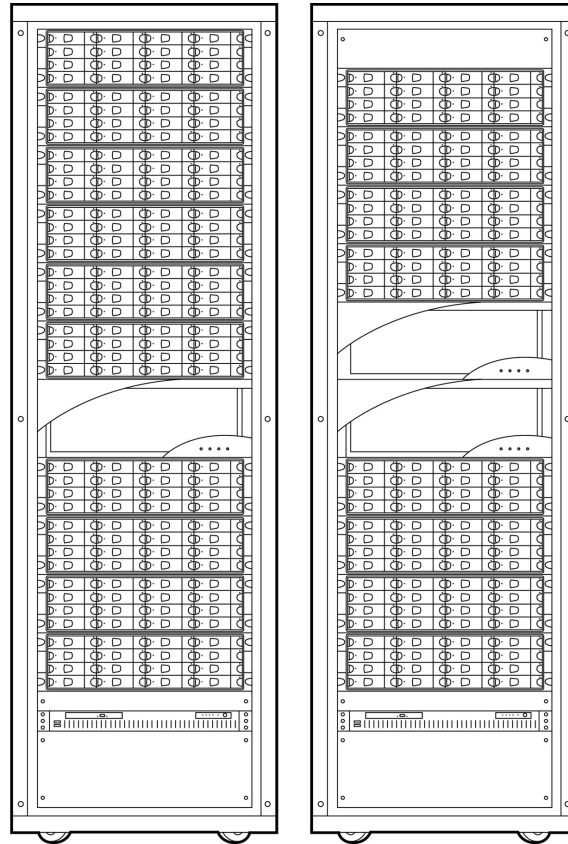


QuickSpecs

HP 3PAR F-Class Storage System

Overview

The HP 3PAR® F200 and F400 Storage Systems bring next-generation utility storage benefits and features to the midrange by offering unique features, high-end scalability, and high availability at a price that fits mid-sized budgets. The industry's first quad controller-capable storage system for the midrange, the F400 was rated "Best In Class" in the DCIG 2012 Midrange Buyers Guide. Traditionally, customers looking for midrange storage solutions have been asked to compromise scalability and availability due to cost constraints. However, a converged infrastructure requires that more and more applications be consolidated and that virtualization technologies are deployed, which places new demands on storage that midrange systems were not designed to meet. However, the alternative—purchasing premium-priced monolithic arrays to do the job—is not an economically viable option for most organizations.



HP 3PAR F-Class Storage Systems

QuickSpecs

HP 3PAR F-Class Storage System

Overview

Summary	F200	F400
Number of Controller Nodes	2	2 or 4
Management Processors	2 Quad-Core 2.33 GHz	2 - 4 Quad-Core 2.33 GHz
Control Cache	8 GB	8 - 16 GB
Data Cache	12 GB	12 - 24 GB
Maximum Host Ports ¹	12 ports	24 ports
Fibre Channel Host Ports ²	0 - 12 ports	0 - 24 ports
iSCSI Host Ports ³	0 - 8 ports	0 - 16 ports
Built-in Remote Copy (RCIP) Ports ¹⁰	2 ports	2 - 4 ports
Number of Drives	16 - 192 drives	16 - 384 drives
Raw Capacity (approx.) ⁴	2.3 - 128 TB ⁵	2.3 - 384 TB ⁵

Capacity Details		
RAID Levels RAID	0, 1, 5, MP ⁶	RAID 0, 1, 5, MP ⁶
RAID 5 Data to Parity Ratio	2:1 - 8:1	2:1 - 8:1
RAID 6 Data to Parity Ratios	6:2, 14:2	6:2, 14:2
Drive Capacities (approximate GB ⁵) (RAID levels, parity ratios, and drive capacities all mixable within the same Storage System)	400 SSD ⁷ 300 FC, 600 FC, 300 SAS ⁸ , 450 SAS ⁸ , 900 SAS ⁸ , 1000 NL ⁹ , 2000 NL SAS ⁹	400 SSD ⁷ 300 FC, 600 FC, 300 SAS ⁸ , 450 SAS ⁸ , 900 SAS ⁸ , 1000 NL ⁹ , 2000 NL SAS ⁹
Number of Drive Chassis (Each Drive Chassis holds up to 16 drives in 3U)	2 - 12 chassis	2 - 24 chassis

