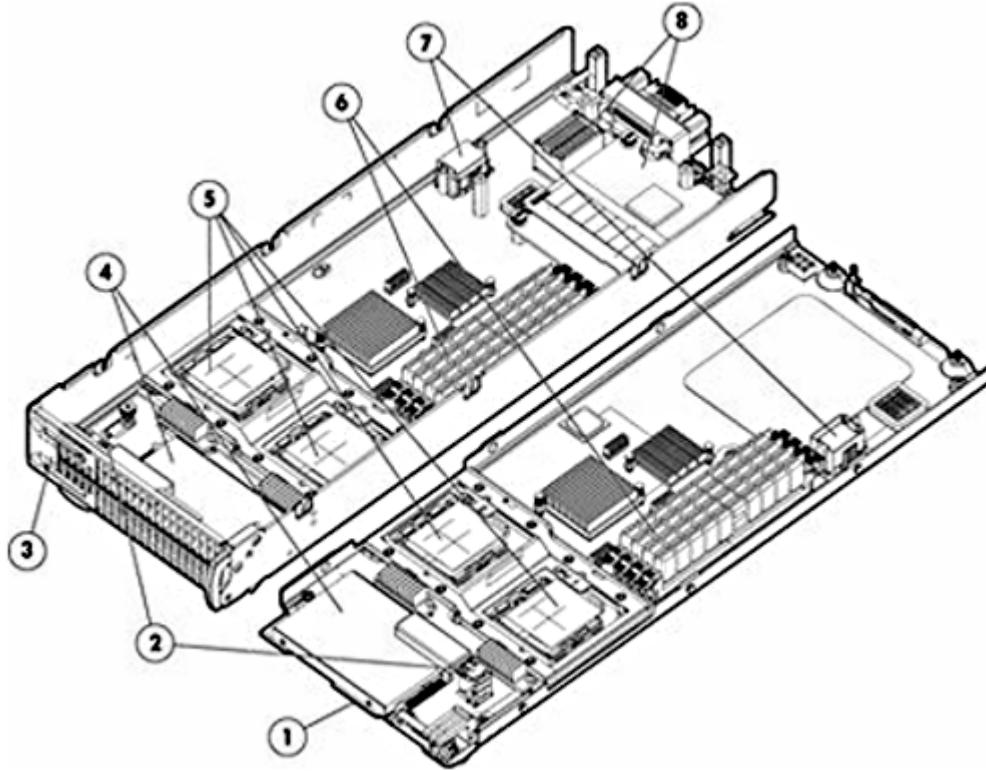


### Overview



### HP ProLiant BL2x220c Generation 5 (G5) Server Blade

- |  |  |
|--|--|
| 1. Server B  | 5. Up to two Quad-Core or Dual-Core Intel® Xeon® processors    |
| 2. Internal USB Connector  | 6. Four (4) PC2-5300, Registered DIMMs (DDR2-667) Memory Slots |
| 3. Server A  | 7. Server interconnection                                      |
| 4. Small form factor (SFF) SATA drive (or battery carriage for storage controller) | 8. Type I Mezzanine slots (1 per node)                         |

### What's New

- Support for I/O Accelerator Mezzanine Options

### At A Glance

This document covers the HP ProLiant BL2x220c G5 server blade only. For more information on HP BladeSystems c-Class Enclosures and HP BladeSystem c-Class Interconnect Components, please see the following QuickSpecs:

HP BladeSystem c-Class c3000 Enclosure QuickSpecs:

[http://h18004.www1.hp.com/products/quickspecs/12790\\_div/12790\\_div.html](http://h18004.www1.hp.com/products/quickspecs/12790_div/12790_div.html)

### Overview

HP BladeSystem c-Class c7000 Enclosure QuickSpecs:

[http://h18004.www1.hp.com/products/quickspecs/12810\\_div/12810\\_div.html](http://h18004.www1.hp.com/products/quickspecs/12810_div/12810_div.html)

HP BladeSystem c-Class Interconnect Components QuickSpecs:

[http://h18000.www1.hp.com/products/quickspecs/12524\\_div/12524\\_div.html](http://h18000.www1.hp.com/products/quickspecs/12524_div/12524_div.html)

The HP ProLiant BL2x220c provides maximum 2-socket x86 server blade density with benchmark leading power efficiency. HP ProLiant BL2x220c server blade includes 2 server nodes per blade providing up to 256 processor sockets/1024 processor cores in 40U of rack space. All specifications listed per node (2 nodes per blade chassis):

