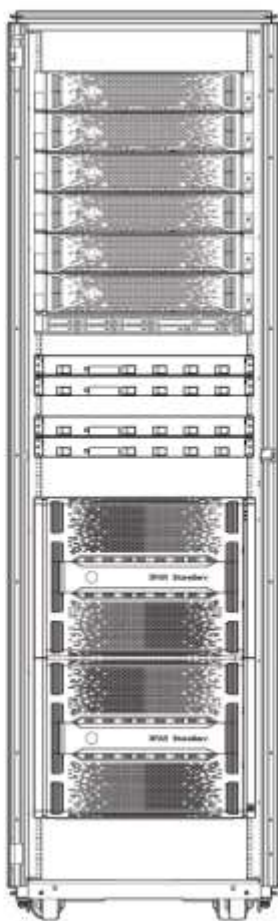


### Overview

#### HP 3PAR StoreServ 20000 Storage

The HP 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, sub-millisecond latencies, a 4X density advantage, and scalability to 15PB\* of usable capacity. The family's flash-first architecture features the HP 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. A choice of models provide a range of options that support true convergence of block and file protocols, 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.



HP 3PAR StoreServ 20000 Storage

### What's New

### Overview

Summary	20800	20850
Number of Controller Nodes	2, 4, 6, or 8	
HP 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	8.4 – 33.8 TiB	0.9 – 3.6 TiB
Max Flash Cache (optional)	8 - 32 TiB	Not Applicable
Max On-Node Cache	448 – 1792 GiB	896 - 3584 GiB
Maximum Host Ports	160 ports	
16Gb/s Fibre Channel Host Ports <sup>1</sup>	0 – 160 ports	
10Gb/s iSCSI Host Ports <sup>2</sup>	0 – 80 ports	
10Gb/s FCoE Host Ports <sup>2</sup>	0 – 80 ports	
10GbE Network Ports <sup>3</sup> for File Persona	0 – 48 ports	
Built-in Remote Copy (RCIP) Ports <sup>4</sup>	2 - 8 ports	
Number of Hard Drive Drives	8 - 1920 drives	Not Applicable
Number of Solid State Drives	4 – 1024	4 - 1024
Raw Capacity	1.92 <sup>5</sup> - 6000 TiB <sup>6</sup>	1.92 <sup>5</sup> - 3932 TiB <sup>6</sup>
Maximum usable file capacity <sup>7</sup>	2 – 256 TB	

Capacity Details		
RAID Levels	RAID 0, 1, 5, MP <sup>8</sup>	
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) <sup>9</sup>	480 MLC SSD, 920 MLC SSD, 480 cMLC SSD, 1920 cMLC SSD, 3840 cMLC SSD	
Drive Capacities (HDDs)	300 15K SAS <sup>10</sup> , 600 15K SAS <sup>10</sup> , 600 10K SAS <sup>10</sup> , 1200 10K SAS <sup>10</sup> , 1800 10K SAS <sup>10</sup> , 2000 7.2K SAS NL <sup>11</sup> , 4000 7.2K SAS NL <sup>11</sup> , 6000 7.2K SAS NL <sup>11</sup>	Not Applicable
Number of Drive Enclosures <sup>12</sup>	2 <sup>13</sup> - 80 enclosures	2 <sup>13</sup> – 48 enclosures
Support for 3PAR StoreServ File Controller v2	Yes	

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

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

2 Each port is full bandwidth 10 Gbit/s iSCSI or FCoE capable

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

4 Two built-in 10-GbE RCIP ports per node pair; maximum of 8 usable; RCFC works out of the FC Host ports

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

6 For storage capacity, 1 GiB = 2<sup>30</sup> bytes and 1 TiB = 1,024 GiB

7 Usable file capacity supported for HP 3PAR File Persona Software Suite

8 RAID MP is HP 3PAR Fast RAID 6 Technology

9 SSDs are Solid State Drives

10 SAS drives are Serial Access SCSI Drives

11 NL drives are Nearline (7.2k) Drives

### Overview

12 Drive enclosures can be 24 x 2.5" drive 2U form factor or 12 x 3.5" drive 2U form factor

13 Recommended minimum is 4 drive enclosures per pair of controller nodes

**NOTE:** Specifications are subject to change without notice

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### 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 HP Storage Products refer <http://www.hp.com/storage/spock>

