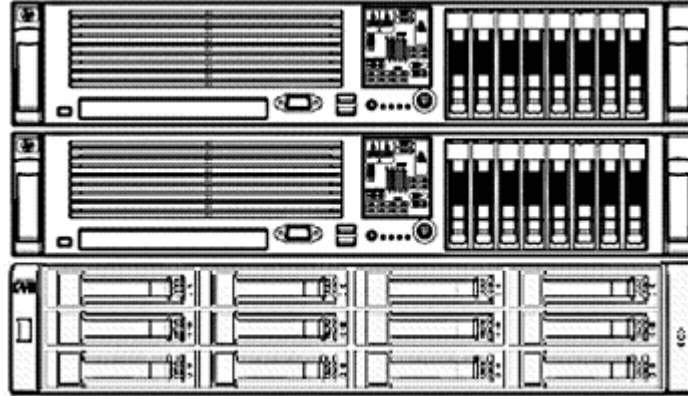


Overview

The HP StorageWorks High Availability Storage Server is the fast and easy way to add clustered networked file storage to your environment. The Microsoft Windows-powered operating system is pre-installed, including the Microsoft Internet Explorer, and the Microsoft Management Console (MMC), giving you the only tools you'll need to manage your solution. This eliminates the need to juggle multiple interfaces. By consolidating and offloading your storage off of application servers, backup times are reduced significantly by allowing backups to run at any time of the day.



What is a ProLiant Storage Server? ProLiant Storage Servers are enhanced Windows-powered file and print server solutions for small or medium business, branch office, workgroup, or data center IT environments. These network storage devices are built on industry-standard HP ProLiant servers and come with either Microsoft Windows Storage Server 2003 R2 or Windows Unified Data Storage Server 2003 operating system pre-installed. Like many Network Attached Storage (NAS) devices, they support heterogeneous file serving environments and are pre-configured to install in minutes. And since they're Windows-based, network integration is easy, your antivirus and backup applications run right on the box, and management has a familiar look and feel. So you can add storage to your network quickly and spend less time on storage management, then get back to what matters most: running your business.

What's New

High Availability Storage Server models now feature:

- DL380 G5 High Availability Storage Server
 - Two HP ProLiant DL380 G5 SAN Gateway Storage Servers (clustered)
 - Shared storage based on MSA2000
 - Two SAS HBA cards
 - Four mini-SAS cables

Overview

Highlights

ProLiant High Availability Storage Servers deliver Enterprise-level performance, scalability and flexibility. Expandability up to 14.4 terabytes (SAS storage) or 48 terabytes (SATA storage) make this the network storage solution of choice for SMB, workgroup, and small Enterprise environments.

- **Operating System:**
 - Microsoft Windows Unified Data Storage Server 2003, Enterprise x64 Edition
- **Drive Support:**
 - Internal
 - 2 x 72GB SAS SFF HDDs for mirrored OS
 - Slimline DVD-ROM Drive (8x/24x) to support System Restore
 - External
 - Enterprise-class Dual-ported SAS or archival-class SATA drives
 - Mixed SAS and SATA drive support within the same drive enclosure
 - Up to 12 (per chassis) MSA2 LFF HDDs (up to 4 total chassis supported)
- **Redundancy:**
 - Clustered Storage Servers
 - Dual controllers on MSA2000
 - Dual ported SAS HBA card
- **Management:**
 - Microsoft Management Console (MMC)-based user interface
 - Remote system management via Remote Desktop or Telnet
 - Remote hardware management via Integrated Lights Out 2 (iLO 2) - Advanced License included
- **Warranty:**
 - Protected by HP Services and a worldwide network of resellers and service providers. Three-year Next Business Day, on-site limited global warranty (three years parts, three years labor, and three years on-site support). Certain restrictions and exclusions apply. SATA hard drives have a one-year warranty.

	Processor	Memory	Storage Controller	Network Controller	Form Factor
DL380 G5 High Availability Storage Server	Two (2) Quad-Core Intel® Xeon® E5430 2.66 GHz	8GB (4 x 2GB) standard	Internal - Smart Array P400/512MB Controller (RAID 0/1/5/6) with BBWC External - 1GB Cache (per controller), Two 3Gb SAS ports per controller, RAID 0/1/3/5/6/10/50	Dual embedded NC373i Multifunction Gigabit Server Adapters with TCP/IP Offload Engine	Rack (6U): 2 server (2U each) and 1 storage array (2U)

Standard Features

Operating System

Microsoft Windows Unified Data Storage Server 2003, Enterprise x64 Edition

- 64-bit processing (compatible with 32-bit applications)
- Optimized for File Serving: Up to 20% faster file serving performance than a general-purpose Windows Server 2003 R2 installation on the same hardware.
- HP-enhanced File Server Management Console: Features the familiar look and feel of the Microsoft Management Console (MMC).
- HP Rapid Start-up Wizard: Simplifies and accelerates new device deployment by walking you through basic system settings step-by-step.
- Single-instance Storage (SIS): Recovers up to 35% of disk space by de-duplicating files and reducing the amount of redundant data stored. Identifies identical files, stores a single copy of the file in a central repository, and replaces the files with pointers to the file in the SIS common store.
- Search Enhancements: Indexing Service extracts the information from a set of documents and organizes it in a way that makes it quick and easy to access that information through the Search function for computers running Windows 2000 or Windows XP.
- File Server Resource Manager (FSRM): Provides both on-demand and scheduled reports detailing storage use, allows administrators to create and manage folder and volume quotas, and permits both name-based screening of files and allowing/disallowing file creation on specified folder trees.
- Windows SharePoint® Services: A powerful Web-based team collaboration environment that provides an integrated portfolio of collaboration and communication services designed to connect people, information, processes, and systems.
- Distributed File System (DFS) Management Console: Updated DFS namespace failover, failback and prioritization controls.
- Distributed File System Replication (DFS-R): State-based, multi-master replication engine that supports replication scheduling and bandwidth throttling. DFS-R uses a new compression algorithm that efficiently updates files over limited bandwidth networks by replicating only the changes needed to ensure global file consistency.
- Full support of Volume Shadow Copy Service, which creates point-in-time copies of files and folders at predetermined time intervals that can then be accessed from client computers.
- Unlimited Client Access Licenses (CALs) included
- Microsoft Services for Network File System (NFS)
- Support for multiple file serving protocols, including SMB/CIFS, NFS, HTTP, FTP, WebDAV, AppleTalk, and NetWare
- Print Management Console: Manage multiple printers (license for unlimited printer support) from a single console, whether locally or over the WAN.
- Support for any number of SATA or SAS drives and multiple network ports
- Microsoft Windows iSCSI Software Target: Adds block storage capability and creates a single platform that delivers file, print, and application storage services, all over existing Ethernet networks. New wizards give you the ability to easily create and manage iSCSI targets, create and manage disks for storage, and implement backup and recovery support using snapshots.
- Microsoft Cluster Server (MSCS) license included
- Storage Manager for SANs (SMfS): Natively provides basic SAN management (such as device discovery, LUN creation, and storage allocation) for SAN gateway installations. Moreover, SMfS enables shared storage solutions and clustering.
- Unified Share and Storage Management Snap-in: With a consistent and familiar interface, simplifies management of shares and volumes by unifying SMB and NFS share provisioning, integrating share and storage provisioning, and providing an overview of storage and shares.
- Remote Administration Enhancements: Key new functionality enables Windows Storage Server to be used and managed in environments that are not predominantly Windows-based.

