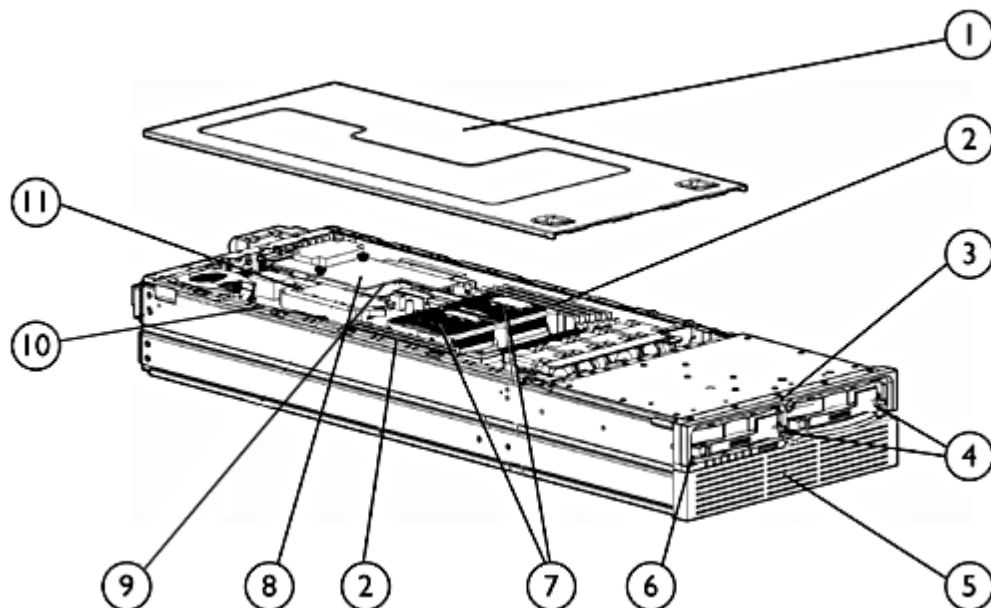


### Overview

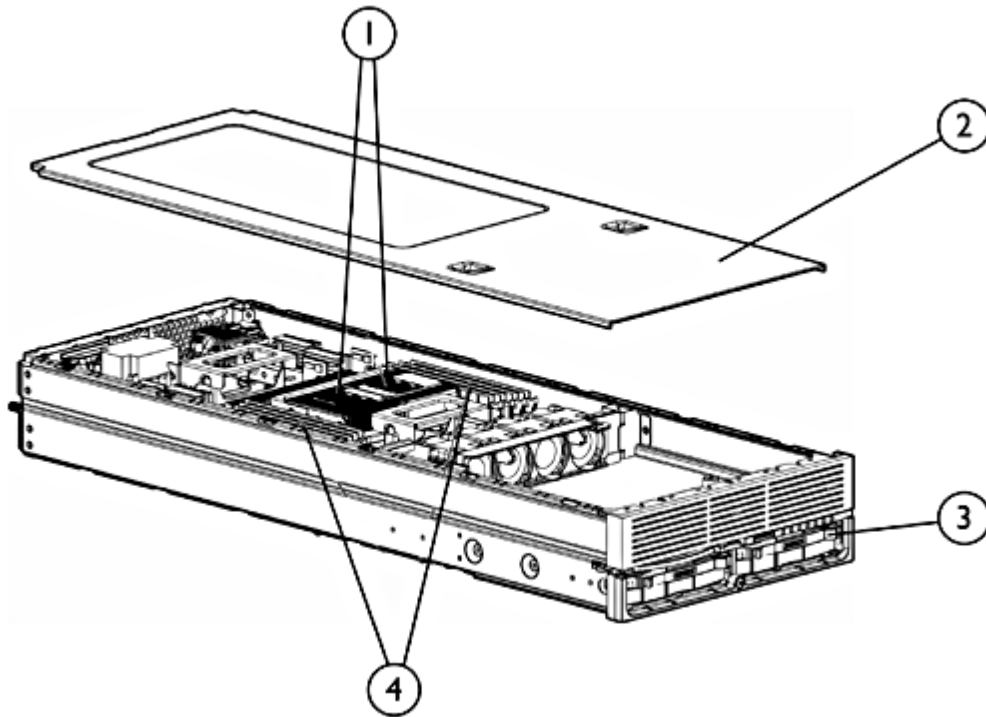
#### Primary Side - HP ProLiant BL45p Server Blade



1. Access Panel
2. Memory banks 1 and 2 (4 DIMM slots per bank, 8 total DIMM slots) for Processors 1 and 2 on primary side
3. Power On/Standby button
4. Up to two U320 hot-plug hard disk drives (optional)
5. Secondary Side - HP ProLiant BL45p
6. Front panel LEDs
7. Up to two single- or dual-core AMD Opteron™ 800 series processors on primary side
8. Dual port Fibre Channel Adapter (optional)
9. PCI-X Gigabit NIC Mezzanine Card (contains two NC7781 single port Gigabit NICs)
10. Smart Array 6i Controller
11. Smart Array 6i Battery-Backed Write Cache Enabler (optional)

#### Secondary Side - HP ProLiant BL45p Server Blade

### Overview



1. Up to two single- or dual-core AMD Opteron™ 800 series processors on secondary side
2. Access Panel
3. Primary Side - HP ProLiant BL45p
4. Memory banks 1 and 2 (4 DIMM slots per bank, 8 total DIMM slots) for Processors 3 and 4 on secondary side

### What's New

- Support for the latest Dual-Core AMD Opteron™ 800 series processor technology
  - Up to four AMD Opteron™ processors Model 885 (2.6 GHz)
  - 1MB L2 cache per core/2MB L2 cache total
  - 1 GHz HyperTransport
- Support for HP Control Tower BladeSystem p-class Management Software

### Overview

### At A Glance

This document covers the HP ProLiant BL45p server blade only. For more information on HP BladeSystems p-Class Infrastructure and HP BladeSystem p-Class Interconnect Components, please see the following QuickSpecs:

HP BladeSystem p-Class Infrastructure QuickSpecs:

[http://h18000.www1.hp.com/products/quickspecs/12330\\_div/12330\\_div.HTML](http://h18000.www1.hp.com/products/quickspecs/12330_div/12330_div.HTML) and HP BladeSystem p-Class Interconnect Components QuickSpecs: [http://h18000.www1.hp.com/products/quickspecs/12331\\_div/12331\\_div.HTML](http://h18000.www1.hp.com/products/quickspecs/12331_div/12331_div.HTML)

- Up to four HP ProLiant BL45p server blades per 6U server blade enclosure
- Performance quad processor server blade designed for enterprise availability and scalability to run existing 32-bit applications, while providing a simplified migration path to 64-bit computing.
- AMD Opteron™ 800 series single-core and dual-core processors (quad capability)
  - Dual-Core: Models 885 (2.6 GHz), 880 (2.4 GHz), 875 (2.2 GHz), 870 (2.0 GHz), 865 (1.8 GHz)
  - Single-Core: Models 854 (2.8 GHz) and 852 (2.6 GHz)
- HP ProLiant BL25/45p Dual Port Fibre Channel Adapter (2-Gb) option for SAN connectivity (shared with BL25p)
- AMD 8131 and 8111 Chipsets
- 1024 MB or 2048 MB PC3200 Registered ECC 400MHz DDR memory, 2 x 1 Interleaved Memory, 16 DIMM slots, expandable to 32 GB (using optional PC3200 DDR) or 64 GB max (using optional PC2700 DDR)
- Five total network ports:
  - Four (4) PCI-X Gigabit embedded ports consisting of two (2) NC7781 and one (1) dual port NC7782
  - One additional 10/100 NIC dedicated to iLO Management
- Smart Array 6i - Integrated (on system board) RAID controller with optional battery-backed write cache
- U320 SCSI Drive Cage (standard) supports up to two U320 hot plug hard disk drives
- Integrated Lights-Out (iLO) Advanced Management (ASIC on system board)
- Plugs vertically into 6U enclosure, four (4) BL45p server blades per enclosure
- Integrated Access Tool for server blade management and enhanced server blade documentation including Best Practices and Common Procedures guides
- Protected by HP Services and a worldwide network of resellers and service providers. Three-year Next Business Day, on-site limited global warranty. Certain restrictions and exclusions apply. Pre-Failure Notification on processors, memory, and SCSI hard drives.

