

Overview

The HP ProLiant DL380 G5 Storage Server is a network attached storage (NAS) solution with multi-protocol file support and storage management for enterprise and workgroup environments. The ProLiant DL380 G5 Storage Server offers both appliance and NAS/SAN fusion storage solutions that offer ease of installation and management features that reduce overall total cost of ownership (TCO). The ProLiant DL380 G5 Storage Server is ideal for customers with limited IT resources who require quick, simple, rapidly deployable, flexible storage and who need remote manageability. The ProLiant DL380 G5 Storage Server uses Microsoft's Windows Storage Server 2003 Release 2 (WSS 2003 R2) operating system which adds increased storage management functionality, increased data protection, performance enhancements and print services allowing customers to take control of their growing storage needs. Plus, it comes with HP Global Services, providing cost-effective support to ensure continuous availability.

HP ProLiant DL380 G5 Storage Server comes in five configurations: a Base, 1.2TB SCSI, 2TB SATA, 1.16TB SAS and SAN storage model.

What Is NAS?

HP uses the Storage Server product name to describe its Network Attached Storage (NAS) solutions. NAS solutions are specialized file-serving devices that provide support for heterogeneous files in a high-capacity package. NAS solutions also provide specific features to simplify the tasks and reduce the resources associated with data storage and management. The objective of NAS technology is to simplify manageability and improve data access to clients and applications. A NAS solution will generally provide network accessible storage to a mix of clients and servers running different operating systems.

What's New

New high performance model with 8 x 146GB 10K SFF SAS drives

Benefits Of NAS

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|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Flexible | <ul style="list-style-type: none">● The ProLiant DL380 G5 Storage Server can be deployed as an appliance with its own direct attached storage or as NAS/SAN fusion product to act as a file serving gateway for an HP-based SAN |
| Large Capacity | <ul style="list-style-type: none">● The appliance models support up to 48TB of external storage using SATA hard disk drives. The SAN storage model supports up to virtually unlimited storage depending on SAN storage capacity. |
| Ready to deploy | <ul style="list-style-type: none">● The hardware is pre-configured and the OS is pre-installed from the factory allowing you to deploy the system on your network in minutes |
| Simple management | <ul style="list-style-type: none">● Web-based user interface enables system administrators to set up and manage the DL380 G5 Storage Server in only a few short steps |
| Remote manageability | <ul style="list-style-type: none">● Supports remote management via web GUI or command console |
| High performance | <ul style="list-style-type: none">● Support up to two Intel Xeon processors, large memory capacity and hardware-based RAID for optimal performance |
| Reliable | <ul style="list-style-type: none">● Provides data protection capabilities like hardware-based RAID, built in "snapshot" technology, redundant power/cooling and support for multiple backup and anti-virus packages |
| 2U Form Factor | <ul style="list-style-type: none">● Space saving rack mounted product design |
| Open | <ul style="list-style-type: none">● Supports all the major file serving protocols including SMB/CIFS, NFS, NCP, AppleTalk, HTTP and FTP |

Overview

Product Features

- Dual Core Intel Xeon 2.67 GHz/1333 MHz FSB with 4MB L2 Cache; systems support up to 2 processors (2 processor are standard on the SAN model)
- 1 GB of PC2-5300 Fully Buffered DIMMs; 2 x 512MB on Base, 1.2TB SCSI, and 2TB SATA Models
- 2 GB of PC2-5300 Fully Buffered DIMMs; 2 x 1GB on SAN Model
- Windows Storage Server 2003, Release 2 Standard Edition pre-installed on Base, 1.2TB SCSI, 2TB SATA, and 1.16TB SAS Models
- Windows Storage Server 2003, Release 2 Enterprise Edition pre-installed on SAN Model
- Windows Storage Server 2003 R2 includes:
 - HP Enhanced, File Server Management Console
 - File Server Resource Manager for quotas, file screening and storage reporting
 - Print Server support
 - New print management console
 - Unlimited printer support in Standard Edition
 - Microsoft Services for Network File System (NFS)
 - Distributed File System Replication, including
 - DFS Management Console
 - Configuration and Diagnostic Tools
 - Unlimited Client Access License (CAL) included
 - Standard Edition (Base, 1.2TB SCSI, and 1TB SATA models)
 - Enterprise Edition (SAN Storage model)
- Smart Array P400 Controller with 512 MB BBWC (integrated on system board)
- Four available PCI slots
 - Two PCI Express Low Profile slots
 - Two PCI-X Full Height slots
- Embedded Dual NC373i Multifunction Gigabit NICs (embedded)
- Redundant Hot Plug Power Supplies
- Fully Redundant Hot Plug Fans
- Integrated Lights-Out (iLO) 2 Management standard on system board, Advanced License Pack included
- 2U rack form factor

Software Components

Optional Software

- **HP Insight Manager** – The ProLiant DL380 G5 Storage Server supports Insight Manager through SNMP. For more information on HP Insight Manager:
<http://h18013.www1.hp.com/products/servers/management/hpsim/index.html>
- **HP OpenView Management tools** – The ProLiant DL380 G5 Storage Server supports Open View through SNMP. For more information HP OpenView:
<http://www.managementsoftware.hp.com/>
- **HP OpenView Storage Data Protector** – The HP OpenView Storage 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.

The ProLiant DL380 G5 Storage Server supports using Data Protector as the backup software solution. For more information on HP OpenView Data Storage Protector:
<http://h18006.www1.hp.com/products/storage/software/dataprotector/index.html>

- **HP OpenView Storage Mirroring** – The ProLiant DL380 G5 Storage Server supports using Storage Mirroring as the replication software solution (see Options section for more details)

Non HP Software for Exchange Backup & Archive

- Backup and Restore of Exchange Data - HP has qualified CommVault Systems to provide simplified and cost-effective data management and protection solutions for HP ProLiant Storage Server customers. The solution helps SMB customers address the issues of growing business and regulatory compliance requirements for data retention, reduced data backup windows and increasing storage management administration cost and complexity. CommVault's QiNetix software suite running on an HP Storage Server device includes the following key features:
 - Complete protection and management of Microsoft Exchange and NAS data, including backup, restore (Database and Message Level), archiving and data migration to secondary storage devices.
 - Use of HP ProLiant Storage Server devices as backup and archive targets to stage Microsoft Exchange and other data.
 - Content-based indexing of Exchange data to assist in compliance and specific searching of Exchange e-mail text, e-mail attachments, and Window files.
 - Immediate ability to increase reliability and performance by staging data to the HP ProLiant Storage Server product and then to tape (D2D2T) seamlessly via CommVault QiNetix, including support for HP StorageWorks Magneto Optical Storage.

NOTE: For more information on CommVault QiNetix software for HP Storage Servers, please go to: http://www.commvault.com/hp/hp_nas.asp

NOTE: To order CommVault QiNetix software for HP Storage Servers:
U.S.: Call (877) 723-5091 or email partnersupport@commvault.com or
Europe: Email HPInfo@commvaultemea.com

Service and Support, HP Care Pack, and Warranty Information

Storage Service Packages

The Storage Services Packaging takes the existing storage product along with the existing services and creates a package of the storage hardware and appropriate services. The increased level of support provides for a higher level of storage system availability for the customer. The package includes 24x7 support with a 4-hour response for 3 years as well as installation and startup service.

Software Product Services

- HP warrants only that the Software media will be free of physical defects for a period of 90 days from delivery.
- Upgrades to the 90 day media defect warranty are available as HP Care Pack services. These services are available to upgrade the warranty to (1 or 3) full year of 9 hours by 5 days (or 24x7) software advisory and remedial software telephone support, new version license rights, and media and documentation distribution service.