Standard Features

For more information about this OS see:

<http://www.microsoft.com/windowsserver/system/storage/wudss.msp>

MSA2000sa

- High performance Modular Smart Array controller with two 3Gb SAS ports
- Dual controller
- Celeron 566MHz processor(s)
- 1 GB transportable cache per controller - battery-free cache backup with super capacitors and compact flash
- 256 LUNs with 16TB LUNs supported
- Twelve 3.5 inch dual-ported SAS or SATA MSA2000-specific drives (supports mixing of drive types in a single shelf)
- Support expansion to 3 additional enclosures & total of 48 disk drives
- Redundant power supplies and fans are standard
- RAID levels 0, 1, 3, 5, 6, 10, 50
- Non-disruptive on-line controller code upgrade
- Optional controller-based snapshot and clone functionality

Processors

2 x Quad-Core Intel® Xeon® Processor E5430 (2.66 GHz, 80 Watts, 1333 FSB)

Cache Memory

12 MB (2 x 6 MB) Level 2

Chipset

Intel® 5000P Chipset

NOTE: For more information regarding Intel chipsets, please see the following URL:

<http://www.intel.com/products/server/chipsets/>.

Memory

Type	PC2-5300 Fully Buffered DIMMs (DDR2-667) with 4:1 and 2:1 interleaving available (interleaving requires identical DIMMs)
Memory Protection	Advanced ECC (multi-bit error protection), Online Spare, Mirroring, 4-way Interleaving
DIMM Sockets	8
Standard	8 GB (4 x 2GB) low-power
Maximum configuration	64 GB

Network Controller

Dual Embedded NC373i Multifunction Gigabit NICs with TCP/IP Offload Engine

NOTE: Supports the included Microsoft Windows Server 2003 Scalable Networking Pack, which includes TCP Chimney Offload, Receive-side Scaling (RSS), and NetDMA features

NOTE: Also supports RDMA through optional ProLiant Essentials Licensing Kits

Standard Features

Expansion Slots

Embedded Slots

Slot Number	Bus Speed*	Bus Number**	Device Number***	Hot Plug	PCI Voltage
1	x4 PCIe (x8 connector)	6	0	no	N/A
2	x4 PCIe (x8 connector)	11	0	no	N/A

NOTE: One slot occupied by integrated Smart Array P400/512MB controller.

NOTE: Embedded slots support half-height low profile cards.

PCIe Riser

Slot Number	Bus Speed*	Bus Number**	Device Number***	Hot Plug	PCI Voltage
3	x4 PCIe (x8 connector)	14	0	no	N/A
4	x8 PCIe (x16 connector)	23	0	no	N/A
5	x8 PCIe (x16 connector)	19	0	no	N/A

NOTE: One slot occupied by integrated Smart Array P800/512MB controller (Base, 1.16TB SAS, 4.5TB SATA, 6TB SATA, 1.8TB SAS, and 2.7TB SAS models).

NOTE: Riser slots support full-size PCIe cards.

Storage Controller

Internal - HP Smart Array P400/512MB Controller with battery-backed write cache (BBWC)

- RAID 0/1/1+0/5 and RAID 6 with Advanced Data Guarding
- x8 2.5G PCIe host interface

Fibre Channel SAN connectivity for all models requires a Host Bus Adapter (must be purchased separately). Please see 'SAN Compatibility' for more information.

External - MSA2000 Dual Controller

- 1 GB per controller
- Two 3Gb SAS ports per controller
- RAID 0/1/3/5/6/1+0/5+0
- SAS, SATA, mixed

Storage

Hard Drives

Internal:

- 2 x 72GB 3G SAS 10K SFF HDDs for mirrored OS

External:

- MSA2000 Chassis (No HDDs included by default)

Optical Drive

Slimline DVD-ROM Drive (8x/24x)

Standard Features

Maximum DATA Storage Capacity (raw)	SATA	48TB	48 x 1TB LFF SATA
	SAS	14.4TB	48 x 300GB LFF SAS

Interfaces	Serial	1
	Pointing Device (Mouse)	1
	Graphics	1
	Keyboard	1
	VGA	2 (1 front, 1 back)
	Network RJ-45	2
	iLO 2 remote management port	1
	USB 2.0 Ports	5 total: 2 front, 2 back, 1 internal
		NOTE: Please see the following URL for additional information regarding USB support: http://h18004.www1.hp.com/products/servers/platforms/usb-support.html .

Graphics	Integrated ATI ES1000 1280 x 1024 x 16M color (32MB video standard)
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Management	<p>Microsoft Management Console (MMC)-based user interface (also accessible via HTTPS)</p> <p>Remote system management via Remote Desktop or Telnet</p> <p>Integrated Lights-Out 2 featuring Integrated Remote Console with KVM over IP performance over shared network access (Advanced License included standard)</p> <ul style="list-style-type: none">• Virtual Text Remote Console• Virtual Power Button Control• Integrated Remote Console• Dedicated & full function shared network connectivity• Browser, command line and scripted access• Automatic IP Configuration via DHCP/DNS/WINS• Industry Standard 128-bit Secure Sockets Layer (SSL) and Secure Shell security (SSH)• OS independent hardware health status• IML and iLO Event Logging• Support for 12 user accounts with customizable access privilege• Advanced license: upgrades the iLO 2 processor with comprehensive remote control including Virtual KVM graphical console, virtual media, and enterprise security.
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Form Factor	<p>Server: Rack (4U - Two 2U servers); Height 3.38-inch (8.59 cm); Depth: 26 inches (66 cm)</p> <p>MSA2000: Rack (2U)</p> <p>Expansion MSA2000 Chassis: Rack (2U)</p>
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Standard Features

Industry Standard Compliance	ACPI 2.0 Compliant PCI 2.2 Compliant WOL Support Microsoft® Logo certifications USB 2.0 Support
Server Power Cords	Two high voltage power cords (6 foot IEC C13 to C14) standard
Power Supply	Hot Plug Redundant, 800Watt, CE Mark Compliant
UPS and PDU Power Cord Matrix	Please see the UPS and PDU cable matrix that lists cable descriptions, requirements, and specifications for UPS and PDU units: ftp://ftp.compaq.com/pub/products/servers/ProLiantstorage/power-protection/powercordmatrix.pdf .
System Fans	Fully redundant hot plug fans ship standard (N+1).
Rack Airflow Requirements	<p>Rack 10000 series Cabinets</p> <p>The increasing power of new high-performance processor technology requires increased cooling efficiency for rack-mounted servers. The 10000 Series Racks provide enhanced airflow for maximum cooling, allowing these racks to be fully loaded with servers using the latest processors.</p> <p>CAUTION: If a third-party rack is used, observe the following additional requirements to ensure adequate airflow and to prevent damage to the equipment:</p> <ul style="list-style-type: none">• Front and rear doors: If your 42U server rack includes closing front and rear doors, you must allow 830 square inches (5,350 sq cm) of hole evenly distributed from top to bottom to permit adequate airflow (equivalent to the required 64 percent open area for ventilation).• Side: The clearance between the installed rack component and the side panels of the rack must be a minimum of 2.75 inches (7 cm). <p>CAUTION: Always use blanking panels to fill all remaining empty front panel U-spaces in the rack. This arrangement ensures proper airflow. Using a rack without blanking panels results in improper cooling that can lead to thermal damage.</p> <p>NOTE: For additional information, refer to the Setup and Installation Guide or the Documentation CD provided with the server, or to the server documentation located in the Support section at the following URL: http://h18000.www1.hp.com/products/servers/proliantdl380/index.html.</p>

Standard Features

Rack Kit

The HP ProLiant DL380 G5 quick deploy rail system provides tool-free support for racks with square or round mounting holes (including Compaq/HP 7000*, 9000, 10000 and HP series), with an adjustment range of 24" - 36". The ambidextrous cable management arm can be mounted on either the left or right side for improved cable management.

*High Airflow Inserts (High Air Flow Rack Door Insert for the 7142 Rack (single) - PN: 327281-B21; or High Air Flow Rack Door Insert for the 7142 Rack (6-pack) - PN: 327281-B22) are required to support the HP ProLiant DL380 G5 in 7000 series racks. The DL380 G5 Cable Management Arm is not supported on 7000 series racks.