### Standard Features

<b>Processor</b> <b>NOTE:</b> Support for one, two or four processor configurations only	Single-Core AMD Opteron™ processor Model 854 (2.8 GHz/1MB L2 cache/1 GHz HyperTransport) Single-Core AMD Opteron™ processor Model 852 (2.6 GHz/1MB L2 cache/1 GHz HyperTransport) Dual-Core AMD Opteron™ processor Model 885 (2.6 GHz/1MB L2 cache per core for 2MB total/1 GHz HyperTransport) Dual-Core AMD Opteron™ processor Model 880 (2.4 GHz/1MB L2 cache per core for 2MB total/1 GHz HyperTransport) Dual-Core AMD Opteron™ processor Model 875 (2.2 GHz/1MB L2 cache per core for 2MB total/1 GHz HyperTransport) Dual-Core AMD Opteron™ processor Model 870 ( 2.0 GHz/1MB L2 cache per core for 2MB total/1 GHz HyperTransport) Dual-Core AMD Opteron™ processor Model 865 (1.8 GHz/1MB L2 cache per core for 2MB total/1 GHz HyperTransport)						
<b>Upgradeability</b>	Upgradeable to quad processing						
<b>Cache Memory</b>	1 MB Level 2 Cache per core (2MB total for Dual-Core models)						
<b>Chipset</b>	AMD 8131 and 8111 chipsets						
<b>Memory</b>	<table><tr><td>Type</td><td>2-way interleaved PC3200 DDR SDRAM running at 400 MHz or PC2700 DDR SDRAM running at 333 MHz</td></tr><tr><td>Standard</td><td>1024 MB 400 MHz PC3200 (depending on model) 2048 MB 400 MHz PC3200 (depending on model)</td></tr><tr><td>Maximum</td><td>64 GB max (using optional 333 MHz PC2700 DDR) 32 GB max (using optional 400 MHz PC3200 DDR)</td></tr></table> <p><b>NOTE:</b> Memory must be installed in pairs. <b>NOTE:</b> PC2700 and PC3200 memory should not be mixed within the server blade and is not an HP supported configuration.</p>	Type	2-way interleaved PC3200 DDR SDRAM running at 400 MHz or PC2700 DDR SDRAM running at 333 MHz	Standard	1024 MB 400 MHz PC3200 (depending on model) 2048 MB 400 MHz PC3200 (depending on model)	Maximum	64 GB max (using optional 333 MHz PC2700 DDR) 32 GB max (using optional 400 MHz PC3200 DDR)
Type	2-way interleaved PC3200 DDR SDRAM running at 400 MHz or PC2700 DDR SDRAM running at 333 MHz						
Standard	1024 MB 400 MHz PC3200 (depending on model) 2048 MB 400 MHz PC3200 (depending on model)						
Maximum	64 GB max (using optional 333 MHz PC2700 DDR) 32 GB max (using optional 400 MHz PC3200 DDR)						
<b>Network Controller</b>	Five network ports total: Four (4) PCI-X Gigabit embedded ports consisting of two (2) NC7781 and one (1) dual port NC7782 One 10/100 iLO NIC dedicated to management <b>NOTE:</b> Must use a HP BladeSystem p-class server blade enclosure with enhanced backplane to utilize all four NIC ports (HP P/N's 281404-B22, 243564-B22 or 380625-B22).						

### Standard Features

**Expansion Slots** No PCI slots; all features are integrated  
**I/O cable connectors:**  
(2)USB 1.1 ports, (1) video port, (1) iLO port and (1) kernel debug port  
(2) I/O cables ship with every server blade enclosure  
Tested USB devices (keyboard, mouse, floppy) are listed in the "Options" section of this QuickSpecs

**Integrated Manageability** Integrated Lights-Out (iLO) Management Advanced (ASIC on the system board)

**Internal Storage** Hard Drives None ship standard  
**Maximum Internal Storage** Hot Plug SCSI drive cage 600GB 2 x 300GB U320, hard drives

**Graphics** Integrated ATI Rage XL Video Controller with 8-MB SDRAM Video Memory

**Graphics Resolution Supported** Resolution Color Depths Depths 1280 x 1024, 64k, 256, 16  
1024 x 768, 16.7M, 64k, 256, 16  
800 x 600, 16.7M, 64k, 256, 16  
640 x 480, 16.7M, 64k, 256, 16

**Fiber Channel on the HP ProLiant BL45p server blade** Two optional fiber channel adapters are supported by the HP ProLiant BL45p. Both adapters are mezzanine circuit boards which connect directly to the server blade system board. These optional fiber channel adapters are available via option kits and must be ordered separately.

- QLogic-based
  - Utilizes a QLogic chipset
  - The HP ProLiant BL25/45p dual-port Fibre Channel Adapter (P/N 381881-B21) is compatible with the HP ProLiant BL25p and BL45p server blades. It cannot be used with an HP ProLiant BL20p or HP ProLiant BL35p server blade.
  - Includes two small form factor pluggable transceivers with LC connectors for installation into the Patch Panel 2, CGESM or GbE2 Interconnect Switch (with the Storage Connectivity Kit.)
- Emulex-based
  - Utilizes an Emulex Thor chipset
  - The Emulex-based FC Mezzanine for HP p-Class BladeSystem dual port Fibre Channel HBA (P/N 394588-B21) is compatible with the HP ProLiant BL25p, 35p SATA model, and 45p server blades. It cannot be used with an HP ProLiant BL20p or HP ProLiant BL35p SAS model server blade.
  - There are no SFPs included in the Emulex mezzanine kit for use with ProLiant BL p-Class Fibre Channel pass-through interconnects. If you require SFPs for use with an Emulex mezzanine and a FC pass through interconnect please order an SFP option kit (P/N 397577-B21) which will provide 2 FC SFPs per option kit.
- Two ports on each Dual-port Fibre Channel Mezzanine Card provide a redundant Fibre Channel connection to each server blade
- Supports up to 2 Gb/s Fibre Channel equipment

### Standard Features

#### Compatible SAN

HP ProLiant BL45p server blades are optimized for StorageWorks arrays:

- HSG80 (MA8000, EMA12000, EMA16000); EVA5000; EVA3000; XP48, XP128, XP512, XP1024; HP StorageWorks Modular Smart Array 1000 and 1500

HP ProLiant BL45p server blades are compatible with select 3rd party SANs (please see blade storage page for more details:

<http://h18000.www1.hp.com/products/servers/proliant-bl/p-class/storage.html>

#### ProLiant Essentials Foundation Pack Software for the ProLiant BL Server Blades

##### HP Systems Insight Manger

HP Systems Insight Manager (HP SIM) provides a unified, secure and extensible environment to centrally manage servers, storage and other infrastructure devices across multiple operating system platforms.

Through a single management view, HP SIM provides core management services that include device discovery and identification, event views, health monitoring, inventory data collection, software version control and reporting. HP SIM is built on industry standards and is extensible with value-added ProLiant Essentials, Integrity Essentials and Storage Essentials software to meet individual management needs. For more details on HP SIM visit

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

HP SIM provides organizations with the following benefits:

- Simplifies and consolidates infrastructure lifecycle management using task and query based functionality
- Provides the foundation for infrastructure automation and virtualization
- Enables IT management based on business processes not hardware platforms
- Lowers infrastructure maintenance cost and frees resources for innovation
- Maximizes resource utilization with virtualization technologies
- Provides a central point of integration between infrastructure and Enterprise management tools such as HP OpenView

##### ProLiant Essentials Rapid Deployment Pack

Rapid Deployment Pack (RDP) is an automated deployment and provisioning solution for all ProLiant servers. RDP includes the Altiris Deployment Solution and ProLiant Integration Module featuring ProLiant server pre-configured events for OS installation, and optimized software drivers, firmware and management agents. Every RDP CD includes 10-node trial licenses for evaluation purposes. RDP requires a license for each server deployed and is available for purchase with blade servers. For more information, visit

<http://www.hp.com/servers/rdp>.

### Standard Features

Insight Management Agents	<p>Insight Management Agents should be installed on all HP servers to present system instrumentation, health and configuration information into HP Systems Insight Manager and the HP System Management Homepage. The HP System Management Homepage aggregates systems data from Insight Management Agents and other HP management tools, providing a consolidated browser-based interface for managing individual servers,</p> <p>Insight Management Agents and The HP System Management Homepage are included on ProLiant Support Packs, and can also be installed using the server profiles provided with the ProLiant Essentials Rapid Deployment Pack. For additional information about the Management Agents and the HP System Management Homepage please visit the management Web site at <a href="http://www.hp.com/servers/manage">http://www.hp.com/servers/manage</a></p>
Subscriber's Choice	<p>Subscriber's Choice Driver and Support Alerts/Notifications is a web-based email subscription service that provides software and driver change notifications for ProLiant products. Sign up at <a href="http://www.hp.com/go/subscriberschoice">http://www.hp.com/go/subscriberschoice</a> and customize your profile to receive various new alerts as they become available, on a weekly or monthly basis.</p>
ROMPaq, support software, and configuration utilities	<p>The latest software, drivers, and firmware fully optimized and tested for your ProLiant server and options, available in the RDP CD, SmartStart or downloadable from Software and Drivers download pages, linked from the SmartStart website at <a href="http://www.hp.com/go/support">http://www.hp.com/go/support</a></p>
Insight Diagnostics	<p>The most advanced configuration analysis, reporting and troubleshooting utilities used by HP and at your fingertips, available in SmartStart.</p>

**NOTE:** For more information regarding ProLiant Essentials Software, please see the following URL: <http://www.hp.com/servers/proliantessentials>

### Optional ProLiant Essentials Value Packs

Optional software offerings that selectively extend the functionality of an Adaptive Infrastructure to address specific business problems and needs:

- Intelligent Networking Pack - detects and analyzes network bottlenecks or broken network linkages and steers traffic to the optimum route based on network conditions, plus it provides an extra layer of protection. The virus throttle feature of the solution slows the propagation of fast spreading virus.
- Performance Management Pack - a performance management solution that identifies and explains hardware performance bottlenecks on ProLiant servers and attached options enabling users to better utilize their valuable resources.
- Rapid Deployment Pack (RDP) is an automated deployment and provisioning solution for all ProLiant servers. RDP includes the ProLiant Integration Module featuring ProLiant server pre-configured events for OS installation, and optimized software drivers, firmware and management agents. Every RDP disc includes 10-node trial licenses for evaluation purposes. RDP requires a license for each server deployed and is available for purchase with HP servers. For more information, visit: <http://www.hp.com/servers/rdp>.
- Virtualization Management Software - Get the most out of server virtualization by unifying the management of physical and virtual servers in HP Systems Insight Manager. The Virtual Machine Management Pack plug-in provides central management and control of VMware and Microsoft virtual machines and provides physical host to virtual machine association. The Server Migration Pack plug-in automates the manual task of migrating servers between physical or virtual platforms
- Vulnerability and Patch Management Pack - identifies and remediates software security vulnerabilities due to missing patches as well operating system configurations that can be

### Standard Features

exploited by viruses, worms, and other blended threats

- Workload Management Pack - provides easier management of complex environments, improving overall server utilization and enabling Windows® 2000 customers for the first time to confidently deploy multiple applications on a single multiprocessor ProLiant Server.

