed of memory, you can accelerate application response times with storage class memory (SCM). The 3PAR StoreServ 20000 utilizes NVMe protocol to access SCM as an extended cache for latency sensitive applications, and the 3PAR NVMe 750GB SCM module is very easy to install. A choice of models provide a range of options that support true convergence of block and file protocols offering flexible host connectivity, while providing all-flash array performance, and the use of solid state drives (SSDs) with spinning media for unmatched versatility. Enhanced Tier-1 storage capabilities for always-on data access and fine-grained Quality of Service (QoS) controls ensure predictable service levels for all workload types while bi-directional data mobility enables virtually limitless elastic pools of storage to support the most rigorous on-demand infrastructure.

HPE 3PAR StoreServ 20000 Storage

Overview

What's New:
HPE 3PAR 9000/20000 2p 32Gb FC HBA
For high performance Fibre Channel host connectivity, it accelerates FC performance for 3PAR all Flash storage and delivers up to 2X performance compared to 16Gb FC in a smaller port footprint.

Memory-Driven Flash: HPE 3PAR 750GB NVMe SCM Module
Significantly improves the performance of All-Flash Arrays in specific workloads by decreasing the latency for specified volumes. Intelligent caching algorithms are used to extend DRAM cache to Storage Class Memory devices using NVMe protocols and transport.   The 3PAR NVMe SCM module is also easy to install and plugs directly into an existing PCIe adapter slot..

HPE Storage Performance File Controller
Introducing the new HPE Storage Performance File Controller (Q9D44A) for adding Microsoft-powered file services to any 3PAR 20000.

Standard Features

All-inclusive Single-system Software
The All-Inclusive Single-System Software is included as part of the array and offers all the software titles necessary to run a single HPE 3PAR Storage array.

HPE 3PAR Operating System Software
The HPE 3PAR Operating System Software gives you everything you need to get up and running quickly and efficiently. It is the foundation software of HPE 3PAR StoreServ Storage, combining advanced virtualization capabilities with simple storage management, high efficiency, and world class performance.

HPE 3PAR Virtual Copy
HPE 3PAR Virtual Copy software protects and shares data affordably with rapid recovery using reservation-less, non-duplicative, copy-on-write snapshots.

HPE 3PAR Adaptive Optimization
HPE 3PAR Adaptive Optimization improves storage utilization by enabling cost-optimized storage tiering.

HPE 3PAR Dynamic Optimization
HPE 3PAR Dynamic Optimization delivers the required service levels for the lowest possible cost throughout the data lifecycle.

HPE 3PAR Priority Optimization
HPE 3PAR Priority Optimization assures service levels with QoS controls for mission critical applications.

HPE 3PAR Virtual Domains and Virtual Lock
With HPE 3PAR Virtual Domains and HPE 3PAR Virtual Lock software, 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 Online Import
HPE 3PAR Online Import Software is the first do-it-yourself data migration tool for enterprise Storage Area Networks. Unlike traditional block migration approaches, Online Import Software enables customers to migrate storage volumes from HPE EVA Storage, EMC, Hitachi, IBM Storage to HPE 3PAR StoreServ Storage systems online and without complex planning or dependency on extra tools.

HPE 3PAR File Persona Software
This software enables rich set of file protocol services, core file data services and an Object Access API to extend the spectrum of primary storage workloads natively addressed by HPE 3PAR StoreServ 20000 Storage. With this solution, the architectural benefits of HPE 3PAR StoreServ 20000 Storage can be extended to use cases such as: home directories and user shares; content management and collaboration; data preservation and governance; and custom cloud applications.

HPE Recovery Manager Central (RMC) for VMWare vSphere, MS SQL, Oracle and more
Protect your business critical applications without impacting performance using HPE RMC software. 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 to protect any application data stored on 3PAR arrays. Based on your RTO objectives, retain the space-efficient snapshots on the

Standard Features

3PAR array itself or offload them to a StoreOnce Backup system using fast, efficient, Express Protect Backups. Based on your RPO objectives, generate as many application-consistent recovery points as desired for VMware VMs, MS SQL and Oracle databases or automate the protection workflow for any application data on 3PAR using the RMC REST API SDK.

HPE 3PAR Recovery Manager for Hyper-V (RM-H)
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. By leveraging HPE 3PAR Virtual Copy software, RM-H enables administrators to non-disruptively create space-efficient, application-consistent, point-in-time snapshots to protect and recover Hyper-V Virtual Hard Disks (VHDs) and individual VMs.

HPE 3PAR Recovery Manager for Exchange (RM-E)
Protect your Microsoft Exchange environment with HPE 3PAR Recovery Manager for Microsoft Exchange and the HPE 3PAR VSS Provider software, included in this software bundle. By leveraging HPE 3PAR Virtual Copy software, RM-E enables administrators to non-disruptively create space-efficient, application-consistent, point in time snapshots to protect and recover Exchange databases and mailboxes.

HPE 3PAR Recovery Manager for Oracle (RM-O)
Protect your Oracle environment running on Solaris, HP-UX or IBM AIX platforms with HPE 3PAR Recovery Manager for Oracle. By leveraging HPE 3PAR Virtual Copy software, RM-O enables Oracle administrators to non-disruptively create space-efficient, application-consistent, point-in-time snapshots to protect and recover Oracle databases and instances. For Oracle environments running on RHEL or Oracle Linux, please refer to RMC for Oracle above.

HPE Smart SAN
HPE Smart SAN for HPE 3PAR makes end-to-end SAN configuration and management simple and autonomic, reducing the probability of errors through SAN automation. It is an application embedded in the SAN components (array, hosts and switches) that enables the 3PAR to automate configuration for settings and policies across the SAN. Smart SAN features enable customers to automate peer zoning, resulting in the creation of fewer zones, and enables configuration of zones in minutes, not hours.

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 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.

All-inclusive Multi-system software
The All-inclusive Multi-system software is an optional software suite that includes Peer Motion, Remote Copy, Peer Persistence, and Cluster Extension.

HPE 3PAR Peer Motion
HPE 3PAR Peer Motion enables load balancing at will wherein, movement of data and workloads between arrays is initiated without impacting applications, users or services.

Standard Features

HPE 3PAR Remote Copy
HPE 3PAR Remote Copy offers simple and cost effective data protection for efficient multi-tenant disaster recovery.

HPE 3PAR Peer Persistence
HPE 3PAR Peer Persistence software enables HPE 3PAR StoreServ systems located at metropolitan distances to act as peers to each other, presenting a nearly continuous storage system to hosts connected to them.

HPE 3PAR Cluster Extension
HPE 3PAR Cluster Extension Software offers rapid automated protection against application downtime from fault, failure, or site disaster. CLX integrates with the Windows OS clustering software and HPE 3PAR Remote Copy to automate failover and failback between sites

Capacity Details				
Summary	**20450**	**20800**	**20850**	**20840**
Number of Controller Nodes	2 or 4	2, 4, 6, or 8		
HPE 3PAR Gen5 ASICs	4 or 8	4, 8, 12 or 16		
Management Processors	4-8 x 8-Core 2.5 GHz	4-16 x 8-Core 2.5 GHz	4-16 x 10-Core 2.4 GHz	
Total Cache	0.9 - 1.8 TiB	0.6 - 34.5 TiB	0.9 - 3.6 TiB	0.9 - 51.6 TiB
Flash Cache (optional)	Not Applicable	0 - 32 TiB	Not Applicable	0 - 48 TiB
Max On-Node Cache	896 - 1792 GiB	640 - 2560 GiB	896 - 3584 GiB	896 - 3584 GiB
Total NVMe Storage Class Memory Module[15]	2-4 TB 3TB**	2-8 6TB**	2-8 6TB**	2-8 6TB**
Maximum Host Ports	80 ports	160 ports		
32Gb/s Fibre Channel Host Ports[1]	0 - 40 ports	0 - 80 ports		
16Gb/s Fibre Channel Host Ports[2]	0 - 80 ports	0 - 160 ports		
10Gb/s iSCSI Host Ports[2]	0 - 40 ports	0 - 80 ports		
10GbE Network Ports[3] for File Persona	0 - 24 ports	0 - 48 ports		
Built-in 10GbE Ports[4]	2 - 4 ports	2 - 8 ports		