- **Processor:**
    - Up to two Quad-Core Intel® Xeon® 5400 sequence processors
    - Up to two Dual-Core Intel® Xeon® 5200 sequence processors
    - Intel 5100 chipset supporting up to a 1333 MHz Front Side Bus
    - 667 MHz, 1066 MHz or 1333MHz Front Side Bus
  - **Memory:**
    - Up to 32 GB (4 x 8 GB) of memory, supported by (4) slots of PC2-5300 Registered DIMMs, 667 MHz
    - Low-power memory support
    - Advanced ECC memory support
    - Memory interleaving (2x1)
  - **Internal Drive Support:**
    - 1 non-hot plug small form factor SATA drive (120GB or 250GB)
    - 1 non-hot plug small form factor Solid State Drive (SSD) (32GB or 64GB)
  - **Network Controller:**
    - Embedded Dual-port NC326i Gigabit Server Adapter
  - **Mezzanine Support:**
    - One (1) I/O expansion slots via mezzanine card (Type I only)
      - Dual-Port Fibre Channel Mezzanine (4-Gb) options for SAN connectivity (Choice of Emulex or QLogic)
      - Ethernet adapter Mezzanine options for additional network ports
      - 4X DDR InfiniBand (IB) Mezzanine (20 Gb/s) options for low latency server interconnectivity
  - **Internal USB Support:**
    - One (1) internal USB 2.0 connector for security key devices and USB drive keys
  - **Form Factor:**
    - Half height c-Class Server Blade
  - **Infrastructure Management:**
    - HP ProLiant Onboard Administrator (powered by the HP Integrated Lights-Out 2 management processor) for simplified server setup, health monitoring and recovery, power and thermal control, and lights-out remote administration.
    - 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, control and optimize your IT infrastructure through a single, simple management console. Insight Control supports both Windows and Linux-based central management servers.
    - HP Insight Dynamics for ProLiant, a product option, is an integrated command center that enables IT Staff personnel to continuously analyze and optimize a converged infrastructure, while automating and reducing the cost of common data center tasks by as much as 40 percent. This ultimately enables them to dynamically keep pace with the organization's changing business requirements.
  - **Operating Systems:**
    - Supports Windows, Linux, Netware, and Solaris Operating Systems
  - **Enclosures:**
    - HP offers three different c-Class server blade enclosures to meet your individual needs:
      - The HP BladeSystem c7000 rack enclosure is 10U high and holds up to 16 ProLiant BL2x220c Blades (32 server nodes) plugged vertically.
- NOTE:** Ten (10) fans are required in the c7000 enclosure.

### Overview

- The HP BladeSystem c3000 rack enclosure is 6U high and holds up to 8 HP ProLiant BL2x220c Blades (16 server nodes) plugged horizontally.
- The HP BladeSystem c3000 tower enclosure is designed with casters for sites without racks and holds up to 8 HP ProLiant BL2x220c Blades (16 server nodes) plugged vertically.  
**NOTE:** Six (6) fans are required in the c3000 enclosure.
- Server blades, storage blades, interconnect modules, power supplies, fans, and redundant Onboard Administrator modules are all designed to fit into the c3000 and c7000 enclosures.
- For additional enclosure information, please see:  
<http://h18004.www1.hp.com/products/blades/components/enclosures/c-class/index.html>
- **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; refer to the specific hard drive QuickSpecs for details.  
**NOTE:** Server warranty includes 1 year Parts, 1 year Labor, 1-year on-site support. 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>

### Standard Features

**NOTE:** For a brief, printer friendly data sheet that describes this product and informs you of the essential capabilities and specifications, please visit: [http://h18004.www1.hp.com/products/quickspecs/DS\\_00123/DS\\_00123.pdf](http://h18004.www1.hp.com/products/quickspecs/DS_00123/DS_00123.pdf)

#### Processor

##### Quad-Core Processor Option Kits

**NOTE:** BL2x220c G5 does not support 1600 FSB or 120W and 150W processors.

Quad-Core Intel® Xeon® processor L5430 (2.66 GHz, 133 FSB, 50W)

Quad-Core Intel® Xeon® processor L5420 (2.50 GHz, 1333 FSB, 50W)

Quad-Core Intel® Xeon® processor L5410 (2.33 GHz, 1333 FSB, 50W)

**NOTE:** Offered through Configure-To-Order only. See Factory Integrated Models section for more details.

Quad-Core Intel® Xeon® processor E5450 (3.00 GHz, 1333FSB, 80W)

Quad-Core Intel® Xeon® processor E5440 (2.83 GHz, 1333 FSB, 80W)

**NOTE:** Offered through Configure-To-Order only. See Factory Integrated Models section for more details.

Quad-Core Intel® Xeon® processor E5430 (2.66 GHz, 1333 FSB, 80W)

**NOTE:** Offered through Configure-To-Order only. See Factory Integrated Models section for more details.

Quad-Core Intel® Xeon® processor E5420 (2.50 GHz, 1333 FSB, 80W)

**NOTE:** Offered through Configure-To-Order only. See Factory Integrated Models section for more details.

Quad-Core Intel® Xeon® Processor E5410 (2.33 GHz, 1333 FSB, 80W)

**NOTE:** Offered through Configure-To-Order only. See Factory Integrated Models section for more details.

##### Dual-Core Processor Option Kits

Dual-Core Intel® Xeon® processor X5260 (3.33 GHz, 1333 FSB, 80W)

**NOTE:** Offered through Configure-To-Order only. See Factory Integrated Models section for more details.

Dual-Core Intel® Xeon® processor L5240 (3.00 GHz, 1333 FSB, 40W)

**NOTE:** Offered through Configure-To-Order only. See Factory Integrated Models section for more details.

Dual-Core Intel® Xeon® processor E5205 (1.86 GHz, 1066 FSB, 65W)

**NOTE:** Offered through Configure-To-Order only. See Factory Integrated Models section for more details.

**NOTE:** Intel® 5400 series processors are Quad-Core and support 64-bit Intel VT. Intel®.

**NOTE:** For the Intel® 5400 series, the letter preceding the model number indicates the performance/wattage of the processor. "X" denotes High Performance/Wattage; "E" denotes Enterprise Performance/Wattage (Mainstream); and "L" denotes Lower Wattage.