HP 3PAR F-Class Starter Kits

Summary	F200 Starter Kit	F400 Starter Kit
Number of Controller Nodes	2	2, (supports 2 or 4)
Management Processors	2 Quad-Core 2.33 GHz	2 Quad-Core 2.33 GHz (supports 2 - 4)
Control Cache	8 GB	8 GB, (supports 8 - 16 GB)
Data Cache	12 GB	12 GB, (supports 12 - 24 GB)
Host Ports ¹	4, (maximum 12 ports)	2, (maximum 24 ports)
Fibre Channel Host Ports ²	4, (supports up to 12 ports)	4, (supports up to 24 ports)
iSCSI Host Ports ³	0, (supports up to 8 ports)	0, (supports up to 16 ports)
Number of Drives	16, (supports up to 192 drives)	16, (supports up to 384 drives)
Raw Capacity (approx.) ⁴	9.6 TB, (supports up to 128 TB5)	9.6 TB (supports up to 384 TB5)
Included Software LTU	(4) HP 3PAR OS	(4) HP 3PAR OS
HP 3PAR OS	F200/4x600GB 15K Mag LTU	F200/4x600GB 15K Mag LTU
Host Explorer Software	1	1
Thin Suite LTU	10 TB	10 TB



QuickSpecs

HP 3PAR F-Class Storage System

Overview

NOTE: Support for SAS drives on HP 3PAR F-Class Storage is currently available with HP 3PAR OS version 3.1.2 and higher only. SAS Drives are not compatible with the back revision (currently 3.1.1 MU2) of HP 3PAR OS Software (Option 001)

¹ Fibre Channel and iSCSI host ports are mixable on same HP 3PAR Storage System

² Each port is full bandwidth 4 Gbit/s Fibre Channel capable

³ Each port is full bandwidth 1 Gbit/s iSCSI with complete iSCSI and TCP/IP offload

⁴ Max raw capacity currently supported with any and all drive types

⁵ For storage capacity, 1 GB = 1,024,000,000 bytes and 1 TB = 1,000 GB

⁶ RAID MP is HP 3PAR Fast RAID 6 Technology

⁷ SSDs are Solid State Drives

⁸ SAS drives are Serial Access SCSI Drives

⁹ NL SAS drives are Nearline (Enterprise SATA) SAS disks

¹⁰ Two built-in 1-GbE RCIP ports per node pair; maximum of 4 usable; RCFC works out of the FC Host ports

NOTE: Specifications are subject to change without notice.

Host OS Support

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

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

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

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

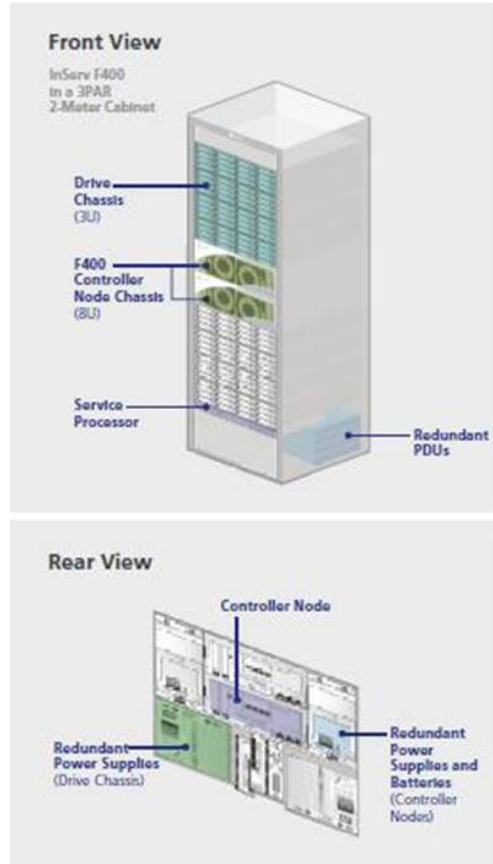
SUSE® Linux® Enterprise | VMware vSphere™

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

QuickSpecs

HP 3PAR F-Class Storage System

Overview



HP 3PAR F200 Starter Kit Contents

The HP 3PAR F200 Field Starter Kit includes 2 Controller Nodes, 4GB Control Cache (per controller node), 6GB Data Cache (per controller node), 2 Drive Enclosures, 4 Drive Magazines (4x 600GB 15K FC Disks), HP 3PAR OS LTU, (1) Host Explorer software, 10TB LTU HP 3PAR Thin Suite

HP 3PAR F400 Starter Kit Contents

The HP 3PAR F400 Field Starter Kit includes 2 Controller Nodes, 4GB Control Cache (per controller node), 6GB Data Cache (per controller node), 2 Drive Enclosures, 4 Drive Magazines (4x 600GB 15K FC Disks), HP 3PAR OS LTU, (1) Host Explorer software, 10TB LTU HP 3PAR Thin Suite

QuickSpecs

HP 3PAR F-Class Storage System

Features

Get Thin and Stay Thin

The revolutionary, zero-detect capable HP 3PAR Gen3 ASIC is a hyper-efficient storage optimization engine designed to power "fat-to-thin" volume conversions in silicon while preserving superior performance levels. Fat-to-thin volume conversions boost capacity utilization by removing allocated but unused space from traditional, "fat" storage volumes.