Standard Features

Number of Hard Disk Drives	Not Applicable	6 - 2304 drives	Not Applicable	6 - 2304 drives
Number of Solid State Drives	6 - 576	6 - 1152	6 - 1152	6 - 1152
Raw Capacity	1.92^5 - 4021 TiB^6	1.92^5 - 9600 TiB^6	1.92^5 - 8043 TiB^6	1.92^5 - 9600 TiB^6
Raw Capacity (SSD Only)	1.92^5 - 4021 TiB^6	1.92^5 - 8043 TiB^6	1.92^5 - 8043 TiB^6	1.92^5 - 8043 TiB^6
Maximum usable file capacity[7]	2 - 512 TiB^6	2 - 1024 TiB^6		

Capacity Details

Summary	20450	20800	20850	20840
RAID Levels	RAID 0, 1, 5, MP[8]			
RAID 5 Data to Parity Ratios	2:1 - 8:1			
RAID 6 Data to Parity Ratios	4:2, 6:2, 8:2, 10:2, 12:2, 14:2			
Drive Capacities (SSDs)[9]	920GB SSD, 1920GB SSD, 3840GB SSD, 7680GB SSD, 15360GB SSD			
Drive Capacities (HDDs)	Not Applicable	600 15K SAS[10], 600 10K SAS[10], 1200 10K SAS[10], 1800 10K SAS[10], 2000 7.2K SAS NL[11], 4000 7.2K SAS NL[11], 8000 7.2K SAS NL[11], 14T 7.2K SAS NL[11]	Not Applicable	600 15K SAS[10], 600 10K SAS[10], 1200 10K SAS[10], 1800 10K SAS[10], 2000 7.2K SAS NL[11], 4000 7.2K SAS NL[11], 8000 7.2K SAS NL[11], 14T 7.2K SAS NL[11]
Number of Drive Enclosures[12]	2^{13} - 48 enclosures	2^{13} - 96 enclosures		
Support for 3PAR StoreServ File Controller v3	Yes			

NOTE: Specifications are subject to change without notice

32Gb FC host support requires 3PAR OS 3.3.1 Technology Release TR05 or later and the 32Gb FC HBA is the same SKU for the 3PAR 9000 and 20000 platforms. Check HPE Spock for latest supported 3PAR software and connectivity.

*Based on 3.84TB SSDs and HPE 3PAR Compaction technologies that deliver 2:1 Thin capacity savings and 2:1 Deduplication capacity savings

1 Each port is full bandwidth 32Gbit/s Fibre Channel capable as applicable

2 Each port is full bandwidth 16 Gbit/s Fibre Channel capable as applicable

3 Each port is full bandwidth 10 Gbit/s iSCSI capable

4 Each port is full bandwidth 10 Gbit/s Ethernet designated for hosting File services and Object access protocols

5 Two built-in 10-GbE ports per node pair can be used for Remote Copy (RCIP); maximum of 8 usable; RCFC works out of the FC Host ports

6 Minimum raw capacity currently supported based on minimum of 4 SSDs per array

7 For storage capacity, 1 GiB = 2^{30} bytes and 1 TiB = 1,024 GiB

Standard Features

8 Usable file capacity supported for HPE 3PAR File Persona
9 RAID MP is HPE 3PAR Fast RAID 6 Technology
10 SSDs are Solid State Drives
11 SAS drives are Serial Access SCSI Drives
12 NL drives are Nearline (7.2k) Drives
13 Drive enclosures can be 24 x 2.5" drive 2U form factor or 12 x 3.5" drive 2U form factor
14 Recommended minimum is 4 drive enclosures per pair of controller nodes
15 NVME Storage Class Memory Module: 1-750GB SCM Module per node and requires 3PAR 3.3.1 Technology Release T05 or higher Only supported on all SSDs configurations, 1module is required per node and only in PCI slot-3.

Host OS Support

Citrix® XenServer® | HP-UX® | IBM® AIX® | Microsoft® Windows® Server, including Microsoft® Hyper-V™ | Apple Mac OSX | OpenVMS* | Oracle® Linux® (UEK and RHEL compatible kernels) | Oracle® Solaris | Ubuntu | VMware vSphere™ | Red Hat® Enterprise Linux® and Virtualization | SUSE® Linux® Enterprise and Virtualization | IBM Virtualization

For latest information on supported OS for HPE Storage Products refer
http://www.hpe.com/storage/spock

Service and Support

Warranty
3 Year, On-site Warranty Service. 24x7 4-hour onsite response
The warranty on all HPE 3PAR StoreServ 20000 Solid State Drives is 5 years, 24x7 4-hour onsite response. Please refer to the HPE 3PAR StoreServ 20000 Drives section for the complete list of SKUs. The HPE 3PAR NVMe SCM Module also has the 5 years, 24x7 4-hour on site response.

The warranty on all other HPE 3PAR StoreServ 20000 drives (SAS and NL SAS) is 3 years, 24x7 4-hour onsite response.
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/storage/warranty

NOTE: All currently available HPE 3PAR StoreServ SSDs carry a five-year warranty offering unconditional replacement in case of drive failure, media wear-out, or both.
NOTE: For Storage Base SKUs and Drive SKUs the warranty only covers the HW and not the All-inclusive software that is included with the same SKUs.

Service and Support
Protect your business beyond warranty with HPE Support Services
HPE Technology Services delivers confidence, reduces risk and helps customers realize agility and stability. Our integrated portfolio of Services for storage help customers reduce costs, optimize data, streamline storage management, and improve backup and recovery. HPE Support Services enable you to choose the right service level, length of coverage and response time as you purchase your new storage solution, giving you full entitlement for the support for need for your IT and business.

Connect your devices
Unlock all of the benefits of your technology investment by connecting your products to Hewlett Packard Enterprise. Achieve up to 77%[1] reduction in down time, near 100%[2] diagnostic accuracy and a single consolidated view of your environment. By connecting, you will receive 24x7monitoring, pre-failure alerts, automatic call logging, and automatic parts dispatch. HPE Proactive Care Service and HPE Datacenter Care Service customers will also benefit from proactive activities to help prevent issues and increase optimization. All of these benefits are already available to you with your server storage and networking products, securely connected to Hewlett Packard Enterprise support.
1- IDC
2 - HPE CSC reports 2014 - 2015

Recommended Services

Optimized Care
HPE Proactive Care Advanced* - 24x7 coverage, three year Support Service
This services helps achieve a higher return on your product investment with personalized support from a local assigned Account Support Manager who will share best practice advice and personalized recommendations designed to help improve availability and performance to increase stability and reduce unplanned downtime. Leverage your system's ability to connect to Hewlett Packard Enterprise for pre-failure alerts, automatic call logging and parts dispatch. For business critical incidents, this service offers critical event management to reduce mean time to resolution. This recommendation provides 24x7 coverage with four-hour response for hardware and collaborative support that offers two-hour callback for supported software issues. Collaborative software management is included with independent software vendors unless you have your software support from Hewlett Packard Enterprise where we own all cases from start through to resolution.

Service and Support

http://www.hpe.com/h20195/V2/GetDocument.aspx?docname=4AA5-3259ENW

Standard Care
HPE Proactive Care* with 24x7 coverage, three year Support Service + 20 services credits for 1ˢᵗ year
HPE Proactive Care gives customers an enhanced call experience plus helps preventing problems and maintains IT stability by utilizing personalized proactive reports with recommendations and advice when your products are connected to Hewlett Packard Enterprise. This Service combines three years' proactive reporting and advice with our 24x7 coverage, four hour hardware response time when there is a problem.
https://www.hpe.com/h20195/v2/GetPDF.aspx/4AA3-8855ENW.pdf

Basic Care
HPE Proactive Care* with 24x7 coverage, three year Support Service + 10 services credits per year
HPE Proactive Care gives customers an enhanced call experience plus helps preventing problems and maintains IT stability by utilizing personalized proactive reports with recommendations and advice when your products are connected to Hewlett Packard Enterprise. This Service combines three years' proactive reporting and advice with our 24x7 coverage, four hour hardware response time when there is a problem.
https://www.hpe.com/h20195/v2/GetPDF.aspx/4AA3-8855ENW.pdf

HPE 3PAR SSD Support
3PAR SSD Extended Replacement Program
Provides for the post warranty replacement of eligible HPE 3PAR SSDs under active HPE support coverage in the event the SSD has reached its maximum usage limit based upon the HPE 3PAR SSD Life-Left reading.
http://h20195.www2.hpe.com/V2/GetPDF.aspx/a00000122ENW.pdf

HPE Services Support Credits
Services Support Credits offer flexible services and technical skills to meet your changing IT demands. With a menu of service that is tailored to suit your needs, you get additional resources and specialist skills to help you maintain peak performance of your IT. Offered as annual credits, you can plan your budgets while proactively responding to your dynamic business.

