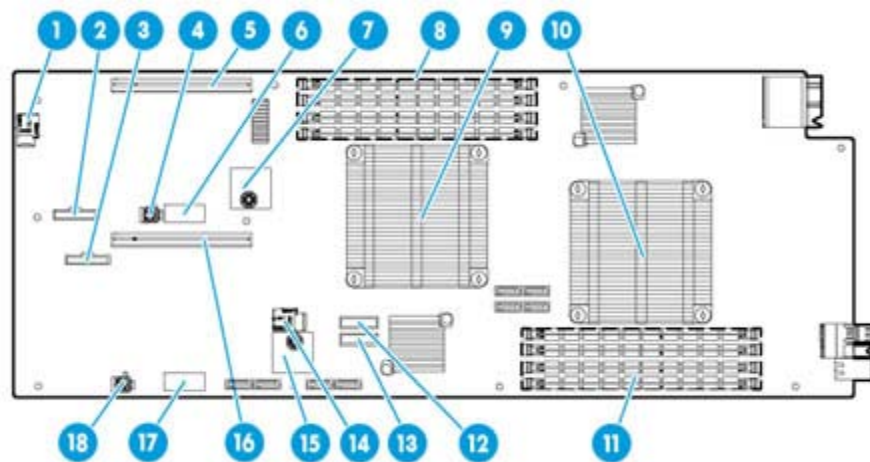


Overview

HP ProLiant XL220a Gen8 v2 Server

The HP Apollo 6000 System is designed for air-cooled high-performance computing (HPC), providing more performance, using less energy at a lower cost than a competing blade server. For single threaded workloads, the HP ProLiant XL220a Gen8 v2 Server has two single socket servers in each front accessible server tray. Both of the processors in the tray are Intel® Xeon® processors.



Item Description

1. MicroSD card slot (node 1)
2. Front panel LED board cable connector (node 1)
3. Front panel LED board cable connector (node 2)
4. Drive backplane power connector (node 1)
5. PCI riser board connector (node 1)
6. System maintenance switch (node 1)
7. TPM module (node 1)
8. DIMMs (node 1)
9. Processor 1 (node 1)
10. Processor 2 (node 2)
11. DIMMs (node 2)
12. System battery (node 2)
13. System battery (node 1)
14. MicroSD card slot (node 2)
15. TPM module (node 2)
16. PCIe riser board connector (node2)
17. System maintenance switch (node 2)
18. Drive backplane power connector (node 2)

Standard Features

NOTE: For the Standard Features shipped in the Factory Integrated Models, please see the "Configuration Information - Factory Integrated Models" section.

Processor One of the following depending on Model	Four-core Processors Intel® Xeon® Processor E3-1281 v3 (3.7GHz/4-core/8MB/HT/80W) Intel® Xeon® Processor E3-1271 v3 (3.6GHz/4-core/8MB/HT/80W) Intel® Xeon® Processor E3-1241 v3 (3.5GHz/4-core/8MB/HT/80W) Intel® Xeon® Processor E3-1231 v3 (3.4GHz/4-core/8MB/HT/80W) Intel® Xeon® Processor E3-1280 v3 (3.6GHz/4-core/8MB/HT/82W) Intel® Xeon® Processor E3-1270 v3 (3.5GHz/4-core/8MB/HT/80W) Intel® Xeon® Processor E3-1220 v3 (3.1GHz/4-core/8MB/No HT/80W) Intel® Xeon® Processor E3-1265L v3 (2.5GHz/4-core/8MB/HT/45W)				
Cache Memory	8MB (1x8MB) Level 3 NOTE: For Quad-core processors.				
Chipset	Intel® C222 Series Chipset NOTE: For more information regarding Intel® chipsets, please see the following URL: http://www.intel.com/products/server/chipsets/ .				
On System Management Processor	HP iLO (Firmware: HP iLO 4) NOTE: For more information, visit: http://www.hp.com/go/ilo .				
Memory Protection	Advanced ECC (multi-bit error protection)				
Memory	Type DIMM Slots Available Maximum (UDIMM) (per server tray)	HP SmartMemory Unbuffered (UDIMM) 4 DIMM Slots available (2 Channels/ 2 DIMMs per channel) 32GB (4 x 8GB@1600MHz) Unbuffered memory configurations NOTE: HP memory from previous generation servers are not fully compatible with the HP ProLiant XL220a v2 Gen8 Server. NOTE: To realize the performance memory capabilities listed in this document, HP SmartMemory is required. For additional information, please see the HP SmartMemory QuickSpecs at: http://h18000.www1.hp.com/products/quickspecs/14225_div/14225_div.html .			
Network Controller	HP Ethernet 10Gb 2P 561FLR-T FIO Adptr HP 10GbE 2P 560FLR-SFP+ Adptr FIO Kit HP FlexFabric 10Gb 554FLR-SFP+ FIO Adptr HP FlexFabric 10Gb 534FLR-SFP+ FIO Adptr HP FlexFabric 10Gb 2P 533FLR-T FIO Adptr HP Ethernet 10GbE 530FLR-SFP+ FIO Adptr HP FlexFabric 10G2P 526FLR-SFP FIO Adptr HP 1GbE 4-port 366FLR Adapter FIO Kit HP Ethernet 1GbE 4P 331FLR FIO Adptr HP Apollo 6000 Dual 1GbE 364i FIO Kit				

Expansion Slots	Expansion Slot #	Technology	Bus Width*	Connector Width	Form Factor
	1	PCIe 3.0	x16	x16	Low profile



Standard Features

2 PCIe 3.0 x8 N/A FlexibleLOM

**Indicates the number of physical electrical lanes running to the connector.*

HP Server ROM

HP ROM (Read Only Memory) is now digitally signed using the HP Corporate Signing Service. This signature is verified before the flash process starts, reducing accidental programming and preventing malicious efforts to corrupt system ROM.

HP ROM provides for essential initialization and validation of hardware components before control is passed to the customer-installed operating system. The ROM also provides the capability of booting from various fixed media (HDD, CD-ROM) and removable media (USB), to continue operation to the operating system.

HP ROM performs very early configuration of the video controller, to allow monitoring of initialization progress via an attached monitor. If configuration or hardware errors are discovered during this early phase of hardware initialization, suitable messages are now displayed on the connected monitor. Additionally, these configuration or hardware errors are logged to the Integrated Management Log (IML) to assist in diagnosis.

The HP ProLiant ROM is used to configure the following:

- Processor and chipset status registers
- System memory, memory map, and memory initialization
- System hardware configuration (Integrated PCI devices and optional PCIe cards).
- Customer-specific BIOS configuration (using the HP ROM-Based Setup Utility (RBSU)).

NOTE: For further information, please refer to the HP RBSU (ROM based setup utility) user guide: www.hp.com/support/rbsu.