With the HP 3PAR Gen3 ASIC's built-in, hardware-based zero-detection capabilities, migration of "fat" volumes from other storage platforms to new "thin" volumes on an HP 3PAR Storage System is achieved with the greatest speed possible and without the application disruption of software-based implementations. With fat-to-thin volume conversions taking place at the hardware level, more parallel memory transactions are possible and system performance is not impacted like it is with software-based approaches to volume optimization. Thin Built In capabilities within the F-Class also power the ongoing, automated optimization of thin provisioned volumes on HP 3PAR Storage Systems, so thin volumes stay thin.

QuickSpecs

HP 3PAR F-Class Storage System

Software

Start Thin. HP 3PAR Thin Provisioning Software

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

Get Thin. HP 3PAR Thin Conversion Software

With HP 3PAR Thin Conversion Software, a technology refresh no longer requires a terabyte-for-terabyte replacement, but instead offers the opportunity to eliminate 70-80% of the legacy capacity in a client's storage environment, simply and rapidly. The zero-detection capability built into the HP 3PAR Gen3 ASIC, combined with HP 3PAR Thin Conversion Software, can effectively and rapidly "thin" a heterogeneous data center to one-quarter of its original size or less while preserving service levels, and without impacting production workloads. This solution not only makes a technology refresh more affordable, but it reduces up-front capital costs as well as ongoing operational and environmental costs associated with powering, cooling, and housing storage equipment. It also provides space and power consumption relief for data centers approaching maximum density.

In an ideal world, all storage volumes would start thin using HP 3PAR Thin Provisioning Software. But in some cases, starting thin has not been an option, particularly when it comes to data stored on legacy arrays from traditional storage vendors. HP 3PAR Thin Conversion Software uses a virtualization mapping engine for space reclamation called the HP 3PAR Thin Engine, together with the unique hardware capabilities of the HP 3PAR Gen3 ASIC to extend the benefits of thin provisioning to existing storage volumes. In tandem with the HP 3PAR Gen3 ASIC, Thin Conversion enables inline, wire speed "fat-to-thin" conversions compatible with any host volume. HP 3PAR Utility Storage is the only storage platform to offer this built-in, hardware-accelerated, fat-to-thin conversion capability. With HP 3PAR Thin Conversion Software, clients can rapidly and non-disruptively shrink storage footprint, reduce storage TCO, and meet Green IT targets.

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

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

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

On average, HP 3PAR Utility Storage clients already purchase 60% less capacity than with traditional storage arrays. With HP 3PAR Thin Persistence and Thin Copy Reclamation, customers can improve this average capacity savings by another 10% for a total savings of up to 70%. Volumes and snapshots can now stay thin to help sustain Green IT targets, defer the cost of purchasing raw capacity to handle new data growth, and keep costs down without the need to purchase special host-based software or retaining professional services.

HP Storage Management Pack for Microsoft System

The HP Management Pack for Systems Center Operations Manager provides seamless integration with Microsoft Systems Center Operations Manager and now System Center Essentials by integrating



QuickSpecs

HP 3PAR F-Class Storage System

Software

Center predefined discovery and state monitoring policies, event processing rules and tasks, and diagram and topology views for the storage system.

For more information:

http://h18000.www1.hp.com/products/quickspecs/14249_div/14249_div.html

HP Storage Management Pack can be downloaded free from the following website:

<https://h20392.www2.hp.com/portal/swdepot/displayProductInfo.do?productNumber=SCOM>

QuickSpecs

HP 3PAR F-Class Storage System

Service and Support, HP Care Pack, and Warranty Information

Warranty

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

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

For more information about HP's Global Limited Warranty and Technical Support, visit <http://www.hp.com/products/storageworks/warranty>

Services

HP Care Pack Services: Packaged server and storage services for increased uptime, productivity and ROI

When you buy HP server and storage products and solutions, it's also a good time to think about what levels of support you may need. Our portfolio of service options reduce deployment and management worries while helping you get the most out of your server and storage investments. We take a holistic approach to your environment, bridging servers, blades, storage, software and network infrastructures with our packaged HP Care Pack Services for servers and storage.