**NOTE:** Flexible and volume quantity license kits are available for ProLiant Essentials Value Packs. Refer to <http://www.hp.com/servers/proliantessentials> or the various ProLiant Essentials Value Pack product QuickSpecs for more information.

#### SmartStart

SmartStart is a tool that simplifies single server setup, providing a rapid way to deploy reliable and consistent server configurations. SmartStart can now deploy the ProLiant BL45p server blades using the I/O port with an attached USB CD-ROM device. To obtain a copy of SmartStart for your blade server, redeem the coupon that is included with your Blade server or order your copy from the SmartStart web site. For more information, please visit the SmartStart Web site at <http://www.hp.com/servers/smartstart>.

#### OS Support Single-Core

Microsoft Windows 2000 Server  
Microsoft Windows 2000 Advanced Server  
Windows Server 2003, Standard Edition  
Windows Server 2003, Enterprise Edition  
Red Hat Enterprise Linux 3  
Red Hat Enterprise Linux 4 Update 2 (or greater)  
SuSE Linux Enterprise Server 8  
SuSE Linux Enterprise Server 9  
Solaris 10 32/64-bit

**NOTE:** 2.8 GHz and 2.6 GHz models

**NOTE:** For a complete and up-to-date listing of supported OSs and versions, please visit our OS Support Matrix at: <http://www.hp.com/go/supportos>.

**NOTE:** For an up-to-date listing of the latest drivers available for the HP ProLiant BL p-Class, please see: <http://h18004.www1.hp.com/support/files/server/us/family/model/5342.html>.

**NOTE:** For a more complete and up-to-date information on Linux support, please visit HP Linux Web site at: <http://h18000.www1.hp.com/products/servers/linux/hpLinuxcert.html>.

#### OS Support Dual-Core

Microsoft Windows 2000 Server (licensed by core)  
Microsoft Windows 2000 Advanced Server (licensed by core)  
Windows Server 2003, Standard Edition (licensed by processor socket)  
Windows Server 2003, Enterprise Edition (licensed by processor socket)  
Red Hat Enterprise Linux 3 Update 5 (or greater)  
Red Hat Enterprise Linux 4 Update 2 (or greater)  
SuSE Linux Enterprise Server 9 SP1 (or greater)  
Solaris 10 32/64-bit

**NOTE:** 1.8 GHz, 2.0 GHz, 2.2 GHz, 2.4 GHz and 2.6 GHz models

**NOTE:** For a complete and up-to-date listing of supported OSs and versions, please visit our OS Support Matrix at: <http://www.hp.com/go/supportos>.

**NOTE:** For an up-to-date listing of the latest drivers available for the HP ProLiant BL p-Class, please see: <http://h18004.www1.hp.com/support/files/server/us/family/model/5342.html>.

**NOTE:** For a more complete and up-to-date information on Linux support, please visit HP Linux Web site at: <http://h18000.www1.hp.com/products/servers/linux/hpLinuxcert.html>.

### Standard Features

#### Supported Software Options

VMware Virtualization Software

**NOTE:** For more information on HP's Certified and Supported HP ProLiant Servers, please visit the VMware Server Support Matrix at:

<http://h18004.www1.hp.com/products/servers/software/vmware/hpvmwarecert.html>

#### Intelligent Manageability

Integrated Lights-Out Advanced (iLO)

Virtual Text and Graphical Remote Console\*

Virtual CD-ROM\*

Virtual Floppy\*

Virtual Power Button Control

Dedicated LAN Connectivity

Automatic IP Configuration via DHCP/DNS/WINS

Industry Standard 128-bit Secure Sockets Layer (SSL) Security

IML and iLO Event Logging

Support for 12 user accounts with customizable access privileges

Automatic Server Recovery-2 (ASR-2)

HP Systems Insight Manager

Redundant ROM

Remote Flash ROM

ROM Based Setup Utility (RBSU)

Advanced Configuration and Power Interface Specification Ready (ACPI)

Server and Interconnect Switch Health Logs

Redundant Power Supply Utility

Pre-Failure Warranty (covers processors, as well as hard drives and memory)

Interconnect Switch Management System and Utilities (Interconnect Switch option)

Integrated Management Log (IML)

Dynamic sector repairing and drive parameter tracking (with Smart Array controllers)

Network adapter teaming set-up utility

**\*NOTE:** Advanced features such as Graphical Remote Console and Virtual Floppy are included with the BL p-Class server.

#### Availability

Dual-Port Fibre Channel Mezzanine Card for redundant SAN connection

Two hot-plug Ultra320 SCSI hard disk drive bays and integrated hardware RAID (Smart Array 6i) on every server blade (Battery-backed write cache is optional.)

Redundant ROM on each server blade

ECC Memory

Network adapter teaming (network fault tolerance, transmit load balancing, switch-assisted load balancing)

Interconnects Switch Availability

- Hot-plug and hot- remove with configuration retention and no need to cable/re-cable
- Two network connections per server blade bay (four NICs total) routed to two redundant interconnect switches
- Redundant Ethernet inter-switch communication with two sets of redundant Ethernet uplink ports per each interconnect switch
- Redundant front panel ports per each interconnect switch for diagnostics, management, and additional uplinks
- Redundant serial ports
- Compatibility with PVST+ (CGESM or GbE2 switch) and 802.1D Spanning tree protocol support for loop-free path redundancy
- Static IEEE 802.3ad (EtherChannel compatible) trunking with automatic port load balancing and failover

### Standard Features

- Redundant configuration files and operating system firmware images in memory (GbE2 switch)
- Redundant fans per each interconnect switch
- Redundant 1+1 power to each interconnect switch
- Support for ProLiant network adapter teaming
- Redundant configurable community strings and SNMP trap manager hosts
- Redundant configurable syslog server, DNS server, and default gateways (GbE2 switch)

### Security

Power-on password  
Administrator's password  
Integrated Lights-Out has 12 customizable user accounts and SSL encryption  
Integrated Lights-Out can be disabled via a Global Setting

### Factory Express Portfolio for Servers and Storage

HP Factory Express offers configuration, customization, integration and deployment services for HP servers and storage products. Customers can choose how their factory solutions are built, tested, integrated, shipped and deployed.

Factory Express offers service packages for simple configuration, racking, installation, complex configuration and design services as well as individual factory services, such as image loading, asset tagging, and custom packaging. HP products supported through Factory Express include a wide array of servers and storage: HP Integrity, HP ProLiant, HP ProLiant Server Blades, HP BladeSystem, HP 9000 servers as well as the MSA1000, VA7xxx, EVA, XP, rackable tape libraries and configurable network switches.

For more information on Factory Express services for your specific server model please contact your sales representative or go to <http://www.hp.com/go/factory-express>.

### Service and Support

This product is covered by a global limited warranty and supported by HP Services and a worldwide network of resellers and service providers. Hardware diagnostic support and repair is available for three years from date of purchase. Support for software and initial setup is available for 90 days from date of purchase. Additional support may be covered under the warranty or available for an additional fee. Enhancements to warranty services are available through HP Care Pack services or customized service agreements

**NOTE:** Server Blade Limited Warranty includes 3 year Parts, 3 year Labor, 3-year on-site support. This warranty supports the HP ProLiant BL20p, HP ProLiant 25p, and HP ProLiant 45p Server Blades.

**NOTE:** Server Blade Limited Warranty includes 3 year Parts, 1 year Labor, 1-year on-site support. This warranty supports the HP ProLiant 35p Server Blades.

**NOTE:** Server Blade Enclosure Limited Warranty includes 3 year Parts, 3 year Labor, 3-year on-site support.

**NOTE:** Server Blade Interconnect Limited Warranty includes 3 year Parts, 3 year Labor, 3-year on-site support.

**NOTE:** The p-Class SAN switch limited warranty is unique to the SAN switch which includes 1 year warranty that is upgradeable to 3 years via Care Pack

Additional information regarding worldwide limited warranty and technical support is available at: <http://h18004.www1.hp.com/products/servers/platforms/warranty/index.html>

The HP Care Pack service part numbers below for ProLiant BL p-Class server blades, cover the server blade and all HP branded hardware options qualified for the server, purchased at the same time or afterwards, internal to the server.

HP Care Pack services for HP BladeSystem p-Class server blade enclosure covers the enclosure including

### Standard Features

patch panels, HP supported Ethernet interconnects, power enclosure with power supplies and power distribution.

HP services provide continuous care and support expertise with committed response designed to meet your IT and business needs.

To fully capitalizing on your HP BladeSystem servers' capabilities requires a service partner who thoroughly understands your server technology and systems environment. HP Services, an industry leader in provision of multi vender support solutions provides a range of support services designed to meet the varying needs of business. Whether an SMB or large global corporation HP has a HP BladeSystem server support offer to help you speedily deploy and maximize system uptime.

Enhanced Care - Minimum recommended service support offer designed to ensure customers have access to expert assistance, whenever they need it.

4-Hour On-site Service, 5-Day x 13-Hour Coverage, 3 Years.

Continuance Care - Recommended service delivering cost-effective support options designed to extend HP Services committed response and guaranteed fix times, designed to speed problem identification and resolution.

4-Hour On-site Service, 7-Day x 24-Hour Coverage, 3 Years.