NOTE: Cable management arm must be removed to access hot-plug power supplies when the cable management arm is mounted on the right.

Telco Rack Support

DL380 G5 Telco Rack Kit:

Support for all 2-post Telco racks requires the use of the standard rack kit and an additional option kit from Rack Solutions (<http://www.racksolutions.com/hp/>)

Optional Software

Optional Software from HP for Storage Servers

- **HP StorageWorks Storage Mirroring Software** - HP StorageWorks Storage Mirroring offers a host-based application that performs remote copy over an IP LAN/WAN. Key features include asynchronous replication that can be scheduled to a fine granular level, Logical Unit Number (LUN), file or byte level. Other features include multiple replication configuration options including peer-to-peer and many-to-one. In addition, Storage Mirroring is a very cost effective disaster recovery alternative from one host to another within a LAN, storage center, or between direct attached storage in metro offices and regional centers. Additional configurations allow replication from small office environments to ensure business continuity without an outside IT staff.

For more information: <http://h18006.www1.hp.com/products/storage/software/sm/index.html>

NOTE: All High Availability Storage Servers include a trial version of StorageWorks Storage Mirroring software, plus a link to a white paper on replicating iSCSI targets.

- **HP Data Protector Software** - The HP Data Protector software is enterprise data protection and disaster recovery, ensuring recovery from any disruption. Data Protector integrates a variety of techniques to eliminate backup and recovery windows. The capabilities to eliminate planned downtime range from online backup and backup of open files to zero-downtime, zero-impact backup. The software provides industry-leading instant recovery as well as several disaster recovery alternatives to eliminate unplanned downtime, allowing recovery of entire data centers in minutes.

Data Protector is enabling organizations to reduce costs by automating routine tasks to maximize the effectiveness of the data protection staff. For the price of an entry-level product, it provides the enterprise functionality customers need. Data Protector scales from single server to distributed enterprise, covering an extensive range of heterogeneous applications, operating environments and storage configurations with a single solution.

All ProLiant Storage Servers support using Data Protector as their backup software solution.

For more information on HP Data Storage Protector:

<http://h18006.www1.hp.com/products/storage/software/dataprotector/index.html>

- **HP Systems Insight Manager Software** - HP SIM 5.x is the first unified server and storage management platform. Now, from a single management console, administrators can manage their complete HP server and storage environment with a feature rich, extensible and secure management tool set.
- HP SIM also serves as a central access point for ProLiant Essentials, Integrity Essentials, and Storage Essentials software options that deliver targeted functionality for these platforms. For more information: <http://h18013.www1.hp.com/products/servers/management/hpsim/index.html>
 - **Insight Management Agents** - Allow all HP servers to present system instrumentation, health and configuration information into HP Systems Insight Manager and the HP System Management Homepage. The HP System Management Homepage aggregates systems data from Insight Management Agents and other HP management tools, providing a consolidated browser-based interface for managing individual servers.
- **HP Storage Essentials NAS Manager Software** - Provides comprehensive Network Attached Storage (NAS) management capabilities for HP ProLiant Storage Servers. Visualize your distributed HP NAS solutions and centrally manage their capacity, performance, events, and dependencies to ensure NAS availability and performance and unify SAN and NAS management. For more information on the complete line of HP Storage Essential products go to: <http://www.hp.com/go/storageessentials>

Optional Software

HP ProLiant Storage Servers and third-party storage arrays/SAN interoperability statement

HP acknowledges that some third party storage arrays/SAN environments have been successfully tested for interoperability with the HP ProLiant Storage Server or HP StorageWorks NAS products. HP will provide support for the HP ProLiant Storage Servers or HP StorageWorks NAS products when connected to third-party storage arrays, but HP will not provide support on third party storage arrays/SAN unless specifically called out in an HP Support contract. HP may support the third party SAN environment attached to HP ProLiant Storage Servers or the HP StorageWorks NAS products when specifically under contract with HP, but that SAN coverage does not extend to supporting the SAN connectivity of the third-party array.

If you call HP Services and the problem is determined to be caused by a third-party storage array or the storage arrays' connectivity into a non-HP supported SAN, you will be directed to contact the third-party storage array supplier for support. Please refer to the third-party supplier for information relating to specific support of their storage arrays with Windows Storage Server 2003 R2 and Windows Unified Data Storage Server 2003 platforms.

SAN Compatibility

Warranty All High Availability Storage Servers come with a standard 3-3-3 warranty (3 years parts exchange, 3 years labor and 3 years onsite next business day response)

HP Care Pack Services Scalable, Flexible, Dependable. Like your storage. Your storage is evolving. Get scalable support that evolves with it. HP Care Pack Services is an easy-to-buy, easy-to-use portfolio of packaged services covering your lifecycle needs. You can rely on our highly skilled, HP certified professionals to offer a breadth of expertise across leading storage technologies, and work side by side with you for optimal results. Push services beyond expectations and choose support that meets the changing needs of your business with the same reliability, scalability and flexibility you demand of your storage.

Protect your business beyond the warranty
Standard warranty protects against product defects and some causes of downtime. HP Care Pack Services helps you proactively guard against unplanned downtime which can reduce your productivity and profitability. By using a standard approach to warranty uplifts, such as HP Care Pack Services, customers can be more sure of consistency of operations for both mission-critical and standard business computing.

Extending warranties with HP Care Pack Services
The key to normalizing the warranty of combined solutions-is making service uplift simple: HP Care Pack Services. This portfolio of predefined packages, extending across the entire IT lifecycle, offering consulting, education, technical support, optimization, risk assessment, and more. It's entirely flexible allowing customers to extend the cover to the precise level of support required. Customer's standard hardware warranty, for example, can be upgraded to next-business-day response, to same-day coverage, or even to a committed six-hour call-to-repair service available 24 hours every day of the week.

- Provide consistent, predictable levels of support across your entire department or business
- Give you direct access to proven technical and problem-solving expertise
- Offer a choice of response-time and repair-time commitments
- Are available whenever and wherever you do business

For many products, post-warranty HP Care Pack Services are available when your original warranty has expired. Choose the support levels that meet your business requirements, from basic to mission-critical. <http://www.hp.com/hps/storage>

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

Recommended Services	HP Care Pack Services recommended for optimal satisfaction of all deployments of your product.	
	3-Year HP Support Plus 24	24x7x365 hardware and software services - plus cost-saving software updates and more HP Support Plus 24 helps you increase performance and availability with comprehensive, consistent hardware and software services. Working with your IT team, HP Services engineers deliver onsite hardware support and over-the-phone software support around-the-clock 365 days per year. Service coverage encompasses HP products and selected multivendor hardware and software. In addition, this convenient HP Care Pack packaged service makes



Service and Support, HP Care Pack, and Warranty Information

		<p>software updates available to you at substantial savings.</p> <p>Choose Support Plus 24 when you need to:</p> <p>Improve uptime with responsive hardware and software services available anytime</p> <p>Cost-effectively obtain expert 24x7 multivendor hardware and software support</p> <p>Enjoy consistent service coverage across geographically dispersed sites</p> <p>Update HP and selected third-party software at a predictable cost</p> <p>Take advantage of subscription savings on software updates</p>		
	<p>HP Installation and Startup Service for ProLiant Storage Server</p>	<p>This service provides for the unpacking, installation, and basic configuration of your higher-performance HP ProLiant storage server (network attached storage, [NAS]) devices. NAS clustering is also included when appropriate. This service begins with verification that you have completed all prerequisite worksheets. HP will perform the physical unpacking, installation, initialization, and basic configuration of the NAS appliance. Load-balancing and failover functionality will be enabled where available. If the storage server is sold as dedicated NAS storage, internal NAS storage and external storage are connected and basic logical unit number (LUN) configuration is completed. SAN connected storage is also connected. If a NAS cluster is desired (and appropriate cluster components are purchased), the installation and configuration of the cluster service are also performed. The NAS functionality will then be validated through the creation and verification of a sample file share. A sample file data copy, or snapshot, is also created. The installed NAS will undergo installation verification tests. The service concludes with a brief orientation session that includes an explanation of the product features and a demonstration of installed host access to the storage file share and to the snapshot copy.</p>		
<p>Product Number</p>	<p>Product Name</p>	<p>Service Name</p>	<p>Care Pack Services Product # and Band</p>	<p>Alternate Care Pack Services Product #</p>
<p>AQ245A</p>	<p>DL380 G5 High Availability Storage Server</p>	<p>3-Year HP Support Plus 24</p>	<p>HA110A3-9LX</p>	<p>UL954E</p>
<p>-</p>	<p>-</p>	<p>HP Installation and Startup Service for ProLiant Storage Server</p>	<p>Contact your HP sales rep or Channel Partner for assistance</p>	<p>Contact your HP sales rep or Channel Partner for assistance</p>