Storage Controller

Smart Array Controller
 HP Smart Array P430/4G Controller
 HP Smart Array P430/2G Controller
Host Bus Adapter
 HP H220 Host Bus Adapter
Storage Controller Cable
 HP a6000 Mini-SAS P430 Cbl
 HP a6000 Mini-SAS H220 Cbl

Internal Storage Devices

Diskette Drives	Via USB through the SUV port, external support only
Optical Drives	Via USB through the SUV port, external support only
USB	Via SUV port, external support only
MicroSD Card	Internal microSD slot

Maximum Internal Storage

Hot Plug SFF SAS	2.0TB	2 x 1TB
Hot Plug SFF SATA	2.0TB	2 x 1TB
Hot Plug SFF SATA SSD	1.6 TB	2 x 800GB

Interfaces

FlexibleLOM	ProLiant Gen8 servers offer a new networking technology-Flexible Network Technology. The ProLiant XL220a Gen8 v2 Server offers the customer the choice of 1Gigabit, 10Gigabit or FlexibleLOM solutions depending on workload. For further details on the choices, see FlexibleLOM in the Networking Section of this document.
KVM	Serial USB Video Port (SUV)

Standard Features

MicroSD	1 (internal)
USB Ports	1 (internal)
HP iLO Remote Management Network Port	Aggregated via HP Apollo 6000 Chassis
Health LED	1 front per server node
Power	1 front per server node
UID	1 front per server node

Industry Standard Compliance

ACPI 2.0b Compliant
PCIe 3.0 Compliant
WOL Support
Microsoft® Logo certifications
PXE Support
USB 1.1 and 2.0 Compliant
SMBIOS 2.6.1

Power Specifications

To review typical system power ratings use the HP Power Advisor which is available via the online tool located at URL: www.hp.com/go/proliant-energy-efficient or www.hp.com/go/hppoweradvisor.

NOTE: Power Specification and Technical Content for supported power supplies can be found at: http://h18000.www1.hp.com/products/quickspecs/14209_div/14209_div.html

Operating Systems and Virtualization Software Support for ProLiant Servers

[Microsoft® Windows® Server](#)
[Canonical® Ubuntu®](#)
[Red Hat Enterprise Linux \(RHEL\)](#)
[SUSE® Linux Enterprise Server \(SLES\)](#)
[VMware®](#)

NOTE: Only 64-bit versions of these operating systems are supported.

NOTE: For more information on the HP Certified and Supported ProLiant Servers for OS and Virtualization Software and latest listing of software drivers available for your server including how to purchase from HP, please visit our OS Support Site at: <http://www.hp.com/go/ossupport> and our driver download page: <http://www.hp.com/support/XL220aGen8v2>.

Graphics

Integrated Matrox G200 video standard

- 1280 x 1024 (32 bpp)
- 1920 x 1200 (16 bpp)

HP iLO 4 On System Management Memory

- 16 MB Flash
- 256 MB DDR 3 with ECC (112 MB after ECC and video)

Form Factor

The ProLiant XL220a Gen8 v2 Server is a single-slot tray for the HP Apollo a6000 Chassis.

On System Management

HP iLO Management

HP iLO Management is a comprehensive set of embedded management features supporting the complete lifecycle of the server, from initial deployment, through ongoing management, to service alerting and remote

Standard Features

support. HP iLO Management comes standard on all HP ProLiant Gen8 servers. The HP iLO Management portfolio includes:

- **HP iLO:** The HP iLO (Integrated Lights-Out) management processor is the core foundation for the HP iLO Management.
- **HP Agentless Management:** Provides built in server health monitoring and alerting capability without OS agents, that starts working the moment a power cord and an Ethernet cable are connected.
- **HP Active Health System:** Always on, continuous monitoring for increased stability and shorter downtimes; 100% configuration history; Health and service alerts and easy export and upload to Service and Support.
- **HP Intelligent Provisioning:** Lets customers provision and configure a single server without any separate media. No more SmartStart CDs or Smart Update Firmware DVD are needed.
 - To start Intelligent Provisioning:
 - Press the F10 key during the ProLiant Gen8 server boot process (also known as power on self test or POST).
 - Please go to the Intelligent Provisioning website at: www.hp.com/go/intelligentprovisioning for additional information and to view usage videos.
 - Use the Service Pack for ProLiant (SPP) at: www.hp.com/go/spp to get firmware and software updates.
- **HP iLO Mobile App:** Enables the ability to access, deploy, and manage your server anytime from anywhere from select smartphones and mobile devices. For additional information please visit: www.hp.com/go/ilo/mobileapp

NOTE: For more information, visit: <http://www.hp.com/go/ilo> or HP iLO Management Engine technologies whitepaper

HP Insight management software

HP Service Pack for ProLiant (SPP)

HP Service Pack for ProLiant (SPP) and HP Smart Update Manager (HP SUM) provide a comprehensive approach to firmware and system software maintenance. Together they provide better operating stability and ensure maximum uptime. The SPP will be updated at a predictable cadence, typically coinciding with new HP server hardware launches. By enabling firmware to be updated online and integrating firmware and system software updates in one operation, HP SUM and the SPP offer faster updates of individual servers and dramatically faster updates of entire HP Apollo 6000 Chassis. Further improving system uptime and stability is the fact that HP provides 12 months of support for each Service Pack for ProLiant release.

The user experience around HP SUM and the SPP has been improved in several ways, starting with the web download. A single web page provides access to a single download containing both the latest version of HP SUM and the latest SPP. Optional smaller subsets with only specific types of servers or specific operating systems are offered to save on download time. The HP SUM application provides a straightforward, intuitive user interface that guides the user through the steps of discovery, analyses and update, providing comprehensive information on available updates, criticality and interdependencies. This information is also available in

Standard Features

reports. By providing the option of multiple local or shared repositories which can be easily updated from hp.com, HP SUM provides the tools to optimize stability and consistency throughout the company. While HP SUM and the SPP recommend the combinations of firmware and system software that HP has found to be the best practice, the application gives customers the flexibility to set their own specific baseline.

The Service Pack for ProLiant has been rigorously tested with specific attention for interaction between firmware, drivers and agents both within the server as well as in interaction with the BladeSystem enclosure components (Onboard Administrator and Virtual Connect). This testing ensures the highest quality as well as providing the input for HP SUM to deploy updates taking into account all interdependencies, when determining the correct updates and order of update deployment.

NOTE: The Service Pack for ProLiant (which includes HP SUM) can be downloaded from www.hp.com/go/spp/download. More information can be found: <http://www.hp.com/go/SmartUpdate>, www.hp.com/go/spp and <http://www.hp.com/go/hpsum>

Security

Power-on password
Keyboard password
QuickLock, Network Server Mode
Serial interface control
Administrator's password
iLO 4 (Integrated Lights-Out 4) has 12 customizable user accounts and SSL encryption
iLO 4 can be disabled via a Global Setting
iLO Advanced supports directory services integration

Warranty

This product is covered by a global limited warranty and supported by HP Services and a worldwide network of HP Authorized Channel Partners. Hardware diagnostic support and repair is available for one year from date of purchase. Support for software and initial setup is available for 90 days from date of purchase. Enhancements to warranty services are available through HP Care Pack services or customized service agreements. Hard drives have either a one year or three year warranty.