*HPE Proactive Care and HPE Proactive Care Advanced require that the customer connect their devices to make the most of these services and receive all the deliverables.

Related Services
HPE 3PAR StoreServ 8000, 9000, and 20000 Storage Installation and Startup Service - Hewlett Packard Enterprise provides onsite deployment of your HPE 3PAR StoreServ 8000, 9000, and 20000 Storage arrays into your storage environment. This Service is included in all the levels of Care mentioned above.
http://h20195.www2.hpe.com/v2/GetPDF.aspx/4AA5-8035ENW.pdf

HPE 3PAR All-inclusive Multi-system Software Installation and Startup Service -
This service, which provides installation and startup for the HPE 3PAR Remote Copy, Peer Motion, and Peer Persistence functionality of HPE 3PAR All-inclusive Multi-system Software in your storage environment, is designed to help you get HPE 3PAR All-inclusive Multi-system Software up and running quickly and to provide a demonstration of the product's key features using sample or test data only**https://www.hpe.com/h20195/v2/GetPDF.aspx/4AA6-6385ENN.pdf**

Service and Support

HPE 3PAR All-inclusive Single-system Software Installation and Startup Service - Complementing your new HPE 3PAR All-inclusive Single-system software, this service provides the necessary activities required to help you deploy Adaptive Optimization, Dynamic Optimization, File Persona, Priority Optimization, System Reporter, Virtual Copy, and an overview of Virtual Domain and Virtual Lock. For Virtual Copy, the service provides a demonstration of the product's key features using sample or test data only
https://www.hpe.com/h20195/v2/GetPDF.aspx/4AA6-6549ENW.pdf

HPE 3PAR 8000, 9000, and 20000 Software Installation and Startup Service -
Designed to provide a smooth startup, this service provides deployment of individual HPE 3PAR 8000, 9000, and 20000 storage software features, helping to ensure proper installation in your storage environment as well as helping you increase the benefit from your storage investment.
http://h20195.www2.hpe.com/V2/GetPDF.aspx/4AA5-8036ENW.pdf

HPE 3PAR Peer Persistence Software Installation and Startup Service -
Provides implementation of the HPE 3PAR Peer Persistence Software feature. The service is designed to help get HPE 3PAR Peer Persistence up and running quickly and to provide a demonstration of the product's key features using sample or test data only.
http://h20195.www2.hpe.com/V2/GetPDF.aspx/4AA4-2772ENW.pdf

HPE Storage Transformation Workshop - Explore data management to business-aligned visions, covering cloud, object, end to end data protection and BC/DR.

HPE 3PAR StoreServ Data Migration - Proven methodology, expertise and tools to help you migrate data across your data center or around the globe.
http://h20195.www2.hpe.com/V2/GetPDF.aspx/4AA5-3759ENW.pdf

HPE Storage Modernization Service - Modernize your storage environment to take better advantage of physical or virtualized server environments, all flash, cloud and object storage solutions.
http://h20195.www2.hpe.com/v2/GetPDF.aspx/4AA5-8498ENW.pdf

Data Profiling Service - Let TS Consulting assess your current file storage and identify redundant, obsolete and trivial data - simplifying your transformation to 3PAR and reducing migration costs.

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 StoreServ Online Import Quick Start Service - Choose the most effective, appropriate methods for configuring and migrating to a HPE 3PAR platform.
http://h20195.www2.hpe.com/v2/getpdf.aspx/4AA6-0422ENW.pdf

HPE EVA to 3PAR Acceleration Service - The HPE EVA to HPE 3PAR Acceleration Service provides customers with 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 Consulting Storage migration specialists.

Service and Support

HPE SAN Deployment Service - Hewlett Packard Enterprise delivers complete design and implementation services for Fibre Channel, FCoE, FCIP, SAS, and iSCSI SAN connectivity components.
http://h20195.www2.hpe.com/V2/GetPDF.aspx/5981-8527ENE.pdf

HPE Data Replication Solution Service for 3PAR Virtual Copy - This service enables snapshots and mirroring to facilitate data restores, minimize downtime for backups, perform application testing and 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 3PAR Remote Copy - HPE Data Replication Solution Service for 3PAR Remote Copy Software configures real-time data mirroring between local and remote 3PAR storage systems to safeguard critical business information
http://h20195.www2.hpe.com/V2/GetPDF.aspx/4AA3-8627ENW.pdf

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.
https://h20195.www2.hpe.com/V2/GetPDF.aspx/4AA4-3393ENW.pdf

HPE Storage Virtual Volume Design and Implementation Service - When deploying an HPE Storage array, the HPE Virtual Volume Design and Implementation Service provides the necessary activities required to design and implement a new virtual volume configuration.
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 Hewlett Packard Enterprise 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.
https://h20195.www2.hpe.com/V2/GetPDF.aspx/4AA4-3393ENW.pdf

HPE Data Sanitization Storage and Server Services -
These services provide the skilled resources and tools to help your organization address the need to protect data when your organization is retiring systems, upgrading storage and servers, returning leased equipment, or redeploying data storing devices. Using specialized software techniques, an HPE service specialist or authorized service partner will help ensure that data cannot be reconstructed or retrieved from hard disk media in your server and storage devices. These services offer you a smart alternative or augmentation to physical hardware destruction by executing procedures to remove data from disk media.
https://www.hpe.com/h20195/v2/GetPDF.aspx/5981-9510EN.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 Storage disk arrays. HPE Performance Analysis Service for HPE Storage Disk Arrays provides a single engagement concerning the performance of a single HPE Storage disk array **http://h20195.www2.hpe.com/V2/GetPDF.aspx/5982-6668EN.pdf**

Service and Support

HPE 3PAR Performance and Capacity Trending Service - HPE 3PAR Performance and Capacity Trending Service provides data collection, analysis, and reports with key performance and capacity metrics for your HPE 3PAR StoreServ array. Through this service, you will receive a specified number of reports describing long-term trends in performance and capacity usage, and have the option to purchase additional reports. You will also receive briefing sessions highlighting The Hewlett Packard Enterprise findings and recommendations. **http://h20195.www2.hpe.com/V2/GetPDF.aspx/4AA5-8792ENW.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/4AA4-3404ENW.pdf**

HPE 3PAR Rebalance Service - The HPE 3PAR Rebalance Service helps balance data across your HPE 3PAR StoreServ Storage to take advantage of the capabilities of the array architecture. The service provides analysis, planning, and implementation of data movement and/or physical movement of drive magazines within the array.
http://h20195.www2.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 Support Service 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 configuration tools.

Customers purchasing from a commercial reseller can find HPE Support Service Services at:
https://ssc.hpe.com/portal/site/ssc/

Parts and Materials
Hewlett Packard Enterprise will provide HPE-supported replacement parts and materials necessary to maintain the covered hardware product in operating condition, including parts and materials for available and recommended engineering improvements.

Parts and components that have reached their maximum supported lifetime and/or the maximum usage limitations as set forth in the manufacturer's operating manual, product quick-specs, or the technical product data sheet will not be provided, repaired, or replaced as part of these services.

The defective media retention service feature option applies only to Disk or eligible SSD/Flash Drives replaced by Hewlett Packard Enterprise due to malfunction.