Protect your business beyond warranty

When it comes to robustness and reliability, standard computing equipment warranties have matured along with technology. Good news that can also create problems stemming from depending on standard warranties designed to only protect against product defects and some downtime causes. Using a standard approach to warranty uplifts, such as HP Care Pack Services, helps reduce downtime risks and provides operational consistency for mission-critical and standard business computing.

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

HP Care Pack Services: Upgrading or extending standard server and storage warranties cost effectively

HP Care Pack Services offer a standard reactive hardware and software support services suite sold separately, or combined with our Foundation Care 24x7 services. The portfolio also provides a combination of integrated proactive and reactive services, such as Proactive 24 Service and Critical Service. In addition with HP Proactive Select, you can acquire the specific proactive constancy and technical services. HP Proactive Select menu offers a broad set of service options that you can mix and match depending on your specific requirements. Proactive service options include offers for server, storage, network, SAN device, software, environment and education services.

HP server and storage lifecycle support services offers a full spectrum of customer care—from technology support to complex migrations to complete managed services. HP Factory Express provides customization, integration and deployment services for turnkey solutions. HP Education Services offer flexible, comprehensive training on to help your IT staff get the most out of your server and storage investments. HP Financial solutions extend innovative financing and cost-effective asset management programs—from purchase to equipment retirement.

Learn more: www.hp.com/services/servers and www.hp.com/services/storage

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

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

- Services for customers purchasing from HP or an enterprise reseller are quoted using HP order configuration tools.
- Customers purchasing from a commercial reseller can find HP Care Pack Services at



Service and Support, HP Care Pack, and Warranty Information

<http://www.hp.com/go/lookuptool>

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

HP Foundation Care 24x7 Service

HP Foundation Care 24x7 connects you to HP 24 hours a day, seven days a week for assistance on resolving issues - hardware onsite response within four hours and software call back within two hours after opening your case. Three years' coverage recommended with HP Care Pack Service.

HP 3PAR Storage System Installation and Startup Service

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

- Allows your IT resources to stay focused on their core tasks and priorities
- Reduces implementation time, impact and risk to your storage environment
- Helps ensure a successful implementation by providing HP installation planning and coordination
- Helps you more effectively utilize HP product by knowledge gained from service specialist during onsite delivery of the service

<http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA2-8240ENW.pdf>

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

HP Storage Data Migration Service

For customers who need to safely transport mission critical data with minimal impact to their operations:

You need to move your critical enterprise data to your new HP SAN platform. And you need to accomplish that without losing data and without interrupting your ongoing business operations.

HP Storage Data Migration Service helps you minimize the risk of data loss, threats to data integrity, and avoid productivity-sapping performance slowdowns during data transport. A highly experienced HP Services storage specialist works with you to rapidly and securely migrate mission-critical business information across your data center or around the globe - regardless of the complexity of your environment.

<http://h20195.www2.hp.com/V2/GetDocument.aspx?docname=5982-4107EN&cc=us&lc=en>

QuickSpecs

HP 3PAR F-Class Storage System

Service and Support, HP Care Pack, and Warranty Information

eSupport

HP eSupport is a portfolio of technology-based services that assist you with managing your business environment - from the desktop to the data center.

Support Portal

The HP support portal provides one-stop access to the information, tools and services you need to manage the daily operations of your IT environment.

Features include:

- Access to self-solve tools (including search technical knowledge base)
- Efficient logging and tracking of support cases
- Access to diagnostic tools
- Proactive notification of relevant information

Access to certain features of the support portal requires an HP service agreement. To access the support portal, visit: https://support.3pardata.com/OA_HTML/jtfflogin.jsp

The HP remote monitoring and support solution for the HP 3PAR Storage System provides 24x7 remote monitoring for hardware failure and other potential issues using secure technology that's been proven at thousands of companies around the world. In many cases, you can avoid problems before they occur, allowing you can spend less time solving problems and more time focused on your business. Our Secure Service Architecture leverages industry standard HTTP over Secure Socket Layer (HTTPS) for all external communication, ensuring secure and encrypted data transmission. The Secure Service Architecture delivers the three A's - Authentication, Authorization, and Audit Logging - that form the hallmark of secure communication.