Service and Support, HP Care Pack, and Warranty Information

Related Services	Services that will enhance the user experience in many product deployments.				
	3-Year HP Proactive 24		<p>HP Proactive 24 Service (P24) integrates hardware and software support to help you improve the stability and operational effectiveness of your IT environment. An HP Account Manager acts as your primary point of contact to ensure that HP meets your support needs effectively.</p> <p>P24 provides the maximum value when multiple technologies in the environment (e.g. servers, storage, SAN and the network), are all covered. It provides an environment-wide view and consistent support of all of these components which affect stability of your key applications.</p> <p>Choose P24 when you want to:</p> <ul style="list-style-type: none"> o enhance operational effectiveness with proactive problem identification and recommendations from HP o partner with technical experts who help coordinate support, provide hands-on assistance, and share knowledge with your staff o rapidly access support and expertise spanning your environment o obtain personalized services tailored to your business environment and critical success factors o anticipate necessary change - and execute it correctly the first time o efficiently manage infrastructure resources to meet your performance objectives 		
	Product Number	Product Name	Service Name	Care Pack Services Product # and Band	Alternate Care Pack Services Product #
AQ245A	DL380 G5 High Availability Storage Server	3-Year HP Proactive 24	HA111A3-9LX	-	

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
- Collaboration with other business and IT professionals
- Download of patches and drivers
- 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 <http://www.hp.com/support>

Remote Support Technology (RST)-HP Remote Support Pack

Taking a more proactive approach to IT support, the HP Remote Support pack plug-in module easily

Service and Support, HP Care Pack, and Warranty Information

integrates with HP Systems Insight Manager to provide a powerful, unified "single pane of glass" solution for onsite and remote management.

HP Remote Support Pack enhances HP Systems Insight Manager with intelligent event diagnosis plus the automatic submission of hardware event notifications securely to HP support, including acknowledgment and status returns. It adds remote configuration collections to allow the delivery of assessment and proactive services for your SAN storage and HP-UX environments.

Customer Technical Training

Consider education as an integral part of your strategy to get the best return on investment for your HP storage solution. HP offers a variety of training courses on storage software, networking, archiving and disk storage systems. Our classes are available in many delivery modalities from traditional instructor-led courses at one of our 80 training centers worldwide to on-site training customized to your needs or online. <http://www.hp.com/learn/storage>

HP Services Awards

HP 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. For a list of all our awards, please visit <http://h20129.www2.hp.com/services/cache/77318-0-0-225-121.html>.

Additional Services Information

For more information about HP Care Pack Services for Storage, please visit:

<http://www.hp.com/hps/storage>

If you have specific questions, contact your local HP representative. Contact information for a representative in your area can be found at "Contact HP" <http://www.hp.com>

Product Configuration

In the following you will be guided through a series of steps to help you configure your ProLiant Storage Server.

NOTE: Options ship separately and are not factory integrated.

Step 1 - Choose a Model

Select one of the available High Availability Storage Server models

NOTE: Models names are based on raw storage capacity, not available user storage.

HP ProLiant DL380 G5 High Availability Storage Server AQ245A	# of Servers	Two (2) DL380 G5 SAN Gateway Storage Servers
	Operating System	Microsoft Windows Unified Data Storage Server 2003, Enterprise x64 Edition
	Internal Storage	2 x 72GB 3G SAS 10K SFF DP HDDs per server (for mirrored OS internal to server)
	External Storage	MSA2000sa Chassis (No HDDs included)
	Host Bus Adapter	Two (2) SC08Ge SAS HBA (488765-B21) [one per server]
	Cabling	One (1) Ethernet crossover cable Four (4) mini-SAS 1M cable
	Form Factor	Rack (6U)

Step 2 - Add Storage

The base controller chassis has twelve drive bays for both SAS and/or SATA drives. For additional twelve additional drive bays purchase an MSA2000 3.5" Disk Enclosure. You may attach a total of three Drive Enclosures for a total of forty-eight drive bays on a single MSA2000 array.

Step 2a - MSA2 SAS and SATA Hard Drive Options

NOTE: MSA2000 3.5 inch drives are for use only with MSA2000 products.

SAS HDDs	HP StorageWorks MSA2 146GB 3G 15K 3.5 inch SAS DP HDD	AJ735A
	HP StorageWorks MSA2 300GB 3G 15K 3.5 inch SAS DP HDD	AJ736A
	HP StorageWorks MSA2 450GB 3G 15K 3.5-inch SAS DP HDD	AJ737A
SATA HDDs	HP StorageWorks MSA2 500GB 7.2K 3.5 inch SATA HDD	AJ738A
	HP StorageWorks MSA2 750GB 7.2K 3.5 inch SATA HDD	AJ739A
	HP StorageWorks MSA2 1TB 7.2K 3.5 inch SATA HDD	AJ740A

Step 2b - Drive Enclosure Options

The array itself has twelve drive bays. Should you require an additional drive enclosure, select the enclosure listed below.

Expansion enclosure	HP StorageWorks MSA2000 Dual I/O 3.5 inch 12 Drive Enclosure (w/ two .6m SAS cables)	AJ750A
SAS Cables	NOTE: Additional cable is needed only if standard .6m cable is not a sufficient length	
	HP Ext SAS 1m Cable	389665-B21
	HP Ext SAS 2m Cable	389668-B21
	HP Ext SAS 4m Cable	389671-B21

Product Configuration

Step 3 - Add More Memory

Memory	NOTE: Standard 8GB (4 x 2GB) of low power memory and is expandable to 64GB	
	2 GB FBD PC2-5300 2 x 1 GB Low Power Single Rank Kit	461826-B21
	4 GB FBD PC2-5300 2 x 2 GB Low Power Dual Rank Kit	461828-B21
	8 GB FBD PC2-5300 2 x 4 GB Low Power Dual Rank Kit	466440-B21
	1 GB FBD PC2-5300 2 x 512 MB Single Rank Kit	397409-B21
	2 GB FBD PC2-5300 2 x 1 GB Dual Rank Kit	397411-B21
	4 GB FBD PC2-5300 2 x 2 GB Dual Rank Kit	397413-B21
	8 GB FBD PC2-5300 2 x 4 GB Dual Rank Kit	397415-B21
	16 GB FBD PC2-5300 2 x 8 GB Dual Rank Kit	413015-B21
	64 GB FBD PC2-5300 8 x 8 GB Dual Rank Kit	495604-B21

Step 4 - Add Network Adapters

NOTE: DL380 G5 Storage Servers support only PCIe expansion cards.

Dual Embedded NC373i Multifunction Gigabit Server Adapters with TCP/IP Offload Engine standard. Select additional cards for higher performance and further redundancy.

NOTE: Multifunction Server Adapters (including the embedded NC373i) support the installed Microsoft Windows Server 2003 Scalable Networking Pack, which enables TCP Chimney offload, Receive-side Scaling (RSS), and Network Direct Memory Access (NetDMA) features.