Hardware Product Services

- Installation services
- On-site Maintenance (includes warranty support)
- Response time upgrades during the warranty period
- Post-warranty coverage
- RAID setup and performance consulting via statement of work

For additional hardware installation and maintenance information please refer to the URLs listed below:

<http://h20219.www2.hp.com/services/cache/9516-0-0-225-121.aspx>

Installation and Startup Services

The Installation and Startup Service package provides installation and configuration of HP StorageWorks products. Major categories of work could include:

- Pre-installation consulting and planning
- Hardware installation, configuration and verification
- RAID array configuration and initialization
- Installation, configuration and verification of StorageWorks software
- Service tools installed, configured and verified
- Customer orientation

Warranty

The HP ProLiant DL380 G5 Storage Server has a standard 3-3-3 warranty (3 years parts exchange, 3 years labor and 3 year on-site, next business day response).

Warranty Upgrade Options

- Response – Upgrade on-site response from next business day to same day 4-hours
- Coverage – Extend hours of coverage from 5 days x 9 hours to 7 days x 24 hours
- Duration – Select duration of coverage for a minimum period of 1 year or multiple years

The HP Care Pack is defined as an upgrade to the product warranty attribute, available for a specific duration and hours of coverage.

- HP Care Pack is not available for less than the product's warranty duration.
- HP Care Pack is available for sale anytime during the warranty period for most products, but the commencement date will be the same as the Warranty Start Date (delivery date to end user customer). Proof of purchase may be required.
- HP Care Pack services are prepaid.
- For additional HP Care Pack (hardware & software) information, as well as orderable part numbers, please refer to the URL listed below:

<http://h20219.www2.hp.com/services/cache/9516-0-0-225-121.aspx>

Components

The following brick level options/components do not have individual HP Care Pack Services. These items will be included in product HP Care Pack Services into which they are installed.

Disk Drives	Tape Drives	CD/DVD ROM	SCSI Hubs in SBBs	Adapters
Bus Converters	Backplane RAID Controllers	Power Supplies	Cabling	Fans

Product Configuration Wizard

In the following steps you will be guided through a series of steps to help you configure a customized model.

NOTE: Options ship separately and are not factory integrated.

Step 1 – Order required models

Select here one of the available base models

HP ProLiant DL380 G5 Storage Server Base Model AG453A	Processor	(1) Dual-Core Intel Xeon 5150 Processors (2.67 GHz, 1333 FSB)
	Cache Memory	4MB (1 x 4MB) Level 2 cache – 5100 Series
	Memory	1 GB (2 x 512 MB) PC2-5300 Fully Buffered DIMMs (DDR2-667) with Advanced ECC, up to 4GB supported
	Operating System	Windows Storage Server 2003 Release 2, Standard Edition
	Network Controller	Embedded Dual NC373i Multifunction Gigabit NICs
	Storage Controller	Smart Array P400 Controller with 512 MB BBWC (integrated on system board)
	Hard Drive	(2) 36GB 3G SAS 10K SFF HDDs (for mirrored OS internal to server)
	Internal Storage	No internal hard drives for user storage shipped with this model
	Optical Drives	HP DVD+R/RW 8X Slim
	External Storage	A maximum of 8 MSA30 and/or MSA20 storage enclosures can be added to the DL380 G5 Storage Server (all models) to expand storage capacity. MSA30 and MSA20 enclosures can be intermixed for attachment depending on customer storage requirements
	Form Factor	Rack (2U), (3.5-inch)
	Protocol Support	SMB/CIFS, NFS, NCP, AppleTalk, HTTP, FTP
	Remote Management	iLO2 Port with Advance License Pack Included
HP ProLiant DL380 G5 Storage Server 1.2TB SCSI Model AG454A	Processor	(1) Dual-Core Intel Xeon 5150 Processors (2.67 GHz, 1333 FSB)
	Cache Memory	4MB (1 x 4MB) Level 2 cache – 5100 Series
	Memory	1 GB (2 x 512 MB) PC2-5300 Fully Buffered DIMMs (DDR2-667) with Advanced ECC, up to 4GB supported
	Operating System	Windows Storage Server 2003 Release 2, Standard Edition
	Network Controller	Embedded Dual NC373i Multifunction Gigabit NICs
	Storage Controller	Smart Array P400 Controller with 512 MB BBWC (integrated on system board) Smart Array 6402 with 128MB BBWC (in a PCI-X slot) for external MSA30 enclosure
	Hard Drive	(2) 36GB 3G SAS 10K SFF HDDs (for mirrored OS internal to server)
	Internal Storage	No internal hard drives for user storage shipped with this model
	Optical Drives	HP DVD+R/RW 8X Slim
	Storage Enclosures	Standard one (1) Modular Smart Array 30 SB enclosure complete with dual power supply and four (4) 300 GB 1" Ultra320 10K RPM drives (1.2 TB). NOTE: 1.2TB of user storage is installed in the included MSA30 external enclosure NOTE: A maximum of eight external MSA 30 or MSA20 can be added
	Form Factor	Rack (5U), (7.5-inch)
	Protocol Support	SMB/CIFS, NFS, NCP, AppleTalk, HTTP, FTP
	Remote Management	iLO2 Port with Advance License Pack Included
HP ProLiant DL380 G5 Storage Server 2TB SATA Model AG455A	Processor	(1) Dual-Core Intel Xeon 5150 Processors (2.67 GHz, 1333 FSB)
	Cache Memory	4MB (1 x 4MB) Level 2 cache – 5100 Series
	Memory	1 GB (2 x 512 MB) PC2-5300 Fully Buffered DIMMs (DDR2-667) with Advanced ECC, up to 4GB supported
	Operating System	Windows Storage Server 2003 Release 2, Standard Edition
	Network Controller	Embedded Dual NC373i Multifunction Gigabit NICs
	Storage Controller	Smart Array P400 Controller with 512 MB BBWC (integrated on system board) Smart Array 6402 with 128MB BBWC (in a PCI-X slot) for external MSA20 enclosure
	Hard Drive	(2) 36GB 3G SAS 10K SFF HDDs (for mirrored OS internal to server)
	Internal Storage	No internal hard drives for user storage shipped with this model
	Optical Drives	HP DVD+R/RW 8X Slim
	Storage Enclosures	Standard one (1) Modular Smart Array 20 enclosure complete with dual power supply and four (4) 500 GB 7.2K RPM 1" drives (1TB). NOTE: 2TB of user storage is installed in the included MSA20 external enclosure NOTE: A maximum of eight external MSA 30 or MSA20 can be added