### Warranty

3 Year, On-site Warranty Service. 24x7 4-hour onsite response

The warranty on all HP 3PAR StoreServ 20000 Solid State Drives is 5 years, 24x7 4-hour onsite response. Please refer to the HP 3PAR StoreServ 20000 Drives section for the complete list of SKUs

The warranty on all other HP 3PAR StoreServ 20000 drives (SAS and NL SAS) is 3 years, parts only.

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

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

<http://www.hp.com/products/storage/works/warranty>

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

### Service and Support, HP Care Pack, and Warranty Information

#### 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>

Additional Option : HP Data Sanitization Service

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

HP 24x7 Proactive 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>

Additional Option : HP Data Sanitization Service, 20 HP Proactive Select Credits / year

**Basic Care** - Minimum recommended support

HP 24x7 Proactive 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>

Additional Option : HP Data Sanitization Service , 10 HP Proactive Select Credits / year

**Implement right from the start**

**HP 3PAR StoreServ Storage Installation and Startup Service** - HP provides onsite deployment of your HP 3PAR StoreServ 20000 Storage array into your storage environment. This Service is

### Service and Support, HP Care Pack, and Warranty Information

included in all the levels of Care mentioned above.

<http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA5-8035ENW.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 Transformation Workshop** - Explore data management transformation journey to business-aligned visions, aligning your specific situation and HP's experiences.

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

**HP 3PAR StoreServ Data Migration** - Proven expertise and tools help you migrate data across your data center or around the globe

[https://nexus.sharepoint.hp.com/teams/tscmsr/Documents/HP 3PAR StoreServ Data Migration Service data sheet - US English \(A4\).pdf](https://nexus.sharepoint.hp.com/teams/tscmsr/Documents/HP%203PAR%20StoreServ%20Data%20Migration%20Service%20data%20sheet%20-%20US%20English%20(A4).pdf)

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

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

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

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

**HP EVA to 3PAR Acceleration Service** - The HP EVA to 3PAR Acceleration Service can help guide you or even execute data migration activities on your behalf that can not only optimize, but provide OPEX and CAPEX savings as a result of your journey from EVA to 3PAR.

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

**HP SAN Deployment Service** - 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 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.hp.com/V2/GetPDF.aspx/4AA4-0217ENW.pdf>

**HP Data Replication Solution Service for 3PAR Remote Copy** - HP Data Replication Solution Service for 3PAR Remote Copy Software configures real-time data mirroring between local and remote 3PAR storage systems to safeguard critical business information

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

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

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

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

**HP 3PAR Adaptive Optimization Policy Implementation Service** - Provides analysis, recommendations, and implementation of HP 3PAR Adaptive Optimization policies to enable storage tiering using data collected from the HP 3PAR Storage system over time.

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

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

### Service and Support, HP Care Pack, and Warranty Information

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

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

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

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

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

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

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

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

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

#### Get connected and get back to business

HP Storage Technology Services provide the path to get your HP Storage solutions and your business connected to HP. Once connected, our experts are able to scan your system and run health checks, then use that data to create personalized reports and recommendations for actions to take to prevent problems and downtime.