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#### Upgradeability

Upgradeable to 2 processors per server node.

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#### Cache Memory

2x6 MB shared L2 cache (5400 Sequence)

1x6 MB shared L2 cache (5200 Sequence)

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### Standard Features

Chipset Intel®-5100 chipset

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Memory

Type	PC2-5300 DDR2 Registered DIMMS at 667 MHz
Standard	4 GB (2 x 2 GB) per server node
Maximum	32 GB (4 x 8 GB) per server node

**NOTE:** Memory must be installed in pairs.

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Network Controller

Dual-port Broadcom 5715S based Gigabit Ethernet network adapter per server node  
One (1) additional 10/100 network adapter dedicated to iLO 2 Management per server node

**NOTE:** The Gigabit Ethernet adapters transmit from the server only at 2000 Mbps, full duplex per port. However, within a Linux environment, the speed can be reduced or "throttled" using a feature available within the Linux operating system; see the white paper at <http://h71028.www7.hp.com/ERC/downloads/4AA1-5513ENW.pdf> for more information. The 10 Gigabit KX-4 NC512m adapter transmits from the server only at 20 Gbps (20,000 Mbps), full duplex.

Once the adapter signal reaches the interconnect within the blade enclosure and communicates outside the blade enclosure to the LAN, the blade interconnect uplink types and settings determine the cable media, speed, duplex mode, and auto negotiation mode. Interconnects are available with Ethernet uplinks supporting 10/100/1000T, 10/100/1000 SFP, 1000 SX fiber, and 10Gb KX-4.

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I/O Expansion Slots One I/O expansion x8mezzanine Type I slot per server node

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Integrated Manageability ProLiant Onboard Administrator (powered by the Integrated Lights-Out 2 management processor)

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Maximum Internal Storage	Non-Hot Plug Serial ATA (SATA)	250GB SATA	1 x 250GB Serial ATA (Per server node)
	Non-Hot Plug SSD (SATA)	64GB SATA	1 x 64GB SATA (Per server node)

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Graphics Integrated ATI RN-50 1600x1280x64K 16M color (64 MB DDR1 memory)

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Graphics Resolution Supported	Resolution	Color	Depths	Depths
				1600x1280, 64K, 256, 16
				1280 x 1024, 16.7M, 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	

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### Standard Features

**Dynamic Power Capping** Dynamic Power Capping enables you to limit the power consumption of the enclosure, by setting an enclosure Dynamic Power Cap within the Onboard Administrator. The enclosure Dynamic Power Cap will be shared amongst all of the installed devices and individual server caps will be changed to match the server load. This will optimize the performance of the servers while ensuring that the enclosure stays below the Dynamic Power Cap value.

Requires:

- Onboard Administrator V2.32 or later
- iLO V1.70 or later for each server
- iLO Advanced for BladeSystem for each server
- Latest ROM BIOS for each server

See: <http://www.hp.com/go/powercapping> for more information

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**Partner Blade Support** Partner blades such as the PCI Expansion Blade, Tape Blade and SB40c are not supported on the BL2x220c.

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**Virtual Connect Support** Virtual Connect will only be supported with version 1.30 or later of the HP c-Class Virtual Connect Firmware. This firmware release may also require other subsystem firmware upgrades please consult <http://h18004.www1.hp.com/products/blades/components/c-class-compmatrix.html> for more information.

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**Onboard Administrator** The BL2x220c is supported with Onboard Administrator firmware version 2.20 or later. This firmware release may also require other subsystem firmware upgrades please consult <http://h18004.www1.hp.com/products/blades/components/c-class-compmatrix.html> for more information.

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**Fibre Channel on the HP ProLiant BL2x220c server blade** One optional Fibre Channel HBA is supported per node by the HP ProLiant BL2x220c. Mezzanine circuit boards connect directly to the server blade system board. Fibre Channel HBAs are available via option kits and must be ordered separately.

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**Compatible SAN** HP ProLiant BL2x220c server blades are optimized for HP StorageWorks MSA, EVA and XP

HP ProLiant BL2x220c 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/c-class/storage.html>)