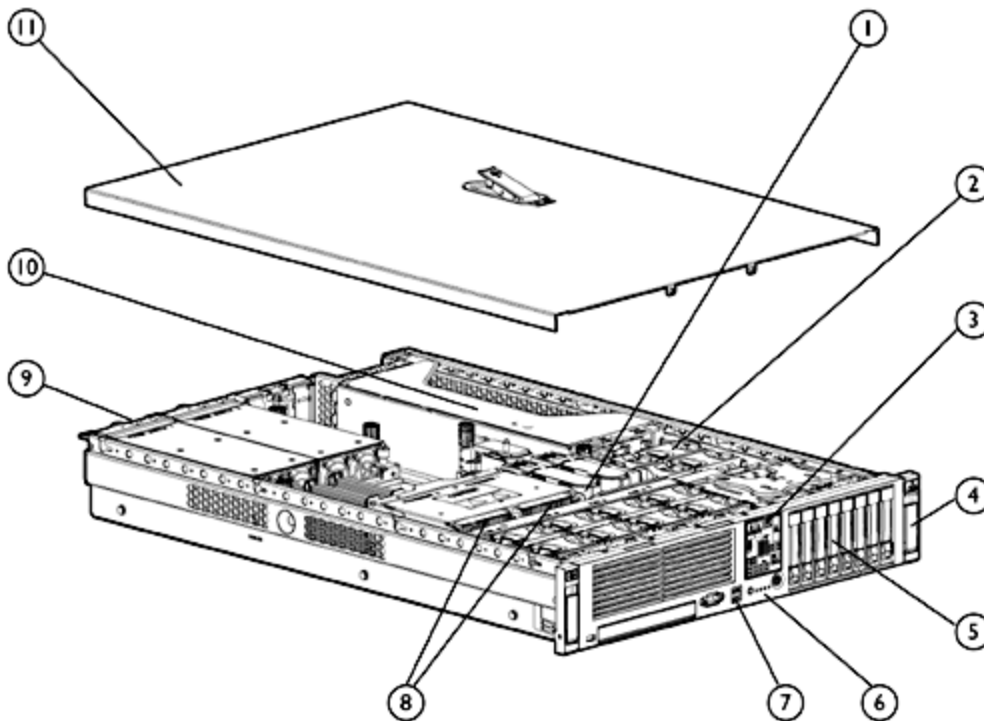
Product Configuration Wizard

Form Factor	Rack (4U), (7.5-inch)
Protocol Support	SMB/CIFS, NFS, NCP, AppleTalk, HTTP, FTP
Remote Management	iLO2 Port with Advance License Pack Included

HP ProLiant DL380 G5 Storage Server 1.16TB SAS Model AG581A	<p>Processor (1) Dual-Core Intel Xeon 5150 Processors (2.67 GHz, 1333 FSB)</p> <p>Cache Memory 4MB (1 x 4MB) Level 2 cache – 5100 Series</p> <p>Memory 1 GB (2 x 512 MB) PC2-5300 Fully Buffered DIMMs (DDR2-667) with Advanced ECC, up to 4GB supported</p> <p>Operating System Windows Storage Server 2003 Release 2, Standard Edition</p> <p>Network Controller Embedded Dual NC373i Multifunction Gigabit NICs</p> <p>Storage Controller Smart Array P400 Controller with 512 MB BBWC (integrated on system board)</p> <p>Hard Drive (8) 146GB 3G SAS 10K SFF HDDs</p> <p>Optical Drives HP DVD+R/RW 8X Slim</p> <p>Storage Enclosures NOTE: A maximum of eight external MSA 30 or MSA20 can be added</p> <p>Form Factor Rack (4U), (7.5-inch)</p> <p>Protocol Support SMB/CIFS, NFS, NCP, AppleTalk, HTTP, FTP</p> <p>Remote Management iLO2 Port with Advance License Pack Included</p>
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HP ProLiant DL380 G5 Storage Server SAN Storage Model AG456A	<p>Processor (2) Dual-Core Intel Xeon 5150 Processors (2.67 GHz, 1333 FSB)</p> <p>Cache Memory 4MB (1 x 4MB) Level 2 cache – 5100 Series</p> <p>Memory 2 GB (2 x 1 GB) PC2-5300 Fully Buffered DIMMs (DDR2-667) with Advanced ECC, up to 32GB supported</p> <p>Operating System Windows Storage Server 2003 Release 2, Enterprise Edition</p> <p>Network Controller Embedded Dual NC373i Multifunction Gigabit NICs</p> <p>Storage Controller Smart Array P400 Controller with 512 MB BBWC (integrated on system board)</p> <p>Hard Drive (2) 36GB 3G SAS 10K SFF HDDs (for mirrored OS internal to server)</p> <p>Internal Storage No internal hard drives for user storage shipped with this model</p> <p>Optical Drives HP DVD+R/RW 8X Slim</p> <p>External Storage Supports attachment to XP, EVA, MSA, VA and MSA1000/1500 in a SAN</p> <p>NOTE: This model is primarily intended for use as a NAS/SAN gateway, but can support direct attach storage with either MSA 30 or MSA 20.</p> <p>Form Factor Rack (2U), (3.5-inch)</p> <p>Protocol Support SMB/CIFS, NFS, NCP, AppleTalk, HTTP, FTP</p> <p>Remote Management iLO2 Port with Advance License Pack Included</p>
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Model Design



1. Eight sockets for PC2-5300 Fully Buffered DIMMs (DDR2-667)
2. Hot-plug fans, full redundancy
3. Front panel I/O ports
4. Front panel I/O ports
5. Front panel I/O ports
6. Front panel I/O ports
7. Two front USB ports (2 rear USB ports, 1 internal USB port)
8. Intel Xeon Processor (Performance models include two processors)

Product Configuration Wizard

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| 3. Systems Insight Display | 9. Hot plug power supply, redundancy option (High performance models include redundant power supply) |
| 4. Quick release lever for rapid server access | 10. Three PCI-E non-hot plug expansion slots (or optional mixed PCI-X/E expansion cage) |
| 5. Support for eight Small Form Factor hot plug hard drives bays | 11. Quick removal access panel |
| 6. Front LEDs (show server status) and Unit Identification button/LED (for easy in rack server identification) | |

Step 2 – add second processor

You may add a second processor to a ProLiant DL380 G5 Storage Server Base, External SCSI or External SATA Model

Processor	Dual-Core Intel Xeon 5150 Processor (2.67 GHz, 1333 FSB)	418323-B21
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Step 3 – add additional memory

Memory	1 GB FBD PC2-5300 2 x 512 MB Kit	397409-B21
	2 GB FBD PC2-5300 2 x 1 GB Kit	397411-B21
	4 GB FBD PC2-5300 2 x 2 GB Kit	397413-B21
	8 GB FBD PC2-5300 2 x 4 GB Kit	397415-B21

NOTE: Base Model, External SCSI and External SATA Models come standard with 1 GB of memory and is expandable to 4 GB. SAN Storage Model comes standard with 2GB of memory and is expandable to 32GB.

Step 4 – add storage controllers

The ProLiant DL380 G5 Storage Server comes per default with one embedded Smart Array P400 Controller. Select additional controllers from the below list only if required.

Storage Controllers **NOTE:** Please refer to the [HP ProLiant DL380 G5 SCSI Cabling Matrix](ftp://ftp.compaq.com/pub/products/servers/proliantdl380/dl380g4-cabling-matrix.pdf) for information on what's required to cable optional array controllers:

SAS Controllers

Smart Array P400 Controller

HP Smart Array P400/256MB Controller	405132-B21
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HP Smart Array P400 Controller/512MB and BBWC	411064-B21
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512MB Battery-backed cache upgrade	405148-B21
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NOTE: For Smart Array P400 Controller.

Battery-backed write cache upgrade	383280-B21
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NOTE: For Smart Array P400 Controller.

Smart Array P400 Battery Attach Kit	417836-B21
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NOTE: This option kit contains a 24" battery cable and adhesive material for installing a battery into the server if a Smart Array P400 is integrated outside of the factory. For all solutions, please refer to the server QuickSpecs and User's Manual for detailed installation instructions.

Smart Array E200 Controller

HP Smart Array E200/128 Controller	411508-B21
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HP Smart Array E200/64 Controller	409180-B21
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128-MB BBWC (Battery-Backed Write Cache) Enabler	351580-B21
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NOTE: Supports the Smart Array E200 Controller, Smart Array 641 Controller, and Smart Array 642 Controller.

Smart Array P600 Controller

HP Smart Array P600 Controller	337972-B21
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NOTE: Requires Mixed PCI-E/X riser cage.

512 MB Battery-Backed Cache Upgrade	372538-B21
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NOTE: This 512-MB Battery-Backed Cache Module upgrade kit supports the Smart Array P600 Controller and the Smart Array 6400 series Controller.