Total Care - Highest HP Support service level recommend to help increase IT performance and availability with comprehensive, integrated hardware and software services.

Support Plus 24 - Onsite HW support 24x7, 4hr response and Microsoft O/S SW Tech support offsite, onsite at HP's discretion, 24x7 2hr response time incl. HP holidays.

Deployment Services - HP Installation and Start Up services designed to take time, risk, and worry out of the deployment of HP BladeSystem servers - and free customers IT support staff to focus on what they do best, their business.

Installation & Start-Up service for HP BladeSystem Infrastructure plus HP BladeSystem Enhanced Network Installation and Start-UP as per the Customer Description and/or Data Sheet. To be delivered on a scheduled basis 8am-5pm, M-F, excl. HP holidays.

For a complete listing of service offerings and information visit:

<http://www.hp.com/services/bladessystemservices>

<http://www.hp.com/go/proliant/carepack>

### Models

#### Single-Core Models

<p>HP ProLiant BL45p 2.8 GHz-1MB SC 2GB (2P) 397814-B21</p>	<p><b>Processor(s)</b></p> <p><b>Cache Memory</b></p> <p><b>Memory</b></p> <p><b>Network Adapter</b></p> <p><b>Storage Controller</b></p> <p><b>Hard Drives</b></p> <p><b>Internal Storage</b></p> <p><b>Optical Drive</b></p> <p><b>Form Factor</b></p>	<p>(2) Single-Core AMD Opteron™ processors Model 854, 2.8 GHz standard (up to 4 supported)</p> <p>1MB Level 2 per cache core</p> <p>2048 MB (Standard) of PC3200 DDR SDRAM 400 MHz 32 GB (Maximum) of PC3200 DDR SDRAM 400 MHz 64 GB (Maximum) of PC2700 DDR SDRAM 333 MHz 2-way interleaved, 16 DIMM slots</p> <p>Four (4) PCI-X Gigabit embedded ports consisting of two (2) NC7781 and one (1) dual port NC7782 One additional 10/100 NIC dedicated to iLO Management</p> <p>Smart Array 6i Controller (integrated on system board)</p> <p>None ship standard</p> <p>Up to 600GB maximum (with optional, U320 hard disk drives)</p> <p>None</p> <p>Plugs vertically into HP BladeSystem p-Class Server Blade Enclosure</p>
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<p>HP ProLiant BL45p 2.6 GHz-1MB SC 1GB (1P) 374966-B21</p>	<p><b>Processor(s)</b></p> <p><b>Cache Memory</b></p> <p><b>Memory</b></p> <p><b>Network Adapter</b></p> <p><b>Storage Controller</b></p> <p><b>Hard Drives</b></p> <p><b>Internal Storage</b></p> <p><b>Optical Drive</b></p> <p><b>Form Factor</b></p>	<p>(1) Single-Core AMD Opteron™ processors Model 852, 2.6 GHz standard (up to 4 supported)</p> <p>1MB Level 2 per cache core</p> <p>1024 MB (Standard) of PC3200 DDR SDRAM 400 MHz 32 GB (Maximum) of PC3200 DDR SDRAM 400 MHz 64 GB (Maximum) of PC2700 DDR SDRAM 333 MHz 2-way interleaved, 16 DIMM slots</p> <p>Four (4) PCI-X Gigabit embedded ports consisting of two (2) NC7781 and one (1) dual port NC7782 One additional 10/100 NIC dedicated to iLO Management</p> <p>Smart Array 6i Controller (integrated on system board)</p> <p>None ship standard</p> <p>Up to 600GB maximum (with optional, U320 hard disk drives)</p> <p>None</p> <p>Plugs vertically into HP BladeSystem p-Class Server Blade Enclosure</p>
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### Models

#### Dual-Core Models

<b>HP ProLiant BL45p 2.6 GHz-1MB DC 2GB (2P) 406432-B21</b>	<b>Processor(s)</b>	(2) Dual-Core AMD Opteron™ processors Model 885, 2.6 GHz standard (up to 4 supported)
	<b>Cache Memory</b>	1MB Level 2 per cache core
	<b>Memory</b>	2048 MB (Standard) of PC3200 DDR SDRAM 400 MHz 32 GB (Maximum) of PC3200 DDR SDRAM 400 MHz 64 GB (Maximum) of PC2700 DDR SDRAM 333 MHz 2-way interleaved, 16 DIMM slots
	<b>Network Adapter</b>	Four (4) PCI-X Gigabit embedded ports consisting of two (2) NC7781 and one (1) dual port NC7782 One additional 10/100 NIC dedicated to iLO Management
	<b>Storage Controller</b>	Smart Array 6i Controller (integrated on system board)
	<b>Hard Drives</b>	None ship standard
	<b>Internal Storage</b>	Up to 600GB maximum (with optional, U320 hard disk drives)
	<b>Optical Drive</b>	None
	<b>Form Factor</b>	Plugs vertically into HP BladeSystem p-Class Server Blade Enclosure

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<b>HP ProLiant BL45p 2.4 GHz-1MB DC 2GB (2P) 399604-B21</b>	<b>Processor(s)</b>	(2) Dual-Core AMD Opteron™ processors Model 880, 2.4 GHz standard (up to 4 supported)
	<b>Cache Memory</b>	1MB Level 2 cache per core
	<b>Memory</b>	2048 MB (Standard) of PC3200 DDR SDRAM 400 MHz 32 GB (Maximum) of PC3200 DDR SDRAM 400 MHz 64 GB (Maximum) of PC2700 DDR SDRAM 333 MHz 2-way interleaved, 16 DIMM slots
	<b>Network Adapter</b>	Four (4) PCI-X Gigabit embedded ports consisting of two (2) NC7781 and one (1) dual port NC7782 One additional 10/100 NIC dedicated to iLO Management
	<b>Storage Controller</b>	Smart Array 6i Controller (integrated on system board)
	<b>Hard Drives</b>	None ship standard
	<b>Internal Storage</b>	Up to 600GB maximum (with optional, U320 hard disk drives)
	<b>Optical Drive</b>	None
	<b>Form Factor</b>	Plugs vertically into HP BladeSystem p-Class Server Blade Enclosure

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### Models

HP ProLiant BL45p 2.2 GHz-1MB DC 2GB (2P) 392220-B21	<b>Processor(s)</b>	(2) Dual-Core AMD Opteron™ processors Model 875, 2.2 GHz standard (up to 4 supported)
	<b>Cache Memory</b>	1MB Level 2 cache per core
	<b>Memory</b>	2048 MB (Standard) of PC3200 DDR SDRAM 400 MHz 32 GB (Maximum) of PC3200 DDR SDRAM 400 MHz 64 GB (Maximum) of PC2700 DDR SDRAM 333 MHz 2-way interleaved, 16 DIMM slots
	<b>Network Adapter</b>	Four (4) PCI-X Gigabit embedded ports consisting of two (2) NC7781 and one (1) dual port NC7782 One additional 10/100 NIC dedicated to iLO Management
	<b>Storage Controller</b>	Smart Array 6i Controller (integrated on system board)
	<b>Hard Drives</b>	None ship standard
	<b>Internal Storage</b>	Up to 600GB maximum (with optional, U320 hard disk drives)
	<b>Optical Drive</b>	None
	<b>Form Factor</b>	Plugs vertically into HP BladeSystem p-Class Server Blade Enclosure

HP ProLiant BL45p 2.0 GHz-1MB DC 2GB (2P) 374965-B21	<b>Processor(s)</b>	(2) Dual-Core AMD Opteron™ processors Model 870, 2.0 GHz standard (up to 4 supported)
	<b>Cache Memory</b>	1MB Level 2 cache per core
	<b>Memory</b>	2048 MB (Standard) of PC3200 DDR SDRAM 400 MHz 32 GB (Maximum) of PC3200 DDR SDRAM 400 MHz 64 GB (Maximum) of PC2700 DDR SDRAM 333 MHz 2-way interleaved, 16 DIMM slots
	<b>Network Adapter</b>	Four (4) PCI-X Gigabit embedded ports consisting of two (2) NC7781 and one (1) dual port NC7782 One additional 10/100 NIC dedicated to iLO Management
	<b>Storage Controller</b>	Smart Array 6i Controller (integrated on system board)
	<b>Hard Drives</b>	None ship standard
	<b>Internal Storage</b>	Up to 600GB maximum (with optional, U320 hard disk drives)
	<b>Optical Drive</b>	None
	<b>Form Factor</b>	Plugs vertically into HP BladeSystem p-Class Server Blade Enclosure

### Models

HP ProLiant BL45p 1.8 GHz-1MB DC 2GB (2P) 389563-B21	<b>Processor(s)</b>	(2) Dual-Core AMD Opteron™ processors Model 865, 1.8 GHz standard (up to 4 supported)
	<b>Cache Memory</b>	1MB Level 2 cache per core
	<b>Memory</b>	2048 MB (Standard) of PC3200 DDR SDRAM 400 MHz 32 GB (Maximum) of PC3200 DDR SDRAM 400 MHz 64 GB (Maximum) of PC2700 DDR SDRAM 333 MHz 2-way interleaved, 16 DIMM slots
	<b>Network Adapter</b>	Four (4) PCI-X Gigabit embedded ports consisting of two (2) NC7781 and one (1) dual port NC7782 One additional 10/100 NIC dedicated to iLO Management
	<b>Storage Controller</b>	Smart Array 6i Controller (integrated on system board)
	<b>Hard Drives</b>	None ship standard
	<b>Internal Storage</b>	Up to 600GB maximum (with optional, U320 hard disk drives)
	<b>Optical Drive</b>	None
	<b>Form Factor</b>	Plugs vertically into HP BladeSystem p-Class Server Blade Enclosure

### Configuration Information - Factory Integrated Models (North America only)

**NOTE:** For Configure to Order requirements within EMEA region, please consult local Sales Contact.

**NOTE:** HP does not allow factory integration of options into standard models listed above.

Configure-to-order servers must start with a CTO Chassis.