### Standard Features

HP Insight management software	HP Insight Foundation	Managing the growing number of servers can be complex and expensive for your organization. IT managers need to address changing business needs with tools that meet the challenges of managing today's complex Datacenters.
		HP provides management solutions that are designed to simplify a server's installation, configuration and maintenance throughout the entire server lifecycle. This provides the customer with higher levels of operational efficiency and highly reliable systems: <a href="http://www.hp.com/go/foundation">www.hp.com/go/foundation</a> .
		The foundation pack includes:
		<ul style="list-style-type: none"><li>● HP SmartStart</li><li>● HP Management</li><li>● HP ProLiant Firmware Maintenance</li></ul>
		SmartStart version supported (minimum): SmartStart 8.15 <a href="http://www.hp.com/servers/smartstart">http://www.hp.com/servers/smartstart</a>
	ProLiant Onboard Administrator	HP ProLiant Onboard Administrator (powered by the HP Integrated Lights-Out 2 management processor) simplifies server setup, health monitoring, power and thermal control, and lights-out remote administration of ProLiant ML, DL, and BL servers. HP ProLiant Onboard Administrator functions without additional software, and can be accessed from any location via a web browser. It works hand-in-hand with HP Systems Insight Manager, Insight Control suites, and the Insight Dynamics for ProLiant helping customers unlock the value of the ProLiant platform and deliver the highest possible quality of IT service to the business. See <a href="http://www.hp.com/go/ProLiantOA">www.hp.com/go/ProLiantOA</a>
	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.
		Two versions of Insight Control are available, to serve environments requiring either a Linux-based or a Windows-based central management server: HP Insight Control for Linux, and HP Insight Control. See <a href="http://www.hp.com/go/insightcontrol">www.hp.com/go/insightcontrol</a>
		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, please visit: <a href="http://www.hp.com/services/insight">http://www.hp.com/services/insight</a> .
	HP Insight Dynamics for ProLiant	HP Insight Dynamics for ProLiant, a product option, is an integrated command center that enables IT Staff personnel to continuously analyze and optimize a converged infrastructure, while automating and reducing the cost of common data center tasks by as much as 40 percent. As a powerfully integrated by design toolkit to accelerate complex technology projects and simplify daily operations that ultimately enable IT Staff personnel to dynamically keep pace with the organizations changing business requirements. It enables them to plan capacity and power continuously,

### Standard Features

balance across physical and virtual resources, and ensure cost-effective high availability. It also enables IT organizations to provision infrastructure consistently and automatically from pools of shared resources using a self-service portal. Resources provisioned can range from a single virtual machine to complex multi-tier environments and their associated physical and virtual resource requirements. In addition to the previous functional benefits, it also provides a cost-effective disaster recovery for physical and virtual environments that works with HP StorageWorks Continuous Access software for both the Enterprise Virtual Array and the XP storage array allowing application environments to be reactivated in minutes with the touch of a button to a remote location.

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

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#### OS Support

Microsoft Windows Server 2003 R2  
Microsoft Windows Small Business Server 2003 R2  
Microsoft Windows Server 2008  
Microsoft Windows Small Business Server 2008  
Microsoft Windows Essential Server 2008  
Oracle Enterprise Linux (OEL)  
Red Hat Enterprise Linux  
SUSE Linux Enterprise Server  
Sun Solaris for x64/x86-based Systems

**NOTE:** For more information on HP's Certified and Supported ProLiant Servers for OS and Virtualization Software and latest listing of software drivers available for your server, please visit our Support Matrix at: <http://www.hp.com/go/support> our driver download page <http://www.hp.com/support/BL2x220cG5>

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#### Availability

- Dual-Port Fibre Channel Mezzanine Card per server node for redundant SAN connection
- Two (2) embedded Gigabit Ethernet adapters per server node for redundant LAN connections
- Advanced ECC Memory - can correct a multi-bit error (up to 4 bits) that occurs within one memory chip
- Network adapter teaming (network fault tolerance, transmit load balancing, switch-assisted load balancing)
- Emergency Recovery ROM

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#### Industry Standard Compliance

ACPI 2.0 Compliant  
PCI 2.2 Compliant  
WOL Support  
Microsoft® Logo certifications  
USB 2.0 Support

### Standard Features

#### Security

- One (1) internal USB 2.0 connector for security key devices and USB drive keys on each server node
- Power-on password
- Administrator's password
- Integrated Lights-Out 2 has 12 customizable user accounts and SSL encryption
- Integrated Lights-Out 2 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 MSAxxx, VA7xxx, EVA, XP, rackable tape libraries and configurable network switches.

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

#### HP Enterprise Configurator

The HP eConfigure Enterprise Configurator now provides factory default racking for our HP hardware portfolio. This approach is aligned with our strategic direction to meet the needs and expectations of our valued customers. If you require "custom" rack configuration, please contact HP's Customer Business Center or an Authorized Partner for assistance. <http://www.hp.com/products/configurator>.

#### Service and Support

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.

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

The HP Care Pack service for HP ProLiant BL c-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.

To fully capitalize 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.

**Recommended Service** - Simplify ProLiant solution implementation, maintenance and management.

- **Support Service** - 4-Hour Response Coverage, 3-Year, 24 x 7, Same Business Day
- **Deployment Service** - Installation and Start Up for HP BladeSystem Infrastructure

**Enhanced Service** - Optimize service level to increase IT performance and availability

### Standard Features

- **Support Service** - HP Proactive BladeSystem Service, 1-Year
- **Deployment Service** - Enhanced Network Installation and Start-up for HP BladeSystem Switches

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, excluding HP holidays.