Configuration Information

Step 1 - Choose a Base configuration

HPE 3PAR StoreServ 20000 configurations start with the selection of the Base. The Base includes the controller node chassis that determines how many controller nodes the storage array can scale to.

HPE 3PAR StoreServ 20000 Base Configurations

Description	SKU
HPE 3PAR StoreServ 20000 4-way Storage Configuration Base	C8S89B
HPE 3PAR 20800 R2 2-node Storage Base with All-inclusive Single-system Software	Q1H28A
HPE 3PAR 20840 R2 2-node Storage Base with All-inclusive Single-system Software	Q1H29A
HPE 3PAR 20850 R2 2-node Storage Base with All-inclusive Single-system Software	Q1H30A

- A minimum of one (1) configuration base must be ordered for each array
- C8S89B must be used to order a HPE 3PAR StoreServ 20450 Storage array and does not include any controller node with the chassis
- Q1H28A, Q1H29A, Q1H30A include the controller node chassis and two (2) controller nodes

Step 2 - Choose a Controller Node

HPE 3PAR StoreServ 20000 Storage Controller Nodes determine the type of storage array that is required to be built. Each Controller Node consists of CPUs, ASICs, Cache banks and connectivity options for the storage array.

HPE 3PAR StoreServ 20000 Controller Node Options

HPE 3PAR 20450 2x8 Core 2.4GHz 192GB/256GB Cache Node with All-inclusive Single-system Software	C8S90B
HPE 3PAR 20800 R2 2x8 Core 2.4GHz 192GB/128GB Cache Node with All-inclusive Single-system SW	Q1H31A
HPE 3PAR 20840 R2 2x10 Core 2.4GHz 192GB/256GB Cache Node with All-inclusive Single-system SW	Q1H32A
HPE 3PAR 20850 R2 2x10 Core 2.4GHz 192GB/256GB Cache Node with All-inclusive Single-system SW	Q1H33A

- Each Controller Node SKU represents a single (1) unit
- Each Controller Node SKU is loaded with All-inclusive Single-system Software
- Controller Nodes are always ordered in pairs on a HPE 3PAR StoreServ 20000 Storage array
- One (1), two (2), or three (3) pairs of 20800, 20840 or 20850 Controller Nodes can be ordered per array. Two (2) Controller Nodes are already included as part of the Storage Base SKUs (Q1H31A, Q1H32A, Q1H33A)
- One (1) or two (2) pairs of 20450 Controller Nodes can be ordered per array
- Each of the 20800, 20840, 20850 Controller Nodes (Q1H31A, Q1H32A, Q1H33A) includes two (2) SAS adapters
- The 20450 Controller Node (C8S90B) does not include any SAS adapter
- An array with Q1H31A nodes (20800) or Q1H32A nodes (20840) can be configured as a converged flash array with SSDs and HDDs
- An array with C8S90B nodes (20450) or Q1H33A nodes (20850) can be configured as an all flash array with SSDs only
- The four node types (C8S90B, Q1H29A, Q1H32A, Q1H35A) cannot be mixed within a single array
- The node configurations and base configuration, shown in the section above, have built-in Gigabit

Configuration Information

Ethernet ports for management and Remote Copy over IP

HPE 3PAR StoreServ 20000 Upgrade Controller Node Options

Use the HPE 3PAR StoreServ 20000 Upgrade Controller Nodes to increase the number of controller nodes on an existing previously installed HPE 3PAR StoreServ 20000 array. Increasing the controller nodes on an existing array helps improve resiliency, performance and increase scalability in a balanced fashion.

Description	SKU
HPE 3PAR 20450 2x8 Core 2.5GHz 192GB/256GB Cache Upgrade Node with All-inclusive Single-system SW	C8S91B
HPE 3PAR 20800 R2 2x8 Core 2.5GHz 192GB/128GB Cache Upgrade Node with All-inclusive Single-system SW	Q1H34A
HPE 3PAR 20840 R2 2x10 Core 2.4GHz 192GB/256GB Cache Upg Node with All-inclusive Single-system SW	Q1H35A
HPE 3PAR 20850 R2 2x10 Core 2.4GHz 192GB/256GB Cache Upg Node with All-inclusive Single-system SW	Q1H36A

- Each Controller Node SKU represents a single (1) unit
- Each Controller Node SKU is loaded with All-inclusive Single-system Software
- Controller Nodes are always ordered in pairs on a HPE 3PAR StoreServ 20000 Storage array
- One (1), two (2), three (3) pairs of 20800, 20840 or 20850 Upgrade Controller Nodes can be ordered per array
- Only one (1) 20450 pair Upgrade Controller Nodes can be ordered per array
- Each of the 20800, 20840, 20850 Upgrade Controller Nodes (Q1H34A, Q1H35A, Q1H36A) includes two (2) SAS adapters
- The 20450 Upgrade Controller Node (C8S91B) does not include any SAS adapter
- An array with Q1H34A nodes (20800) or Q1H35A nodes (20840) can be configured as a converged flash array with SSDs and HDDs
- An array with C8S91B nodes (20450) or Q1H36A nodes (20850) can be configured as an all flash array with SSDs only
- The node configurations and base configuration, shown in the section above, have built-in Gigabit Ethernet ports for management and Remote Copy over IP

NOTE: The four different controller nodes cannot be mixed within a HPE 3PAR StoreServ 20000 Storage array. Care must be taken to ensure that the appropriate upgrade node is purchased while performing a node field upgrade for an existing 20000 array.

Step 3 - Choose Drive Adapter

HPE 3PAR StoreServ 20000 Storage uses SAS Drive adapters for backend drive connectivity. These SAS HBAs can be ordered separately to be installed in the field or they can be factory configured into controller nodes. 1 SAS Drive Adapter on each node of a single node pair can connect up to 8 drive enclosures. Each of the 20800, 20840, 20850 Controller Nodes includes two (2) SAS adapters as part of the Node SKU. The 20450 Controller Nodes do not include any SAS adapter.

HPE 3PAR StoreServ 20000 Drive Adapters

HPE 3PAR StoreServ 20000 4-port 12Gb SAS Host Bus Adapter	C8S93A
HPE 3PAR StoreServ 20000 4-port 12Gb SAS Upgrade Host Bus Adapter	C8S97A

- For HPE 3PAR 20450, SAS Adapters must be ordered in addition to the base configurations and controller node configurations
- For HPE 3PAR 20450 a minimum of two (2) SAS adapters must be configured per node or four (4) per

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> node pair
> - For HPE 3PAR 20800, 20840, 20850, two (2) SAS adapters are included as part of each Controller Node SKU. A third optional SAS adapter can be ordered per Controller Node.

Step 4 - 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/sec iSCSI ports or 10Gb/sec Ethernet ports. The additional FC ports can be used for multiple purposes including connection to hosts and connection to other HPE 3PAR StoreServ Storage systems in a Remote Copy or Peer Motion relationship. The iSCSI ports permit host connection in iSCSI environments. The Ethernet ports can be used to natively host various File protocols and core file data services.

HPE 3PAR StoreServ 20000 Host Adapters

Description	SKU
HPE 3PAR StoreServ 9000/20000 2-port 32Gb Fibre Channel Adapter	Q2P67A
HPE 3PAR StoreServ 20000 4-port 16Gb Fiber Channel Host Bus Adapter	C8S92A
HPE 3PAR StoreServ 20000 2-port 10Gb Converged Network Adapter	C8S94A
HPE 3PAR StoreServ 20000 2-port 10Gbps Ethernet Adapter for File Persona	C8S95A
HPE 3PAR StoreServ 20000 4-port 16Gb Fiber Channel Upgrade Host Bus Adapter	C8S96A
HPE 3PAR StoreServ 20000 2-port 10Gb Upgrade Converged Network Adapter	C8S98A
HPE 3PAR StoreServ 20000 2-port 10Gbps Upgrade Ethernet Adapter for File Persona	C8S99A

- iSCSI protocol is available through Converged Network Adapter
- 32Gb FC host support requires 3PAR OS 3.3.1 Technology Release TR05 or later and the 32Gb FC HBA is the same SKU for the 3PAR 9000 and 20000 platforms. Check HPE Spock for latest supported 3PAR software and connectivity.