NOTE: Server Warranty includes 1 year Parts, 1 year Labor, 1-year on-site support with next business day response. Warranty repairs may be accomplished through the use of Customer Self Repair (CSR) parts. These parts fall into two categories: 1) Mandatory CSR parts are designed for easy replacement. A travel and labor charge will result when customers decline to replace a Mandatory CSR part; 2) Optional CSR parts are also designed for easy replacement but may involve added complexity. Customers may choose to have HP replace Optional CSR parts at no charge. Additional information regarding worldwide limited warranty and technical support is available at: <http://h18004.www1.hp.com/products/servers/platforms/warranty/index.html>.

Optional Features

HP Insight management software	HP Insight Control	HP Insight Control, a product option, delivers essential infrastructure management that can help save time and money by making it easy to deploy, migrate, monitor, remote control, and optimize your IT infrastructure through a single, simple management console. For more information, see: http://www.hp.com/go/insightcontrol .
	HP Insight Control includes one year of 24 x 7 HP Software Technical Support and Update Service ensuring rapid access to HP support staff and proactive delivery of software updates. For more information about this service, see: http://www.hp.com/services/insight .	
	HP iLO Advanced	HP Integrated Lights-Out Advanced License a product option, providing smart remote server management without compromise. iLO Advanced unlocks the full set of remote administration functionality for all HP ProLiant servers by activating the full Virtual Keyboard Video and Mouse remote console, multi-user collaboration, console record and replay, GUI-based and scripted virtual media and virtual folders, and enhanced security and power management functionality. For more information, see: http://www.hp.com/go/iloadvance .
	HP iLO Scale-Out	The HP iLO Scale-Out license ideal for web/hosting/cloud service providers and High Performance Computing environments. This license is a specific subset of iLO Advanced functionality, provides fast remote access through Text Console via SSH, lower operational cost with Dynamic power capping, and faster time to resolution through Email-based Alerting and proactive notifications. With this newly designed HP iLO Scale-Out license HPC customers now have a server management package solely design and priced for their massive data environments. HP iLO Scale-Out is available on all HP ProLiant Gen8 SL and BL, DL 160 and HP Apollo servers. For more information, see: http://www.hp.com/go/iLO/scale-out .
	HP Matrix Operating Environment	The HP Matrix Operating Environment (Matrix OE) for ProLiant and Integrity servers is an integrated command center that helps you instantly adjust to dynamic business demands. This advanced infrastructure management software lets you reduce the cost of common data center tasks by up to 40 percent while keeping pace with your changing business.

The HP Matrix OE includes the automated provisioning, optimization, and recovery management capabilities for HP CloudSystem Matrix, the ideal platform for private cloud and Infrastructure as a Service (IaaS).

NOTE: For more information, visit: <http://www.hp.com/go/matrixoe>.

High Performance Clusters	HP Cluster Platforms	HP Cluster Platforms are specifically engineered, factory-integrated large-scale ProLiant clusters optimized for High Performance Computing, with a choice of servers, networks and software. Operating system options include specially priced offerings for Red Hat Enterprise Linux and SUSE Linux Enterprise Server, as well as Microsoft Windows HPC Server. A Cluster Platform Configurator simplifies ordering. http://www.hp.com/go/clusters
	HP HPC Interconnects	High Performance Computing (HPC) interconnect technologies are available for this server as part of the HP Cluster Platform portfolio. These high-speed InfiniBand and Gigabit interconnects are fully supported by HP when integrated within an HP cluster. Flexible, validated solutions can be defined with the help of configuration tools. http://www.hp.com/techservers/clusters/ucp/index.html
	HP Insight Cluster	HP Insight Cluster Management Utility (CMU) is an HP-licensed and HP-

Optional Features

Management Utility supported suite of tools that are used for lifecycle management of hyperscale clusters of Linux ProLiant systems. CMU includes software for the centralized provisioning, management and monitoring of nodes. CMU makes the administration of clusters user friendly, efficient, and effective.
<http://www.hp.com/go/cmu>

HP Insight Online HP Insight Online is a new addition to the HP Support Center for one stop, secure access to product and HP support information personalized to your IT environment. Insight Online can automatically display devices remotely monitored by HP Insight Remote Support. With Insight Online's easy navigation you can efficiently track your IT support contracts and device status from anywhere and at anytime.
www.hp.com/go/insightonline

HP Advanced Power Manager The HP Advanced Power Manager (HP APM) is an optional rack level solution. HP APM will automatically discover hardware components and enable bay level power on and off, server metering, aggregate dynamic power capping, configurable power-up dependencies and sequencing, consolidated Ethernet access to all resident iLOs, and asset management capabilities.

HP APM features rack level event logging, RADIUS authentication, integrated serial concentrator, up to 11 local user accounts, read only service port, and supports SNMP, SSH, Syslogd, telnet.

Service and Support

Service and Support

HP Technology Services for HP Apollo 6000 Server

Capitalizing on the capabilities of new technology requires a service partner who understands your increasingly complex business technology environment. That's why it makes sense to team up with the people who know HP infrastructure hardware and software best - the experienced professionals at HP Services.

Support for the HP Apollo 6000 servers, APM and chassis are all covered by support purchased at the chassis level. This simplifies your support experience and can reduce total cost of ownership over support purchased per server.

What HP Technology Services can do for you

We can help you design, deploy, test, integrate, support, and manage IT and infrastructure solutions. Our services solutions include more than just uplift of base warranty; we help deliver high levels of application availability through proactive service management and advanced technical response.

Protect your business beyond warranty with HP Care Pack Services that provide total support expertise to meet your IT and business needs. We have made it simple to select among 3 levels of recommended services; optimized, standard, or basic.