For a complete listing of service offerings and information visit:

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

<http://h20219.www2.hp.com/services/us/en/warranty/carepack-servers-proliant.html>

### Models

#### Quad-Core Models

**NOTE:** The BL2x220c supports 2 server nodes in each Blade. All options listed are per server node.

HP ProLiant BL2x220c G5 L5430 4G (2P) 483265-B21	<b>Processor(s)</b> One of the following depending on model	(2) Quad-Core Intel® Xeon® processor L5430 ((2.66 GHz, 1333 FSB, 50W) per server node (2) Quad-core Intel® Xeon® Processor E5450 (3.0 GHz, 1333 FSB,80W) per server node (2) Quad-core Intel® Xeon® Processor L5420 (2.5 GHz, 1333 FSB. 50W) per server node
HP ProLiant BL2x220c G5 E5450, 4G (2P) 483264-B21	<b>Cache Memory</b>	2 x 6 MB Level 2 cache (5400 Sequence)
HP ProLiant BL2x220c G5 L5420, 4G, (2P) 467696-B21	<b>Memory</b>	4 GB (2 x 2 GB) PC2-5300, Registered DDR2-667 per server node
	<b>Network Adapter</b>	Dual 1GbE NC326i plus (1) additional 10/100 NIC dedicated to iLO 2 Management per server node
	<b>Storage Controller</b>	Embedded SATA
	<b>Hard Drives</b>	No drives included: 1 x Non-Hot Plug SATA drive bay
	<b>Internal Storage</b>	250GB Non-Hot Plug SFF SATA per server node. 64GB Non-Hot Plug SSD SATA per server node.
	<b>Optical Drive</b>	None
	<b>Form Factor</b>	Up to 8 half-height blades(16 server nodes) supported in HP BladeSystem c3000 Enclosure Up to 16 half-height blades (32 server nodes) supported in HP BladeSystem c7000 Enclosure

### 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 CTO product offerings and requirements.

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

Configure-to-order server blades must start with a CTO Blade.

**NOTE:** FIO indicates that this option is a Factory Installable Option.

### Step 1: Base Server Blade Configuration (Select CTO Blade, Server A and Server B)

Models	HP ProLiant BL2x220c G5 CTO Blade	461897-B21
	HP ProLiant BL2x220c G5 Server A CTO Blade	465400-B21
	HP ProLiant BL2x220c G5 Server B CTO Blade	465401-B21

**NOTE:** When ordering a BL2x220c all three parts CTO Blade, Server A and Server B must be included on the order. The Server A and Server B blades allow for configuration of each server node with CPUs, Memory and other options. It is not possible to order any of these 3 parts independently.

#### Configurable Model ships with:

Embedded 1GbE NC326i Dual-port Gigabit Server Adapter per server node plus one (1) additional 10/100 network adapter dedicated to iLO 2 Management  
Integrated Lights-Out 2 Standard Blade Edition per server node

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

#### HP Processors

For single processor configuration choose:

**NOTE:** Up to 2 processors per server node.

**NOTE:** If 2 processors are desired, select one xxxxx-L21 and one xxxxx-B21.

#### Quad-Core Processor Option Kits

Quad-Core Intel® Xeon® processor L5430 (2.66 GHz, 133 FSB, 50W), FIO Base	483266-L21
Quad-Core Intel® Xeon® processor L5420 (2.5 GHz, 1333 FSB, 50W), FIO Base	466658-L21
Quad-Core Intel® Xeon® processor L5410 (2.33 GHz, 1333 FSB, 50W), FIO Base	466660-L21
Quad-Core Intel® Xeon® processor E5450 (3.0 GHz, 1333 FSB, 80W), FIO Base	466650-L21
Quad-Core Intel® Xeon® processor E5440 (2.83 GHz, 1333 FSB, 80W), FIO Base	466652-L21
Quad-Core Intel® Xeon® processor E5430 (2.66 GHz, 1333 FSB, 80W), FIO Base	466656-L21
Quad-Core Intel® Xeon® processor E5420 (2.50 GHz, 1333 FSB, 80W), FIO Base	466663-L21
Quad-Core Intel® Xeon® processor E5410 (2.33 GHz, 1333 FSB, 80W), FIO Base	466665-L21

#### Dual-core Process Option Kits

Dual-Core Intel® Xeon® processor X5260 (3.33 GHz, 1333 FSB, 80W), FIO Base	483895-L21
Dual-Core Intel® Xeon® processor L5240 (3.0 GHz, 1333 FSB, 40W), FIO Base	466654-L21
Dual-Core Intel® Xeon® processor E5205 (1.86 GHz, 1333 FSB, 65W), FIO Base	466669-L21

#### Memory

2 GB REG PC2-5300 2 x 1 GB Single Rank Kit	408851-B21
4 GB REG PC2-5300 2 x 2 GB Low Power Single Rank Kit	483401-B21
4 GB REG PC2-5300 2 x 2 GB Dual Rank Kit	408853-B21



### Configuration Information - Factory Integrated Models

8 GB REG PC2-5300 2 x 4 GB Dual Rank Kit	408854-B21
8 GB REG PC2-5300 2 x 4 GB Low Power Dual Rank Kit	483403-B21
16 GB REG PC2-5300 2 x 8 GB Dual Rank Kit	408855-B21

**NOTE:** Supports up to 2 DIMM kits (4 DIMMs) per server node.

**NOTE:** Must be installed in pairs.

### Step 3: Choose Additional Options for Factory Integration (One per server node)

**NOTE:** For additional options, including server blade enclosures interconnect options and power subsystem options; please see the options section below; or the following QuickSpecs:

HP BladeSystem c-Class Enclosures QuickSpecs:

HP BladeSystem c-Class c7000 Enclosure QuickSpecs:

[http://h18004.www1.hp.com/products/quickspecs/12810\\_div/12810\\_div.html](http://h18004.www1.hp.com/products/quickspecs/12810_div/12810_div.html)

HP BladeSystem c-Class c3000 Enclosure QuickSpecs:

[http://h18004.www1.hp.com/products/quickspecs/12790\\_div/12790\\_div.html](http://h18004.www1.hp.com/products/quickspecs/12790_div/12790_div.html)

and HP BladeSystem c-Class Interconnect Components QuickSpecs:

[http://h18000.www1.hp.com/products/quickspecs/12524\\_div/12524\\_div.html](http://h18000.www1.hp.com/products/quickspecs/12524_div/12524_div.html).

#### HP Hard Drives

**NOTE:** The components of a storage subsystem (e.g. the drive, the HBA/controller, 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; refer to the specific hard drive QuickSpecs for details.

#### SATA Non-Hot Plug Solid State Drive (SSD)

HP 64GB 1.5G SATA NHP SFF SP ENT SSD	461203-B21
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HP 32GB 1.5G SATA NHP SFF SP ENT SSD	461201-B21
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**NOTE:** One per server node.

#### SATA Non-Hot Plug SFF (2.5-inch) Entry (ETY) Drives

HP 250GB 3G SATA 5.4K rpm SFF (2.5-inch) Non-hot Plug Entry 1y Wty Hard Drive	460357-B21
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HP 120GB 1.5G SATA 5.4K rpm SFF (2.5-inch) Non-hot Plug Entry 1y Wty Hard Drive	459357-B21
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**NOTE:** One per server node.

### Core Options

HP Ethernet Mezzanine Options	<b>Gigabit Ethernet Mezzanines</b>	
	HP NC326m PCI Express Dual Port 1Gb Server Adapter for c-Class BladeSystem	406771-B21
	HP NC360m Dual Port 1GbE BL-c Adapter	445978-B21
	HP NC382m Dual Port 1GbE Multifunction BL-c Adapter	453246-B21
	HP BLc QLogic iSCSI Dual Port Adapter with Virtual Connect Kit	488074-B22
	<b>10 Gigabit Ethernet Mezzanines</b>	
HP NC532m Dual Port Flex-10 10GbE Multifunction BL-c Adapter	467799-B21	
<p><b>NOTE:</b> The Gigabit Ethernet adapters above transmit from the server at 2000 Mbps, full duplex per port. For more information, see the "Network Controller" segment in the Standards Features section for more information.</p>		

HP Fiber Channel Mezzanine Options	<b>4Gb Fibre Channel Mezzanines</b>	
	Emulex LPe1105 FC Dual Channel 4Gb, PCI-E-to-Fibre Channel Host Bus Adapter	403621-B21
	QLogic QMH2462 4Gb FC HBA for HP c-Class BladeSystem	403619-B21

HP Processors	<b>Quad-Core Processor Option Kits</b>	
	Quad-Core Intel® Xeon® processor L5430 (2.66 GHz, 133 FSB, 50W)	483266-B21
	Quad-Core Intel® Xeon® processor L5420 (2.5 GHz, 1333 FSB, 50W)	466658-B21
	Quad-Core Intel® Xeon® processor L5410 (2.33 GHz, 1333 FSB, 50W)	466660-B21
	Quad-Core Intel® Xeon® processor E5450 (3.0 GHz, 1333 FSB, 80W)	466650-B21
	Quad-Core Intel® Xeon® processor E5440 (2.83 GHz, 1333 FSB, 80W)	466652-B21
	Quad-Core Intel® Xeon® processor E5430 (2.66 GHz, 1333 FSB, 80W)	466656-B21
	Quad-Core Intel® Xeon® processor E5420 (2.50 GHz, 1333 FSB, 80W)	466663-B21
	Quad-Core Intel® Xeon® processor E5410 (2.33 GHz, 1333 FSB, 80W)	466665-B21
	<b>Dual-core Processor Option Kits</b>	
	Dual-Core Intel® Xeon® processor X5260 (3.33 GHz, 1333 FSB, 80W)	483895-B21
	Dual-Core Intel® Xeon® processor L5240 (3.0 GHz, 1333 FSB, 40W)	466654-B21
	Dual-Core Intel® Xeon® processor E5205 (1.86 GHz, 1333 FSB, 65W)	466669-B21

HP Memory	2 GB REG PC2-5300 DDR2 2 x 1 GB Single Rank Kit	408851-B21
	4 GB REG PC2-5300 DDR2 2 x 2 GB Low Power Single Rank Kit	483401-B21
	4 GB REG PC2-5300 DDR2 2 x 2 GB Dual Rank Kit	408853-B21
	8 GB REG PC2-5300 DDR2 2 x 4 GB Dual Rank Kit	408854-B21
	8 GB REG PC2-5300 DDR2 2 x 4 GB Low Power Dual Rank Kit	483403-B21
	16 GB REG PC2-5300 2 x 8 GB Dual Rank Kit	408855-B21
	<p><b>NOTE:</b> Supports up to 2 DIMM kits (4 DIMMs) per server node.  <b>NOTE:</b> Must be installed in pairs.</p>	

### Core Options

#### HP Hard Drives

**NOTE:** The components of a storage subsystem (e.g. the drive, the HBA/controller, 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; refer to the specific hard drive QuickSpecs for details.