Customer Technical Training

HP Education Services

In today's cost-conscious business environment, IT professionals, developers, consultants and users face an interesting challenge: how to keep up with the latest technologies and expand important skills while delivering profitable results on current projects. To help address this challenge, HP offers innovative training solutions that help keep you up-to-date on virtualization, server, storage, Insight Control, Citrix, Microsoft® and open source/Linux-related topics-while spending less time away from business-critical activities.

HP Services Awards

HP Technology Services continues to be recognized for service and support excellence by customers, partners, industry organizations and publications around the world. Recent honors and award reflect our services team's dedications, technical expertise, professionalism and uncompromising commitment to customer satisfaction.

Additional Services Information

To learn more on HP ProLiant servers, HP BladeSystem servers and HP storage products, please contact your HP sales representative or HP Authorized Channel Partner. Or visit www.hp.com/services/proliant or www.hp.com/services/bladesystem or <http://www.hp.com/services/storage>



QuickSpecs

HP 3PAR F-Class Storage System

Configuration

Configuration Steps for F-Class Systems

Step 1 - Choose a Base Configuration

HP 3PAR F-Class Storage System	HP 3PAR F200 Configuration Base	QL226C
	HP 3PAR F400 Configuration Base	QL227C
	HP 3PAR Service Processor	QL340B

Configuration Rules: Base Configuration

- Must order one (1) F-Class Base configuration
- Includes Controller Node Chassis with 2 Controller Nodes, 2 Power Supplies with integrated Batteries, and 2 Node fans
- Service Processor - Must order one per HP 3PAR Storage System
NOTE: For customers that require the previous version of the HP 3PAR OS (one revision back from the current revision) in their configuration the #001 option must be used. QL226B #001 or QL227B #001 must be added to the Watson configuration.
NOTE: The base configuration does not include control cache, data cache, adapters (outside of the embedded ports), drive chassis, or drives. Each of these must be ordered separately.

OR

HP 3PAR F200 Field Starter Kit	QW960C
• 9.6TB (16) 600Gb 15K HDD	
HP 3PAR F400 Field Starter Kit	QW961C
• 9.6TB (16) 600Gb 15K HDD	

Configuration Rules: Base Configuration

- Must order one (1) F-Class Starter Kit Base configuration
- Includes Controller Node Chassis with (2) Controller Nodes, (2) Power Supplies with integrated Batteries, (2) Node fans, (2) 6GB Data Cache, (2) 4GB Control Cache, (2) 16 Disk Drive Chassis, (4) 4x600GB 15K FC Drives, (4) 2M LC-LC Fiber Cables, (2) 10M LC-LC Fiber Cables, (4) HP 3PAR OS F200/4x600GB 15K Mag LTU, (1) HP 3PAR Host Explorer Software and (10) HP 3PAR Thin Suite 1TB LTU
- Service Processor - Automatically added when either of F-Class starter kit(s) base configuration is selected
NOTE: To order an upgrade for F-Class Starter Kits, please consult your local sales representative

QuickSpecs

HP 3PAR F-Class Storage System

Configuration

Step 2 - Choose a Controller Node configuration

HP 3PAR Controller Nodes	HP 3PAR 2.33GHz F-Class Controller Node	QL228C
	HP 3PAR 2.33GHz F-Class Upgrade Controller Node	QL321C

Configuration Rules: Controller Nodes

- 2 nodes are included in the base configuration
- 2 nodes are supported on F200
- 2 or 4 nodes are supported on F400
- Nodes are arranged in pairs, where one is the backup node for the other. The HP 3PAR Storage System is an Active/Active array where the same volume can be exported from all nodes.
- 4 GB Control Cache (2 x 2-GB DIMMs) per node
- 6 GB Data Cache (3 x 2-GB DIMMs) per node
- Built-in 4 FC ports per node for host and disk. The default is to use 2 built-in ports per node for disk connectivity.
- Built-in Gigabit Ethernet (GbE) for Remote Copy over IP
- Built-in Gigabit Ethernet (GbE) for management
- 2 PCI-X slots per node (max 4 expansion ports) to be used for host (FC or iSCSI), disk, iSCSI or Remote Copy over FC

HP 3PAR Cache	HP 3PAR 4GB (2x2GB DIMMs) F-Class Controller Cache	QL232B
	HP 3PAR 6GB (3x2GB DIMMs) F-Class Data Cache	QL231B
	HP 3PAR 4GB (2x2GB DIMMs) F-Class Upgrade Controller Cache	QL330B
	HP 3PAR 6GB (3x2GB DIMMs) F-Class Upgrade Data Cache	QL329B