Optimized Recommendation

Optimized Recommendation: Supports maintaining servers at optimum performance availability

Installation Services

HP Factory Express brings simplicity to complex implementations by integrating and testing the hardware before it leaves the factory then providing onsite assistance to ensure your systems are ready for operation, saving valuable deployment time. www.hp.com/go/startupservices

HP Proactive Care with 24x7 coverage, 4 hour response - 3 year Care Pack Service

Helps prevent IT issues, maintain stability so you can focus on business requirements. Includes proactive reports, 24x7 hardware coverage with four hour response, collaborative software support with rapid access to advanced technical expertise. System connectivity to HP support tools is a prerequisite.

www.hp.com/services/proactivecare

<http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA3-8855Enw.pdf>

Standard Recommendation

Standard Recommendation: Service recommendation that maintains high level of server availability

Installation Services

HP Factory Express brings simplicity to complex implementations by integrating and testing the hardware before it leaves the factory then providing onsite assistance to ensure your systems are ready for operation, saving valuable deployment time. www.hp.com/go/startupservices

HP Proactive Care, Next Business Day response, 3-Year Care Pack Service

Helps prevent IT issues, maintain stability so you can focus on business requirements. Includes proactive reports, hardware coverage with next business day response, collaborative software support with rapid access to advanced technical expertise. System connectivity to HP support tools is a prerequisite. www.hp.com/services/proactivecare.

www.hp.com/services/proactivecare

<http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA3-8855Enw.pdf>

Service and Support

Basic Recommendation **Basic Recommendation:** delivers minimum recommended support service level

3-Year HP Foundation Care Service, Next Business Day response, 3 year Care Pack Service

This service connects you to HP during business hours for assistance on resolving issues. It features next business day hardware onsite response and software call back within two hours after opening your case. Make HP your first call for hardware or software questions; Collaborative Support is included in this service and provides troubleshooting assistance on software such as Microsoft Server, Red Hat Linux, VMware and more. Three years' coverage recommended with HP Care Pack Service.

<http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA4-8876enw.pdf>

Additional Recommended Services **HP Installation and Startup for Insight Control Software / HP SIM**

Provides for the deployment and basic configuration of HP Insight Control or HP SIM (Systems Insight Manager) on HP ProLiant servers <http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA0-9972ENW.pdf>

For a Hyperscale Environment, Datacenter Care is our most flexible and comprehensive support offering. HP works in partnership with our customers to provide end-to-end tailored support for your existing IT environments while aiding you on your converged cloud journey. It leverages the integrated technology, people, processes, and partner ecosystem of HP to deploy, help operate, and evolve your data centers on their journey from traditional data centers to converged cloud. With the ability to configure support tailored to your needs, we offer you flexibility that is cost effective. Datacenter Care is made from "building blocks" of services, each tested and delivered globally. These can be combined to deliver the services that you require, and are monitored and updated to change as your needs change. Start with the core building blocks of an assigned account service manager, enhanced call handling, proactive and reactive support, and add on other services that are tailored to your specific needs. Proactive and reactive support are configured to deliver the level of support needed by the different components in a data center, to meet both SLA and cost targets.

For SMB to Enterprise customers HP Technology Services meets business challenges with the right services solution.

Insight Remote Support Provides 24 X 7 remote monitoring, proactive notifications, and problem resolution. Learn more <http://www.hp.com/go/insightremotesupport>

HP Support Center Personalized online support portal with access to information, tools and experts to support HP business products. Submit support cases online, chat with HP experts, access support resources or collaborate with peers. Learn more <http://www.hp.com/go/hpsc>

The HP Support Center Mobile App* allows you to resolve issues yourself or quickly connect to an agent for live support. Now, you can get access to personalized IT support anywhere, anytime. HP Insight Remote Support and HP Support Center are available at no additional cost with a HP warranty, HP Care Pack or HP contractual support agreement.

*The HP Support Center Mobile App is subject to local availability.

Warranty / Service Coverage

The factory warranty for this product is described earlier in this Quick Spec in the Standard Features section, Warranty. Note the warranty coverage is NBD and requires mandatory Customer Self Service remove and replace activities.

For ProLiant servers and storage systems, the services cover HP-branded hardware options qualified for the server, purchased at the same time or afterward, internal to the enclosure, as well as external monitors up to 22" and tower UPS products; these items will be covered at the same service level and for the same coverage period as the server unless the maximum supported lifetime and/or the maximum usage limitation has been exceeded. Coverage of the UPS battery is not included; standard

Service and Support

warranty terms and conditions apply.

The defective media retention service feature option applies only to Disk or eligible SSD/Flash Drives replaced by HP due to malfunction. It does not apply to any exchange of Disk or SSD/Flash Drives that have not failed. SSD/Flash Drives that are specified by HP as consumable parts and/or that have exceeded maximum supported lifetime and/or the maximum usage limit as set forth in the manufacturer's operating manual or the technical data sheet are not eligible for the defective media retention service feature option.

For more information

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

To find the full list of Care Pack SKUs for the Apollo family of products, go to: <http://hp.com/go/lookuptool> and in step 2 select HP ProLiant, then select Apollo Series Servers.

Configuration Information – Factory Integrated Models

NOTE: This section lists some of the steps required to configure a Factory Integrated Model. To ensure only valid configurations are ordered, HP recommends the use of an HP approved configurator. Contact your local sales representative for information on configurable product offerings and requirements.

NOTE: FIO indicates that this option is only available as a factory installable option.

NOTE: HP Apollo a6000 Chassis and HP Apollo Power Shelf are required to support the server. If you do not already have them, please refer to their QuickSpecs for additional information.

HP Apollo 6000 Power Shelf

http://h18000.www1.hp.com/products/quickspecs/14976_div/14976_div.html

HP Apollo a6000 Chassis

http://h18000.www1.hp.com/products/quickspecs/14974_div/14974_div.html

Step 1: Base Configuration

HP Server	HP ProLiant XL220a Gen8 v2 Compute Tray 753173-B21 NOTE: This server is a 2-in-1 system. There are two single-socket processors/nodes in one tray. NOTE: Both nodes must be configured identically. Therefore, most options in step 2, step 3, and step 4, must be selected in pairs of matching part numbers.
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Step 2: Choose Required Options

HP Processors	NOTE: Each processor kit includes two (2) processors. NOTE: Maximum one kit can be selected.
	HP XL220a Gen8 v2 E3-1281v3 FIO Kit 774239-L21 HP XL220a Gen8 v2 E3-1271v3 FIO Kit 774241-L21 HP XL220a Gen8 v2 E3-1241v3 FIO Kit 774243-L21 HP XL220a Gen8 v2 E3-1231v3 FIO Kit 774245-L21 HP XL220a Gen8 v2 E3-1280v3 FIO Kit 738250-L21 HP XL220a Gen8 v2 E3-1270v3 FIO Kit 754546-L21 HP XL220a Gen8 v2 E3-1220v3 FIO Kit 754552-L21 HP XL220a Gen8 v2 E3-1265Lv3 FIO Kit 754554-L21
HP Memory	NOTE: HP memory from previous generation servers are not qualified or warranted with this HP ProLiant Server. HP SmartMemory is required to realize the memory performance improvements and enhanced functionality listed in this document for Gen8. For additional information, please see the HP SmartMemory QuickSpecs at: http://h18000.www1.hp.com/products/quickspecs/14225_div/14225_div.html NOTE: only UDIMMs are supported. NOTE: A minimum of two DIMMs is required per server. NOTE: DIMMs must be ordered in pair of matching part numbers. Unbuffered with ECC DIMMs (UDIMMs)
	HP 8GB (1x8GB) Dual Rank x8 PC3-12800E (DDR3-1600) Unbuffered CAS-11 Memory Kit 669324-B21 HP 8GB (1x8GB) Dual Rank x8 PC3L-12800E (DDR3-1600) Unbuffered CAS-11 Low Voltage Memory Kit 713979-B21 HP 8GB (1x8GB) Dual Rank x8 PC3L-10600E (DDR3-1333) Unbuffered CAS-9 Low Voltage Memory Kit 647909-B21 HP 4GB (1x4GB) Dual Rank x8 PC3-12800E (DDR3-1600) Unbuffered CAS-11 Memory Kit 669322-B21 HP 4GB (1x4GB) Dual Rank x8 PC3L-12800E (DDR3-1600) Unbuffered CAS-11 Low Voltage Memory Kit 713977-B21 HP 4GB (1x4GB) Dual Rank x8 PC3L-10600E (DDR3-1333) Unbuffered CAS-9 Low Voltage Memory Kit 647907-B21

