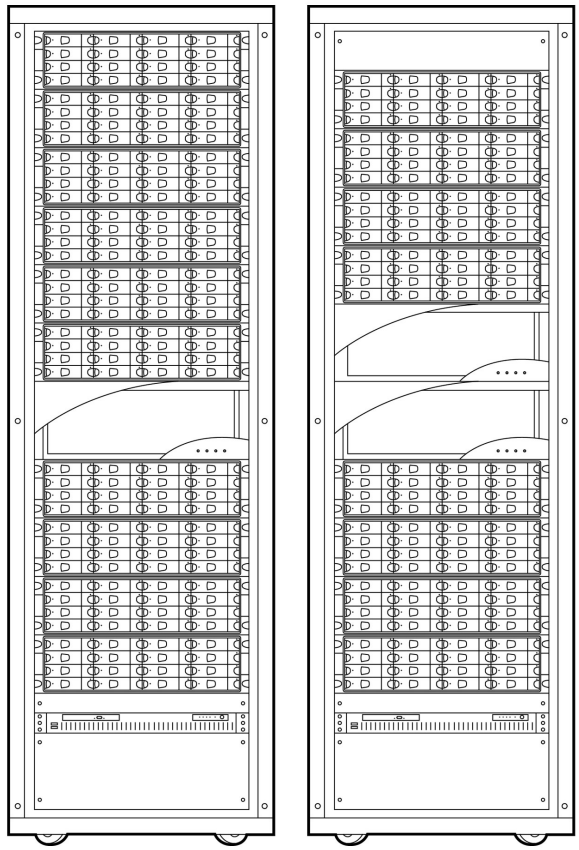
Overview

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 named by Storage magazine-SearchStorage.com as the 2009 Product of the Year in the disks and disk subsystems category.

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

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
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)	50 SSD[7], 100 SSD[7], 200 SSD[7], 300 FC, 600 FC, 1000 NL[8], 2000 NL[8]	50 SSD[7], 100 SSD[7], 200 SSD[7], 300 FC, 600 FC, 1000 NL[8], 2000 NL[8]s
Number of Drive Chassis (Each Drive Chassis holds up to 16 drives in 3U)	2 - 12 chassis	2 - 24 chassis

[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] NL drives are Nearline (Enterprise SATA) disks
NOTE: Specifications are subject to change without notice.

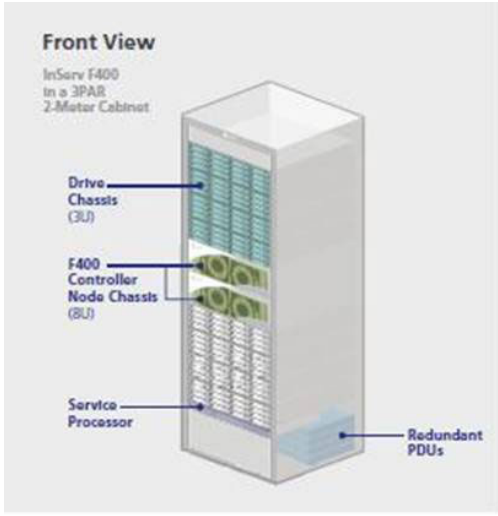
Host OS Support

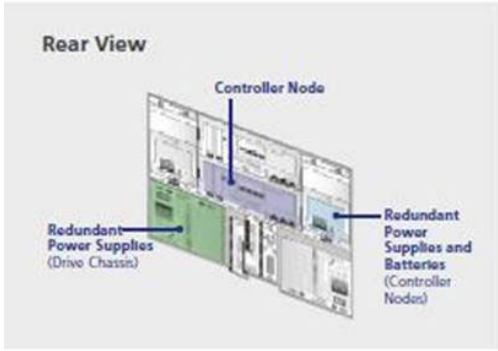
Citrix® XenServer® | HP-UX® | IBM® AIX®

Microsoft® Windows®, including Microsoft® Windows® Server 2008 Hyper-V™
NetApp® Data ONTAP® | ONStor™ EverON™

Oracle Solaris | Oracle Enterprise Linux | Red Hat® Enterprise Linux® | Red Hat® Enterprise Virtualization

SUSE® Linux Enterprise | VMware ESX and ESXi


Front View
InServ F400
in a 3PAR
2-Meter Cabinet
Drive
Chassis
(3U)
F400
Controller
Node Chassis
(8U)
Service
Processor
Redundant
PDUs


Rear View
Controller Node
Redundant
Power Supplies
(Drive Chassis)
Redundant
Power
Supplies and
Batteries
(Controller
Nodes)

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.