Configuration Rules: Cache

- One 4 GB Control Cache (2 x 2-GB DIMMs) per node
- One 6 GB Data Cache (6 x 2-GB DIMMs) per node
- Must order one Control Cache and one Data Cache per Controller Node, including the two in the base configuration

Step 3 - Choose Host Adapter

HP 3PAR Adapters	HP 3PAR 2-port 4Gb F-Class FC Adapter	QL229B
	HP 3PAR 2-port F-Class iSCSI Adapter	QL230B
	HP 3PAR 2-port 4Gb F-Class FC Upgrade Adapter	QL327B
	HP 3PAR 2-port F-Class iSCSI Upgrade Adapter	QL328B

Configuration Rules Adapters

Slotting Rules

- When configuring an F-Class with a single 2-port FC adapter, there are two possible configurations around the 4 embedded ports and the adapter (on a per-node basis)
 - Case A:
 - 2 embedded FC ports for Host, 2 embedded FC ports for Disk
 - 1 x 2-port FC adapter for Disk per node
 - Case B:
 - 0 embedded FC ports for Host, 4 embedded FC ports for Disk



QuickSpecs

HP 3PAR F-Class Storage System

Configuration

- | | |
|-----------------------------------|---|
| SSD Magazine Population | <p>types is 8 magazines (8 drives). Allowable minimum configurations are:</p> <ul style="list-style-type: none">○ 16 magazines (16 drives) of FC, 8 magazines (8 drives) of NL○ 16 magazines (16 drives) of FC, 8 magazines (8 drives) of SSD○ 16 magazines (16 drives) of FC, 8 magazines (8 drives) of NL, 8 magazines (8 drives) of SSD○ 16 magazines (16 drives) of NL, 8 magazines (8 drives) of FC○ 16 magazines (16 drives) of NL, 8 magazines (8 drives) of SSD○ 16 magazines (16 drives) of FC, 8 magazines (8 drives) of NL, 8 magazines (8 drives) of SSD <ul style="list-style-type: none">● HP 3PAR OS 2.2.4: minimum of 16 magazines (16 drives) of one drive type (FC or NL) per node-pair. After that, the minimum increment for the other drive type is 12 magazines (12 drives). Allowable minimum configurations are:<ul style="list-style-type: none">○ 16 drives (16 magazines) of FC, 12 drives (12 magazines) of NL○ 16 drives (16 magazines) of NL, 12 drives (12 magazines) of FC○ SSD magazines not available on HP 3PAR OS 2.2.4● A configuration with 8 magazines (8 drives) of FC drives and 8 magazines (8 drives) of NL is NOT acceptable● SSD only configurations are NOT acceptable● Minimum of 16 magazines (16 drives) of each drive type (FC or NL) spread across a minimum of 2 drive chassis on a given node-pair. See SSD rules below. |
| Minimum Magazines in each Chassis | <ul style="list-style-type: none">● 4 magazines (4 drives) per drive chassis (minimum magazines and minimum increment in a chassis) |
| SSD Magazine Population | <ul style="list-style-type: none">● Minimum of 8 SSD magazines (8 drives) spread across a minimum of 2 drive chassis on a given node-pair● Maximum of 32 SSD magazines (32 drives) on a given node-pair● Minimum of 4 SSD magazines (4 drives) per drive chassis● Maximum of 8 SSD magazines (8 drives) per drive chassis● Requires a minimum of 16 magazines (16 drives) of another type (FC, NL) on the same node-pair; 8 FC drives and 8 NL drives is NOT acceptable● SSD only configurations are NOT acceptable● SSD magazines not available on HP 3PAR OS 2.2.4 |
| Magazine Population | <ul style="list-style-type: none">● All 4 drives in a bundle of 4 x drive magazines that are purchased must be installed in the same drive chassis● There are 16 slots (4 columns x 4 slots) in the drive chassis<ul style="list-style-type: none">○ Column 1 (slots 0, 4, 8, 12)○ Column 2 (slots 1, 5, 9, 13)○ Column 3 (slots 2, 6, 10, 14)○ Column 4 (slots 3, 7, 11, 15)● Drive loading is done in columns: |

QuickSpecs

HP 3PAR F-Class Storage System

Configuration

- Column 1 and 4 first: ESI slots 0, 15 must be filled first. 2 FC drives of the highest and same speed preferred. 2 15K FC, combination of 1 FC / 1 NL / 1 SSD, 2 NL, or 2 SSD drives acceptable.
- Column 2 next, then column 3
- All 4 slots in a column must be filled with drives of same type and speed.
- Acceptable to load columns 2 and 3 without filling all slots in column 1 and 4 if drive type/speed differs from drives in columns 1 and 4.