NOTE: Please see the following Controller QuickSpecs for Technical Specifications such as PCI Bus, PCI Peak Data Transfer Rate, SCSI Protocols supported, SCSI Peak Data Transfer Rate, Channels, SCSI Ports, Drives supported, Cache, RAID support, and additional information:

http://h18000.www1.hp.com/products/quickspecs/12460_div/12460_div.HTML (Smart Array E200 Controller)

Product Configuration Wizard

http://h18000.www1.hp.com/products/quickspecs/12400_div/12400_div.HTML

(Smart Array P400 Controller)

http://h18000.www1.hp.com/products/quickspecs/12247_div/12247_div.HTML

(Smart Array P600 Controller)

SAS HBA

HP 8 Internal Port SAS HBA with RAID

347786-B21

NOTE: Please see the following QuickSpecs for additional information:

http://h18004.www1.hp.com/products/quickspecs/12332_div/12332_div.html

(SAS HBA)

SCSI Controllers for External Drive/Storage Support

NOTE: All Ultra 320 controllers are PCI-X and require the Mixed Riser Cage Option Kit (PCI-E/PCI-X).

Smart Array 6402/128 Controller

273915-B21

NOTE: Ultra320 SCSI.

Smart Array 6404/256 Controller

273914-B21

NOTE: Ultra320 SCSI.

Smart Array 642 Controller

291967-B21

NOTE: Ultra320 SCSI.

128-MB Battery-Backed Write Cache (BBWC)

351580-B21

NOTE: Supports the Smart Array E200 Controller, Smart Array 641 Controller, and Smart Array 642 Controller.

Ultra320 Expansion Module for SA-6402

273911-B21

64-Bit/133-MHz Single Channel Ultra320 SCSI HBA G2

374654-B21

NOTE: Please see the following Controller or SCSI Adapter QuickSpecs for Technical Specifications such as PCI Bus, PCI Peak Data Transfer Rate, SCSI Protocols supported, SCSI Peak Data Transfer Rate, Channels, SCSI Ports, Drives supported, Cache, RAID support, and additional information:

http://h18000.www1.hp.com/products/quickspecs/11943_div/11943_div.HTML

(Single Channel Ultra320 SCSI HBA)

http://h18000.www1.hp.com/products/quickspecs/11587_div/11587_div.HTML

(Smart Array 6400 Series)

http://h18000.www1.hp.com/products/quickspecs/12069_div/12069_div.HTML

(Smart Array 642)

Step 5 – add disk enclosures (Base, External SCSI, External SATA models only)

The ProLiant DL380 G5 Storage Server system holds maximum 2 operating system disks and 4 data disk drives. Each MSA30 disk enclosures holds up to 14 SCSI hard drives and each MSA20 disk enclosure holds up to 12 SATA hard drives.

Modular Smart Array 20

335921-B21

NOTE: Rack-mountable 12 (SATA) drive enclosure with U320 Host connectivity, redundant power supplies

HP StorageWorks Modular Smart Array 20 Starter Kit

366172-B21

NOTE: Rack-mountable 12 (SATA) drive enclosure with U320 Host connectivity, redundant power supplies. Includes Smart Array 6402/128 Controller.

NOTE: The Modular Smart Array Enclosure 20 Family supports the SATA 1.5Gb/s 3.5" Hot Plug Hard Drives.

Modular Smart Array 30 SB

302969-B21

NOTE: Rack-mountable 14 drive (SCSI) drive enclosure with single bus, redundant power supplies.

Modular Smart Array 30 DB

302970-B21

NOTE: Rack-mountable 14 drive (SCSI) drive enclosure with dual bus, redundant power supplies.

NOTE: The Modular Smart Array Enclosure 30 Family supports the Wide Ultra3, Ultra320 Hot Plug Hard Drives

HP StorageWorks Modular Smart Array 500 Generation 2

335880-B21

NOTE: Please see the Modular Smart Array 500 Generation 2 QuickSpecs for additional information including configuration steps and additional options needed for a complete solution at:

http://h18000.www1.hp.com/products/quickspecs/11956_div/11956_div.HTML

(Worldwide)

If desired, previous generation disk enclosures, StorageWorks 4314 and 4354 are also supported.

Product Configuration Wizard

Step 6 – add hard drives

Hard Drives	SFF SAS – Universal Hot Plug	
Internal to DL380 G5	HP 36GB 3G SAS 10K SFF HDD	375859-B21
	HP 72GB 3G SAS 10K SFF HDD	375861-B21
	HP 146GB 3G SAS 10K SFF HDD	431958-B21
	NOTE: Please see the SAS Hard Drive QuickSpecs for Technical Specifications such as capacity, height, width, interface, transfer rate, seek time, physical configuration, and operating temperature: http://h18000.www1.hp.com/products/quickspecs/12244_div/12244_div.HTML (Worldwide)	
	SFF SATA Hot Plug	
	HP 60GB 1.5G SATA 5.4K SFF HDD	379306-B21
	NOTE: SATA drives have a 1 year warranty. Please see the SATA Hard Drive QuickSpecs for Technical Specifications such as capacity, height, width, interface, transfer rate, seek time, physical configuration, and operating temperature: http://h18000.www1.hp.com/products/quickspecs/12091_div/12091_div.HTML (Worldwide)	
Hard Drives For External Arrays	Ultra320 SCSI – Universal Hot Plug	
	HP 72 GB U320 10K Universal HDD	286714-B22
	HP 146 GB U320 10K Universal HDD	286716-B22
	HP 300 GB U320 10K Universal HDD	350964-B22
	HP 36 GB U320 15K Universal HDD	286776-B22
	HP 72 GB U320 15K Universal HDD	286778-B22
	HP 146GB U320 15K Universal HDD	347708-B22
	NOTE: All U320 Universal Hard Drives are backward compatible to U2 or U3 speeds. U320 drives require an optional U320 Smart Array Controller or U320 SCSI HBA to support U320 transfer rates.	
	SATA – Hot Plug	
	HP 80GB 1.5G SATA 7.2K 3.5" HDD	349237-B21
	HP 160GB 1.5G SATA 7.2K 3.5" HDD	349238-B21
	HP 250GB 1.5G SATA 7.2K 3.5" HDD	349239-B21
	HP 500GB 1.5G SATA 7.2K 3.5" HDD	395473-B21
	NOTE: For complete compatibility information, refer to the HP Hard Drive Compatibility table located at http://www.hp.com/products/harddiskdrives	

Hot Plug SCSI Hard Drives	Common features	Height	1.0 in (2.54 cm)
		Width	4.0 in (10.16 cm)
		Interface	Ultra320 SCSI
		Transfer rate synchronous (maximum)	320 MB/s
		Physical Configuration	Bytes/Sector 512
		Operating temperature	50° to 95° F (10° to 35° C)

Step 7 – add external SAN storage array (SAN Storage Model only)