#### For more information:

[www.hp.com/services/storage](http://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](http://www.hp.com/go/lookuptool)

### Software Suites for HP 3PAR StoreServ Storage

#### HP 3PAR Operating System Software Suite

Required for all new HP 3PAR StoreServ systems, this foundational software suite gives you everything you need to get up and running quickly and efficiently. This suite includes the HP 3PAR Operating System, StoreServ Management Console and HP 3PAR Host Explorer—software designed to get you off to a quick start with your new HP 3PAR StoreServ 20000 array; HP 3PAR System Reporter and HP 3PARInfo—software designed to track performance and capacity utilization trends for multiple HP 3PAR StoreServ Storage arrays. It also includes all of the platform's thin software offerings—HP 3PAR Thin Provisioning, HP 3PAR Thin Conversion, HP 3PAR Thin Persistence and HP 3PAR Thin Deduplication. Other highlights of this suite include



### Service and Support, HP Care Pack, and Warranty Information

HP 3PAR Full Copy and Autonomic Rebalancing capabilities that help you optimize the use of future capacity expansions, and support for standard multipathing software for high availability in clustered environments. A 180-day license for Online Import is included to enable migration from HP EVA, EMC CLARiON CX4, EMC VNX, EMC VMAX or HDS NSC, USP, USP V or USP VM.

#### **HP 3PAR Replication Suite**

This optional suite bundles HP 3PAR Virtual Copy, HP 3PAR Remote Copy, HP 3PAR Peer Persistence and Cluster Extension software. The HP 3PAR Virtual Copy software protects and shares data affordably with rapid recovery using reservation-less, non-duplicative, copy-on-write snapshots; HP 3PAR Remote Copy offers simple and cost effective data protection for efficient multi-tenant disaster recovery. HP 3PAR Peer Persistence enables peer federation for VMware and Hyper-V clusters to improve overall availability. HP 3PAR Cluster Extension Software offers rapid automated protection against application downtime from fault, failure, or site disaster. These software titles can be licensed based on number of drives in the array or based on provisioned usable capacity marked for replication.

#### **HP 3PAR Data Optimization Software Suite**

This optional software bundle combines HP 3PAR Dynamic Optimization, HP 3PAR Adaptive Optimization, HP 3PAR Peer Motion, and HP 3PAR Priority Optimization software, so you can move data and workloads between tiers of storage within an array or between arrays based on performance requirements without impacting applications, users, or services. Licensed based on number of drives in the array, the four software titles bundled in this suite are also sold separately for all HP 3PAR StoreServ models.

#### **HP 3PAR File Persona Suite**

This software suite 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 HP 3PAR StoreServ 20000 Storage. With this solution, the architectural benefits of HP 3PAR StoreServ 20000 Storage can be extended to use cases such as home directory consolidation, group, departmental/corporate shares and custom cloud applications. This software suite is licensed based on aggregate usable file capacity in increments of 1TB software LTU.

#### **HP 3PAR Security Suite**

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

#### **HP 3PAR Application Software Suite for Hyper-V**

Protect your Microsoft Hyper-V environment with VM consistent snapshots using HP 3PAR Recovery Manager for Microsoft Hyper-V and the HP 3PAR VSS Provider software.

#### **HP 3PAR Application Software Suites for Microsoft Exchange, Oracle & SQL**

These three bundles provide the essentials for protecting your Microsoft Exchange, Microsoft SQL and Oracle instances with application consistent snapshots. Each bundle contains the HP 3PAR Recovery Manager for that application and the VSS Provider software.

#### **HP StoreOnce Recovery Manager Central**

By combining the performance of snapshots with the protection of backups, this software integrates HP 3PAR StoreServ 20000 Storage with HP 3PAR StoreOnce Backup Systems to provide a converged availability and flat backup service that augments traditional backup processes. With this automated, non-intrusive software the simplicity and performance of snapshots can be combined with the reliability and cost effective retention of deduplicated backups. HP StoreOnce Recovery Manager Central now supports protection of VMware instances.

### Detailed Specifications

#### Step 1 - Choose a Base configuration

HP 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.

#### HP 3PAR StoreServ 20000 Base Configurations

HP 3PAR StoreServ 20000 8-way Storage Configuration Base	C8S83A
<ul style="list-style-type: none"><li>A minimum of one (1) configuration base must be ordered for each array</li></ul>	

#### Step 2 - Choose a Controller Node

HP 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.