Configuration Information – Factory Integrated Models

	HP 2GB (1x2GB) Single Rank x8 PC3-12800E (DDR3-1600) Unbuffered CAS-11 Memory Kit	669320-B21
	HP 2GB (1x2GB) Single Rank x8 PC3L-12800E (DDR3-1600) Unbuffered CAS-11 Low Voltage Memory Kit	713975-B21
	HP 2GB (1x2GB) Single Rank x8 PC3-12800E (DDR3-1600) Unbuffered CAS-11 Memory Kit	669320-B21
	HP 2GB (1x2GB) Single Rank x8 PC3L-10600E (DDR3-1333) Unbuffered CAS-9 Low Voltage Memory Kit	647905-B21
HP Storage Controllers	NOTE: Two controllers of the same part numbers are required.	
	HP Smart Array P430/4GB FBWC 12Gb 1-port Int SAS Controller	698530-B21
	HP Smart Array P430/2GB FBWC 12Gb 1-port Int SAS Controller	698529-B21
	HP H220 Host Bus Adapter	650933-B21
	Storage Cables	
	NOTE: Two cables are required of the same part numbers.	
	HP Apollo 6000 Mini-SAS P430 Cable	757406-B21
	NOTE: This cable is required to support P430 controller.	
	HP Apollo 6000 Mini-SAS H220 Cable	757405-B21
	NOTE: This cable is required to support H220 controller.	
HP Networking	NOTE: Must select one of the following Network modules	
	NOTE: If the Dual FlexibleLOM Riser Kit (757401-B21) is selected, a pair of FlexibleLOM Adapters of matching part numbers must be selected as well.	
	HP Apollo 6000 Dual Ethernet 1Gb 1-port 364i FIO Kit	757404-B21
	HP Apollo 6000 Dual FlexibleLOM Riser Kit	757401-B21

Step 3: Choose Additional Factory Integrated Options

HP Networking

FlexibleLOM Adapters

NOTE: The FlexibleLOM Adapters in this section is required if the Dual FlexibleLOM Riser Kit (757401-B21) is selected

NOTE: FlexibleLOM Adapters in this section is Factory Integrated Only (FIO) options.

NOTE: FlexibleLOM Adapters can only be selected in pair of matching part numbers.

HP Ethernet 10Gb 2-port 561FLR-T FIO Adapter	700700-B21
HP Ethernet 10Gb 2-port 560FLR-SFP+ FIO Adapter	684218-B21
HP FlexFabric 10Gb 2-port 554FLR-SFP+ FIO Adapter	684213-B21
HP FlexFabric 10Gb 2-port 534FLR-SFP+ FIO Adapter	700752-B21
HP FlexFabric 10Gb 2-port 533FLR-T FIO Adapter	700760-B21
HP Ethernet 10Gb 2-port 530FLR-SFP+ FIO Adapter	684210-B21
HP FlexFabric 10Gb 2-port 526FLR-SFP+ FIO Adapter	684219-B21
HP Ethernet 1Gb 4-port 366FLR FIO Adapter	684217-B21
HP Ethernet 1Gb 4-port 331FLR FIO Adapter	684208-B21

NOTE: Please see the QuickSpecs for Technical Specifications and additional information: www.hp.com/go/ProLiantNICs

Step 4: Choose Additional Options for Factory Integration

NOTE: For additional options, please refer to the "Core Options" and "Additional Options" section below.

Core Options

NOTE: Some options may not be integrated at the factory. To ensure only valid configurations are ordered, HP recommends the use of an HP approved configurator. Contact your local sales representative for additional information.

HP Memory	Unbuffered with ECC DIMMs (UDIMMs)	
	HP 8GB (1x8GB) Dual Rank x8 PC3-12800E (DDR3-1600) Unbuffered CAS-11 Memory Kit	669324-B21
	HP 8GB (1x8GB) Dual Rank x8 PC3L-12800E (DDR3-1600) Unbuffered CAS-11 Low Voltage Memory Kit	713979-B21
	HP 8GB (1x8GB) Dual Rank x8 PC3L-10600E (DDR3-1333) Unbuffered CAS-9 Low Voltage Memory Kit	647909-B21
	HP 4GB (1x4GB) Dual Rank x8 PC3-12800E (DDR3-1600) Unbuffered CAS-11 Memory Kit	669322-B21
	HP 4GB (1x4GB) Dual Rank x8 PC3L-12800E (DDR3-1600) Unbuffered CAS-11 Low Voltage Memory Kit	713977-B21
	HP 4GB (1x4GB) Dual Rank x8 PC3L-10600E (DDR3-1333) Unbuffered CAS-9 Low Voltage Memory Kit	647907-B21
	HP 2GB (1x2GB) Single Rank x8 PC3-12800E (DDR3-1600) Unbuffered CAS-11 Memory Kit	669320-B21
	HP 2GB (1x2GB) Single Rank x8 PC3L-12800E (DDR3-1600) Unbuffered CAS-11 Low Voltage Memory Kit	713975-B21
	HP 2GB (1x2GB) Single Rank x8 PC3-12800E (DDR3-1600) Unbuffered CAS-11 Memory Kit	669320-B21
	HP 2GB (1x2GB) Single Rank x8 PC3L-10600E (DDR3-1333) Unbuffered CAS-9 Low Voltage Memory Kit	647905-B21
	HP 8GB (1x8GB) Dual Rank x8 PC3L-12800E (DDR3-1600) Unbuffered CAS-11 Low Voltage Memory Kit	713979-B21

HP Hard Drives

NOTE: The components of a storage subsystem (e.g. the drive, the HBA/controller, firmware, and the server backplane) should operate at the same data transfer rate or the system bandwidth will be negotiated down to an acceptable level for all components.

NOTE: Hard drives have either a one year or three year warranty.

NOTE: The hard drive options are not required when configuring a Drive-less Model.