Step 5 - Choose Cables

HP 3PAR Fiber Cables	HP 3PAR 2m 50/125 (LC-LC) Fiber Cable	QL280B
	HP 3PAR 4m 50/125 (LC-LC) Fiber Cable	QL281B
	HP 3PAR 10m 50/125 (LC-LC) Fiber Cable	QL266B
	HP 3PAR 50m 50/125 (LC-LC) Fiber Cable	QL267B
	HP 3PAR 100m 50/125 (LC-LC) Fiber Cable	QL268B

Configuration Rules: Cabling

Capacity with...	<ul style="list-style-type: none"> ● Drive Chassis (16-disk, 4 Gb/sec) (aka "SBOD 4 Gb", "DC3 4 Gb")
Backend Cabling (non-Daisy chain)	<ul style="list-style-type: none"> ● Two 2m 50um cables per drive chassis for 1st cabinet ● Two 10m (or greater) 50um cables per drive chassis for expansion cabinets
Backend Cabling (Daisy chain)	<ul style="list-style-type: none"> ● Same quantities of cables as non-daisy configuration, although actual physical cabling is different and cable lengths may vary.
Fibre Channel Host Cables	<ul style="list-style-type: none"> ● Host Cables should be ordered from HP. Special short-boot connector is not mandatory. ● Host cables must be multi mode fiber (50 Micron)
iSCSI Host Cables	<ul style="list-style-type: none"> ● HP 3PAR Storage Systems support standard iSCSI host cables.

Step 6 - Add a Rackmount Kit and optional Cabinet

HP 3PAR Cabinets	HP 3PAR 2m F-Class with PDU Pair Expansion Cabinet Kit	QL290B
	HP 3PAR 2m F200 Base Cabinet	QL288B
	HP 3PAR 2m F400 Base Cabinet	QL289B
HP 3PAR Rackmount Kits	HP 3PAR F-Class 2-post Base Configuration Rack-mount Kit	QL284B
	HP 3PAR F-Class 2-post Drive Chassis Rack-mount Kit	QL285B
	HP 3PAR F-Class 4-post Base Configuration Rack-mount Kit	QL286B
	HP 3PAR F-Class 4-post Drive Chassis Rack-mount Kit	QL287B

Configuration Rules: Cabinets

- Rack
 - Must order 2-meter rack or third-party rack kit



QuickSpecs

HP 3PAR F-Class Storage System

Technical Specifications

Physical Specifications

2-Meter Cabinet

Dimensions (width x height x depth)	23.8 x 76.4 x 36 in	60.5 x 194.1 x 91.4 cm
Service Clearance	30 in (76.2 cm) front and back	
Weight (not populated)	475 lb	215.5 kg
Maximum Weight (fully populated)	1361.5 lbs	617.6 kg
Maximum Weight per Leveling Foot	340.4 lb	154.4 kg
Maximum Load per Leveling Foot	111 lb/sq in	50.5 kg/sq cm
Dimensions (width x height x depth)	23.8 x 76.4 x 36 in	60.5 x 194.1 x 91.4 cm

Controller Node Chassis (Base Configuration)¹

F200 Dimensions (width x height x depth)	19 x 6.85 x 22 in	48.3 x 17.4 x 55.9 cm
F400 Dimensions (width x height x depth)	19 x 13.85 x 22 in	48.3 x 35.17 x 55.9 cm
F200 with 2 Controller Nodes (fully populated)	90 lb	40.8 kg
F400 with 2 Controller Nodes (fully populated)	121 lb	54.9 kg
2 Controller Nodes (fully populated)	36 lb	16.3 kg

Drive Chassis¹

Dimensions (width x height x depth)	19 x 5.12 x 22 in	48.3 x 13 x 55.9 cm
Weight (fully populated)	78 lb	35.4 kg

Service Processor¹

Dimensions (width x height x depth)	19 x 1.68 x 15 in	48.3 x 4.3 x 38.1 cm
Weight	16.5 lb	7.5 kg

Supported Host FC Connections

FC Connector Type from Storage System to Host	LC to LC
FC Cable Core Diameter	50- or 62.5-micron

Supported Host iSCSI Connections

iSCSI Cable Type	Cat-5, Cat-5e, Cat-6 copper (1-Gb/sec)
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HP 3PAR Operating System Interfaces

Host Platform Support for the InForm Management Console	Microsoft® Windows®, Red Hat® Enterprise Linux®
Host Platform Support for InForm Command Line Interface	Microsoft® Windows®, Oracle Solaris, Red Hat® Enterprise Linux®, SUSE® Linux Enterprise Server

SSH is supported for CLI. InForm CIM API and SNMP are also supported.