#### HP 3PAR StoreServ 20000 Controller Node Options

HP 3PAR StoreServ 20800 2x6 Core 2.5GHz 96GB Control 128GB Data Cache Controller Node	C8S84A
HP 3PAR StoreServ 20850 2x8 Core 2.5GHz 192GB Control 256GB Data Cache Controller Node	C8S87A
<ul style="list-style-type: none"><li>Each Controller Node SKU represents a single (1) unit</li><li>Controller Nodes are always ordered in pairs on a HP 3PAR StoreServ 20000 Storage array</li><li>One (1), two (2), three (3) or four (4) pairs of 20800 or 20850 Controller Nodes can be ordered per array</li><li>An array with C8S84A nodes (20800) can be configured as a converged flash array with SSDs and HDDs</li><li>An array with C8S87A nodes (20850) can be configured as an all flash array with SSDs only</li><li>The two node types (C8S84A &amp; C8S87A) cannot be mixed within a single array</li><li>The node configurations and base configuration, shown in the section above, have built-in Gigabit Ethernet ports for management and Remote Copy over IP</li></ul>	

#### HP 3PAR StoreServ 20000 Upgrade Controller Node Options

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

HP 3PAR StoreServ 20800 2x6Core 2.5GHz 96GB Control Cache 128GB Data Cache Upgrade Controller Node	C8S85A
HP 3PAR StoreServ 20850 2x8Core 2.5GHz 192GB Control Cache 256GB Data Cache Upgrade Controller Node	C8S88A
<ul style="list-style-type: none"><li>Each Controller Node SKU represents a single (1) unit</li><li>Controller Nodes are always ordered in pairs on a HP 3PAR StoreServ 20000 Storage array</li><li>One (1), two (2), three (3) of 20800 or 20850 Upgrade Controller Nodes can be ordered</li></ul>	



### Detailed Specifications

per array

- An array with C8S85A nodes can be configured as a converged flash array with SSDs and HDDs
- An array with C8S88A nodes 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 two different controller nodes cannot be mixed within a HP 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

HP 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.

#### HP 3PAR StoreServ 20000 Drive Adapters

HP 3PAR StoreServ 20000 4-port 12Gb SAS Host Bus Adapter	C8S93A
HP 3PAR StoreServ 20000 4-port 12Gb SAS Upgrade Host Bus Adapter	C8S97A
<ul style="list-style-type: none"><li>• Minimum of one (1) required per node or two (2) per node pair</li><li>• Drive Adapters must be ordered in addition to the base configurations and controller node configurations</li></ul>	

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

#### HP 3PAR StoreServ 20000 Host Adapters

HP 3PAR StoreServ 20000 4-port 16Gb Fiber Channel Host Bus Adapter	C8S92A
HP 3PAR StoreServ 20000 2-port 10Gb Converged Network Adapter	C8S94A
HP 3PAR StoreServ 20000 2-port 10Gbps Ethernet Adapter for File Persona	C8S95A
HP 3PAR StoreServ 20000 4-port 16Gb Fiber Channel Upgrade Host Bus Adapter	C8S96A
HP 3PAR StoreServ 20000 2-port 10Gb Upgrade Converged Network Adapter	C8S98A
HP 3PAR StoreServ 20000 2-port 10Gbps Upgrade Ethernet Adapter for File Persona	C8S99A
<ul style="list-style-type: none"><li>• iSCSI and FCoE protocols are available through Converged Network Adapter</li></ul>	

### Step 5 - Choose Drive Enclosures

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

### Detailed Specifications

enclosure supports twenty-four (24) small form factor 2.5" drives while the other supports twelve (12) large form factor 3.5" drives. The HP 3PAR StoreServ 20800 Storage supports up to eighty (80) drive enclosures. The HP 3PAR StoreServ 20850 supports up to forty four (44) drive enclosures. The two drive enclosure types can be intermixed in a single array.