<p>Array Support: XP, EVA, EMA, MA, MSA1000, and MSA1500</p>	<p>Please see the Storage Array Systems QuickSpecs below to determine configuration requirements</p>	<p>External</p>	<p>Please see the URL's listed below appropriate Array QuickSpecs for the latest list of supported HBA's.</p>
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<http://h18006.www1.hp.com/products/storageworks/eva8000/index.html>
<http://h18006.www1.hp.com/products/storageworks/eva6000/index.html>
<http://h18006.www1.hp.com/products/storageworks/enterprise/index.html>
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<http://h18006.www1.hp.com/products/storageworks/enterprise/index.html>
http://www.hp.com/products1/storage/products/disk_arrays/midrange/va7410/index.html (VA 7410)
<http://h18006.www1.hp.com/products/storageworks/va7110/index.html> (VA 7110)
http://www.hp.com/products1/storage/products/disk_arrays/midrange/va7100/index.html (VA 7100)
<http://h18006.www1.hp.com/products/storageworks/ema16000/index.html> (EMA16000)
<http://h18006.www1.hp.com/products/storageworks/ma8kema12k/index.html> (EMA12000 FC)
<http://h18006.www1.hp.com/products/storageworks/ma8kema12k/index.html> (MA8000)
http://www.hp.com/products1/storage/products/disk_arrays/highend/xp1024/index.html (XP1024)
http://www.hp.com/products1/storage/products/disk_arrays/highend/xp128/index.html (XP128)
http://www.hp.com/products1/storage/products/disk_arrays/highend/xp48/index.html (XP48)
http://www.hp.com/products1/storage/products/disk_arrays/highend/xp512/index.html (XP512)
<http://h18006.www1.hp.com/products/storageworks/msa1000/index.html> (MSA1000)
<http://h18006.www1.hp.com/products/storageworks/msa1500cs/index.html> (MSA1500 cs)

StorageWorks Options **NOTE:** For the complete listing of Fibre Channel Host Bus Adapters, please see:

<http://h18006.www1.hp.com/storage/saninfrastructure/hba.html>

StorageWorks 2 Gb, 64-bit/133 MHz PCI-X-to-Fibre Channel Host Bus Adapter for Windows 2000, Windows Server 2003, NetWare and Linux	281541-B21
StorageWorks 2 Gb, Dual Port, 64-Bit/133 MHz PCI-X-to-Fibre Channel Host Bus Adapter W2K, Windows Server 2003 and Linux	321835-B21
HP StorageWorks 2 Gb, single channel, 133 MHz PCI-X-to-Fibre Channel Host Bus Adapter Windows 2000 and 20003	A7388A
HP StorageWorks 2 Gb, dual channel, 133 MHz PCI-X-to-Fibre Channel Host Bus Adapter Windows 2000 and 20003	A7387A
HP StorageWorks FC2143 4Gb PCI-X 2.0 HBA	AD167A
HP StorageWorks FC2243 4Gb PCI-X 2.0 DC HBA	AD168A

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 both the 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 a customer calls 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, the customer 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 platforms.

Product Configuration Wizard

Step 8 – additional network cards

The system comes with an embedded NC7782 Dual Port PCI-X Gigabit NIC. Select additional cards for higher performance and further redundancy.

HP NC150T PCI 4-port Gigabit 1000T Combo Switch Adapter	367132-B21
HP NC310F PCI-X 1000SX Gigabit Server Adapter	368169-B21
HP NC340T PCI-X 4-port 1000T Gigabit Server Adapter	391661-B21
HP NC370F PCI-X Multifunction 1000SX Gigabit Server Adapter	374193-B22
HP NC370T PCI-X Multifunction 1000T Gigabit Server Adapter	374191-B22
HP NC1020 PCI 1000T Gigabit Server Adapter	353377-B21
HP NC7170 PCI-X Dual Port 1000T Gigabit Server Adapter	313881-B21
HP NC7771 PCI-X 1000T Gigabit Server Adapter	290563-B21

NOTE: Any NIC (except the NC1020) on the option list can be used for redundancy with the embedded Dual NC373i Multifunction Gigabit NICs. When teaming with other NICs or with the embedded NIC, the lack of Jumbo Frames and LSO features on the NC1020 will cause high end NICs to have those features disabled.

Step 9 – add cluster kit (SAN Storage model only)

Storage Server Cluster Kit	ProLiant Storage Server Cluster Kit	331474-B21
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NOTE: Windows Storage Server 2003 clusters can include up to eight nodes. One ProLiant Storage Server Cluster Kit (PN 331474-B21) is required for each node in a cluster.

Step 10 – add host base data replication

HP OpenView Storage Mirroring (SM) 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
- Asynchronous replication allows hosts to continue processing for maximum performance

HP OpenView Storage Mirroring v4.4.2 Media Kit	T2558AA
HP OpenView Storage Mirroring NAS Edition LTU 1	T3841AA
HP OpenView Storage Mirroring NAS Edition LTU 10	T3842AA

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

Step 11 – add tape backup solution

Tape Drives

NOTE: For the complete listing of Tape Drive offerings, please see:
<http://www.hp.com/products1/storage/compatibility/tapebackup/ISS/index.html>

NOTE: All SCSI tape and tape automation devices connecting to the Single Channel Ultra320 SCSI HBA G2 (374654-B21) require the optional PCI-X Hot Plug Riser Cage Option Kit (410570-B21). For recommended tape drive offerings for this ProLiant server see the following:

USB Tape Drives

HP StorageWorks DAT 72 USB External Tape Drive (Carbonite) DW027A

External, Rack-Mount, and Array Module Ultrium Tape Drives

HP StorageWorks Ultrium 232 External Tape Drive (Carbonite) DW065B

HP StorageWorks Ultrium 460 External Tape Drive (Carbon) Q1520B

HP StorageWorks Ultrium 448 External Tape Drive (Carbonite) DW017B

HP StorageWorks 1U Rack-mount kit with one Ultrium 448 (Carbonite) DW028B

HP StorageWorks Ultrium 960 External Tape Drive (Carbonite) Q1539B

HP StorageWorks 3U Rack-mount kit with one Ultrium 960 (Carbonite) Q1595B

NOTE: Please see the HP StorageWorks Ultrium Tape Drive QuickSpecs for additional options such as controllers, media, and other related items:

http://h18006.www1.hp.com/products/quickspecs/11739_div/11739_div.html
 (Worldwide)

For an up-to-date listing of the latest O/S and software support details for HP Ultrium tape drives, please visit: <http://www.hp.com/go/connect>.

External, Rack-Mount, and Array Module DAT Drives

HP StorageWorks DAT 72 SCSI External Tape Drive (Carbon) Q1523B

NOTE: Please see the DAT Tape Drive QuickSpecs for controllers, media, and other options:

http://h18000.www1.hp.com/products/quickspecs/11883_div/11883_div.HTML
 (Worldwide)

For an up-to-date listing of the latest O/S and software support details for HP DAT drives, please visit: <http://www.hp.com/go/connect>.

Rack-Mount Tape Drive Enclosures

HP StorageWorks 1U Rack-Mount Kit A7445B

NOTE: The 1U Rack-mount Kit can support up to 2 half-height tape drives and is compatible with multiple Single-Ended and LVD SCSI tape drives including DAT 24, DAT 40, DAT 72, DLT VS80, DLT VS160, Ultrium 215, Ultrium 232, and Ultrium 448 tape drives.

HP StorageWorks 1U USB Rack-Mount Kit A8007A

HP StorageWorks 3U Rack-Mount Kit 274338-B22

NOTE: The 3U Rack-Mount Kit can support up to 2 full-height or 4 half-height tape drives and compatible with multiple Single-Ended and LVD SCSI tape drives including DAT 24, DAT 40, DAT 72, DLT VS80, DLT VS160, SDLT 320, SDLT 600, Ultrium 215, Ultrium 230, Ultrium 232, Ultrium 460, Ultrium 448 and Ultrium 960 tape drives.