Step 5 - Choose Memory-Driven Flash: Storage Class Memory Module

Storage Class Memory Module can be used to improve the performance of All-Flash Arrays by decreasing the latency for specified volumes. Intelligent caching algorithms are used to extend DRAM cache to Storage Class Memory devices using NVMe protocols and transport. Storage Class Memory Module is available in the form of an Add-in Card. Store Class Memory Module can be ordered separately to be installed in the field.

HPE 3PAR 750GB NVMe Storage Class Memory Module	Q2P70A

- Minimum of one (1) SCM Module per node must be ordered
- Only all SSD configurations are supported with SCM, and the NVMe SCM Module but be installed in PCI-Slot-3.
- SCM Module will work with HPE 3PAR OS 3.3.1 Technology Release TR05 (or later)
- SCM effectiveness should be assessed based on workload characteristics prior to configuration
- SCM module must not be configured on arrays expected to run Encryption

Step 6 - Choose Drive Enclosures

Add drive enclosures to expand the configuration. Drive enclosures can be ordered separately for

Configuration Information

installation in the field, or they can be factory configured in a rack. There are two drive enclosures each supporting two different drive form factors. One drive enclosure supports twenty-four (24) small form factor 2.5" drives while the other supports twelve (12) large form factor 3.5" drives. The HPE 3PAR StoreServ 20800 Storage and HPE 3PAR StoreServ 20850 Storage support up to eighty (80) drive enclosures. The HPE 3PAR StoreServ 20450 Storage supports up to forty (40) drive enclosures. The two drive enclosure types can be intermixed in a single array.

HPE 3PAR StoreServ 20000 Drive Enclosures

Description	SKU
HPE 3PAR StoreServ 20000 12Gb SAS 24-disk 2U SFF(2.5in) Drive Enclosure	E7Y20A
HPE 3PAR StoreServ 20000 12Gb SAS 12-disk 2U LFF(3.5in) Drive Enclosure	E7Y21A
HPE 3PAR StoreServ 20000 12Gb SAS 24-disk 2U SFF(2.5in) Upgrade Drive Enclosure	E7Y22A
HPE 3PAR StoreServ 20000 12Gb SAS 12-disk 2U LFF(3.5in) Upgrade Drive Enclosure	E7Y23A

- A minimum of 2 drive enclosures is required per node pair for each form factor

Step 7 - 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 20000 drives are sold as single drives.

HPE 3PAR StoreServ 20000 Drives

HPE 3PAR SSDs

Description	SKU
HPE 3PAR 20000 920GB SAS SFF (2.5in) SSD with All-inclusive Single-system Software	R0P65A
HPE 3PAR 20000 1.92TB SAS SFF (2.5in) SSD with All-inclusive Single-system Software	J8S13B
HPE 3PAR 20000 3.84TB SAS SFF (2.5in) SSD with All-inclusive Single-system Software	K2R25B
HPE 3PAR 20000 7.68TB SAS SFF (2.5in) SSD with All-inclusive Single-system Software	P9L79B
HPE 3PAR 20000 15.36TB SAS SFF (2.5in) SSD with All-inclusive Single-system Software	P9M61B

HPE 3PAR SAS HDDs

Description	SKU
HPE 3PAR 20000 600GB SAS 15K SFF (2.5in) HDD with All-inclusive Single-system Software	J8S06B
HPE 3PAR 20000 600GB SAS 10K SFF (2.5in) HDD with All-inclusive Single-system Software	J8S07B
HPE 3PAR 20000 1.2TB SAS 10K SFF (2.5in) HDD with All-inclusive Single-system Software	J8S08B
HPE 3PAR 20000 1.8TB SAS 10K SFF (2.5in) HDD with All-inclusive Single-system Software	J8S09B

HPE 3PAR NL SAS HDDs

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HPE 3PAR 20000 2TB SAS 7.2K SFF (2.5in) HDD with All-inclusive Single-system Software	M0S93B
HPE 3PAR 20000 4TB SAS 7.2K LFF (3.5in) HDD with All-inclusive Single-system Software	K2Q38B
HPE 3PAR 20000 14TB SAS 7.2K LFF (3.5in) HDD with All-inclusive Single-system Software	R3B19A

HPE 3PAR FIPS 140-2 Encryption Drives

Description	SKU
HPE 3PAR 20000 920GB SFF (2.5in) FIPS Encrypted SSD with All-inclusive Single-system Software	J8S14B
HPE 3PAR 20000 1.92TB SFF (2.5in) FIPS Encrypted SSD with All-inclusive Single-system Software	J8S15B
HPE 3PAR 20000 3.84TB SFF (2.5in) FIPS Encrypted SSD with All-inclusive Single-system Software	M0T65B
HPE 3PAR 20000 7.68TB SAS SFF (2.5in) FIPS Encrypted SSD with All-inclusive Single-system Software	P9L81B
HPE 3PAR 20000 15.36TB SAS SFF (2.5in) FIPS Encrypted SSD with All-inclusive Single-system Software	P9M63B
HPE 3PAR 20000 600GB SAS 15K SFF (2.5in) FIPS Encrypted HDD with All-inclusive Single-system SW	J8S16B
HPE 3PAR 20000 1.2TB SAS 10K SFF (2.5in) FIPS Encrypted HDD with All-inclusive Single-system SW	J8S17B
HPE 3PAR 20000 4TB SAS 7.2K LFF FIPS Encrypted HDD with All-inclusive Single-system Software	N9Y00B
HPE 3PAR 20000 8TB SAS 7.2K LFF FIPS Encrypted HDD with All-inclusive Single-system Software	P9B41B
HPE 3PAR 20000 14TB SAS 7.2K FIPS Encrypted HDD with All-inclusive Single-system Software	R3B20A

- RAID 6 is strongly recommended for all drive types, SSDs and HDDs (both Fast Class and Nearline).

NOTE: For P9M61B, P9L81B, and P9M63B the minimum number of drives per drive enclosure is 2 with 3PAR OS 3.3.1 MU1 and operating temperature of 95°F / 35°C. With earlier 3PAR OS versions these three drives require a minimum of 8 SSDs (of any capacity) per drive enclosure.

HPE 3PAR Encryption License

HPE 3PAR 20450 Data Encryption LTU	L7C87A
HPE 3PAR 20450 Data Encryption E-LTU	L7C87AAE
HPE 3PAR 20850 Data Encryption E-LTU	L7D11AAE
HPE 3PAR 20840 Data Encryption Software E-LTU	L7E28AAE

- An encrypted HPE 3PAR StoreServ array, i.e. any HPE 3PAR StoreServ array that has HPE 3PAR Data Encryption license activated or intended to be activated, must have only self-encrypted drives installed
- All other non-encrypted HPE 3PAR StoreServ arrays can have a mix of encrypted and non-encrypted

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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 8 - Choose Service Processor

The HPE 3PAR Service Processor monitors the HPE 3PAR StoreServ 20000 and enables remote monitoring and remote servicing of the array. The key capabilities of the HPE 3PAR Service Processor is to:

- Enable rapid, proactive response 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; key diagnostic information maintained centrally on a historical basis

  Remote Serviceability; provides fast predictive response and remediation

Each HPE 3PAR StoreServ 20000 requires its own physical 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 physical Service Processor is a dedicated storage appliance located within the storage rack providing close proximity to the HPE 3PAR StoreServ 20000 Storage. The physical Service Processor is fully supported and maintained by HPE Services. The physical Service Processor has virtual serial port (through iLO) connectivity that provides maintenance access for trouble shooting capabilities.

Description	SKU
HPE 3PAR StoreServ RPS Service Processor	Q2S13A

- K2R29A is used with HPE 3PAR 20450 arrays
- Q0F86A is used with HPE 3PAR 20800, 20840, 20850 arrays
- Q2S13B is used with HPE 3PAR 20450 arrays
- Q2S13A is used with HPE 3PAR 20800, 20840, 20850 arrays

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 following benefits:

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- 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.