### HP 3PAR StoreServ 20000 Drive Enclosures

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

- A minimum of 2 drive enclosures is required per node pair for each form factor
- Best practice is to configure multiples of 4 drive enclosures of each drive form factor used per node pair

### Step 6 - Choose Drives

Drives are orderable at the time the array is purchased, or can be added in the future when additional capacity is required. HP 3PAR StoreServ 20000 drives are sold as single drives.

### HP 3PAR StoreServ 20000 Drives

<b>HP 3PAR SSDs</b>	HP 3PAR StoreServ 20000 480GB SAS MLC SFF(2.5in) Solid State Drive	K2Q50A
	HP 3PAR StoreServ 20000 480GB SAS cMLC LFF(3.5in) Solid State Drive	K2Q54A
	HP 3PAR StoreServ 20000 480GB SAS cMLC SFF(2.5in) Solid State Drive	J8S12A
	HP 3PAR StoreServ 20000 1.92TB SAS cMLC SFF(2.5in) Solid State Drive	J8S13A
	HP 3PAR StoreServ 20000 3.84TB SAS cMLC SFF(2.5in) Solid State Drive	K2R25A
	HP 3PAR StoreServ 20000 480GB SAS MLC SFF(2.5in) Upgrade Solid State Drive	K2Q51A
	HP 3PAR StoreServ 20000 480GB SAS cMLC LFF(3.5in) Upgrade Solid State Drive	K2Q55A
	HP 3PAR StoreServ 20000 480GB SAS cMLC SFF(2.5in) Upgrade Solid State Drive	J8S28A
	HP 3PAR StoreServ 20000 1.92TB SAS cMLC SFF(2.5in) Upgrade Solid State Drive	J8S29A
	HP 3PAR StoreServ 20000 3.84TB SAS cMLC SFF(2.5in) Upgrade Solid State Drive	K2R24A
<b>HP 3PAR SAS HDDs</b>	HP 3PAR StoreServ 20000 300GB SAS 15K SFF(2.5in) Hard Drive	J8S05A
	HP 3PAR StoreServ 20000 600GB SAS 15K SFF(2.5in) Hard Drive	J8S06A
	HP 3PAR StoreServ 20000 600GB SAS 10K SFF(2.5in) Hard Drive	J8S07A
	HP 3PAR StoreServ 20000 1.2TB SAS 10K SFF(2.5in) Hard Drive	J8S08A
	HP 3PAR StoreServ 20000 1.8TB SAS 10K SFF(2.5in) Hard Drive	J8S09A
	HP 3PAR StoreServ 20000 300GB SAS 15K SFF(2.5in) Upgrade Hard Drive	J8S19A
	HP 3PAR StoreServ 20000 600GB SAS 15K SFF(2.5in) Upgrade Hard Drive	J8S20A
	HP 3PAR StoreServ 20000 600GB SAS 10K SFF(2.5in) Upgrade Hard Drive	J8S21A
	HP 3PAR StoreServ 20000 1.2TB SAS 10K SFF(2.5in) Upgrade Hard Drive	J8S22A
	HP 3PAR StoreServ 20000 1.8TB SAS 10K SFF(2.5in) Upgrade Hard Drive	J8S23A

<b>HP 3PAR NL SAS</b>	HP 3PAR StoreServ 20000 2TB SAS 7.2K SFF(2.5in) Hard Drive	M0S93A
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### Detailed Specifications