NOTE: Hard drives must be selected in pair of matching part numbers.

SAS Hot Plug with SmartDrive SFF (2.5-inch) Enterprise Drives

HP 900GB 6G SAS 10K rpm SFF (2.5-inch) SC Enterprise 3yr Warranty Hard Drive	652589-B21
HP 600GB 6G SAS 10K rpm SFF (2.5-inch) SC Enterprise 3yr Warranty Hard Drive	652583-B21
HP 450GB 6G SAS 10K rpm SFF (2.5-inch) SC Enterprise 3yr Warranty Hard Drive	652572-B21
HP 300GB 6G SAS 15K rpm SFF (2.5-inch) SC Enterprise 3yr Warranty Hard Drive	652611-B21
HP 300GB 6G SAS 10K rpm SFF (2.5-inch) SC Enterprise 3yr Warranty Hard Drive	652564-B21

SAS Hot Plug SmartDrive SFF (2.5-inch) Midline Drives

HP 1TB 6G SAS 7.2K rpm SFF (2.5-inch) SC Midline 1yr Warranty Hard Drive	652749-B21
HP 500GB 6G SAS 7.2K rpm SFF (2.5-inch) SC Midline 1yr Warranty Hard Drive	652745-B21

6G SATA Hot Plug with SmartDrive SFF (2.5-inch) Midline (MDL) Drives

HP 1TB 6G SATA 7.2K rpm SFF (2.5-inch) SC Midline 1yr Warranty Hard Drive	655710-B21
HP 500GB 6G SATA 7.2K rpm SFF (2.5-inch) SC Midline 1yr Warranty Hard Drive	655708-B21

6G SATA Value Endurance Hot Plug SFF (2.5-inch) Enterprise Value Solid State Drives

HP 600GB 6G SATA Value Endurance SFF 2.5-in SC Enterprise Value 3yr Wty Solid	739898-B21
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Core Options

State Drive	
HP 300GB 6G SATA Value Endurance SFF 2.5-in SC Enterprise Value 3yr Wty Solid State Drive	739888-B21
6G SATA ME Hot Plug SFF (2.5-inch) Enterprise Mainstream Solid State Drives	
HP 800GB 6G SATA Mainstream Endurance SFF 2.5-in SC Enterprise Mainstream 3yr Wty Solid State Drive	691868-B21
HP 400GB 6G SATA Mainstream Endurance SFF 2.5-in SC Enterprise Mainstream 3yr Wty Solid State Drive	691866-B21
HP 200GB 6G SATA Mainstream Endurance SFF 2.5-in SC Enterprise Mainstream 3yr Wty Solid State Drive	691864-B21
HP 100GB 6G SATA Mainstream Endurance SFF 2.5-in SC Enterprise Mainstream 3yr Wty Solid State Drive	691862-B21

HP Networking

HP Ethernet 10Gb 2-port 530FLR-SFP+ Adapter	647581-B21
HP Ethernet 10Gb 2-port 560FLR-SFP+ Adapter	665243-B21
HP Ethernet 10Gb 2-port 561FLR-T Adapter	700699-B21
HP Ethernet 1Gb 4-port 331FLR Adapter	629135-B21
HP Ethernet 1Gb 4-port 366FLR Adapter	665240-B21
HP FlexFabric 10Gb 2-port 526FLR-SFP+ Adapter	629138-B21
HP FlexFabric 10Gb 2-port 533FLR-T Adapter	700759-B21
HP FlexFabric 10Gb 2-port 534FLR-SFP+ Adapter	700751-B21
HP FlexFabric 10Gb 2-port 554FLR-SFP+ Adapter	629142-B21
HP Apollo 6000 Dual FlexibleLOM Riser Kit	757401-B21

NOTE: Please see the QuickSpecs for Technical Specifications and additional information: www.hp.com/go/ProLiantNICs

Additional Options

HP Insight Software	<p>HP Insight Control</p> <p>Integrated Lights-Out (iLO)</p> <p>HP iLO Scale Out</p> <p>HP Integrated Lights-Out Scale-Out including 3yr 24x7 Tech Support and Updates Flex Qty E-LTU BD776AAE</p> <p>HP Integrated Lights-Out Scale-Out 3yr 24x7 Tech Support and Updates Flex Quantity License BD776A</p> <p>HP Integrated Lights-Out Scale-Out including 3yr 24x7 Tech Support and Updates Tracking License BD777A</p> <p>HP Integrated Lights-Out Scale-Out including 1yr 24x7 Tech Support and Updates Flex Qty E-LTU BD778AAE</p> <p>HP Integrated Lights-Out Scale-Out 1yr 24x7 Tech Support and Updates Flex Quantity License BD778A</p> <p>HP Integrated Lights-Out Scale-Out including 1yr 24x7 Tech Support and Updates Tracking License BD779A</p> <p>HP iLO Advanced including 3yr 24x7 Technical Support and Updates E-LTU E6U64ABE</p> <p>HP Integrated Lights-Out (iLO) Advanced for ProLiant</p> <p>HP iLO Advanced including 1yr 24x7 Technical Support and Updates Single Server License 512485-B21</p> <p>HP iLO Advanced 1 Server License with 3yr 24x7 Tech Support and Updates BD505A</p> <p>HP iLO Advanced Flexible Qty License with 3yr 24x7 Tech Support and Updates BD506A</p> <p>HP iLO Advanced Electronic License with 3yr 24x7 Tech Support and Updates BD506AAE</p> <p>HP iLO Advanced Tracking License with 3yr 24x7 Tech Support and Updates BD507A</p> <p>HP iLO Advanced including 1yr 24x7 Technical Support and Updates Tracking License 512487-B21</p> <p>HP iLO Advanced including 1yr 24x7 Technical Support and Updates Electronic License TA850AAE</p> <p>NOTE: For additional license options please see the QuickSpecs at: http://h18004.www1.hp.com/products/quickspecs/14276_div/14276_div.html</p> <p>NOTE: For more information, visit: http://www.hp.com/go/ilo</p>
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High Performance Clusters	<p>HP Cluster Management Utility</p> <p>HP Insight Cluster Management Utility 1yr 24x7 Flexible License QL803B</p> <p>HP Insight Cluster Management Utility 3yr 24x7 Flexible License BD476A</p> <p>NOTE: These part numbers can be used to purchase one certificate for multiple licenses and support with a single activation key. Each license is for one node (server). Customer will receive a printed end user license agreement and license entitlement certificate via physical shipment. The license entitlement certificate must be redeemed online in order to obtain a license key. Customer also will receive a support agreement.</p> <p>HP Insight Cluster Management Utility Media BD477A</p> <p>NOTE: For additional license kits please see the QuickSpecs at: http://h18004.www1.hp.com/products/quickspecs/12612_div/12612_div.html</p>
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HP Storage Controllers	<p>SAS Controllers</p> <p>Smart Array P430 Controller</p> <p>HP Smart Array P430/2GB FBWC 12Gb 1-port Int SAS Controller 698529-B21</p> <p>HP Smart Array P430/4GB FBWC 12Gb 1-port Int SAS Controller 698530-B21</p>
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Additional Options

Optional Upgrades

HP Apollo 6000 Mini-SAS H220 Cable	757405-B21
HP Apollo 6000 Mini-SAS P430 Cable	757406-B21

Host Bus Adapter

HP H220 Host Bus Adapter	650933-B21
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NOTE: Please see the QuickSpecs for Technical Specifications and additional information:

http://h18004.www1.hp.com/products/quickspecs/14336_div/14336_div.html
(HBA 220)

HP Advanced Power Manager

HP Advanced Power Manager Kit	741192-B21
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NOTE: Each HP APM can connect up to 10 chassis via consolidated chassis management cable.