**NOTE:** This product offering does not support HP Factory Express Server Configuration Level 1.

**NOTE:** FIO indicates that this option only available as a Factory Installable Option.

### Step 1: Base Server Blade Configuration

Models	HP ProLiant BL45p MOD-FX (US)	390604-405
	<b>Configurable Model ships with:</b>	
	Two (2) PCI-X Gigabit embedded ports consisting of one (1) NC7782 Gigabit Dual Port PCI-X LOM	
	One additional 10/100 NIC dedicated to iLO Management	
	Smart Array 6i Controller (integrated on system board)	

### Step 2: Choose Required Options (one of the following from each list unless otherwise noted):

Processors	AMD Opteron™ 854 2.8 GHz-1M SC FIO BL45p	397816-L21
	<b>NOTE:</b> If 2 processors are desired, select one 397816-L21 and one 397816-B21	
	<b>NOTE:</b> If 4 processors are desired, select one 397816-L21 and three 397816-B21	
	AMD Opteron™ 852 2.6 GHz-1M SC FIO BL45p	390603-L21
	<b>NOTE:</b> If 2 processors are desired, select one 390603-L21 and one 390603-B21	
	<b>NOTE:</b> If 4 processors are desired, select one 390603-L21 and three 390603-B21	
	AMD Opteron™ 280 2.4 GHz-1M per core DC FIO BL45p	399605-L21
	<b>NOTE:</b> If 2 processors are desired, select one 399605-L21 and one 399605-B21	
	<b>NOTE:</b> If 4 processors are desired, select one 399605-L21 and three 399605-B21	
	AMD Opteron™ 865 1.8 GHz-1M per core DC FIO BL45p	390605-L21
	<b>NOTE:</b> If 2 processors are desired, select one 390605-L21 and one 390605-B21	
	<b>NOTE:</b> If 4 processors are desired, select one 390605-L21 and three 390605-B21	
	AMD Opteron™ 870 2.0 GHz-1M per core DC FIO BL45p	390606-L21
	<b>NOTE:</b> If 2 processors are desired, select one 390606-L21 and one 390606-B21	
	<b>NOTE:</b> If 4 processors are desired, select one 390606-L21 and three 390606-B21	
	AMD Opteron™ 875 2.2 GHz-1M per core DC FIO BL45p	392221-L21
	<b>NOTE:</b> If 2 processors are desired, select one 392221-L21 and one 392221-B21	
	<b>NOTE:</b> If 4 processors are desired, select one 392221-L21 and three 392221-B21	
	HP BL45p O885 2.6GHZ DC FIO Kit	406433-L21
	<b>NOTE:</b> If 2 processors are desired, select one 406433-L21 and one 406433-B21	
	<b>NOTE:</b> If 4 processors are desired, select one 406433-L21 and three 406433-B21	
	<b>NOTE:</b> One, two or four processor configurations supported only.	

### Configuration Information - Factory Integrated Models (North America only)

<b>Memory</b>	<p><b>NOTE:</b> Two-way memory interleaving is enabled when an identical pair of DIMMs is installed.</p> <p>1 GB PC3200 DDR SDRAM DIMM Memory Kit (2 x 512 MB) <span style="float: right;">376638-B21</span></p> <p><b>NOTE:</b> Must install in pairs</p> <p>2 GB PC3200 DDR SDRAM DIMM Memory Kit (2 x 1 GB) <span style="float: right;">376639-B21</span></p> <p><b>NOTE:</b> Must install in pairs</p> <p>4 GB PC3200 DDR SDRAM DIMM Memory Kit (2 x 2 GB) <span style="float: right;">379300-B21</span></p> <p><b>NOTE:</b> Must install in pairs</p> <p>8 GB PC2700 DDR SDRAM DIMM Memory Kit (2 x 4 GB) <span style="float: right;">395409-B21</span></p> <p><b>NOTE:</b> Must install in pairs</p>
<b>Communications</b>	<p><b>NOTE:</b> Must select one communications adapter, either the HP ProLiant BL25p/35/45p NIC Mezzanine or the HP ProLiant BL25p/35p/45p Dual NC370i Multifunction Network Adapter.</p> <p>HP ProLiant BL25/35/45p NIC Mezz FIO Base <span style="float: right;">382850-B21</span></p> <p><b>NOTE:</b> HP ProLiant BL25p/35/45p NIC Mezz contains two (2) NC7781 single port Gigabit NICs.</p> <p>Or upgrade to:</p> <p>HP ProLiant BL25p/35p/45p Dual NC370i Multifunction Network Adapter <span style="float: right;">384043-B21</span></p> <p><b>NOTE:</b> Accelerated iSCSI is not yet supported for Linux environments; RDMA and iSCSI boot is not yet supported for Windows or Linux environments. Future support is planned for all of these features.</p> <p><b>NOTE:</b> A minimum of 1 GB of memory per port is required for NC370x adapters, with a maximum of two NC370x ports permitted in a server.</p>

### Step 3: Choose Additional Options for Factory Integration

**NOTE:** For additional options, including server blade enclosure with enhanced backplanes, interconnect options and power subsystem options; please refer to the "Options" section below.

### Options

ProLiant Essentials Value Pack Software	<b>ProLiant Essentials Intelligent Networking Pack Windows Edition and Linux Edition</b>	
	ProLiant Essentials Intelligent Networking Pack - Windows Edition, Single Server License	372906-B21
	<b>NOTE:</b> For use with a single server. Contains one license with a unique license activation key and documentation.	
	ProLiant Essentials Intelligent Networking Pack Linux Edition, Single Server License	397004-B21
	<b>NOTE:</b> For use with a single server. Contains one license with a unique license activation key and documentation.	
	<b>NOTE:</b> For additional ProLiant Intelligent Networking Pack License Kits please see the QuickSpecs at:	
	<a href="http://h18000.www1.hp.com/products/quickspecs/12062_div/12062_div.HTML">http://h18000.www1.hp.com/products/quickspecs/12062_div/12062_div.HTML</a>	
	<a href="http://h18000.www1.hp.com/products/quickspecs/12327_div/12327_div.HTML">http://h18000.www1.hp.com/products/quickspecs/12327_div/12327_div.HTML</a>	
	<b>ProLiant Essentials Performance Management Pack</b>	
	ProLiant Essentials Performance Management Pack, Single-Server License	306696-B21
<b>NOTE:</b> For use with a single server. Contains one license with a unique license activation key, HP Management CD and documentation.		
<b>NOTE:</b> The most recent version of the software can always be downloaded at <a href="http://www.hp.com/products/pmp">http://www.hp.com/products/pmp</a> .		
<b>NOTE:</b> For additional ProLiant Performance Management Pack License Kits please see the QuickSpecs at:		
<a href="http://h18000.www1.hp.com/products/quickspecs/11925_div/11925_div.HTML">http://h18000.www1.hp.com/products/quickspecs/11925_div/11925_div.HTML</a>		
<b>ProLiant Essentials Rapid Deployment Pack</b>		
Rapid Deployment Pack, Single-Server License	267196-B21	
<b>NOTE:</b> This license allows 1 server to be deployed and managed via RDP.		
Rapid Deployment Pack, Single-Server License (Japan)	267196-291	
<b>NOTE:</b> This license allows 1 server to be deployed and managed via RDP.		
<b>NOTE:</b> For additional ProLiant Essentials Rapid Deployment Pack License Kits please see the QuickSpecs at:		
<a href="http://h18000.www1.hp.com/products/quickspecs/11053_div/11053_div.HTML">http://h18000.www1.hp.com/products/quickspecs/11053_div/11053_div.HTML</a>		
<b>ProLiant Essentials Server Migration Pack</b>		
ProLiant Essentials Server Migration Pack, Single-Migration License	375345-B21	
<b>NOTE:</b> Contains one license, enabling 1 server migration, with a unique license activation key and documentation.		
<b>NOTE:</b> This license allows 1 server to be migrated from a physical server to a virtual machine. Or this license can be used to migrate a virtual machine from one virtualization layer i.e. VMware GSX to a different virtualization layer such as VMware ESX or Microsoft Virtual Server 2005.		
<b>NOTE:</b> For additional ProLiant Server Migration Pack License Kits please see the QuickSpecs at:		
<a href="http://h18000.www1.hp.com/products/quickspecs/12328_div/12328_div.HTML">http://h18000.www1.hp.com/products/quickspecs/12328_div/12328_div.HTML</a>		
<b>ProLiant Essentials Workload Management Pack</b>		
ProLiant Essentials Workload Management Pack, Single Server License	303284-B21	
<b>NOTE:</b> For additional ProLiant Workload Management Pack License Kits please see the QuickSpecs at:		
<a href="http://h18000.www1.hp.com/products/quickspecs/11452_div/11452_div.HTML">http://h18000.www1.hp.com/products/quickspecs/11452_div/11452_div.HTML</a>		
<b>ProLiant Essentials Virtual Machine Management Pack</b>		