<b>HDDs</b>	HP 3PAR StoreServ 20000 2TB SAS 7.2K LFF(3.5in) Hard Drive	J8S10A
	HP 3PAR StoreServ 20000 4TB SAS 7.2K LFF(3.5in) Hard Drive	K2Q38A
	HP 3PAR StoreServ 20000 6TB SAS 7.2K LFF(3.5in) Hard Drive	J8S11A
	HP 3PAR StoreServ 20000 2TB SAS 7.2K SFF(2.5in) Upgrade Hard Drive	M0S94A
	HP 3PAR StoreServ 20000 2TB SAS 7.2K LFF(3.5in) Upgrade Hard Drive	J8S24A
	HP 3PAR StoreServ 20000 4TB SAS 7.2K LFF(3.5in) Upgrade Hard Drive	K2Q39A
	HP 3PAR StoreServ 20000 6TB SAS 7.2K LFF(3.5in) Upgrade Hard Drive	J8S27A
<b>HP 3PAR FIPS 140-2 Encryption Drives</b>	HP 3PAR StoreServ 20000 920GB SAS MLC SFF(2.5in) FIPS Encrypted Solid State Drive	J8S14A
	HP 3PAR StoreServ 20000 1.92TB SAS cMLC SFF(2.5in) FIPS Encrypted Solid State Drive	J8S15A
	HP 3PAR StoreServ 20000 600GB SAS 15K SFF(2.5in) FIPS Encrypted Hard Drive	J8S16A
	HP 3PAR StoreServ 20000 1.2TB SAS 10K SFF(2.5in) FIPS Encrypted Hard Drive	J8S17A
	HP 3PAR StoreServ 20000 6TB SAS 7.2K LFF(3.5in) FIPS Encrypted Hard Drive	J8S18A
	HP 3PAR StoreServ 20000 920GB SAS MLC SFF(2.5in) FIPS Encrypted Upgrade Solid State Drive	J8S30A
	HP 3PAR StoreServ 20000 1.92TB SAS cMLC SFF(2.5in) FIPS Encrypted Upgrade Solid State Drive	J8S31A
	HP 3PAR StoreServ 20000 600GB SAS 15K SFF(2.5in) FIPS Encrypted Upgrade Hard Drive	J8S32A
	HP 3PAR StoreServ 20000 1.2TB SAS 10K SFF(2.5in) FIPS Encrypted Upgrade Hard Drive	J8S33A
	HP 3PAR StoreServ 20000 6TB SAS 7.2K LFF(3.5in) FIPS Encrypted Upgrade Hard Drive	J8S34A
<b>HP 3PAR Encryption License</b>	HP 3PAR StoreServ 20800 Data at Rest Encryption LTU	L7C63A
	HP 3PAR StoreServ 20800 Data at Rest Encryption E-LTU	L7C63AAE
	HP 3PAR StoreServ 20850 Data at Rest Encryption LTU	L7D11A
	HP 3PAR StoreServ 20850 Data at Rest Encryption E-LTU	L7D11AAE

#### Notes:

- All drives within a 3PAR StoreServ encrypted array must be self-encrypted devices. There cannot be a mixture of encrypted drives and non-encrypted drives within the same encrypted array.
- 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 HP 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 HP 3PAR StoreServ Storage, it cannot be disabled.
- The local key manager is included in the HP 3PAR OS. There is not a separately orderable part number for the local key manager.

### Detailed Specifications

#### Step 7 - Choose Service Processor

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

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

Each HP 3PAR StoreServ 20000 requires its own physical Service Processor. The Service Processor functions as the communication interface between a customer's IP network and HP 3PAR Central by managing all service-related communications. The Service Processor leverages the industry-standard HTTP over Secure Sockets Layer (HTTPS) protocol to secure and encrypt data communication.

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

HP 3PAR StoreServ Redundant Power Supply Service Processor

K2R29A

#### HP 3PAR Policy Server

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

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

HP 3PAR Policy Manager Software LTU

TE400B

#### Step 8 – Choose Cables

Cables are required for various connections on the HP 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.