NOTE: Multifunction Server Adapters also support RDMA through optional ProLiant Essentials Licensing Kits.

Network Adapters	HP NC110T PCI Express Gigabit Server Adapter	434905-B21
	HP NC360T PCI Express Dual Port Gigabit Server Adapter	412648-B21
	HP NC364T PCI Express Quad Port Gigabit Server Adapter	435508-B21
	HP NC373F PCI Express Multifunction Gigabit Server Adapter	394793-B21
	HP NC373T PCI Express Multifunction Gigabit Server Adapter	394791-B21
	HP NC380T PCI Express Dual Port Multifunction Gigabit Server Adapter	394795-B21
	HP NC522SFP Dual Port 10GbE Server Adapter	468332-B21
	NOTE: A minimum of two gigabyte (2 GB) of server memory is required per each NC522SFP adapter.	

Product Configuration

Step 5 - Add Host Bus Adapters

Host Bus Adapters for Shared Storage

The DL380 G5 SAN Gateway Storage Server is designed and optimized for integration with a SAN or storage array; however any DL380 G5 Storage Server model can be connected to a SAS storage array or Fibre Channel SAN or array by adding a recommended HBA.

NOTE: A SC08Ge SAS HBA (488765-B21) is included as standard. Additional HBA selection is left as your choice based on existing infrastructure and/or desired array support.

NOTE: High Availability Storage Servers support only PCIe expansion cards.

NOTE: For the complete listing of Fibre Channel Host Bus Adapters, please see: <http://h18006.www1.hp.com/storage/saninfrastructure/hba.html>

HP StorageWorks FC2142SR 4Gb PCIe HBA	A8002A
HP StorageWorks FC2242SR Dual Channel 4 Gb PCIe HBA	A8003A
HP StorageWorks FC1142SR 4Gb PCIe HBA	AE311A
HP StorageWorks FC1242SR Dual Channel 4 Gb PCIe HBA	AE312A
HP StorageWorks 81Q PCI-e FC HBA	AK344A
HP 82Q 8Gb Dual Port PCI-e FC HBA	AJ764A
HP StorageWorks 81E 8Gb SP PCI-e FC HBA	AJ762A
HP 82E 8Gb Dual-port PCI-e FC HBA	AJ763A

Step 6 - Add Optional Software

HP StorageWorks Storage Mirroring Software

HP StorageWorks Storage Mirroring (SM) Software is an ideal entry host-based software product for IP networks. SM does not require high bandwidth Fibre Channel networks, high capacity replication and zero down time service levels. Storage Mirroring provides near real-time full application or file recovery up to the last byte replication. SM is an excellent choice for low bandwidth; low storage volume changes and meets business recovery goals within tens of minutes or hours. The immediate return on investment is realized in the reduced management cost associated with branch or small offices networks.

Product Highlights:

- High availability with Microsoft Windows 2000/NT/2003 servers
- Application aware and supported with Exchange, SQL and Oracle
- Host-based remote storage copy with TCP/IP networks
- Data distribution one-to-many or 'fan-out' to multiple destinations
- Data migration utility for transferring large data projects
- Centralize backup, data protection and recovery operations
- Built in scheduler for off hours replication
- Built in network bandwidth utilization management
- Disaster recovery between source and destination failover sites
- Powered by NSI Software's Double-Take patented 'Sequential Transfer Asynchronous Replication' technology
- Sequential transfer maintains write sequential across multiple files for data integrity

Product Configuration

- Asynchronous replication allows hosts to continue processing for maximum performance
- Introducing a new software option (Server Recovery Option) that captures a server's configuration information including OS, patches, drivers, and Service Packs. The IT department can respond to a server failure and use the Server Recover Option to re-create the boot sequence on a new server plus all of the data captured during the replication and send that data to the production site for replacement.
- Introducing a new software feature (Full Server Failover) that creates a one-to-one relationship between two servers. Should a production server fail, the server running Full Server Failover would assume the identify of the production server. The failover can occur over any distance and does not require "Enterprise" versions of the operating system or applications

NOTE: High Availability Storage Servers include a trial version of StorageWorks Storage Mirroring software.

Special note about Microsoft iSCSI Software Target and replication:
All HP ProLiant High Availability Storage Servers include the Distributed File System Replication (DFS-R) feature in the pre-installed Windows Unified Data Storage Server 2003 operating systems. DFS-R is a file-based replication technology that only replicates files when they are closed. Microsoft iSCSI Software Target does not close the virtual disk files (.vhd files) while they are in use, and so these files are not replicated during normal usage when replicating using DFS-R. Therefore, if iSCSI Software Target virtual disk files need to be replicated, DFS-R should not be used, and HP StorageWorks Storage Mirroring software should be considered instead. Storage Mirroring software asynchronously replicates each write into the file system to a secondary system, and therefore it can be used to effectively replicate iSCSI Software Target virtual disk files.

NOTE: High Availability Storage Servers include a desktop link to a white paper with more information on replicating iSCSI targets.

HP Storage Mirroring v5.1 Windows Media Kit

TA696A

HP Storage Mirroring NAS Edition Stock LTU

TA713A

HP Storage Mirroring NAS Edition E-LTU

TA701AAE

NOTE: For more information go to the HP StorageWorks Storage Mirroring website at: <http://h18006.www1.hp.com/products/storage/software/sm/index.html>

HP StorageWorks X3000 Upgrade to Windows Storage Server 2008 Enterprise Software

Select ProLiant G5 SAN Gateway Storage Servers with the Microsoft Windows Unified Data Storage Server 2003 Enterprise x64 Edition operating system are eligible for a software-only upgrade to the Microsoft Windows Storage Server 2008 Enterprise x64 Edition operating system:

- DL380 G5 x64 SAN Storage Server (AG771A)
- DL380 G5 SAN Gateway Storage Server (AG771B)
- DL380 G5 Integrated HA Storage Server (AQ245A)-requires an upgrade license for each node
- SB460c SAN Gateway Storage Server (AN583A)

This upgrade requires a clean install and contains all X3000 Network Storage System features, including Microsoft iSCSI Software Target and a Microsoft Cluster Server



Product Configuration

(MSCS) license.

NOTE: X3000 Network Storage Gateways may be clustered only with gateways also running Microsoft Windows Storage Server 2008, Enterprise x64 Edition operating system (HP recommends like hardware as well).

NOTE: Some expansion cards, including HBAs and NICs, may not be supported by Windows Storage Server 2008. Check Windows Server 2008 driver availability before purchase and installation.

NOTE: Check for HP and 3rd-party software qualification with 64-bit Windows Server 2008 operating systems before purchase and installation.

HP StorageWorks X3000 Upgrade to Windows Storage Server 2008 Enterprise Software

TA726A

Step 7 - Add a Backup Solution

Tape Drives

For the complete listing of Tape Drive offerings, please see:

<http://www.hp.com/products1/storage/compatibility/tapebackup/ISS/index.html>

HP D2D Backup System

Please see the HP D2D Backup Systems QuickSpecs for additional information:

http://h18000.www1.hp.com/products/quickspecs/12651_na/12651_na.html

Tape Autoloaders

Please reference the 1/8 Tape Autoloader QuickSpecs at:

<http://www.hp.com/go/automation> for additional information needed to create a complete solution; reference current compatibility information at:

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

Tape Libraries

Please reference the MSL Tape Library QuickSpecs at:

<http://www.hp.com/go/automation> for additional information needed to create a complete solution; reference current compatibility information at:

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

HP Data Protector Express Software

HP Data Protector Express 4.0 Backup Server

BB117BA

HP Data Protector Express Backup Server 4.0 Upgrade from Data Protector Express Single Server Edition

BB117BT

NOTE: Please see the HP Data Protector Express QuickSpecs for additional information regarding the purchase of HP Data Protector Express software:

http://h18000.www1.hp.com/products/quickspecs/12337_na/12337_na.html

Product Configuration

Step 8 - Order HPTS Service Care Packs

Service Care Packs or warranty upgrades enhance the base hardware warranty provided with your HP ProLiant Storage Server. The Care Packs provide support for product software and operating system with extended hours of coverage and reduced response time. And Care Packs allow the customer to budget fixed cost support rather than variable costs that include parts and labor.