### Options

<p>ProLiant Essentials Virtual Machine Management Pack, Single-Server License  <b>NOTE:</b> For use with a single server. Contains one license with a unique license activation key and documentation.  <b>NOTE:</b> For additional ProLiant Virtual Machine Management Pack License Kits please see the QuickSpecs at:  <a href="http://h18000.www1.hp.com/products/quickspecs/12328_div/12328_div.HTML">http://h18000.www1.hp.com/products/quickspecs/12328_div/12328_div.HTML</a>  <b>ProLiant Essentials Vulnerability and Patch Management Pack</b></p>	<p>372214-B21</p>
<p>ProLiant Essentials Vulnerability and Patch Management Pack, Single-Server License  <b>NOTE:</b> For use with a single server. Contains one license with a unique license activation key and documentation.  <b>NOTE:</b> For additional ProLiant Vulnerability and Patch Management Pack License Kits, please see the QuickSpecs at:  <a href="http://h18000.www1.hp.com/products/quickspecs/12111_div/12111_div.HTML">http://h18000.www1.hp.com/products/quickspecs/12111_div/12111_div.HTML</a>  <b>NOTE:</b> Flexible and volume quantity license kits are available for ProLiant Essentials Value Packs. Refer to <a href="http://www.hp.com/servers/proliantessentials">http://www.hp.com/servers/proliantessentials</a> or the various ProLiant Essentials Value Pack product QuickSpecs for more information.  <b>NOTE:</b> For more information regarding ProLiant Essentials Software, please see the following URL: <a href="http://www.hp.com/servers/proliantessentials">http://www.hp.com/servers/proliantessentials</a>.</p>	<p>371645-B21</p>

<p><b>HP Control Tower BladeSystem p-class Management Software</b></p>	<p>HP Control Tower for HP BladeSystem, Single Server License. No media included.  <b>NOTE:</b> For use with a single blade server. Contains one license with a single unique license activation key.</p>	<p>412957-B21</p>
	<p>HP Control Tower for HP BladeSystem, Eight-pack (8-pack) Server License. No media included.  <b>NOTE:</b> For use with eight (8) blade servers. Contains eight (8) licenses with a single unique license activation key.</p>	<p>412958-B21</p>
	<p>HP Control Tower for HP BladeSystem, Flexible License. No media included.  <b>NOTE:</b> For use with multiple servers (minimum of 5). This part number can be used to purchase multiple licenses with a single activation key. The quantity ordered for this part number will be the quantity of licenses included in the kit in the form of a corresponding activation key. Use the same key to activate all licenses in the actual quantity ordered. For a given order, one kit will be delivered with the activation key.</p>	<p>412959-B21</p>

<p><b>Processors</b></p>	<p>Single-Core AMD Opteron™ Model 854 processor 2.8 GHz/1 M</p>	<p>397816-B21</p>
	<p>Single-Core AMD Opteron™ Model 852 processor 2.6 GHz/1 M</p>	<p>390603-B21</p>
	<p>Dual-Core AMD Opteron™ Model 885 processor 2.6 GHz/1 M</p>	<p>406433-B21</p>
	<p>Dual-Core AMD Opteron™ Model 880 processor 2.4 GHz/1 M</p>	<p>399605-B21</p>
	<p>Dual-Core AMD Opteron™ Model 865 processor 1.8 GHz/1 M</p>	<p>390605-B21</p>
	<p>Dual-Core AMD Opteron™ Model 870 processor 2.0 GHz/1 M</p>	<p>390606-B21</p>
	<p>Dual-Core AMD Opteron™ Model 875 processor 2.2 GHz/1 M</p>	<p>392221-B21</p>

### Options

Memory (SDRAM DIMMs)	8 GB PC2700 DDR SDRAM DIMM Memory Kit (2 x 4 GB)	395409-B21
	<b>NOTE:</b> Must install in pairs	
	4 GB PC3200 DDR SDRAM DIMM Memory Kit (2 x 2 GB)	379300-B21
	<b>NOTE:</b> Must install in pairs	
2 GB PC3200 DDR SDRAM DIMM Memory Kit (2 x 1 GB)		376639-B21
	<b>NOTE:</b> Must install in pairs	
1 GB PC3200 DDR SDRAM DIMM Memory Kit (2 x 512 MB)		376638-B21
	<b>NOTE:</b> Must install in pairs	

Hard Drives	<b>Ultra320 SCSI - Universal Hot Plug</b>	
	HP 300GB U320 10K Universal HDD	350964-B22
	HP 146GB U320 10K Universal HDD	286716-B22
	HP 72GB U320 10K Universal HDD	286714-B22
	HP 300GB U320 15K Universal HDD	411089-B22
	HP 146GB U320 15K Universal HDD	347708-B22
	HP 72GB U320 15K Universal HDD	286778-B22
	HP 36GB U320 15K Universal HDD	286776-B22

Communications	HP ProLiant BL25/35/45p Dual NC370i Multifunction Network Adapter	384043-B21
	<b>NOTE:</b> Accelerated iSCSI is not yet supported for Linux environments; RDMA and iSCSI boot is not yet supported for Windows or Linux environments. Future support is planned for all of these features.	
	<b>NOTE:</b> A minimum of 1 GB of memory per port is required for NC370x adapters, with a maximum of two NC370x ports permitted in a server.	

Storage Controllers	128MB Battery Backed Write Cache Enabler Option Kit	346914-B21
	<b>NOTE:</b> 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: <a href="http://h18000.www1.hp.com/products/quickspecs/12030_div/12030_div.HTML">http://h18000.www1.hp.com/products/quickspecs/12030_div/12030_div.HTML</a> (Smart Array 6i)	

### Options

<b>ProLiant BL45p Fibre Channel Adapter</b> (shared with the BL25p)	<p>Emulex based BL25/35/45p Dual Port Fibre Channel HBA</p> <p><b>NOTE:</b> SFPs for use with pass through SAN switches not included with the Emulex based Fibre Channel Mezzanine card. If SFPs required please order the SFP option kit (P/N 397577-B21) which includes 2 2Gb SFPs per option kit.</p> <p>HP 2-2Gb SFP for Fibre Channel pass through kit</p> <p><b>NOTE:</b> Must select if SFP for use with pass through SAN switches is required when ordering Emulex based Fibre Channel Mezzanine card for HP p-Class BladeSystem (P/N 394757-B21).</p> <p>QLogic based Dual port Fibre Channel Adapter (2-Gb) for ProLiant BL25/45p</p> <p><b>NOTE:</b> When using this card, the Patch Panel 2, CGESM, or GbE2 Interconnect Switch (with Storage Connectivity Kit) must be used to provide the Fibre Channel pass through.</p> <p><b>NOTE:</b> Supports BL25p/45p only.</p>	<p>394588-B21</p> <p>397577-B21</p> <p>381881-B21</p>
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<b>HP BladeSystem p-Class Other Options</b>	<p>HP BladeSystem p-Class Diagnostic Station</p> <p><b>NOTE:</b> The Diagnostic Station allows access to the HP ProLiant p-Class server blades and the BL p-Class interconnect switch outside of the server blade enclosure. The option provides power and a data interface so that "offline" upgrade and diagnostic functions may be performed.</p> <p>HP BladeSystem p-Class Diagnostic Station Upgrade Kit for the HP ProLiant BL45p server blade.</p>	<p>230743-B21</p> <p>309329-B21</p>
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### Tape Libraries

#### HP StorageWorks MSL6000 Tape Library

##### Ultrium 960 technology

HP StorageWorks MSL6030 1 Ultrium 960 Dr LVDS Library	AD606B
HP StorageWorks MSL6030 1 Ultrium 960 Dr FC Library	AD608B
HP StorageWorks MSL6030 2 Ultrium 960 Dr LVDS Library	AD607B
HP StorageWorks MSL6030 2 Ultrium 960 Dr FC Library	AD609B

##### Ultrium 460 technology

HP StorageWorks MSL6030 1 Ultrium 460 Dr LVDS Library	AD598B
HP StorageWorks MSL6030 1 Ultrium 460 Dr FC Library	AD600B
HP StorageWorks MSL6030 2 Ultrium 460 Dr FC Library	AD601B

**NOTE:** Please reference the [MSL6000 Tape Library QuickSpecs at http://www.hp.com/go/automation](http://www.hp.com/go/automation) for additional information needed to create a complete solution; reference current compatibility information at <http://www.hp.com/go/ebs>

#### HP StorageWorks Virtual Library Systems

HP StorageWorks 6105 Virtual Library System	AF728A
HP StorageWorks 6510 Virtual Library System	AF729A
HP StorageWorks 6840 Virtual Library System	AG051A
HP StorageWorks 6109 Virtual Library System	AG167A
HP StorageWorks 6518 Virtual Library System	AG168A
HP StorageWorks 6870 Virtual Library System	AG169A

### Options

**NOTE:** Please reference the VLS Tape Libraries 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>

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HP StorageWorks Modular Smart Array 1000	HP StorageWorks Modular Smart Array 1000 <b>NOTE:</b> Please see the Modular Smart Array 1000 QuickSpecs for additional options and configuration information at <a href="http://h18000.www1.hp.com/products/quickspecs/11033_div/11033_div.HTML">http://h18000.www1.hp.com/products/quickspecs/11033_div/11033_div.HTML</a> (Worldwide)	201723-B22
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HP StorageWorks Modular Smart Array 1500 cs	Modular Smart Array 1500 Controller Shelf <b>NOTE:</b> Please see the StorageWorks Modular SAN Array 1500 cs QuickSpecs for additional options and configuration information at: <a href="http://www.hp.com/go/MSA1500cs">http://www.hp.com/go/MSA1500cs</a>	AA986A
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Cluster Options	<b>NOTE:</b> For configuration/certification options for the HP Parallel Database Cluster for Oracle RAC please go to: <a href="http://www.hp.com/solutions/highavailability/oracle">http://www.hp.com/solutions/highavailability/oracle</a>	
	HP Serviceguard for Linux and Red Hat Global File System - 1 year subscription	T2798AA#001
	HP Serviceguard for Linux and Red Hat Global File System - 3 years subscription	T2798AA#003
	HP Serviceguard for Linux, A.11.16 for SUSE SLES 9 & 10 and Red Hat 3 & 4 (single license version)	307754-B26
	HP Serviceguard for Linux ProLiant Cluster, A.11.16 (for SUSE SLES 9 & 10 and Red Hat EL 3 & 4 (2 node cluster kit)	305199-B26
	<b>NOTE:</b> For additional information regarding the HP Serviceguard for Linux License, please see the following QuickSpecs at: <a href="http://h18000.www1.hp.com/products/quickspecs/11518_div/11518_div.html">http://h18000.www1.hp.com/products/quickspecs/11518_div/11518_div.html</a> (Worldwide)	