NOTE: Please see the Rack-Mount Tape Drive Kits QuickSpecs for additional information regarding these kits:

http://h18000.www1.hp.com/products/quickspecs/10854_div/10854_div.HTML
 (Worldwide)

Tape Autoloaders

HP StorageWorks 1/8 Tape Autoloader

HP StorageWorks 1/8 Ultrium 960 Tape Autoloader AF204A

HP StorageWorks 1/8 Ultrium 448 Tape Autoloader AF203A

HP StorageWorks 1/8 Ultrium 232 Tape Autoloader AF202A

NOTE: 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>

Product Configuration Wizard

Tape Libraries	<p>HP StorageWorks MSL2024 Tape Library</p> <p>HP StorageWorks MSL2024 1 Ultrium 960 Drive Library AG115A</p> <p>HP StorageWorks MSL2024 1 Ultrium 960 FC Drive Library AG326A</p> <p>HP StorageWorks MSL2024 1 Ultrium 448 Drive Library AG116A</p> <p>HP StorageWorks MSL2024 2 Ultrium 448 Drive Library AG117A</p> <p>HP StorageWorks MSL4048 Tape Library</p> <p>HP StorageWorks MSL4048 1 Ultrium 448 Drive Library AG320A</p> <p>HP StorageWorks MSL4048 2 Ultrium 448 Drive Library AG321A</p> <p>HP StorageWorks MSL4048 1 Ultrium 960 Drive Library AG322A</p> <p>HP StorageWorks MSL4048 1 Ultrium 960 FC Drive Library AG324A</p> <p>HP StorageWorks MSL4048 2 Ultrium 960 Drive Library AG323A</p> <p>HP StorageWorks MSL4048 2 Ultrium 960 FC Drive Library AG325A</p> <p>HP StorageWorks MSL6000 Tape Library</p> <p>Ultrium 960 technology</p> <p>HP StorageWorks MSL6030 1 Ultrium 960 Dr LVDS Library AD606B</p> <p>HP StorageWorks MSL6030 1 Ultrium 960 Dr FC Library AD608B</p> <p>HP StorageWorks MSL6030 2 Ultrium 960 Dr LVDS Library AD607B</p> <p>HP StorageWorks MSL6030 2 Ultrium 960 Dr FC Library AD609B</p> <p>Ultrium 460 technology</p> <p>HP StorageWorks MSL6030 1 Ultrium 460 Dr LVDS Library AD598B</p> <p>HP StorageWorks MSL6030 1 Ultrium 460 Dr FC Library AD600B</p> <p>HP StorageWorks MSL6030 2 Ultrium 460 Dr LVDS Library AD599B</p> <p>HP StorageWorks MSL6030 2 Ultrium 460 Dr FC Library AD601B</p> <p>NOTE: Please reference the MSL2024, MSL4048 and MSL6000 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</p>	
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HP Data Protector Express Software	<p>HP DP Express Backup Server Upgrade for ProLiant Software BB117AP</p> <p>HP DP Express Package for Microsoft Small Business Server BB118AA</p> <p>NOTE: To obtain a free licensed copy of HP Data Protector Express for ProLiant edition software, please visit the "Protect Your Data" link accessible from your ProLiant server's System Management Homepage (SMH) software (SmartStart 7.5 or later).</p> <p>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_div/12337_div.html (Worldwide)</p>	
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Step 12 – add UPS, rack and power distribution unit (pdu)

NOTE: The ProLiant DL380 G4 Storage Server includes a standard rail kit for HP racks.

Uninterruptible Power Systems - Rack	<p>HP R1.5 VA 1U UPS INTL AF418A</p> <p>HP R1.5 VA 1U UPS JPN AF421A</p> <p>HP R1.5 VA 1U UPS NA AF419A</p> <p>HP R/T2200 2-U ERM AF412A</p>	
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USB Options	<p>HP USB 2-Button Optical Scroll Mouse (Carbonite/Silver) DC172B</p> <p>USB 1.44-MB External Diskette Drive (Carbonite) DC141B</p> <p>512MB HP Drive Key II (USB 2.0) ED516AA</p>	
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HP Rack 5000 Series (Graphite Metallic)	<p>HP 5642 Rack-Unassembled 358254-B21</p> <p>NOTE: Please see the HP Rack 5642 QuickSpecs for additional part numbers and Technical Specifications such as height, width, depth, weight, and color: http://h18000.www1.hp.com/products/quickspecs/12074_div/12074_div.HTML (Worldwide)</p> <p>NOTE: For additional information regarding Rack Cabinets, please see the following URL: http://www.hp.com/go/rackandpower.</p>	
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Product Configuration Wizard

HP Rack 10000 G2 Series (Carbon/Graphite Metallic)	10642 G2 (42U) Rack Cabinet – Pallet	AF001A
	10642 G2 (42U) Rack Cabinet – Shock Pallet	AF002A
	10642 G2 (42U) Rack Cabinet – Crated	AF003A
	10642 G2 (42U) Rack Cabinet, with Extension – Shock Pallet	AF004A
	10636 G2 (36U) Rack Cabinet – Pallet	AF011A
	10636 G2 (36U) Rack Cabinet – Shock Pallet	AF012A
	10636 G2 (36U) Rack Cabinet – Crated	AF013A
	10636 G2 (36U) Rack Cabinet, with Extension – Shock Pallet	AF014A

NOTE: It is mandatory to use a shock pallet when shipping racks with equipment installed.

NOTE: Please see the Rack 10000 G2 QuickSpecs for Technical Specifications such as height, width, depth, weight, and color:

http://h18000.www1.hp.com/products/quickspecs/12402_div/12402_div.HTML (Worldwide)

NOTE: For additional information regarding Rack Cabinets, please see the following URL: <http://www.hp.com/go/rackandpower>.

HP Rack 10000 Series (Graphite Metallic)	HP S10614 (14U) Rack Cabinet – Shock Pallet	292302-B22
	HP 10842 (42U) Rack Cabinet – Pallet	257415-B21
	HP 10842 (42U) Rack Cabinet – Shock Pallet	257415-B22
	HP 10647 (47U) Rack Cabinet – Pallet	245160-B21
	HP 10647 (47U) Rack Cabinet – Crated	245160-B23
	HP 10622 (22U) Rack Cabinet – Pallet	245163-B21
	HP 10622 (22U) Rack Cabinet – Shock Pallet	245163-B22
	HP 10622 (22U) Rack Cabinet – Crated	245163-B23

NOTE: xxxxxx-B21 (pallet) used to ship empty racks shipped on a truck. -B22 (shock pallet) used to ship racks with equipment installed (by custom systems, VARs and Channels). xxxxxx-B23 (crated) used for air shipments of empty racks.

NOTE: It is mandatory to use a shock pallet in order to ship racks with equipment installed. Not all Compaq equipment is qualified to be shipped in the Rack 10000 series.

NOTE: Please see the Rack 10000 QuickSpecs for additional options and Technical Specifications such as height, width, depth, weight, and color:

http://h18000.www1.hp.com/products/quickspecs/10995_div/10995_div.HTML (Worldwide)

NOTE: For additional information regarding Rack Cabinets, please see the following URL: <http://www.hp.com/go/rackandpower>

Keyboards and Monitors	TFT7210R Rack Mounted 17" Monitor	348373-B21
	NOTE: For a complete list of Monitors please view the following URL: http://www.hp.com/go/kvm	
	TFT7600 Rackmount Keyboard Monitor US	AG052A
	TFT7600 Rackmount Keyboard Monitor UK	AG053A
	TFT7600 Rackmount Keyboard Monitor GR	AG054A
	TFT7600 Rackmount Keyboard Monitor FR	AG055A
	TFT7600 Rackmount Keyboard Monitor IT	AG056A
	TFT7600 Rackmount Keyboard Monitor SP	AG057A
	TFT7600 Rackmount Keyboard Monitor DEN	AG058A
	TFT7600 Rackmount Keyboard Monitor NOR	AG059A
	TFT7600 Rackmount Keyboard Monitor SE/FI	AG060A
	TFT7600 Rackmount Keyboard Monitor SWI	AG061A
	TFT7600 Rackmount Keyboard Monitor PORT	AG062A
	TFT7600 Rackmount Keyboard Monitor BEL	AG063A
	TFT7600 Rackmount Keyboard Monitor JPN2	AG064A
	TFT7600 Rackmount Keyboard Monitor RUS	AG065A
	TFT7600 Rackmount Keyboard Monitor INTL	AG066A
	1U Rackmount Keyboard with USB, US	AG072A
	1U Rackmount Keyboard with USB, UK	AG073A
	1U Rackmount Keyboard with USB, GR	AG074A
	1U Rackmount Keyboard with USB, FR	AG075A