HPE 3PAR Policy Manager Software LTU   TE400B

Step 9 - Choose Cables

Cables are required for various connections on the HPE 3PAR StoreServ 20000 Storage. Copper SAS cables are required for connecting the drive enclosures to the nodes on the base rack of the array and for daisy chaining between adjacent drive enclosures. Active Optical SAS Cables are required for connecting drive enclosures in adjacent racks to the nodes in the base rack. OM4 Fiber Cables are required for other connectivity such as host connectivity, Remote Copy and Peer Motion.

SAS Cables for Drive Connectivity

HPE External 0.5m (1ft) Mini-SAS HD 4x to Mini-SAS HD 4x Cable	691968-B21
HPE External 2.0m (6ft) Mini-SAS HD 4x to Mini-SAS HD 4x Cable	716197-B21
HPE 10m Mini SAS High Density Active Optical Cable	E7V95A
HPE 25m Mini SAS High Density Active Optical Cable	E7V96A
HPE 100m Mini SAS High Density Active Optical Cable	E7V97A

OM4 Cables for host connectivity and other data services

Description	SKU
HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 2m Cable	QK733A
HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 5m Cable	QK734A
HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 15m Cable	QK735A
HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 30m Cable	QK736A
HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 50m Cable	QK737A

Optical splitters

HPE Multi Fiber Push On to 4 x Lucent Connector 5m Cable	K2Q46A
HPE Multi Fiber Push On to 4 x Lucent Connector 15m Cable	K2Q47A

Direct Attach Copper Cables for host connectivity

HPE FlexNetwork

HPE FlexNetwork X240 10G SFP+ to SFP+ 1.2m Direct Attach Copper Cable	JD096C
HPE FlexNetwork X240 10G SFP+ to SFP+ 3m Direct Attach Copper Cable	JD097C
HPE FlexNetwork X240 10G SFP+ to SFP+ 5m Direct Attach Copper Cable	JG081C
HPE FlexNetwork X240 40G QSFP+ to 4x10G SFP+ 1m Direct Attach Copper Splitter Cable	JG329A
HPE FlexNetwork X240 40G QSFP+ to 4x10G SFP+ 3m Direct Attach Copper Splitter Cable	JG330A
HPE FlexNetwork X240 40G QSFP+ to 4x10G SFP+ 5m Direct Attach Copper Splitter Cable	JG331A

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HPE ARUBA

Aruba 10G SFP+ to SFP+ 1m Direct Attach Copper Cable	J9281D
Aruba 10G SFP+ to SFP+ 3m Direct Attach Copper Cable	J9283D
Aruba 10G SFP+ to SFP+ 7m Direct Attach Copper Cable	J9285D

Broadcom

HPE B-series SFP+ to SFP+ Active Copper 1.0m Direct Attach Cable	AP818A
HPE B-series SFP+ to SFP+ Active Copper 3.0m Direct Attach Cable	AP819A
HPE B-series SFP+ to SFP+ Active Copper 5.0m Direct Attach Cable	AP820A

Cisco

HPE StoreFabric C-series 3M Passive Copper SFP+ Cable	K2Q21A
HPE StoreFabric C-series 5M Passive Copper SFP+ Cable	K2Q22A
HPE C-series SFP+ to SFP+ Active Copper 7.0m Direct Attach Cable	QK701A
HPE C-series SFP+ to SFP+ Active Copper 10.0m Direct Attach Cable	QK702A

HPE BladeSystem

HPE BladeSystem c-Class 10GbE SFP+ to SFP+ 3m Direct Attach Copper Cable	487655-B21
HPE BladeSystem c-Class 10GbE SFP+ to SFP+ 5m Direct Attach Copper Cable	537963-B21

- DAC cable support for 3PAR 20000 platforms require HPE 3PAR OS version 3.2.2 MU3 or higher.
- J9285D, AP818A, AP819A, AP820A, QK701A, QK702A, 487655-B21, 537963-B21, 487658-B21 require HPE 3PAR OS version 3.3.1 or higher.
- DAC cables are supported for 10GbE speeds with iSCSI, FCoE and File protocols
- Direct Connect between the host and storage is not supported with DAC cables, they require the use of a switch.
- DAC cables can be used on built-in RCIP port for Replication

For the latest information refer to Single Point of Connectivity Knowledge for HPE Storage Products (SPOCK)

Step 10 - Choose Rack Options

The HPE 3PAR StoreServ 20000 Storage is available factory integrated on the HPE Intelligent Series racks with the appropriate power distribution units (PDUs). Multiple racks are required based on the number of drive enclosures used in the array configuration. Alternatively, a third party rackmount kit can be purchased in cases where the HPE 3PAR StoreServ 20000 Storage needs to be installed on any rack other the Hewlett Packard Enterprise racks mentioned below.

Description	SKU
HPE 42U 600mmx1075mm G2 Kitted Advanced Shock Rack with Side Panels and Baying	P9K08A
HPE 42U 600mmx1200mm G2 Kitted Advanced Shock Rack with Side Panels and Baying	P9K10A
HPE 42U 600mmx1075mm G2 Enterprise Shock Rack	P9K38A
HPE G2 Rack 42U 1075mm Side Panel Kit	P9L15A

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HPE 42U 600mmx1200mm G2 Enterprise Shock Rack	P9K40A
HPE G2 Rack 42U 1200mm Side Panel Kit	P9L16A
HPE 3PAR StoreServ Third Party Rack Mount Kit	C8S86A
HPE 600mm Rack Stabilizer Kit	BW932A

- When HPE 3PAR 20800, 20840, 20850 arrays are installed on a 42U 1075mm rack (P9K08A, P9K38A) horizontal modular PDUs are used and a single rack can support up to 8 drive enclosures.
- When HPE 3PAR 20800, 20840, 20850 arrays are installed on a 42U 1200mm rack (P9K10A, P9K40A) vertical PDUs are used and a single rack can support up to 12 drive enclosures.
- Expansion racks can support up to 20 drive enclosures.

NOTE: The Third Party Rack Mount Kit is required for mounting the 3PAR StoreServ 20000 Node enclosure on third party racks. For mounting the drive enclosure, rail kits are included with the product.
NOTE: For more information on the HPE rack offerings, please see the following URL:
https://www.hpe.com/us/en/integrated-systems/rack-power-cooling.html
NOTE: For more information on rack options, see: **http://www.hpe.com/products/rackoptions**.

PDUs

HPE G2 Basic Modular 4.9kVA/L6-30P 24A/208V Outlets (6) IEC C19/1U Horizontal NA/JP PDU	P9Q39A
HPE G2 Basic 4.9kVA/L6-30P 24A/208V Outlets (20) C13/Vertical NA/JP PDU	P9Q41A
HPE G2 Basic Modular 7.3kVA/60309 3-wire 32A/230V Outlets (6) C19/1U Horizontal INTL PDU	P9Q43A
HPE G2 Basic 7.3kVA/60309 3-wire 32A/230V Outlets (20) C13/Vertical INTL PDU	P9Q45A
HPE G2 Basic Modular 3Ph 8.6kVA/L15-30P 24A/208V Outlets (6) C19/1U Horizontal NA/JP PDU	P9Q52A
HPE G2 Basic 3Ph 8.6kVA/L15-30P 24A/208V Outlets (18) C13/Vertical NA/JP PDU	P9Q54A
HPE G2 Basic Modular 3Ph 11kVA/60309 5-wire 16A/230V Outlets (6) C19/1U Horizontal INTL PDU	P9Q57A
HPE G2 Basic 3Ph 11kVA/60309 5-wire 16A/230V Outlets (36) C13 (6) C19/Vertical INTL PDU	P9Q58A
HPE G2 Basic 3Ph 22kVA/60309 5-wire 32A/230V Outlets (18) C13 (6) C19/Vertical INTL PDU	P9Q64A
HPE G2 IEC C20 Input/(8) C13 Expansion Outlets/PDU Extension Bar Kit	P9Q66A

Branding Kit

HPE 3PAR G2 Rack 42U Branding Kit	Q9D29A

NOTE: The branding kit is an optional SKU available for G2 42U racks. It adds to the rack a storage specific branding consisting of a silver/green door panel and a yellow "Storage" element.