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USB Options	HP USB 2-Button Optical Mouse (Carbonite)	DC172B
	HP USB 04 Standard Keyboard	DT528A#xxx
	USB 2.0 4-port HUB	DG954A
	HP 1GB Drive Key II- USB 2.0 Flash Drive	AG382AA
	HP 512MB DriveKey II- USB Flash Drive	ED516AA
	USB Optical Scroll Mouse (Carbonite)	DD441B
	256MB Hp Drive Key II (USB 2.0)	PH657A

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HP Rack 5000 Series (Metallic Carbonite)	HP5642 Rack-Unassembled <b>NOTE:</b> Please see the HP Rack 5642 QuickSpecs for additional part numbers and Technical Specifications such as height, width, depth, weight, and color: <a href="http://h18000.www1.hp.com/products/quickspecs/12074_div/12074_div.HTML">http://h18000.www1.hp.com/products/quickspecs/12074_div/12074_div.HTML</a> (Worldwide) <b>NOTE:</b> For additional information regarding Rack Cabinets, please see the following URL: <a href="http://www.hp.com/go/rackandpower">http://www.hp.com/go/rackandpower</a>	358254-B21
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### Options

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

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

[http://h18000.www1.hp.com/products/quickspecs/12402\\_div/12402\\_div.HTML](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)	10642 (42U) Infrastructure Rack (Low Voltage)	379005-001
	10642 (42U) Infrastructure Rack (High Voltage)	379006-001
	HP S10614 (14U) Rack Cabinet - Shock Pallet	292302-B22
	HP Rack 10842 (42U, 800mm wide) Rack Cabinet - Pallet	257415-B21
	HP Rack 10842 (42U, 800mm wide) Rack Cabinet - Shock Pallet	257415-B22
	HP 10647 (47U) Rack Cabinet - Pallet	245160-B21
	HP 10647 (47U) Rack Cabinet - Shock Pallet	245160-B23
	HP Rack 10622 (22U) Cabinet - Pallet	245163-B21
	HP Rack 10622 (22U) Cabinet - Shock Pallet	245163-B22
	HP Rack 10622 (22U) Cabinet - Crated	245163-B23

**NOTE:** xxxxx-B21 (pallet) used to ship empty racks shipped on a truck. xxxxx-B22 (shock pallet) used to ship racks with equipment installed (by custom systems, VARs and Channels). xxxxx-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.

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

[http://h18000.www1.hp.com/products/quickspecs/10995\\_div/10995\\_div.HTML](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>.

### Options

<b>Monitors and Keyboards</b>	TFT7210R Rack Mounted 17" Monitor	348373-B21
	<b>NOTE:</b> For a complete list of Monitors please view the following URL: <a href="http://www.hp.com/go/kvm">http://www.hp.com/go/kvm</a>	
	TFT7600 Rack Mounted 17" Monitor - US	AG052A
	TFT7600 Rack Mounted 17" Monitor - UK	AG053A
	TFT7600 Rack Mounted 17" Monitor - GR	AG054A
	TFT7600 Rack Mounted 17" Monitor - FR	AG055A
	TFT7600 Rack Mounted 17" Monitor - IT	AG056A
	TFT7600 Rack Mounted 17" Monitor - SP	AG057A
	TFT7600 Rack Mounted 17" Monitor - DEN	AG058A
	TFT7600 Rack Mounted 17" Monitor - NOR	AG059A
	TFT7600 Rack Mounted 17" Monitor - SE/FI	AG060A
	TFT7600 Rack Mounted 17" Monitor - SWI	AG061A
	TFT7600 Rack Mounted 17" Monitor - PORT	AG062A
	TFT7600 Rack Mounted 17" Monitor - BEL	AG063A
	TFT7600 Rack Mounted 17" Monitor - JPN2	AG064A
	TFT7600 Rack Mounted 17" Monitor - RUS	AG065A
	TFT7600 Rack Mounted 17" 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
	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
	<b>NOTE:</b> For additional information regarding Rack Options, please see the following URL: <a href="http://h18000.www1.hp.com/products/servers/proliantstorage/rack-options/index.html">http://h18000.www1.hp.com/products/servers/proliantstorage/rack-options/index.html</a> .	

### Options

<b>HP KVM Switch Options</b>	HP BladeSystem CAT5 KVM Interface Adapter - 1 pack	AF100A
	HP KVM CAT5 0x1x8 Server Console	336044-B21
	HP KVM CAT5 0x2x16 Server Console Switch	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	373045-B21
	<b>NOTE:</b> Cat5e cables are required to connect Interface Adapters to Consoles Switches. Cat52 cables can be found at the following URL: <a href="http://www.hp.com/go/kvm">http://www.hp.com/go/kvm</a>	
	HP 1x4 USB/PS2 KVM Switch, TT (NA/JPN)	371301-D71
	HP 1x4 USB/PS2 KVM Switch, TT (AU/NZ)	371301-011
	HP 1x4 USB/PS2 KVM Switch, TT (UK)	371301-031
	HP 1x4 USB/PS2 KVM Switch, TT (EU)	371301-A21
	HP 1x4 USB/PS2 KVM Switch, RM (ALL)	371302-B21
	HP PS2 KVM Cable with audio, 6'-2-pack	371730-B21
	HP USB KVM Cable with audio, 6'-2-pack	371729-B21
	<b>NOTE:</b> For additional information regarding KVM switches, Serial Console servers, rack mount monitors, keyboards and all related options please see the following URL: <a href="http://www.hp.com/go/kvm">http://www.hp.com/go/kvm</a>	

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<b>HP Serial Console Server Options</b>	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
	<b>NOTE:</b> 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: <a href="http://www.hp.com/go/kvm">http://www.hp.com/go/kvm</a> .	
	2x1x16 IP Console Switch with Virtual Media	AF601A
	4x1x16 IP Console Switch with Virtual Media	AF602A
	2x16 Server Console Switch with Virtual Media	AF600A
	USB Virtual Media Interface Adapter	AF603A
	PS/2 Virtual Media Interface Adapter, 1 pack	AF604A
	<b>NOTE:</b> Requires PS/2 and one USB port on server.	
	<b>NOTE:</b> For additional information regarding KVM switches, Serial Console servers, rack mount monitors, keyboards and all related options please see the following URL: <a href="http://www.hp.com/go/kvm">http://www.hp.com/go/kvm</a> .	

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### Options

#### Service and Support Offerings (HP Care Pack Services)

**NOTE:** The HP Care Pack service part numbers below for HP BladeSystem p-Class server blades, cover the server blade and all HP branded hardware options qualified for the server, purchased at the same time or afterwards, internal to the server.

##### Hardware Services On-site Service

4-Hour On-site Service, 5-Day x 13-Hour Coverage, 3 Years, Electronic	UD187E
4-Hour On-site Service, 7-Day x 24-Hour Coverage, 3 Years, Electronic	UD188E
6-Hour Call to Repair, On-site Service, 7-Day x 24-Hour Coverage, 3 Years, Electronic	UD189E

**NOTE:** The HP Care Pack service part numbers below for HP BladeSystem p-Class server blade enclosure covers the enclosure including patch panels, HP supported Ethernet interconnects, power enclosure with power supplies and power distribution.

##### Hardware Services On-site Service

4-Hour On-site Service, 5-Day x 13-Hour Coverage, 3 Years, Electronic	HC031E
4-Hour On-site Service, 7-Day x 24-Hour Coverage, 3 Years, Electronic	HC032E
6-Hour Call to Repair, On-site Service, 7-Day x 24-Hour Coverage, 3 Years, Electronic	HC033E

**NOTE:** The HP Care Pack service part numbers below covers the HP BladeSystem Brocade and McData SAN Switches.

##### Hardware Services On-site Service

Next Business Day On-site Service, 5-Day x 9-Hour Coverage, 3 Years, Electronic	UC007E
4-Hour On-site Service, 5-Day x 13-Hour Coverage, 3 Years, Electronic	UC008E
4-Hour On-site Service, 7-Day x 24-Hour Coverage, 3 Years, Electronic	UC009E
6-Hour Call to Repair, On-site Service, 7-Day x 24-Hour Coverage, 3 Years, Electronic	UC023E

##### Installation & Start-up Services

HP Installation & Startup Service for HP BladeSystem Infrastructure	UC905E
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**NOTE:** provides for an integrated hardware and software implementation that includes remote service planning, onsite deployment of hardware and software, installation verification testing and customer orientation. Hardware deployment covers the installation of a single BladeSystem enclosure that include server blades (up to 16), Ethernet network interconnect, and power options. Software deployment covers the installation and configuration of HP Systems Insight Manager (SIM), HP Rapid Deployment Pack (RDP), and deploy up to two operating system editions of either Windows or Linux, using scripted operating system installation software.