Product Configuration Wizard

1U Rackmount Keyboard with USB, ITL	AG076A
1U Rackmount Keyboard with USB, SP	AG077A
1U Rackmount Keyboard with USB, DEN	AG078A
1U Rackmount Keyboard with USB, NOR	AG079A
1U Rackmount Keyboard with USB, SE/FI	AG080A
1U Rackmount Keyboard with USB, SWI	AG081A
1U Rackmount Keyboard with USB, PORT	AG082A
1U Rackmount Keyboard with USB, BEL	AG083A
1U Rackmount Keyboard with USB, JPN2	AG084A
1U Rackmount Keyboard with USB, RUS	AG085A
1U Rackmount Keyboard with USB, INTL	AG086A

NOTE: For additional information regarding Rack Options, please see the following URL: <http://www.hp.com/go/rackandpower>.

HP KVM Switch Options

2x1x16 IP Console Switch with Virtual Media	AF601A
4x1x16 IP Console Switch with Virtual Media	AF602A
2x16 Server Console Switch with Virtual Media	AF600A
PS/2 Virtual Media Interface Adapter, 1 pack	AF604A
NOTE: Requires PS/2 and one USB port on server.	
Server Console Switch (KVM), 0 x 1 x 8 port	336044-B21
Server Console Switch (KVM), 0 x 2 x 16 port	336045-B21
PS/2 Interface Adapter, 1 pack	262588-B21
PS/2 Interface Adapter, 8 pack	262587-B21
USB Interface Adapter, 1 pack	336047-B21
Serial Interface adapter - 1 Pack with power supply	373035-B21
NOTE: Cat5e cables are required to connect Interface Adapters to Console Switches. Cat5e cables can be found at the following URL: http://www.hp.com/go/kvm .	
HP 1x 4 USB/PS2 KVM Switch, RM (ALL)	371302-B21

NOTE: For additional information regarding KVM switches, Serial Console servers, rack mount monitors, keyboards and all related options please see the following URL: <http://www.hp.com/go/kvm>.

HP Serial Console Server Options

HP 16 Port Serial Console Server (worldwide)	AF101A
HP 48 Port Serial Console Server (worldwide)	AF102A
Serial Adapter, RJ45-DB9 DCE Female, 1 Pack	AF103A
Serial Adapter, RJ45-DB9 DCE Female, 8 Pack	AF110A

NOTE: Cat5e cables are required to connect Serial Adapters to Serial Console Servers. Additional Serial Adapters and Cat5e cables can be found at the following URL: <http://www.hp.com/go/kvm>.

NOTE: For additional information regarding KVM switches, Serial Console servers, rack mount monitors, keyboards and all related options please see the following URL: <http://www.hp.com/go/kvm>.

Memory

NOTE: This server contains 8 DIMM slots. You can expand server memory by installing supported Registered DDR-2 FBDIMMs.

Memory configurations

The server supports the following Advanced Memory Protection (AMP) options to optimize server availability.

- Advanced ECC supporting up to 16 GB of active memory using 2-GB FBDIMMs.
- Online Spare Memory providing additional protection against degrading FBDIMMs supporting up to 12 GB of active memory and 4 GB of online spare memory utilizing 2-GB FBDIMMs.
- Mirrored Memory providing protection against failed FBDIMMs supporting up to 8 GB of active memory and 8 GB of mirrored memory utilizing 2-GB FBDIMMs.

Maximum memory capacities for all AMP modes will increase with the availability of 4-GB and 8-GB FBDIMMs, including a maximum of 64 GB in Advanced ECC mode.

The Advanced Memory Protection option is configured in RBSU. By default, the server is set to Advanced ECC mode. For more information, refer to HP ROM-Based Setup Utility (on page 56). If the configured AMP mode is not supported by the installed FBDIMM configuration, the system boots in Advanced ECC mode.

The following configuration requirements apply to all AMP modes:

- FBDIMMS must be ECC Registered DDR-2 SDRAM FBDIMMs.
- FBDIMMs must be installed in pairs.
- FBDIMM pairs in a memory bank must have identical HP part numbers.
- FBDIMMS must be populated as specified for each AMP memory mode.

The memory subsystem for this server is divided into two branches. Each memory branch is essentially a separate memory controller. The FBDIMMs map to the two branches as indicated in the following table:

Branch 0	Branch 1
FBDIMM 1A	FBDIMM 5B
FBDIMM 3A	FBDIMM 7B
FBDIMM 2C	FBDIMM 6D
FBDIMM 4C	FBDIMM 8D

This multi-branch architecture provides enhanced performance in Advanced ECC mode. The concept of multiple branches is important for the operation of online spare mode and mirrored memory mode.

If the server contains more than 4 GB of memory, consult the operating system documentation about accessing the full amount of installed memory.

Advanced ECC memory

Advanced ECC memory is the default memory protection mode for this server. In Advanced ECC, the server is protected against correctable memory errors. The server provides notification if the level of correctable errors exceeds a pre-defined threshold rate. The server does not fail because of correctable memory errors. Advanced ECC provides additional protection over Standard ECC in that it is possible to correct certain memory errors that would otherwise be uncorrectable and result in a server failure.

Whereas standard ECC can correct single-bit memory errors, Advanced ECC can correct single-bit memory errors and multi-bit memory errors if all failed bits are on the same DRAM device on the FBDIMM.

In addition to general configuration requirements, Advanced ECC memory also has the following configuration requirements:

- FBDIMMs must be installed in pairs unless operating in single-FBDIMM mode. The server supports single-FBDIMM mode only in FBDIMM slot 1A.
- FBDIMMs must be installed in sequential order, beginning with bank A.

In Advanced ECC 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	-	-	-
2	X	X	-	-
3	X	X	X	-
4	X	X	X	X

Memory

Online spare memory configuration

Online spare memory provides protection against degrading FBDIMMs by reducing the likelihood of uncorrectable memory errors.

An understanding of single-rank and dual-rank FBDIMMs is required to understand memory usage in online spare mode. FBDIMMs can either be single-rank or dual-rank. Certain FBDIMM configuration requirements are based on these classifications. A dual-rank FBDIMM is similar to having two separate FBDIMMs, or ranks, on the same module. Although only a single FBDIMM module, a dual-rank FBDIMM acts as two separate FBDIMMs. The purpose of dual-rank FBDIMMs is to provide the largest capacity FBDIMM for the current DRAM technology. If the current DRAM technology allows for 2-GB single-rank FBDIMMs, a dual-rank FBDIMM using the same technology would be 4-GB.

In online spare mode, a single rank of memory acts as the spare memory. For single-rank FBDIMMs, the entire FBDIMM acts as the spare memory. For a dual-rank FBDIMM, only half of the FBDIMM acts as the spare memory while the other half is available for operating system and application usage.

If one of the non-spare FBDIMMs receives correctable memory errors at a higher rate than a specific threshold, the server automatically copies the memory contents of the degraded rank to the online spare rank. The server then deactivates the failing rank and automatically switches over to the online spare. Because FBDIMMs that experience a high rate of correctable memory errors have a higher probability of receiving an uncorrectable memory error, this effectively reduces the likelihood of uncorrectable memory errors that would result in server downtime.