Note that the standard HP warranty ensures software media will be free of physical defect for a period of 90 days from delivery. However, all ProLiant Storage Servers come with a full year of 9 hours by 5 days software advisory and remedial software telephone support, new version license rights, and media and documentation distribution service. Extended hours of coverage and additional years of service are available should the customer require more support.

See "**Service and Support Upgrade options**" section for more information on available Care Packs for your ProLiant Storage Server.

Memory

Standard Memory

PC2-5300 Fully Buffered DIMMs (DDR2-667) with 4:1 and 2:1 interleaving available (interleaving requires identical DIMMs)

- 8 GB (4 x 2GB) low-power

Upgrading Memory and Memory Interleaving

When upgrading memory, DIMMs 1A and 2A must match. DIMMs 3B and 4B, DIMMs 5C and 6C, and DIMMs 7D and 8D must match and must be installed as a pair. When DIMMs 1A and 2A are populated the system is automatically configured for 2:1 interleaving. When all 4 banks are populated the system is automatically configured for 4:1 interleaving. When four, six, or eight DIMMs are populated with identical DIMMs the system is automatically configured for bank interleaving.

Maximum Memory

- 64 GB (8 x 8GB)

Standard Memory Replaced with Optional Memory

Up to 64 GB of memory is available with the removal of the standard memory and the optional installation of 8 GB PC2-5300 Fully Buffered DIMMs (DDR2-667) memory kits.

NOTE: Chart does not represent all possible configurations.

Configuration		Slot							
		1	2	3	4	5	6	7	8
Standard	8 GB	2 GB	2 GB	2 GB	2 GB	Empty	Empty	Empty	Empty
Maximum	64 GB	8 GB	8 GB	8 GB	8 GB	8 GB	8 GB	8 GB	8 GB

NOTE: In the online spare configuration, the ROM automatically configures the last populated bank as the spare memory. If only banks A and B are populated, bank B is the spare bank. If banks A, B, and C are populated, bank C is the spare bank, Online spare memory is configured through RBSU.

NOTE: Mirrored Memory uses mirrored banks to provide a high level of memory redundancy. Customer chooses to implement or not: User selectable via BIOS and default is off.

Following are memory options available from HP:

2 GB FBD PC2-5300 2 x 1 GB Low Power Single Rank Kit	461826-B21
4 GB FBD PC2-5300 2 x 2 GB Low Power Dual Rank Kit	461828-B21
8 GB FBD PC2-5300 2 x 4 GB Low Power Dual Rank Kit	466440-B21
1 GB FBD PC2-5300 2 x 512 MB Single Rank Kit	397409-B21
2 GB FBD PC2-5300 2 x 1 GB Dual Rank Kit	397411-B21
4 GB FBD PC2-5300 2 x 2 GB Dual Rank Kit	397413-B21
8 GB FBD PC2-5300 2 x 4 GB Dual Rank Kit	397415-B21
16 GB FBD PC2-5300 2 x 8 GB Dual Rank Kit	413015-B21
64 GB FBD PC2-5300 8 x 8 GB Dual Rank Kit	495604-B21

In Advanced ECC mode, FBDIMMs must be populated as specified in the following table:

Memory

Configuration	Bank A 1A and 3A	Bank B 5B and 7B	Bank C 2C and 4C	Bank D 6D and 8D
1	X	-	-	-
2	X	X	-	-
3	X	X	X	-
4	X	X	X	X

Online spare memory configuration

Online spare FBDIMM configuration requirements (in addition to general configuration requirements):

- When only bank A is being used, it must be fully populated with dual-rank FBDIMMs.
- If banks A and C are being used, they must be fully populated.
- If installed, bank A and bank C must contain FBDIMMs with identical part numbers.
- If installed, bank B and bank D must also contain FBDIMMs with identical part numbers

In online spare mode, FBDIMMs must be populated as specified in the following table:

Configuration	Branch 0 Bank A 1A and 3A	Branch 0 Bank C 2C and 4C	Branch 1 Bank B 5B and 7B	Branch 1 Bank D 6D and 8D
1*	X	-	-	-
2	X	X	-	-
3	X	X	X	X

*Configuration 1 is only supported if using bank A, populated with dual-rank FBDIMMs. All FBDIMMs 1GB and above are dual-rank.

After installing FBDIMMs, use RBSU to configure the system for online spare memory support.

Mirrored memory configuration

Mirrored memory FBDIMM configuration requirements (in addition to general configuration requirements):

- Banks A and B must be fully populated.
- Bank A and bank B must contain FBDIMMs with identical part numbers. If installed, bank C and bank D must also contain FBDIMMs with identical part numbers.

When using mirrored memory mode, FBDIMMs must be populated as specified in the following table:

Configuration	Bank A 1A and 3A	Bank B 5B and 7B	Bank C 2C and 4C	Bank D 6D and 8D
1	X	X	-	-
2	X	X	X	X

NOTE: After installing FBDIMMs, use RBSU to configure the system for mirrored memory support ("Configuring mirrored memory" on page 57).

Storage

Factory RAID Configuration

NOTE: Where applicable, user storage is factory configured into 2TB (maximum) logical drives to accommodate Microsoft iSCSI Software Target (which currently does not support either dynamic disks or logical drives greater than 2TB on basic disks). However, Windows Unified Data Storage Server 2003 O/S and Smart Array P400 controllers do support creation of logical drives greater than 2TB using GUID Partitioning Table (GPT) disk architecture.

	Volume	RAID level	Physical Drives
Logical Disk 1	Operating System	RAID 1	0-1
Logical Disk 2	DON'T ERASE recovery partition	RAID 1	0-1

Tape Drives, Tape Autoloaders, and Tape Libraries

NOTE: For an up-to-date listing of the latest O/S Support details for each of the Tape Drives listed below, please see the following: <http://h18000.www1.hp.com/products/quickspecs/division/10233.html> (Worldwide)

NOTE: For an up-to-date listing of the latest O/S Support details for each of the Tape Autoloaders & Tape Libraries listed below, please see the following: <http://h18000.www1.hp.com/products/quickspecs/division/10809.html> (Worldwide)

NOTE: SAS Tape Drives: Connecting hard drive cage and SAS tape to the same SAS Controller using split cable (supplied with tape drive) deactivates 1 of the hard drive bays. Actual hard drive bay deactivated depends on where split cable plugs into SAS drive connector. Example: 3x SAS cable connector plugged into SAS drive connector (5-8) on the back of the hard drive cage would mean drive bay 8 is deactivated.