<b>SAS Cables for Drive Connectivity</b>	HP Ext 0.5m MiniSAS HD to MiniSAS HD Cbl	691968-B21
	HP Ext 2.0m MiniSAS HD to MiniSAS HD Cbl	716197-B21
	HP 12Gb Mini-SAS HD AOC 10m Cable	E7V95A
	HP 12Gb Mini-SAS HD AOC 25m Cable	E7V96A
	HP 12Gb Mini-SAS HD AOC 100m Cable	E7V97A

### Detailed Specifications

<b>OM4 Cables for host connectivity and other data services</b>	HP Premier Flex LC/LC OM4 2f 2m Cbl	QK733A
	HP Premier Flex LC/LC OM4 2f 5m Cbl	QK734A
	HP Premier Flex LC/LC OM4 2f 15m Cbl	QK735A
	HP Premier Flex LC/LC OM4 2f 30m Cbl	QK736A
	HP Premier Flex LC/LC OM4 2f 50m Cbl	QK737A

### Step 8 – Choose Rack Options

The HP 3PAR StoreServ 20000 Storage is available factory integrated on the HP 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 HP 3PAR StoreServ 20000 Storage needs to be installed on any rack other than HP racks mentioned below.

HP 642 1075mm Shock Intelligent Series Rack	BW904A
HP 600mm Rack Stabilizer Kit	BW932A
HP 42U 1075mm Side Panel Kit	BW906A
HP 642 1200mm Shock Intelligent Rack	BW908A
HP 3PAR StoreServ 20000 Third Party Rack Mount Kit	C8S86A

- For more information on the HP rack offerings, please see the following URL: <http://h18004.www1.hp.com/products/servers/platforms/rackandpower.html>. For more information on rack options, see: <http://www.hp.com/products/rackoptions>.

### Step 9 – Choose File Controller

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

<http://www8.hp.com/h20195/v2/GetHtml.aspx?docname=c04637524>

### Detailed 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 Base Rack <sup>1</sup> (fully populated)	1256.1 lb	571.0 kg
Maximum Weight of Expansion Rack <sup>2</sup> (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 Controller Node	48.15 lb	21.8 kg
20000 Drive Enclosure	38 lb	17.3 kg
Service Processor	37.48 lb	17 kg
HP Rack	245 lb	111.4 kg

#### Supported Host FC Connections

FC Connector Type from Storage System to Host Port	LC to LC
FC Cable Core Diameter	OM4
Connector Boot Length	Standard

#### Power and Heat

##### Single Phase Power Supply Requirements

###### 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 Connectors for 2-Meter Cabinet	(4) L6-30P with 1+1 redundant
Power Receptacles	(4) L6-30R with 1+1 redundant

###### IEC (International)

Input Voltage (VAC)	220 (200 - 240)
Frequency (Hz)	50 - 60
Circuit Breaker Maximum	32 A per PDU
Power Connectors for 2-Meter Cabinet	(4) IEC 60309-32A (332P6) with 1+1 redundant
Power Receptacles	(4) IEC 60309-32A (332C6) with 1+1 redundant

##### Three Phase Power Supply Requirements

###### NEMA (North America, Taiwan, Philippines & Japan)

### Detailed Specifications

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 (Base rack) or (4) L15-30P with 1+1 redundant (Exp rack)
Power Receptacles	(2) Hubbell HBL460C9W or equivalent or L15-30

### 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 (Base rack) or 16A per phase per PDU (Exp rack)
Power Connectors for 2-Meter Cabinet	(2) IEC 60309, 4-pole, 5-wire, RED, gnd clocked to 6:00 with 1+1 redundant
Power Receptacles	(2) Hubbell C532C6S or equivalent