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 InForm 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.

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.

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 Support Plus and Support Plus 24 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 http://www.hp.com/go/lookuptool

---

Service and Support, HP Care Pack, and Warranty Information

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

3-Year HP Support Plus 24

For a higher return on your server and storage investment, HP Support Plus 24 provides integrated hardware and software support services designed specifically for your technology. Available 24x7, this 3-year combined reactive support option delivers onsite hardware support and over-the-phone software support around-the-clock. Leverage the full strength of HP Technology Services - customers can trust the services professionals at HP to work collaboratively with them, putting our strategic and technical know-how to work across their entire infrastructure.

- Improve uptime with responsive hardware and software services
- Enjoy consistent service coverage across geographically dispersed sites
- Update HP software at a predictable cost
- Increase customer satisfaction-with no interoperability gaps

http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-6638EEE

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

---

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/jtflogin.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/hps/storage

Step 1 - Choose a Base Configuration

HP 3PAR F-Class Storage System	HP 3PAR F200 Configuration Base	QL226B
	HP 3PAR F400 Configuration Base	QL227B
	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 InForm 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.

Step 2 - Choose a Controller Node configuration

HP 3PAR Controller Nodes	HP 3PAR 2.33-GHz F-Class Controller Node	QL228B
	HP 3PAR Upgrade 2.33-GHz F-Class Controller Node	QL321B

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 4 GB (2 x 2-GB DIMMs) F-Class Control Cache	QL232B
	HP 3PAR 6 GB (3 x 2-GB DIMMs) F-Class Data Cache	QL231B
	HP 3PAR Upgrade 4 GB (2 x 2-GB DIMMs) F-Class Control Cache	QL330B
	HP 3PAR Upgrade 6 GB (3 x 2-GB DIMMs) F-Class 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 4-Gb/sec F-Class Fibre Channel Adapter	QL229B
	HP 3PAR 2-Port iSCSI F-Class Adapter	QL230B
	HP 3PAR Upgrade 2-Port 4-Gb/sec Fibre Channel F-Class Adapter	QL327B
	HP 3PAR Upgrade 2-Port F-Class iSCSI 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
    - 1 x 2-port FC adapter for Host
  - If the customer plans on adding more host ports (FC or iSCSI,) or RC over FC), then configure Case A
  - If the customer plans to add more disks over time (and thus additional disk adapters), then configure Case B

Step 4 - Choose Drives

HP 3PAR Drive Chassis	HP 3PAR 16-Disk 4-Gb/sec Drive Chassis	QL243B
	HP 3PAR Upgrade 16-Disk 4-Gb/sec Drive Chassis	QL322B
	HP 3PAR DC 16-Disk 4G Drive Chassis Connector	QL323B
HP 3PAR SSDs	HP 3PAR 4x50 GB 4-Gb/sec Single-SSD Magazine	QL250B
	HP 3PAR 4x100 GB 4-Gb/sec Single-SSD Magazine	QR611B
	HP 3PAR 4x200 GB 4-Gb/sec Single-SSD Magazine	QR613B
	HP 3PAR Upgrade 4x50 GB 4-Gb/sec Single-SSD Magazine	QL334B
	HP 3PAR Upgrade 4x100 GB 4-Gb/sec Single-SSD Magazine	QR615B
	HP 3PAR Upgrade 4x200 GB 4-Gb/sec Single-SSD Magazine	QR617B
HP 3PAR FC HDDs	HP 3PAR 4x300 GB 15K 4-Gb/sec FC LFF Single-Drive Magazine	QL245B
	HP 3PAR 4x600 GB 15K 4-Gb/sec FC LFF Single-Drive Magazine	QL253B
	HP 3PAR Upgrade 4x300 GB 15K 4-Gb/sec FC LFF Single-Drive Magazine	QL325B
	HP 3PAR Upgrade 4x600 GB 15K 4-Gb/sec FC LFF Single-Drive Magazine	QL337B