NOTE: For complete listing of tape drive offerings see <http://www.hp.com/products1/storage/compatibility/tapebackup/ISS/index.html>
For recommended tape drive offerings for this ProLiant server see the following:

	Position Supported	Controller	Part Number
HP StorageWorks SCSI Tape Drives, External	External	HP SC11Xe Host Bus Adapter	412911-B21
LTO-1 Ultrium 232			
LTO-2 Ultrium 448			
LTO-3 Ultrium 960			
LTO-3 Ultrium 920			
LTO-4 Ultrium 1760			
LTO-4 Ultrium 1840			
DAT 40			
DAT 72			
DAT 160			
1U Rack-Mount Kit			
3U Rack-Mount Kit			
HP StorageWorks USB Tape Drives, External	External	USB 2.0 Port	N/A
DAT 40 USB			
DAT 72 USB			
DAT 160 USB			
1U USB Rack-Mount Kit			

Storage

HP StorageWorks SAS Tape Drives, External DAT 160 SAS LTO-2 Ultrium 448 SAS LTO-3 Ultrium 920 SAS LTO-4 Ultrium 1760 SAS LTO-4 Ultrium 1840 SAS 1U Rack-Mount Kit 3U Rack-Mount Kit	External	HP SC44Ge Host Bus Adapter	416096-B21
		NOTE: Please visit: http://www.hp.com/go/connect for details about minimum SAS controller firmware version and SAS cabling requirements.	
HP StorageWorks SCSI Tape Automation, External DAT 72X10 Autoloader 1/8 G2 Autoloader MSL2024 MSL4048	External	HP SC11Xe Host Bus Adapter	412911-B21
		HP U320e SCSI Host Bus Adapter NOTE: Only valid for MSL tape libraries.	AH627A
HP StorageWorks SAS Tape Automation, External 1/8 G2 Autoloader MSL2024 MSL4048	External	HP SC44Ge Host Bus Adapter	416096-B21
		NOTE: Please visit: http://www.hp.com/go/connect for details about minimum SAS controller firmware version and SAS cabling requirements.	
HP StorageWorks Fibre Tape Libraries, External MSL2024 MSL4048	External	Please consult the EBS connectivity matrix at: http://www.hp.com/go/ebs for detailed connectivity information	N/A
HP StorageWorks D2D Backup Systems D2D120 D2D130 D2D2503i D2D4004i	External	Embedded Network Controller	N/A

Power Specifications

Power Supply Specification - AC	Part number		380622-001			
	Spare Kit		403781-001			
Operational Input Voltage Range (Vrms)	90 to 264					
Frequency Range (Nominal) (Hz)	47 to 63 (50/60)					
Nominal Input Voltage (Vrms)	100	120	208	220	230	240
Max Rated Output Wattage Rating	800	850	1000	1000	1000	1000
Nominal Input Current (A rms)	10.0	8.8	5.85	5.5	5.2	4.97
Max Rated Input Wattage Rating (Watts)	980	1035	1193	1186	1172	1169
Max. Rated VA (Volt-Amp)	1000	1056	1217	1210	1196	1193
Efficiency (%)	81.5	82	84	84	85	85.5
Power Factor	0.98	0.98	0.98	0.98	0.98	0.98
Leakage Current (mA)	0.44	0.52	0.91	0.96	1.00	1.04
Max. Inrush Current (A peak)	30	30	30	30	30	30
Max. Inrush Current duration (mS)	3	3	3	3	3	3

Power Supply Specification - DC	Part number		433634-B21			
	Spare Kit		419613-001			
Operational Input Voltage Range (Vrms)	-36.0 to -72.0V DC					
Frequency Range (Nominal) (Hz)	DC					
Nominal Input Voltage (Vrms)	36	48	72			
Max Rated Output Wattage Rating	1210	1210	1210			
Nominal Input Current (A rms)	38	29	20			
Max Rated Input Wattage Rating (Watts)	980	1035	1193			
Max. Rated VA (Volt-Amp)	1368	1392	1440			
Efficiency (%)	87.6	87.6	86			
Max. Inrush Current (A peak)	60	60	60			
Max. Inrush Current duration (mS)	100	100	100			

NOTES:

- To review typical system power ratings use the Active Answers Power Calculator which is available via the online tool located at url: <http://h30099.www3.hp.com/configurator/calc/Power%20Calculator%20Catalog.xls>

To drill down to calculators:

- Click on: "ProLiant Servers"
- Click on the Server of interest. Example: DL380 G5
- Click on: "Power Calculator" link. (You may need to scroll down to see it)

Technical Specifications

System Unit	Dimensions (HxWxD) (with feet/bezel)	3.38 x 17.54 x 26.01 in (8.59 x 44.54 x 66.07 cm)										
	Weight (approximate)	<table border="0"> <tr> <td>Maximum</td> <td>60 lb (27.22 kg)</td> </tr> <tr> <td>Minimum</td> <td>47.18 lb (20.41 kg)</td> </tr> </table>	Maximum	60 lb (27.22 kg)	Minimum	47.18 lb (20.41 kg)						
Maximum	60 lb (27.22 kg)											
Minimum	47.18 lb (20.41 kg)											
	Input Requirements (per power supply)	<table border="0"> <tr> <td>Rated Line Voltage</td> <td>100-132 VAC, 200-240 VAC</td> </tr> <tr> <td>Rated Input Current</td> <td>10A (100VAC), 10A (120VAC), 6.1A (200VAC)</td> </tr> <tr> <td>Rated Input Frequency</td> <td>50 to 60 Hz</td> </tr> <tr> <td>Rated Input Power</td> <td>1000/1056/1205 W</td> </tr> </table>	Rated Line Voltage	100-132 VAC, 200-240 VAC	Rated Input Current	10A (100VAC), 10A (120VAC), 6.1A (200VAC)	Rated Input Frequency	50 to 60 Hz	Rated Input Power	1000/1056/1205 W		
Rated Line Voltage	100-132 VAC, 200-240 VAC											
Rated Input Current	10A (100VAC), 10A (120VAC), 6.1A (200VAC)											
Rated Input Frequency	50 to 60 Hz											
Rated Input Power	1000/1056/1205 W											
	BTU Rating	BTU/HR 3490/3680/4150										
	Power Specifications	<p>To review typical system power ratings use the Active Answers Power Calculator which is available via the online tool located at URL: http://h30099.www3.hp.com/configurator/powercalcs.asp.</p> <p>To drill down to calculators:</p> <ul style="list-style-type: none"> - Click on: "ProLiant Servers" - Click on the Server of interest. Example: DL380 G5 - Click on: "Power Calculator" link. (You may need to scroll down to see it.) 										
	Power Supply Output Power (per power supply)	<table border="0"> <tr> <td>Rated Steady-State Power</td> <td>800/850/1000 W</td> </tr> <tr> <td>Maximum Peak Power</td> <td>800/850/1000 W</td> </tr> </table>	Rated Steady-State Power	800/850/1000 W	Maximum Peak Power	800/850/1000 W						
Rated Steady-State Power	800/850/1000 W											
Maximum Peak Power	800/850/1000 W											
	Temperature Range	<table border="0"> <tr> <td style="vertical-align: top;">Operating</td> <td>50° to 95° F (10° to 35° C) at sea level with an altitude de-rating of 1.8° F per 1000 ft (1.0° C per 304.8 m) to 10,000 ft (3048 m) no direct sunlight allowed. Maximum rate of change is 18° F/Hr (10° C/Hr). Upper operating limit is 10,000 ft (3,048 m) or 70 Kpa/10.1 psia. System performance may be reduced if operating with a fan fault or above 30° C.</td> </tr> <tr> <td style="vertical-align: top;">Non-operating</td> <td>-22° to 140° F (-30° to 60° C) Maximum rate of change is 36° F/Hr (20° C/Hr). Upper non-operating limit is 30,000 ft (9,144 m) or 30.3KPa/4.4 psia.</td> </tr> </table>	Operating	50° to 95° F (10° to 35° C) at sea level with an altitude de-rating of 1.8° F per 1000 ft (1.0° C per 304.8 m) to 10,000 ft (3048 m) no direct sunlight allowed. Maximum rate of change is 18° F/Hr (10° C/Hr). Upper operating limit is 10,000 ft (3,048 m) or 70 Kpa/10.1 psia. System performance may be reduced if operating with a fan fault or above 30° C.	Non-operating	-22° to 140° F (-30° to 60° C) Maximum rate of change is 36° F/Hr (20° C/Hr). Upper non-operating limit is 30,000 ft (9,144 m) or 30.3KPa/4.4 psia.						
Operating	50° to 95° F (10° to 35° C) at sea level with an altitude de-rating of 1.8° F per 1000 ft (1.0° C per 304.8 m) to 10,000 ft (3048 m) no direct sunlight allowed. Maximum rate of change is 18° F/Hr (10° C/Hr). Upper operating limit is 10,000 ft (3,048 m) or 70 Kpa/10.1 psia. System performance may be reduced if operating with a fan fault or above 30° C.											
Non-operating	-22° to 140° F (-30° to 60° C) Maximum rate of change is 36° F/Hr (20° C/Hr). Upper non-operating limit is 30,000 ft (9,144 m) or 30.3KPa/4.4 psia.											
	Maximum Wet Bulb Temperature	101.7° F (38.7° C)										
	Relative Humidity (non-condensing)	<table border="0"> <tr> <td style="vertical-align: top;">Operating</td> <td>10% to 90% relative humidity (Rh), 28° C maximum wet bulb temperature.</td> </tr> <tr> <td style="vertical-align: top;">Non-operating</td> <td>5% to 95% relative humidity (Rh), 38.7° C maximum wet bulb temperature.</td> </tr> </table>	Operating	10% to 90% relative humidity (Rh), 28° C maximum wet bulb temperature.	Non-operating	5% to 95% relative humidity (Rh), 38.7° C maximum wet bulb temperature.						
Operating	10% to 90% relative humidity (Rh), 28° C maximum wet bulb temperature.											
Non-operating	5% to 95% relative humidity (Rh), 38.7° C maximum wet bulb temperature.											
	Acoustic Noise	<table border="0"> <tr> <td colspan="2">Idle Minimum (Fixed Disk Drives Spinning)</td> </tr> <tr> <td style="padding-left: 20px;">L WAd (BELS)</td> <td>6.1</td> </tr> <tr> <td style="padding-left: 20px;">L pAm (dBA)</td> <td>44</td> </tr> <tr> <td colspan="2">Operating Minimum (Random Seeks to Fixed Disks)</td> </tr> <tr> <td style="padding-left: 20px;">L WAd (BELS)</td> <td>6.1</td> </tr> </table>	Idle Minimum (Fixed Disk Drives Spinning)		L WAd (BELS)	6.1	L pAm (dBA)	44	Operating Minimum (Random Seeks to Fixed Disks)		L WAd (BELS)	6.1
Idle Minimum (Fixed Disk Drives Spinning)												
L WAd (BELS)	6.1											
L pAm (dBA)	44											
Operating Minimum (Random Seeks to Fixed Disks)												
L WAd (BELS)	6.1											