#### SATA Non-Hot Plug Solid State Drive (SSD)

HP 64GB 1.5G SATA NHP SFF SP ENT SSD 461203-B21

HP 32GB 1.5G SATA NHP SFF SP ENT SSD 461201-B21

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

[http://h18000.www1.hp.com/products/quickspecs/13121\\_div/13121\\_div.html](http://h18000.www1.hp.com/products/quickspecs/13121_div/13121_div.html)  
(Worldwide)

#### SATA Non-Hot Plug SFF (2.5-inch) Entry (ETY) Drives

HP 250GB 3G SATA 5.4K rpm SFF (2.5-inch) Non-hot Plug Entry 1y Wty Hard Drive 460357-B21

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

[http://h18000.www1.hp.com/products/quickspecs/13021\\_div/13021\\_div.html](http://h18000.www1.hp.com/products/quickspecs/13021_div/13021_div.html)  
(Worldwide)

#### SATA Non-Hot Plug SFF (2.5-inch) Entry (ETY) Drives

HP 120GB 1.5G SATA 5.4K rpm SFF (2.5-inch) Non-hot Plug Entry 1y Wty Hard Drive 459357-B21

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

[http://h18000.www1.hp.com/products/quickspecs/11940\\_div/11940\\_div.html](http://h18000.www1.hp.com/products/quickspecs/11940_div/11940_div.html)  
(Worldwide)

### Additional Options

#### HP Insight Software

#### HP Insight Control

HP Insight Control suite, No Media, Electronic License including 1 year of 24x7 Technical Support and Updates T9074BAE

HP Insight Control suite, No Media 1-Server License including 1 year of 24x7 Technical Support and Updates 452148-B22

HP Insight Software Media Kit 436222-B22

**NOTE:** Insight Software DVD media without licenses. Contains Insight Control, Insight Dynamics and Virtual Connect Enterprise Manager. Uses an integrated installer to perform quick and accurate software installation and updates.

**NOTE:** Licenses ship without media. The HP Insight Control Media Kit can be ordered separately, or can be downloaded at: <http://www.hp.com/go/insightupdates>.

**NOTE:** Requires one (1) license per server node.

**NOTE:** Electronic licenses can be used to purchase multiple licenses with a single activation key, and is available in all countries except China and Japan. Customers in China and Japan should order the physical equivalent.

**NOTE:** Customer will receive a license entitlement certificate, which must be redeemed online or via fax in order to obtain the license activation key(s). Includes one year of 24 x 7 HP Software Technical Support & Update Service.

**NOTE:** For additional license kits, including bundles with HP BladeSystem enclosures, please see the Insight Control QuickSpecs at:

[http://h18004.www1.hp.com/products/quickspecs/12631\\_div/12631\\_div.html](http://h18004.www1.hp.com/products/quickspecs/12631_div/12631_div.html)

#### HP Insight Control for Linux

HP Insight Control for Linux, 1-server license, including one year of 24x7 Technical Support and Updates, Electronic TC213AAE

HP Insight Control for Linux, No Media, 1-Server license, including one year of 24x7 Technical Support and Updates TC209A

HP Insight Control for Linux, Media pack (DVD) - No licenses included TC208A

**NOTE:** Media pack DVD contains HP Insight Control for Linux, HP Systems Insight Manager, HP Insight Control power management, HP Insight Control virtual machine management, and an integrated installer. Licenses must be acquired separately.

**NOTE:** Licenses ship without media. The Media Kit for Insight Control for Linux can be ordered separately, or can be downloaded at: <http://www.hp.com/go/ic-linux> (click on Download button).

**NOTE:** Requires one (1) license per server node.

**NOTE:** Electronic licenses can be used to purchase multiple licenses with a single activation key, and are available in all countries except China and Japan. Customers in China and Japan should order the physical equivalent.

**NOTE:** Customer will receive a license entitlement certificate, which must be redeemed online or via fax in order to obtain the license activation key(s). Includes one year of 24 x 7 HP Software Technical Support Service.

**NOTE:** For additional License Kits, including electronic licensing options, please see the QuickSpecs at:

[http://h18000.www1.hp.com/products/quickspecs/13019\\_div/13019\\_div.html](http://h18000.www1.hp.com/products/quickspecs/13019_div/13019_div.html)

#### HP Integrated Lights-Out (iLO) Advanced for ProLiant BladeSystem Remote Management

HP Integrated Lights-Out Advanced for BladeSystem, No Media, Electronic License, including 1 year of 24x7 Technical Support and Updates TA851AAE

### Additional Options

HP Integrated Lights-Out (iLO) Advanced for ProLiant BladeSystem (1) Server License/(1) Key for BladeSystem, No Media, including 1 year of 24x7 Technical Support and Updates 512488-B21

#### HP Insight Control server deployment

HP Insight Control server deployment Electronic License including 1 year 24x7 Technical Support and Updates T9082AAE

HP Insight Control server deployment 1-Server License including 1 year 24x7 Technical Support and Updates 452151-B21

**NOTE:** Licenses ship without media. The Insight Control Media Kit can be ordered separately, or can be downloaded at: <http://www.hp.com/go/insightupdates>.