Online spare is performed per branch of the memory controller. For a server populating both branches, two ranks are utilized for online spare memory. One branch can have a fail over to the associated online spare while the other branch is still protected.

Each branch is made up of two banks:

- Branch 0 contains banks A and C
- Branch 1 contains banks B and D

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

***NOTE:** Configuration 1 is only supported if using bank A, populated with dual-rank FBDIMMs.

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

Mirrored memory configuration

Mirroring provides protection against uncorrectable memory errors that would otherwise result in server downtime.

Mirroring is performed on the branch level. Branch 0 and branch 1 mirror each other.

Each branch maintains a copy of all memory contents. Memory writes go to both branches. Memory reads come from only one of the two branches (unless an uncorrectable error occurs). If a memory read on one branch returns incorrect data due to an uncorrectable memory error, the system automatically retrieves the proper data from the other branch. A branch is not necessarily disabled (thus losing mirroring protection) because of a single uncorrectable error. Mirroring protection is not lost due to transient and soft uncorrectable errors, resulting in systems that maintain mirroring protection (and thus improved uptime) unless there is a true FBDIMM failure.

Because both branches are active, concurrent reads from both branches at the same time are possible. Therefore, mirroring provides superior read performance compared to all other Advanced Memory Protection modes.

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	-	-

Memory

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

Storage



1-8 Eight SFF SAS hot plug hard drive bays

Drive Support

	Quantity Supported	Position Supported	Controller
Removable Media			
1.44-MB Diskette Drive	Only 1 available removable media bay	Slimline bay	Integrated diskette NOTE: Optional
Slimline CD-RW/DVD-ROM Combo Option Kit NOTE: Included in performance models.	Only 1 available removable media bay	Slimline bay	Integrated IDE NOTE: Optional
Slimline DVD-ROM Drive (8x/24x) Option Kit	Only 1 available removable media bay	Slimline bay	Integrated IDE NOTE: Optional
HP ProLiant Slim CD-ROM x24	Only 1 available removable media bay	Slimline bay	Integrated IDE NOTE: Optional
HP DVD±R/RW 8X Slim	Only 1 available removable media bay	Slimline bay	Integrated IDE NOTE: Optional

Hard Drives

SAS - Hot Plug Drives

	Quantity Supported	Position Supported	Controller
36GB 3G SAS 10K 72GB 3G SAS 10K	Up to 8	1-8	Smart Array E200 Controller Smart Array P400 Controller Smart Array P600 Controller NOTE: Optional mixed PCI-X/E required for SA-P600.

SATA - Hot Plug Drives

	Quantity Supported	Position Supported	Controller
60GB 1.5G SATA 5.4K	Up to 8	1-8	Smart Array E200 Controller Smart Array P400 Controller Smart Array P600 Controller NOTE: Optional mixed PCI-X/E required for SA-P600.

External Storage

	Quantity Supported	Position Supported	Host Controller or Adapter
Modular Smart Array 20 Family	1 per SCSI VHDCI connector	External	Smart Array 6402/128 Controller Smart Array 6404/256 Controller NOTE: Optional mixed PCI-X/E cage required.
Modular Smart Array 50 Enclosure	2 per connector (supports 1+1 cascading)	External	HP Smart Array P600 Controller NOTE: Optional mixed PCI-X/E cage required.
Modular Smart Array 500 G2	1 per SCSI	External	Please see the Modular Smart Array 500 or 500 G2 QuickSpecs for the latest list of supported HBAs: http://www.hp.com/go/msa500 .
Modular Smart Array 1000:	http://h18000.www1.hp.com/products/quickspecs/11033_div/11033_div.HTML (Worldwide)		
Modular Smart Array 1500 cs:	http://www.hp.com/go/MSA1500cs		

Storage

Maximum Storage Capacity - (with MSA50)

Internal	576GB (8 x 72GB SAS SFF)
External	1.44TB (20 x 72GB SAS SFF)
Total	1.728TB (4 x 72GB int. + 20 x 72GB ext.)

Tape Drives, Tape Autoloaders, & 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: 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:

	Quantity Supported	Position Supported	Controller
HP StorageWorks Tape Drives, External DAT 24 USB DAT 40 USB DAT 72 USB	1	External	USB 2.0 Port
HP StorageWorks Tape Drives, External Ultrium 960 SDLT 600	1	External	NOTE: Requires the optional PCI-X Hot Plug Riser Cage Option Kit (410570-B21): 64-Bit/133-MHz Single Channel Ultra320 SCSI HBA G2
HP StorageWorks Tape Drives, External Ultrium 232 Ultrium 448 Ultrium 460 DAT 40 DAT 72 DLT VS80 DLT VS160 SDLT 320	Up to 2	External	NOTE: Requires the optional PCI-X Hot Plug Riser Cage Option Kit (410570-B21): 64-Bit/133-MHz Single Channel Ultra320 SCSI HBA G2
HP StorageWorks Rack-mount Tape Drive Enclosures 1U Rack-Mount Kit 3U Rack-Mount Kit	1 per SCSI channel	External	NOTE: Requires the optional PCI-X Hot Plug Riser Cage Option Kit (410570-B21): 64-Bit/133-MHz Single Channel Ultra320 SCSI HBA G2
HP StorageWorks Tape Autoloaders, External 1/8 Tape Autoloader	1 autoloader per SCSI channel	External	NOTE: Requires the optional PCI-X Hot Plug Riser Cage Option Kit (410570-B21): 64-Bit/133-MHz Single Channel Ultra320 SCSI HBA G2
HP StorageWorks Tape Libraries, External MSL2024 (Ultrium 448 and 960-based) MSL4048 (Ultrium 448 and 960-based) MSL6000 (Ultrium 960 and 460-based) MSL6000 (SDLT 600-based)	Please reference the MSL Tape Library QuickSpecs to determine configuration requirements	External	Please consult the EBS connectivity matrix at http://www.hp.com/go/ebs for detailed connectivity information.

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

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 Rack	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)	Maximum	60 lb (27.22 kg)
Input Requirements (per power supply)	Rated Line Voltage	No drives	47.18 lb (20.41 kg)
		Rated Input Current	100-132 VAC, 200-240 VAC
		Rated Input Frequency	10A (100VAC), 10A (120VAC), 6.1A (200VAC)
		Rated Input Power	50 to 60 Hz
BTU Rating	BTU/HR	1000/1056/1205 W	
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)	Rated Steady-State Power	800/850/1000 W	
	Maximum Peak Power	800/850/1000 W	
Temperature Range	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)	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	Idle Minimum (Fixed Disk Drives Spinning)	L WAd (BELS)	6.4
		L pAm (dBA)	47
	Operating Minimum (Random Seeks to Fixed Disks)	L WAd (BELS)	6.6
		L pAm (dBA)	49

Technical Specifications

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)	

Smart Array E200 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	DDR1-266 MHz 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 64MB cache or a 128MB battery backed cache: ECC protection, battery-backed, and transportable	
	Logical Volumes Supported	Up to 32 logical volumes	
	Maximum Volume Capacity	3 TB (6 x 500 GB)	
	Host Memory Addressing	64-bit, supporting greater than 4GB server memory space	
	RAID Support	RAID 5 (Distributed Data Guarding)	
		RAID 1+0 (Striping & Mirroring)	
RAID 0 (Striping)			

Embedded Dual NC373i Multifunction Gigabit NICs	Network Interface Compatibility	10Base-T/100Base-TX/1000Base-TX		
	Data Transfer Method	IEEE 802.3 10Base-T		
		IEEE 802.3ab 1000Base-T		
		IEEE 802.3u 100Base-TX		
	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)		

Technical Specifications

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