Technical Specifications

L pAm (dBA) 44

Smart Array P400 Controller	Disk Drive and Enclosure Interface	3G SAS (Serial Attached SCSI) 1.5G SATA (Serial Advanced Technology Attachment)
	SAS Connectors	2 internal (SFF8484) x4 wide port connectors
	Cache Memory Speed	DDR2-533MHz with 40 or 72-bit wide bus provides up to 4.2 GB/s maximum bandwidth.
	Server Interface	x8 2.5G PCIe provides 2GB/s maximum bandwidth.
	SAS Speed	x8 3G SAS provides 2.4GB/s maximum bandwidth.
	Cache Memory	40-bit 256MB cache (72-bit 512MB module upgrades available); ECC protection, battery-backed, and transportable
	Logical Drives Supported	Up to 32 logical drives
	Maximum Logical Drive Capacity	3TB (6 x 500GB)
	Host Memory Addressing	64-bit, supporting greater than 4GB server memory space
	RAID Support	RAID 6 with ADG (Advanced Data Guarding) requires Battery Backed Write Cache Upgrade RAID 5 (Distributed Data Guarding) RAID 1+0 (Striping & Mirroring) RAID 0 (Striping)

Two Embedded NC373i Multifunction Server Adapters	Network Interface	10Base-T/100Base-TX/1000Base-TX	
	Compatibility	IEEE 802.3 10Base-T	
		IEEE 802.3ab 1000Base-T	
		IEEE 802.3u 100Base-TX	
	Data Transfer Method	PCI Express, four lanes (x4)	
	Network Transfer Rate	10Base-T (Half-Duplex)	10 Mb/s
		10Base-T (Full-Duplex)	20 Mb/s
		100Base-TX (Half-Duplex)	100 Mb/s
		100Base-TX (Full-Duplex)	200 Mb/s
		1000Base-TX (Half and Full-Duplex)	2000Mb/s
Connector	Two RJ-45		
Cable Support	10Base-T	Categories 3, 4 or 5 UTP; up to 328 ft (100 m)	
	100Base-TX	Category 5 or higher UTP; up to 328 ft (100 m)	
	1000BaseTX	Category 5 or higher UTP; up to 328 ft (100 m)	

NOTE: The NC373i Multifunction Gigabit Server Adapters support the installed Microsoft Windows Server 2003 Scalable Networking Pack, which enables TCP Chimney offload, Receive-side Scaling (RSS), and Network Direct Memory Access (NetDMA) features.



Technical Specifications

MSA2000sa

POWER REQUIREMENTS

Input Power Requirements	100-240VAC, 50/60 Hz, 4.5-1.9A
Max Input Power	475W maximum continuous
Heat Dissipation	1622 BTU/hour

TEMPERATURE AND HUMIDITY RANGES

Operating Temperature	41° F to 104° F (5°C to 40°C)
Shipping Temperature	-40° F to 158° F (-40° C to 70° C)
	NOTE: Derate 2°C for every km, up to 3000 meters
Operating Humidity	10% to 90% RH @ 104° F (40° C), non-condensing
Non-Operating Humidity	Up to 93% RH @ 104° F (40° C), non-condensing

DECLARED ACOUSTIC NOISE LEVELS

Sound Power	<6.03B Sound Power
Sound Pressure	<55dBA Sound Pressure

SHOCK AND VIBRATION

Shock, Operational	5.0G, 10ms, half sine
Shock, Non-Operational	15G 11ms, half sine
Vibration, Operational	0.21Grms Random 5Hz to 500Hz flat spectrum/feed forward
Vibration, Non-Operational	0.5G 1 octave/minute 5Hz to 500Hz to 5 Hz sine sweep
	0.5Grms Random 20Hz to-1000Hz flat spectrum

PHYSICAL

Height	3.5 in (8.9 cm)
Depth (excluding cables)	23.7 ins (60.2 cm)
Width	17.6 in (44.7 cm)
Chassis Weight	44 lbs (19.96 kg)

MSA2000sa Controller

Host Interface	2 x4 lane SAS ports - 3Gb/s per lane
Protocol Support	SAS
RAID Support	0, 1, 3, 5, 6, 10, 50
Cache Memory	1GB Read/Write
Cache Backup	ECC protection with back up to flash memory (indefinite backup)
Upgradeable Firmware	- yes - partner firmware update (PFU)
Disk Drive and Enclosure Protocol Support	3Gb SAS - Serial Attached SCSI / 3 Gb SATA=II
Expansion Port	One 4X SAS connector (SFF8470) Expand up to 3 more drive enclosures

Technical Specifications

Regulatory	Safety	UL 60950-1:2003 (USA) CAN/CSA-C22.2 No.60950-1-03 (Canada) EN 60950-1 :2001 + A11 (European Union) IEC 60950-1 :2001 (International)
	Electromagnetic Compatibility	CFR 47 Part 15 Subpart B (U.S.A., Class A) ICES-003 Issue 4 (Canada, Class A) EN 55022 :98 +A1 +A2 (European Union, Class A) EN61000-3-2:2000+A1,+A2,+A14 (Harmonics) EN 61000-3-3 :2001 (Flicker) EN 55024 :1998 +A1 (European Union, Immunity) CISPR 22 :2005 (International, Class A) CISPR 24 :97 (International, Immunity)
	RoHS and WEEE	RoHS-5 Compliance , China RoHS, WEEE
	Country Approvals	Australia/New Zealand, Canada, China (PRC), European Union, Germany (GS Mark), Japan, South Korea, Taiwan, United States

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