QuickSpecs

HP 3PAR F-Class Storage System

Technical Specifications

Power and Heat

Components	Two Controller	Nodes Drive Chassis
Watts	730	525
BTU/hr (fully populated)	2,491	1,791
Input Voltage (VAC)	100 - 240	100 - 240
Frequency (Hz)	50 - 60	48 - 62
Power Receptacle	(2) C14 (IEC 60320)	(2) C14 (IEC 60320) with 1+1 redundant with 1+1 redundant

2-Meter Cabinet¹

Max. Watts per Cabinet (fully populated)	6,330 watts
Max. BTU/hr per Cabinet (fully populated)	21,599 BTU/hr
Input Voltage (VAC)	220 (200 - 240)
Frequency (Hz)	50 - 60
Circuit Breaker Maximum	30 amps per PDU ⁶ (de-rated to 24 amps)
Power Connectors for 2-Meter Cabinet	(4) L6-30P with 1+1 redundant
Power Receptacles	(4) L6-30R with 1+1 redundant
Drive Chassis (without Drives) ²	154 watts / 525 BTU/hr

	Transactional ³ (watts / BTU/hr)	Idle (watts / BTU/hr)
4 x 100-GB SSD Drives	13 / 44	9 / 31
4 x 200-GB SSD Drives	13 / 44	9 / 31
4 x 400-GB SSD Drives	14.8 / 50.5	8.8 / 30
4 x 300-GB SFF 15K SAS Drive Magazine	32 / 110	28 / 94.5
4 x 450-GB SFF 10K SAS Drive Magazine	20 / 69	19 / 64.5
4 x 900-GB SFF 10K SAS Drive Magazine	33 / 111.6	23 / 79
4 x 2-TB LFF 7.2K SAS Drive Magazine	39 / 132	28.5 / 97
4 x 300-GB FC Drive Magazine	68 / 232	49 / 167
4 x 600-GB FC Drive Magazine	70 / 237	57 / 195
4 x 1-TB NearLine Drive Magazine	47 / 160	32 / 109
4 x 2-TB NearLine Drive Magazine	39 / 134	34 / 117

QuickSpecs

HP 3PAR F-Class Storage System

Technical Specifications

Environmental Specifications

Temperature (°F/°C), 0 - 3,000 ft / 0 - 914.4 m	50 - 104°F / 10 - 40°C
Temperature (°F/°C), 3,000 - 10,000 ft / 914.4 m - 3048 m	50 - 95°F / 10 - 35°C
Altitude (ft/m) Maximum	10,000 ft / 3,048 m
Humidity (%), Non-condensing	20 - 80%
Raised Floor	Recommended
EMI/EMC	FCC Part 15 47 CFR Class A, ICES-003 Class A, CISPR 22, EN55022, EN55024
Safety	UL 60950-1:2003, EN 60950-1:2001+A1, CAN/CSA-C22.2 No. 60950-1-03, EN 60825-1:1994+A1+A2, CB Scheme with all country differences
Certifications/Markings	cTUVus Mark, GS Mark (Controller Only), CE Mark, FCC Class A, ICES-003 Class A, VCCI Class A, WEEE, China RoHS
Energy Consumption Efficiency ⁵ (Japan Green Law)	0.427

¹ All components can be mounted in an HP 3PAR 2-meter cabinet, or in an EIA Standard 19-inch rack

² Up to 16 drives of any combination of SAS, FC, NL, and up to 8 SSD drives per Drive Chassis

³ Under maximum load

⁴ Includes power and heat dissipation specifications for the Service Processor as follows: 317 Watts, 1082 BTU/hr, 100 - 240 VAC Input Voltage, 50 - 60 Hz Frequency, and (1) C14 (IEC 60320) Power Receptacle

⁵ Japan Green Law statement of compliance: The energy consumption efficiency value has been calculated per requirements for Category-G Magnetic Disk Drive Units by dividing the power consumption, measured according to the definition in the Law Concerning the Rational Use of Energy, by the storage capacity defined in the Energy Conservation Law. The efficiency value is based on a host-maximized T800 configuration using 450-GB drives.

⁶ Power Distribution Unit

NOTE: Specifications are subject to change without notice.

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For drives, 1 GB = 1 billion bytes. Actual formatted capacity is less.

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