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Step 11 - Choose Software

Hewlett Packard Enterprise provides an extensive selection of features for HPE 3PAR StoreServ Storage. The 3PAR StoreServ 20000 includes as part of the array and drives the All-Inclusive Single-System Software which includes: OS Suite, Virtual Copy, Adaptive Optimization, Dynamic Optimization, Priority Optimization, Virtual Domains, Virtual Lock, Online Import, File Persona, Recovery Manager Central (RMC), and Smart SAN. Additional software can be purchased by ordering the All-inclusive Multi-system Software, a frame license that includes Peer Motion, Remote Copy, Peer Persistence, and Cluster Extension. The Data-at-Rest Encryption Software completes the portfolio of software available with HPE 3PAR StoreServ Storage.

For more information regarding HPE 3PAR 20000 software SKUs see
http://h20195.www2.hpe.com/v2/GetPDF.aspx/c04199812.pdf

Step 12 - Choose File Controller

Add optimized, secure, and reliable Microsoft-powered file services to your 3PAR 20000 with one or more pre-configured HPE Storage Performance File Controllers. Augmenting a 3PAR 20000 with a file controller or highly-available file controller cluster creates a unified block/file solution for your Microsoft environment that maximizes your total storage investment. Each HPE Storage File Controller is built on HPE ProLiant DNA and Microsoft Windows Storage Server 2016, and can serve thousands of concurrent users and multiple diverse workloads while providing a straightforward and familiar management experience for IT generalists or storage administrators

Description	SKU
HPE Storage Perf File Controller	Q9D44A

NOTE: HPE Storage File Controllers have 4 x 1GbE ports and are pre-configured with Windows Storage Server 2016, which includes a software iSCSI initiator. Other array connections require adding at least one HBA or Ethernet adapter plus cables.

NOTE: For two-node clusters, an Ethernet interconnect cable is required. For three- or more node clusters, a network switch plus one Ethernet cable per node is required.

For more information about configuring and connecting an HPE Storage File Controller, please visit:
https://h20195.www2.hpe.com/v2/GetDocument.aspx?docname=a00047729enw

Technical Specifications

Physical Specifications		
2-Meter Cabinet		
Dimensions (width x height x depth)	23.54 x 79 x 44.3 in	59.8 x 200.6 x 112.5 cm
Clearance for installation of cabinet	50 in	127 cm
Service clearance (front and rear)	Front/Rear: 40 in / 36 in	Front/Rear: 101.4 / 91.4 cm
Weight (not populated)	418 lb	190 kg
Maximum Weight of 8-node Base Rack[1] (fully populated)	1256.1 lb	571.0 kg
Maximum Weight of 4-node Base Rack[1] (fully populated)	1327 lb	602.0 kg
Maximum Weight of Expansion Rack[2] (fully populated)	1436.8 lb	653.1 kg
Maximum Weight per Leveling Foot	750 lb	340.2 kg
Component Weights		
20000 8-way Node Chassis	173 lb	78.6 kg
20000 4-way Node Chassis	93 lb	42.3 kg
20000 Controller Node	48.15 lb	21.8 kg
20000 Drive Enclosure	38 lb	17.3 kg
Service Processor	37.48 lb	17 kg
HPE Rack	245 lb	111.4 kg

Supported Host FC Connections		
FC Connector Type from Storage System to Host Port	LC to LC	N/A
FC Cable Core Diameter	OM4	N/A
Connector Boot Length	Standard	N/A

[1]Includes a 20800 base rack with 8 nodes, 6 drive enclosures, 1 Service Processor and PDUs in a 1075mm HPE i-Series Rack
[2]Includes a 20000 expansion rack with 20 drive enclosures and PDUs in a 1075mm HPE i-Series Rack
[3] Under maximum load

Power and Heat

Single Phase Power Supply Requirements (per rack or cabinet)

NEMA (North America, Taiwan, Philippines & Japan)	
Input Voltage (VAC)	220 (200 - 240)
Frequency (Hz)	50 - 60
Circuit Breaker Maximum	30 A per PDU (de-rated to 24 A)
Power Plugs	(4) L6-30P with 1+1 redundant (Base and Exp racks)
Power Connectors	(4) L6-30C with 1+1 redundant (Base and Exp racks)
Power Receptacles	(4) L6-30R with 1+1 redundant (Base and Exp racks)

Technical Specifications

IEC (International)

Input Voltage (VAC)	220 (200 - 240)
Frequency (Hz)	50 - 60
Circuit Breaker Maximum	32 A per PDU
Power Plugs	(4) IEC 60309-332P6 (32A) with 1+1 redundant (Base and Exp racks)
Power Connectors	(4) IEC 60309-332C6 (32A) with 1+1 redundant (Base and Exp racks)
Power Receptacles	(4) IEC 60309-332R6 (32A) with 1+1 redundant (Base and Exp racks)

Three Phase Power Supply Requirements (per rack or cabinet)

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 Plugs	(4) L15-30P with 1+1 redundant (Base and Exp racks)
Power Connectors	(4) L15-30C with 1+1 redundant (Base and Exp racks)
Power Receptacles	(4) L15-30R with 1+1 redundant (Base and Exp racks)

IEC (International)

Input Voltage (VAC)	200 - 240 p-n; 380 - 415p-p
Frequency (Hz)	50 - 60
Circuit Breaker Maximum	16A per phase per PDU (Base and Exp racks)
Power Plugs	(2) IEC 60309-516P6W (16A) with 1+1 redundant (Base and Exp racks)
Power Connectors	(2) IEC 60309-516C6W (16A) with 1+1 redundant (Base and Exp racks)
Power Receptacles	(2) IEC 60309-516R6W (16A) with 1+1 redundant (Base and Exp racks)

Refer to the HPE Power Advisor online tool for power consumption, heat loading, and circuit sizing information available at **https://paonline56.itcs.hpe.com**

Environmental Specifications

Operating Temperature	41° to 95° F (5° to 35° C) - Reduce rating by 1° F for each 1000 ft (1.8° C/1,000 m)
Shipping Temperature (Controller Node)	-22° to 140° F (-30° to 60° C). Maximum rate of change is 20° C/hr (36° F/hr)
Shipping Temperature (Drive Enclosure)	32° to 140° F (0° to 60° C). Maximum rate of change is 20° C/hr (36° F/hr)
Operating Altitude (ft/m) max.	10,000 ft / 3,048 m
Shipping Altitude (ft/m) max.	40,000 ft / 12,192 m
Humidity	10% to 90% non-condensing
Shipping Humidity	10% to 90% non-condensing
Operating Vibration	0.25G, Sine, 5-500 Hz; 0.25 GRMS, Random 5-500 Hz
Non-operating Vibration	0.5G, 5 - 500 Hz, Sine; 0.5 GRMS, Random, 5-500Hz
Operating Shock (Controller Node)	5G, 11ms, half-sine
Operating Shock (Drive Enclosure)	5G, 11ms, half-sine
Non-operating Shock	10G, 11ms, half-sine
Raised Floor	Recommended
Maximum Exhaust Air Flow	Per Controller Node - 157 CFM Per Drive Enclosure - 81 CFM

Technical Specifications

Acoustics Sound pressure level measured per ISO 7779 specifications during normal operating fan conditions	Fan Speed (RPM)	8-way Node	Fan Speed (RPM)	Drive Enclosure
	5600	78.9	5580	43
	8500	89.5	16500	64
Electromagnetic Compatibility	CISPR 22:2008/ EN55022:2010 Class A CISPR 32 Edition 2.0/EN55032:2010 Class A CISPR 24:2010/ EN 55024:2010 IEC 61000-3-2: 2014/ EN 61000-3-2: 2014 IEC 61000-3-3:2013/ EN 61000-3-3: 2013 AS/NZS CISPR22: 2009 +A1:2010 Class A AS/NZS CISPR 32:2013 CNS 13438:2006 Class A 47 CFR Part 15 Subpart b Class A ICES-003 Issue 6 Class A V-3/2015.04 RRA Public Notification 2015-27, Dec 3, 2015			
Safety	IEC 60950-1:2005 (2nd Edition); +A1:2009 +A2:2013 EN 60950-1:2006 +A11:2009 +A1:2010 +A12:2011 +A2:2013 IEC 62368-1:2014 2nd Edition EN 62368-1:2014 2nd Edition EN 62479:2010 CNS 14336-1 2nd Edition UL 60950-1-07 2nd Ed. +A1:2011 +A2:2014 UL 62368-1 CAN/CSA C22.2 No. 60950-1-07 +A1:2011 +A2:2014			
Certifications / Markings	cTUVus Mark TUV GS-mark EnergyStar	CE Mark FCC Class A IC Class A VCCI Class A BSMI Class A	BSMI RoHS BIS KCC EAC RCM	Ukraine WEEE China RoHS Morocco Nordic text

NOTE: Specifications are subject to change without notice.
NOTE: The 3PAR 20000 models that use C8S89B and C8S83B Storage Configuration Base SKUs (3PAR 20450 and legacy 3PAR 20800/20840/20850) have a maximum operating temperature of 104° F / 40° C. However, if the following drives are used (P9M61B, P9M63B, and P9L81B) the maximum operating temperature is 95° F / 35° C.