	<b>Transactional<sup>3</sup> (watts / BTU/h)</b>	<b>Idle (watts / BTU/h)</b>
480-GB MLC SSD Drive	7.8 / 26.61	4.5 / 15.35
920-GB MLC SSD Encryption Drive	7.9 / 26.96	4.5 / 15.35
480-GB cMLC SSD Drive	7.1 / 24.23	3.2 / 10.92
1920-GB cMLC SSD Drive	8.9 / 30.37	3.5 / 11.94
3840-GB cMLC SSD Drive	11 / 37.53	3.4 / 11.6
300-GB 15K SFF SAS Drive	7 / 23.88	6.8 / 23.2
600-GB 15K SFF SAS / Encryption Drive	7.3 / 24.91	7 / 23.88
600-GB 10K SFF SAS / Encryption Drive	6.5 / 22.18	6.3 / 21.5
1.2-TB 10K SFF SAS Drive	8.2 / 27.98	6.5 / 22.18
1.8-TB 10K SFF SAS Drive	7.5 / 25.59	7.3 / 24.91
2-TB 7.2K SFF SAS Drive	6 / 20.47	4.6 / 15.7
2-TB 7.2K LFF SAS Drive	11.6 / 39.58	6.6 / 22.52
4-TB 7.2K LFF SAS Drive	13.1 / 44.70	9.1 / 31.05
6-TB 7.2K LFF SAS / Encryption Drive	14.3 / 48.79	11.9 / 40.6
20800 Controller Node Pair	621 / 2116	562 / 1914
20850 Controller Node Pair	696 / 2371	612 / 2085
SFF Drive Enclosure (No drives)	152.6 / 520.69	152.6 / 520.69
LFF Drive Enclosure (No drives)	149.3 / 509.43	149.3 / 509.43
Service Processor	78.77 / 268.7	43.84 / 149.6
Example Full Cabinet Configuration (4-Node 20800; 6 Drive Enclosures and 144 600-GB 10K SAS drives)	4335.6 / 14782.06	4070.8 / 13786.14

### Environmental Specifications

Operating Temperature	41° to 104° F (5° to 40° 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)



### Detailed Specifications

Shipping Temperature (Drive Enclosure)	32° to 140° F (0° to 60° C). Maximum rate of change is 20° C/hr (36° F/hr)
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	.25 G, 5-500 Hz, Sine
Non-operating Vibration	.5 G, 5-500 Hz, Sine
Operating Shock (Controller Node)	2 G, 11 ms, half-sine
Operating Shock (Drive Enclosure)	5 G, 11 ms, half-sine
Non-operating Shock	10 G, 11 ms, half-sine
Raised Floor	Recommended
Maximum Exhaust Air Flow	Per Controller Node – 157 CFM Per Drive Enclosure – 81 CFM

Electromagnetic Compatibility	CISPR 22:2008/ EN55022:2010 Class A CISPR 24:2010/ EN 55024:2010 IEC 61000-3-2:2005/ EN 61000-3-2:2006 +A1:2009 +A2:2009 IEC/ EN 61000-3-3:2008 AS/NZS CIPSR 22: 2009 Class A CNS 13438:2006 Class A 47 CFR Part 15 Subpart b Class A ICES-003 Issue 5 Class A V-3/2012.04 Class A RRA Notice No. 2013-3 (2013.06.17) (Korea)
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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

Safety	IEC 60950-1:2005 (2nd Edition) EN 60950-1:2006 +A11:2009 +A1:2010 +A12:201 CAN/CSA-C22.2 No. 60950-1-07 +A1:2011	EN 62479:2010, CNS 14336-1 (2010) UL 60950-1:2007 ed 2.0 +A1
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Certifications / Markings	cTUVus Mark TUV T-mark (EN 60950)	CE Mark FCC Class A IC Class A VCCI Class A,	BSMI Class A KCC EAC RCM	Ukraine WEEE China RoHS EU RoHS
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<sup>1</sup>Includes a 20800 base rack with 8 nodes, 6 drive enclosures, 1 Service Processor and PDUs in a 1075mm HP i-Series Rack

<sup>2</sup>Includes a 20800 expansion rack with 20 drive enclosures and PDUs in a 1075mm HP i-Series Rack

<sup>3</sup> Under maximum load

**NOTE:** Specifications are subject to change without notice.

### Summary of Changes

Date	Version History	Action	Description of Change:
05-Jun-2015	From Version 1 to 2	Changed	Changes made to the Service & Support and Detailed Specifications Sections

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