ProLiant BL p-Class Blade Server Hardware Installation, Electronic	UA219E
HP BladeSystem p-Class Enclosure and Server Blade Hardware Installation, Electronic	UA4971E
Installation and Start-up of Rapid Deployment Pack, Electronic	U5683E

**NOTE:** Provides for the installation on a Customer supplied server designated as a Deployment Server. Includes the deployment of a single server. This new server will be deployed using either one of the pre-configured scripts or an image. In addition, the service will provide for the capture and storage of the configuration of the newly deployed server and orientation on product usage. To be delivered during standard office hours, standard office days.

Provides for the Installation and Start-up of Rapid Deployment Pack Implementation of Rapid Deployment Pack (Basic) (Electronic)	UA042E
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### Options

HP ProLiant Essentials Vulnerability and Patch Management Pack Installation and Startup Service. (Electronic)	UC929E
<b>NOTE:</b> Service coverage: onsite installation of the Vulnerability and Patch Management (VPM) software on a customer designated server, configuration of the VPM software to acquire security patches, enabling the VPM software to scan up to five (5) systems, applying the security patches to the designated servers, generating a report from VPM that shows the vulnerability assessment results, and providing customer with an orientation to the software.	
Provides for the Installation and Start-up of System Insight Manager (Electronic)	UA041E
Provides for the Installation and Start-up of System Insight Manager (Electronic)	UA040E
<b>NOTE:</b> For more information, customer/resellers can contact <a href="http://www.hp.com/hps/carepack/services/">http://www.hp.com/hps/carepack/services/</a>	
<b>Software Operating Environment Care Packs</b>	
Microsoft Software Operating Environment Software Telephone 9x5 - 3 incident (Electronic)	U8169E
Red Hat Software Operating Environment Software Telephone 9x5 - 10 incident (Electronic)	U3402E
SUSE Software Operating Environment Software Telephone 9x5 - 3 incident (Electronic)	U9615E
ProLiant Essentials Operating Environment, - 5 Day, 8x5,1 year, 3 incident (Electronic)	U8222E
<b>NOTE:</b> For more information, customer/resellers can contact <a href="http://www.hp.com/hps/carepack/services/">http://www.hp.com/hps/carepack/services/</a>	

### Memory

#### HP ProLiant BL45p Server Blade (2P Models)

##### DIMM Installation Rules:

1. All DIMMs must be either PC3200 DDR 400 MHz SDRAM DIMMS or PC2700 DDR 400 MHz SDRAM DIMMS.
2. Both DIMM slots in a memory bank must be populated.
3. Both DIMM slots in a memory bank must be identical.
4. Processor 1 memory bank 1 must always be populated.
5. Populate DIMMs beginning with the farthest slots from the processor, starting with the SMALLEST DIMMs first, moving in towards the processor.
6. If only installing 1 GB DIMMs, ensure that the Dual Rank DIMMs are installed closest to the processor. Dual Rank can be determined by looking for the "2R" or "2Rx8" wording on the label of the DIMM.
7. For optimal performance in most applications, populate memory bank 1 for every populated processor socket.
8. DIMM banks are active only when the corresponding processor socket is populated.

##### Standard Memory

2048 MB PC3200 Registered DDR SDRAM DIMM installed (4 x 512 MB SDRAM DIMM)

##### Standard Memory Plus Optional Memory

Up to 26624 MB of DDR SDRAM DIMM memory is available with the installation of optional DDR SDRAM DIMM memory expansion kits (requires four processors to be installed).

##### Standard Memory Replaced with Optional Memory

Up to 32768 MB of DDR SDRAM DIMM memory is available with the removal of standard memory and the installation of optional SDRAM DDR DIMM memory expansion kits (requires four processors to be installed).

Up to 65536 MB of PC2700 DDR SDRAM DIMM memory is available with the removal of standard memory and the installation of optional PC2700 DDR SDRAM DIMM memory expansion kits (requires four processors to be installed).

Memory		Slot							
Standard	2048 MB	1	2	3	4	5	6	7	8
		512 MB	512 MB	Empty	Empty	512 MB	512 MB	Empty	Empty
		9	10	11	12	13	14	15	16
		Empty	Empty	Empty	Empty	Empty	Empty	Empty	Empty
Optional	26624 MB	1	2	3	4	5	6	7	8
		512 MB	512 MB	2048MB	2048MB	512 MB	512 MB	2048MB	2048MB
		9	10	11	12	13	14	15	16
		2048 MB	2048 MB	2048 MB	2048 MB	2048 MB	2048 MB	2048 MB	2048 MB
PC3200 Maximum	32768 MB	1	2	3	4	5	6	7	8
		2048 MB	2048 MB	2048 MB	2048 MB	2048 MB	2048 MB	2048 MB	2048 MB
		9	10	11	12	13	14	15	16
		2048 MB	2048 MB	2048 MB	2048 MB	2048 MB	2048 MB	2048 MB	2048 MB
PC2700 Maximum	65536 MB	1	2	3	4	5	6	7	8
		4096 MB	4096 MB	4096 MB	4096 MB	4096 MB	4096 MB	4096 MB	4096 MB
		9	10	11	12	13	14	15	16
		4096 MB	4096 MB	4096 MB	4096 MB	4096 MB	4096 MB	4096 MB	4096 MB

### Memory

Following are memory options available from HP:

- 8 GB PC2700 DDR SDRAM DIMM Memory Kit (2 x 4 GB) 395409-B21
- 4 GB PC3200 DDR SDRAM DIMM Memory Kit (2 x 2 GB) 379300-B21
- 2 GB PC3200 DDR SDRAM DIMM Memory Kit (2 x 1 GB) 376639-B21
- 1 GB PC3200 DDR SDRAM DIMM Memory Kit (2 x 512 MB) 376638-B21

#### HP ProLiant BL45p Server Blade (1P Model)

##### Standard Memory

1024 MB PC3200 400MHz Registered DDR SDRAM DIMM installed

##### Standard Memory Plus Optional Memory

Up to 26624 MB of DDR SDRAM DIMM memory is available with the installation of optional DDR SDRAM DIMM memory expansion kits (requires four processors to be installed).

##### Standard Memory Replaced with Optional Memory

Up to 32768 MB of DDR SDRAM DIMM memory is available with the removal of standard memory and the installation of optional DDR SDRAM DIMM memory expansion kits (requires four processors to be installed).

Up to 65536 MB of PC2700 DDR SDRAM DIMM memory is available with the removal of standard memory and the installation of optional PC2700 DDR SDRAM DIMM memory expansion kits (requires four processors to be installed).

Memory		Slot							
Standard	1024 MB	1	2	3	4	5	6	7	8
		512 MB	512 MB	Empty	Empty	Empty	Empty	Empty	Empty
		9	10	11	12	13	14	15	16
		Empty	Empty	Empty	Empty	Empty	Empty	Empty	Empty
Optional	26624 MB	1	2	3	4	5	6	7	8
		512 MB	512 MB	2048 MB	2048 MB	512 MB	512 MB	2048 MB	2048 MB
		9	10	11	12	13	14	15	16
		2048 MB	2048 MB	2048 MB	2048 MB	2048 MB	2048 MB	2048 MB	2048 MB
PC3200 Maximum	32768 MB	1	2	3	4	5	6	7	8
		2048 MB	2048 MB	2048 MB	2048 MB	2048 MB	2048 MB	2048 MB	2048 MB
		9	10	11	12	13	14	15	16
		2048 MB	2048 MB	2048 MB	2048 MB	2048 MB	2048 MB	2048 MB	2048 MB
PC2700 Maximum	65536 MB	1	2	3	4	5	6	7	8
		4096 MB	4096 MB	4096 MB	4096 MB	4096 MB	4096 MB	4096 MB	4096 MB
		9	10	11	12	13	14	15	16
		4096 MB	4096 MB	4096 MB	4096 MB	4096 MB	4096 MB	4096 MB	4096 MB

## Memory

Following are memory options available from HP:

- |  |            |
|--|------------|
| • 8 GB PC2700 DDR SDRAM DIMM Memory Kit (2 x 4 GB)   | 395409-B21 |
| • 4 GB PC3200 DDR SDRAM DIMM Memory Kit (2 x 2 GB)   | 379300-B21 |
| • 2 GB PC3200 DDR SDRAM DIMM Memory Kit (2 x 1 GB)   | 376639-B21 |
| • 1 GB PC3200 DDR SDRAM DIMM Memory Kit (2 x 512 MB) | 376638-B21 |

### Technical Specifications

System Unit	<b>Dimensions (HxWxD)</b>	3.425 x 10.29 x 28.00 in (8.699 x 26.14 x 71.1 cm)		
	<b>Weight (maximum)</b>	36 lb (16.33 kg)		
	<b>Temperature Range*</b>	Operating	50° to 95° F (10° to 35° C)	
		Shipping	-40° to 140° F (-40° to 60° C)	
		Storage	-4° to 140° F (-20° to 60° C)	
		Maximum Wet Bulb Temperature	86° F (30° C)	
	<b>Relative Humidity (non-condensing)**</b>	Operating	10% to 90%	
		Shipping	10% to 90%	
		Storage	10% to 95%	

**\*NOTE:** All temperature ratings shown are for sea level. An altitude derating of 1°C per 304.8 m (1.8°F per 1,000 ft) to 3048 m (10,000 ft) is applicable. No direct sunlight allowed. Upper operating limit is 3,048m (10,000 ft) or 70 Kpa/10.1 psia. Upper non-operating limit is 9,144 m (30,000 ft) or 30.3 KPa/4.4 psia.

**\*\*NOTE:** Storage maximum humidity of 95% is based on a maximum temperature of 45°C (113°F). Altitude maximum for storage corresponds to a pressure minimum of 70 KPa.

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