HP 4M 20 Pin Consolidated Management Cable	762048-B21
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NOTE: 1 cable per chassis.

HP 3M MicroDB9 to MicroDB9 Cable	762049-B21
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NOTE: This cable is required for connectivity to DC Power shelf.

HP Rack Options

HP USB BFR with PVC Free Keyboard/Mouse Kit

HP USB BFR with PVC Free US Keyboard/Mouse Kit	631341-B21
HP USB BFR with PVC Free UK Keyboard/Mouse Kit	631344-B21
HP USB BFR with PVC Free FR Keyboard/Mouse Kit	631346-B21
HP USB BFR with PVC Free ES Keyboard/Mouse Kit	631348-B21
HP USB BFR with PVC Free DE Keyboard/Mouse Kit	631358-B21
HP USB BFR with PVC Free JP Keyboard/Mouse Kit	631360-B21
HP USB BFR with PVC Free IT Keyboard/Mouse Kit	631362-B21
HP USB BFR with PVC Free CN Keyboard/Mouse Kit	631364-B21
HP USB BFR with PVC Free AE Keyboard/Mouse Kit	638212-B21
HP USB BFR with PVC Free RU Keyboard/Mouse Kit	638214-B21
HP USB BFR with PVC Free IN Keyboard/Mouse Kit	672097-D63
HP USB BFR with PVC Free AP-Intl Keyboard/Mouse Kit	672097-373
HP USB BFR with PVC Free Intl Keyboard/Mouse Kit	672097-B33
HP USB BFR with PVC Free PT Keyboard/Mouse Kit	672097-133
HP USB BFR with PVC Free TR Keyboard/Mouse Kit	672097-143
HP USB BFR with PVC Free CZ Keyboard/Mouse Kit	672097-223
HP USB BFR with PVC Free FI Keyboard/Mouse Kit	672097-353
HP USB BFR with PVC Free SE Keyboard/Mouse Kit	672097-103
HP USB BFR with PVC Free CH Keyboard/Mouse Kit	672097-113
HP USB BFR with PVC Free KR Keyboard/Mouse Kit	672097-KD3

NOTE: Please see the QuickSpecs for Technical Specifications and additional information:

http://h18000.www1.hp.com/products/quickspecs/13972_div/13972_div.html
(Worldwide)

HP USB and SD Options

HP Flash Media Kits for USB Drives

HP 8GB USB Enterprise Mainstream Flash Media Drive Key Kit	737953-B21
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NOTE: 36pin SUV Dongle Kit is required.

Additional Options

Other USB and SD Options

HP 36pin Serial/USB/VGA Dongle Cord Kit 676277-B21

HP Enterprise Mainstream Flash Media Kits for Memory Cards

HP 8GB microSD Enterprise Mainstream Flash Media Kit 726116-B21

HP 32GB microSD Enterprise Mainstream Flash Media Kit 700139-B21

Memory

HP SmartMemory

New HP SmartMemory now provides additional protection for your servers. With HP Authentication it can verify that you have true HP Qualified Memory in your HP ProLiant Gen8 server. With HP SmartMemory your new HP ProLiant server can take advantage of additional Gen8 enhancements in performance, durability and future manageability support through HP Active Health System

For detailed memory configuration rules and guidelines, please use the Online DDR3 Memory Configuration Tool:
www.hp.com/go/ddr3memory-configurator

Memory Subsystem Architecture

Intel Processor socket supports 2 channels and 2 DIMMs per channel. Total max. memory up to 32GB DDR3 PC3-12800E1600MHz.

Standard Memory Plus Optional Memory

Up to 32 GB memory is available with the optional installation of 4 x 8GB PC3-12800E UDIMM ECC DDR3 UDIMM Memory kits, operating at 1600MHz when fully populated at 2 DIMMs per Channel in 4 slots.

NOTE: The below chart does not represent all possible memory configurations.

NOTE: For best performance, it is recommended that customer installs memory in identical pairs

Memory Population Rules and Guidelines:

- White DIMM slots denote the first slot of a channel. For 1 DPC (DIMM per channel) populate white slots only.
- Install DIMMs only if the corresponding processor is installed.
- There are two channels per processor with two DIMM slots per channel.
- Memory channel A consists of the two (2) DIMMs that are closest to the processor.
- Memory channel B consists of the two (2) DIMMs that are furthest from the processor.
- Populate DIMMs from heaviest load (quad-rank) to lightest load (single-rank) within a channel
- Heaviest load (DIMM with most ranks) within a channel goes furthest from the processor
- No support for RDIMMs; Non-ECC UDIMMs
- DIMMs of different speeds may be mixed in any order; the server will select a common optimal speed.
- The maximum memory speed is a function of the memory type, memory configuration, and processor model.
- The maximum memory capacity is a function of the memory type and number of installed processors.
- To realize the performance memory capabilities listed in this document, HP SmartMemory is required. For additional information, please see the HP SmartMemory QuickSpecs at:
http://h18000.www1.hp.com/products/quickspecs/14225_div/14225_div.html.
- For memory population rules and additional memory guidelines, please see the HP ProLiant XL220 Gen8 v2 user guide at
<http://www.hp.com/support>.