Technical Specifications

Appendix A - Legacy HPE 3PAR StoreServ 20000 models

This Appendix includes the technical specifications and controller node SKUs for the legacy HPE 3PAR StoreServ 20000 models that have been refreshed with corresponding models in June 2017.

Summary	20800	20850	20840
Number of Controller Nodes	2, 4, 6, or 8		
HPE 3PAR Gen5 ASICs	4, 8, 12 or 16		
Management Processors	4 - 16 Six-Core 2.5 GHz	4 - 16 Eight-Core 2.5 GHz	
Total Cache	0.4 - 33.8 TiB	0.9 - 3.6 TiB	0.9 - 51.3 TiB
Flash Cache (optional)	0 - 32 TiB	Not Applicable	0 - 48 TiB
Max On-Node Cache	448 - 1792 GiB	896 - 3584 GiB	896 - 3584 GiB
Total NVMe Storage Class Memory Module	2-8 6TB	2-8 6TB	2-8 6TB
Maximum Host Ports	160 ports		
32Gb/s Fibre Channel Host Ports[1]	0-80 ports		
16Gb/s Fibre Channel Host Ports[2]	0 - 160 ports		
10Gb/s iSCSI Host Ports[2]	0 - 80 ports		
10Gb/s FCoE Host Ports[2]	0 - 80 ports		
10GbE Network Ports[3] for File Persona	0 - 48 ports		
Built-in 10GbE Ports[4]	2 - 8 ports		
Number of Hard Disk Drives	6 - 2304 drives	Not Applicable	6 - 2304 drives
Number of Solid State Drives	6 - 1152	6 - 1152	6 - 1152
Raw Capacity	1.92[5] - 9600 TiB[6]	1.92[5] - 8043 TiB[6]	1.92[5] - 9600 TiB[6]
Raw Capacity (SSD Only)	1.92[5] - 8043 TiB[6]	1.92[5] - 8043 TiB[6]	1.92[5] - 8043 TiB[6]
Maximum usable file capacity[7]	2 - 1024 TiB[6]		

NOTE: Specifications are subject to change without notice
1 Each port is full bandwidth 32 Gbit/s Fibre Channel capable as applicable
2 Each port is full bandwidth 16 Gbit/s Fibre Channel capable as applicable
3 Each port is full bandwidth 10 Gbit/s iSCSI or FCoE capable
4 Each port is full bandwidth 10 Gbit/s Ethernet designated for hosting File services and Object access protocols
5 Two built-in 10-GbE ports per node pair can be used for Remote Copy (RCIP); maximum of 8 usable; RCFC works out of the FC Host ports
6 Minimum raw capacity currently supported based on minimum of 4 SSDs per array
7 For storage capacity, 1 GiB = 2^{30} bytes and 1 TiB = 1,024 GiB
8 Usable file capacity supported for HPE 3PAR File Persona
9 NVME Storage Class Memory Module: 1-750GB SCM Module per node and requires 3PAR 3.3.1 Technology Release T05 or higher Only supported on all SSDs configurations, 1module is required per node and only in PCI slot-3.

Summary of Changes

Date	Version History	Action	Description of Change
02-Dec-2019	Version 38	Changed	Added 14TB 7.2K HDD, removed 300G 15K HDD, removed 6T 7.2K HDD
15-Jul-2019	Version 37	Added	Configuration Information section was updated.
10-Jun-2019	Version 36	Changed	Add warranty information for HPE 3PAR NVMe SCM Module
15-Apr-2019	Version 35	Changed	Overview, Standard Features, Configuration Information and Appendix A sections were updated.
04-Feb-2019	Version 34	Changed	Standard Features and Configuration Information sections were updated.
07-Jan-2019	Version 33	Changed	Overview and Configuration Information sections were updated.
26-Noc-2018	Version 32	Changed	Overview and Configuration Information sections were updated Added SCM Module; 32GB FC HBA Replaced 400G to 920G SSD
01-Oct-2018	Version 31	Changed	Updated links to additional documentation. Updated Service Processors.
24-Aug-2018	Version 30	Changed	Typo in Overview section in the Management Processors field for the 20850 and 20840 models was corrected.
06-Aug-2018	Version 29	Changed	Controller Node SKU corrected in the notes of Configuration Information.
02-Jul-2018	Version 28	Changed	Configuration Info updated and 7m DAC Cable updated.
11-Jun-2018	Version 27	Changed	SKU number for the HPE 3PAR G2 Rack 42U Branding Kit was updated.
04-Jun-2018	Version 26	Added	New HPE 3PAR G2 Rack 42U Branding Kit was added.
07-May-2018	Version 25	Added	New Service Processor SKUs were added.
02-Apr-2018	Version 24	Changed	SKU descriptions were updated.
05-Feb-2018	Version 23	Changed	Rack List was updated.
08-Jan-2018	Version 22	Removed	Removed SFP+ 7m DAC Cable; updated Racks Options; Removed Appendix B.
06-Nov-2017	Version 21	Changed	Updated operating temperature and added note on min number of drives per enclosure.
25-Sep-2017	Version 20	Changed	Updated 256 TiB per node pair capacity for File Persona Added G2 Enterprise Racks.
11-Jul-2017	Version 19	Changed	Updated Environmental Specifications.
12-Jun-2017	Version 18	Changed	Fixed typos.
05-Jun-2017	Version 17	Changed	Changes made throughout the QuickSpecs.
27-Mar-2017	Version 16	Changed	Updated the Environmental Specifications section.
17-Feb-2017	Version 15	Changed	Changes made throughout the QuickSpecs.
13-Feb-2017	Version 14	Changed	New Base, Node and Drives SKUs with all-inclusive licensing. New Support services and warranty updates. Note on third party rackmount kits. Updates to raw capacity limit Removed File Persona usage for RCIP port.
28-Nov-2016	Version 13	Changed	Added new drives (7.68TB FE SSD and 15.36TB FE SSD) Updated SSD descriptions.
15-Aug-2016	Version 12	Changed	Changes made to the Overview and Configuration Sections.
07-Jun-2016	Version 11	Changed	Added Smart SAN.
15-Apr-2016	Version 10	Changed	Updated SSD descriptions.
31-Mar-2016	Version 9	Changed	Changes made to the entire document.
16-Feb-2016	Version 8	Changed	Updated the max usable file capacity to 512TiB and updated the use cases for File Persona.

Summary of Changes

04-Dec-2015	Version 7	Changed	Changes made to the Overview and Technical Specifications Sections.
01-Dec-2015	Version 6	Changed	Changes made to the entire document.
02-Oct-2015	Version 5	Added	Added The HPE StoreFront Remote SaaS Portal.
28-Sep-2015	Version 4	Changed	Changes made to the entire document.
24-Aug-2015	Version 3	Changed	Added information on Hewlett Packard Enterprise 3PAR StoreServ 20450 Storage. Changes made to built-in 10GbE port support for File Persona and added sync and share use case.
05-Jun-2015	Version 2	Changed	Changes made to the Service & Support and Detailed Specifications Sections.
01-Jun-2015	Version 1	New	New QuickSpecs.

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