Configuration

HP 3PAR NL HDDs	HP 3PAR 4x1TB 4-Gb/sec LFF Nearline Single-Drive Magazine	QL246B
	HP 3PAR 4x2TB 4-Gb/sec LFF Nearline Single-Drive Magazine	QL254B
	HP 3PAR Upgrade 4x1 TB 4-Gb/sec LFF Nearline Single-Drive Magazine	QL326B
	HP 3PAR Upgrade 4x2 TB 4-Gb/sec LFF Nearline Single-Drive Magazine	QL338B

Configuration Rules: Drive Magazines	Capacity with…	• Drive Chassis (16-disk, 4-Gb/sec) (aka "SBOD 4 Gb", "DC3 4 Gb")
	Drive Magazines	• Supports "4 Gb" Drive Magazines for F-Class Only
	Minimum Magazines per System and Mixed (FC, NL, SSD) Magazine Population	• InForm OS 2.3.1: minimum of 16 magazines (16 drives) of either FC or NL per node-pair. After that, the minimum increment for all other drive types is 8 magazines (8 drives). Allowable minimum configurations are: o 16 magazines (16 drives) of FC, 8 magazines (8 drives) of NL o 16 magazines (16 drives) of FC, 8 magazines (8 drives) of SSD o 16 magazines (16 drives) of FC, 8 magazines (8 drives) of NL, 8 magazines (8 drives) of SSD o 16 magazines (16 drives) of NL, 8 magazines (8 drives) of FC o 16magazines (16 drives) of NL, 8 magazines (8 drives) of SSD o 16 magazines (16 drives) of FC, 8 magazines (8 drives) of NL, 8 magazines (8 drives) of SSD • InForm 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: o 16 drives (16 magazines) of FC, 12 drives (12 magazines) of NL o 16 drives (16 magazines) of NL, 12 drives (12 magazines) of FC o SSD magazines not available on InForm 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	• 4 magazines (4 drives) per drive chassis (minimum magazines and minimum increment in a chassis)
	SSD Magazine Population	• 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 InForm OS 2.2.4

Magazine Population	• 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
	  ○ 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:
	  ○ 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…	• Drive Chassis (16-disk, 4 Gb/sec) (aka "SBOD 4 Gb", "DC3 4 Gb")
	Backend Cabling (non-Daisy chain)	• 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)	• Same quantities of cables as non-daisy configuration, although actual physical cabling is different and cable lengths may vary.
	Fibre Channel Host Cables	• 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	• HP 3PAR Storage Systems support standard iSCSI host cables.

Step 6 - Add a Rackmount Kit and optional Cabinet

HP 3PAR Cabinets	HP 3PAR 2-meter F-Class w/PDU Pair Exp Cabinet Kit	QL290B
	HP 3PAR 2-meter F200 Base Cabinet	QL288B
	HP 3PAR 2-meter F400 Base Cabinet	QL289B
HP 3PAR Rackmount Kits	HP 3PAR F-Class 2-Post Base Configuration Rackmount Kit	QL284B
	HP 3PAR F-Class 2-Post Drive Chassis Rackmount Kit	QL285B
	HP 3PAR F-Class 4-Post Base Configuration Rackmount Kit	QL286B
	HP 3PAR F-Class 4-Post Drive Chassis Rackmount Kit	QL287B

Configuration Rules: Cabinets

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

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 Chassis[1]

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 Processor[1]

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)

InForm® 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.

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 Cabinet[1]

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 50-GB SSD Drives	8 / 26	4 / 14
4 x 100-GB SSD Drives	13 / 44	9 / 31
4 x 200-GB SSD Drives	13 / 44	9 / 31
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

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

Technical Specifications

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 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.

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

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