DIMM slot/capacity/populated speed table									
DIMM Type	Unbuffered with ECC DIMMs (UDIMMs)								
DIMM Rank	Single Rank (1R)			Dual Rank (2R)					
DIMM Capacity	2GB	2GB	2GB	4GB	4GB	8GB	8GB	4GB	8GB
DIMM Native Speed (MHz)	1333	1600	1600	1333	1600	1333	1600	1600	1600
Voltage	LV	Std	LV	LV	Std	LV	Std	LV	LV
SLOTS THAT CAN BE POPULATED									
4 slot servers	4	4	4	4	4	4	4	4	4
MAXIMUM CAPACITY (GB)*									
Capacity	8	8	8	16	16	32	32	16	32

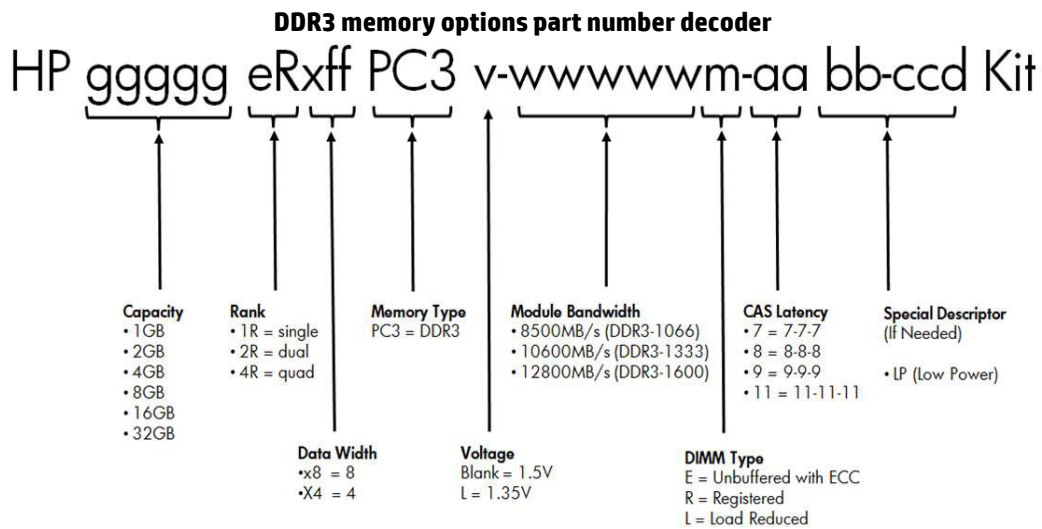
Memory

POPULATED DIMM SPEED (MHz)									
1 DIMM Per Channel	1333	1600	1600	1333	1600	1333	1600	1600	1600
2 DIMM PEr Channel	1333**	1600	1600	1333**	1600	1333**	1600	1600	1600

* Maximum capacity will vary based on individual server platform qualification schedule
 ** For HP SmartMemory, UDIMM is supported at 2DPC@DDR3-1333. Third party memory may only support up to 2DPC@DDR3-1066.

NOTE: Capacity references are rounded to the common Gigabyte values:

- 2GB = 2048MB
- 4GB = 4096MB
- 8GB = 8192MB
- 16GB = 16384MB



Following are memory options available from HP:

HP Memory

Unbuffered with ECC DIMMs (UDIMMs)

HP 8GB (1x8GB) Dual Rank x8 PC3-12800E (DDR3-1600) Unbuffered CAS-11 Memory Kit	669324-B21
HP 8GB (1x8GB) Dual Rank x8 PC3L-12800E (DDR3-1600) Unbuffered CAS-11 Low Voltage Memory Kit	713979-B21
HP 8GB (1x8GB) Dual Rank x8 PC3L-10600E (DDR3-1333) Unbuffered CAS-9 Low Voltage Memory Kit	647909-B21
HP 4GB (1x4GB) Dual Rank x8 PC3-12800E (DDR3-1600) Unbuffered CAS-11 Memory Kit	669322-B21
HP 4GB (1x4GB) Dual Rank x8 PC3L-12800E (DDR3-1600) Unbuffered CAS-11 Low Voltage Memory Kit	713977-B21
HP 4GB (1x4GB) Dual Rank x8 PC3L-10600E (DDR3-1333) Unbuffered CAS-9 Low Voltage Memory Kit	647907-B21
HP 2GB (1x2GB) Single Rank x8 PC3-12800E (DDR3-1600) Unbuffered CAS-11 Memory Kit	669320-B21

Memory

HP 2GB (1x2GB) Single Rank x8 PC3L-12800E (DDR3-1600) Unbuffered CAS-11 Low Voltage Memory Kit	713975-B21
HP 2GB (1x2GB) Single Rank x8 PC3-12800E (DDR3-1600) Unbuffered CAS-11 Memory Kit	669320-B21
HP 2GB (1x2GB) Single Rank x8 PC3L-10600E (DDR3-1333) Unbuffered CAS-9 Low Voltage Memory Kit	647905-B21
HP 8GB (1x8GB) Dual Rank x8 PC3L-12800E (DDR3-1600) Unbuffered CAS-11 Low Voltage Memory Kit	713979-B21

Technical Specifications

System Unit	Server Dimensions (L x W x D)	1.70 x 8.33 x 27.87 in (4.33 x 21.15 x 70.79 cm)	
	Shipping Dimensions (L x W x D)	37.63 x 15.13 x 9 in (95.5 x 38.4 x 22.8 cm)	
System Inlet Temperature	Weight (approximate)	Maximum (four hard drives and two processors installed)	15.0 lb (6.8 kg)
	System Inlet Temperature	Operating	50° to 95° F (10° to 35° C) at sea level with an altitude derating of 1.8°F per every 1000 ft (1.0°C per every 304.8 m) above sea level to a maximum of 10,000 ft (3048 m), no direct sustained sunlight. Maximum rate of change is 18°F/hr (10°C/hr). The upper limit may be limited by the type and number of options installed. System performance may be reduced if operating with a fan fault or above 86°F (30°C).
Relative Humidity (non-condensing)		Non-operating	-22° to 140° F (-30° to 60° C) Maximum rate of change is 36°F/hr (20°C/hr).
		Operating	10% to 90% relative humidity (Rh), 82.4°F (28°C) maximum wet bulb temperature, non-condensing.
Altitude		Non-operating	5% to 95% relative humidity (Rh), 101.7°F (38.7°C) maximum wet bulb temperature, non-condensing.
		Operating	10,000 ft (3048 m). This value may be limited by the type and number of options installed. Maximum allowable altitude change rate is 1500 ft/min (457 m/min).
Emissions Classification (EMC)		Non-operating	30,000 ft (9144 m). Maximum allowable altitude change rate is 1500 ft/min (457 m/min).
		FCC Rating	Class A
	Normative Standards	CISPR 22; EN55022; EN55024; FCC CFR 47, Pt 15; ICES-003; CNS13438; GB9254; K22;K24; EN 61000-3-2; EN 61000-3-3; EN 60950-1; IEC 60950-1	

NOTE: Product conformance to cited product specifications is based on sample (type) testing, evaluation, or assessment. This product or family of products is eligible to bear the appropriate compliance logos and statements.

Environment-friendly Products and Approach	End-of-life Management and Recycling	Hewlett-Packard offers end-of-life HP product return, trade-in, and recycling programs in many geographic areas. For trade-in information, please go to: http://www.hp.com/go/green . To recycle your product, please go to: http://www.hp.com/go/green or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.
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The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on

Technical Specifications

the Hewlett Packard web site at: <http://www.hp.com/go/green>. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.

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