**NOTE:** Requires one (1) license per server node.

**NOTE:** Electronic licenses can be used to purchase multiple licenses with a single activation key, and is available in all countries except China and Japan. Customers in China and Japan should order the physical equivalent.

**NOTE:** Customer will receive a license entitlement certificate, which must be redeemed online or via fax in order to obtain the license activation key(s). Includes one year of 24 x 7 HP Software Technical Support Service.

**NOTE:** For additional license kits please see the Insight Control QuickSpecs at: [http://h18004.www1.hp.com/products/quickspecs/12631\\_div/12631\\_div.html](http://h18004.www1.hp.com/products/quickspecs/12631_div/12631_div.html)

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HP Storage Controllers	HP Smart Array P700m/256 Controller	507925-B21
	HP Smart Array P700m/512 Controller	508226-B21
	Battery-backed write cache upgrade	383280-B21

**NOTE:** Please see the QuickSpecs for Technical Specifications and additional information:  
[http://h18000.www1.hp.com/products/quickspecs/13175\\_div/13175\\_div.html](http://h18000.www1.hp.com/products/quickspecs/13175_div/13175_div.html)

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HP I/O Accelerator Mezzanine Options	HP StorageWorks 80GB IO Accelerator for BladeSystem c-Class	AJ876A
	HP StorageWorks 160GB IO Accelerator for BladeSystem c-Class	AJ877A
	HP StorageWorks 320GB IO Accelerator for BladeSystem c-Class	AJ878A

**NOTE:** Please see the QuickSpecs for Technical Specifications and additional information:  
[http://h18000.www1.hp.com/products/quickspecs/13220\\_div/13220\\_div.html](http://h18000.www1.hp.com/products/quickspecs/13220_div/13220_div.html)

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HP c-Class Mezzanine Options	HP 4X DDR IB Dual Port Mezzanine HCA for HP BladeSystem c-Class	448262-B21
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**NOTE:** Only a single port can be used on the BL2x220c

### Additional Options

HP USB and SD Options	HP USB 2-Button Optical Scroll Mouse (Carbonite/Silver)	DC172B
	USB Floppy Drive	DC361B
	2004 Standard Keyboard USB	DT528A#ABA
	HP 2GB USB Flash Media Drive Key Kit	608447-B21

**NOTE:** HP qualified blank USB key for use with HP ProLiant servers that support the VMware virtualization environment and other HP value-add software like SmartStart. HP recommends this industry standard USB flash device for use with VMware ESXi. USB device must be installed in the internal slot of the ProLiant server for use with VMware ESXi. Refer to [HP VMware Getting Started Guide](#) for installation instructions for installation instructions.

### HP Care Pack Services

**NOTE:** The HP Care Pack service part numbers below for ProLiant BL c-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 Year, Electronic	UK144E
4-Hour On-site Service, 7-Day x 24-Hour Coverage, 3 Year, Electronic	UK145E
6-Hour Call to Repair, On-site Service, 7-Day x 24-Hour Coverage, 3 Year, Electronic	UK146E

### Memory

**NOTE:** Memory configurations listed do not apply to "Factory Integrated Models".

#### DIMM installation guidelines:

1. All DIMMs must be PC2-5300 Registered DDR2, 667 MHz, ECC DIMMS
2. Banks must be populated in sequential alphabetic order, starting with bank 1A
3. Both DIMMs in a memory bank must be identical. Install identical DIMMs as pairs only, starting with DIMM socket 1, bank A.  
The server blade defaults to Advanced ECC

#### HP ProLiant BL2x220c Server Blade

##### Standard Memory

4 GB (2 x 2 GB) per server node (depending on model) of PC2-5300, Registered, DDR2-667 ECC DIMMs

##### Standard Memory Plus Optional Memory

Up to 20 GB (depending on model) of PC2-5300, Registered, DDR2-667 ECC DIMMs. Memory is available with the installation of optional PC2-5300, Registered, DDR2-667 ECC DIMMs memory expansion kits.

##### Standard Memory Replaced with Optional Memory

Up to 16GB of PC2-5300, Registered, DDR2 667MHz, ECC DIMMs. Memory is available with removal of standard and the installation of optional PC2-5300, Registered, DDR2-667 ECC DIMM memory expansion kits.

	Memory	Slot			
		1A	2B	3C	4D
Standard	4 GB	2 GB	2 GB	Empty	Empty
Optional	12 GB	2 GB	2 GB	4 GB	4 GB
Maximum	16 GB	4 GB	4 GB	4 GB	4 GB
Optional	20 GB	2 GB	2 GB	8 GB	8 GB
Maximum	32 GB	8 GB	8 GB	8 GB	8 GB

#### Following are memory options available from HP:

2 GB REG PC2-5300 2 x 1 GB Single Rank Kit	408851-B21
4 GB REG PC2-5300 2 x 2 GB Low Power Single Rank Kit	483401-B21
4 GB REG PC2-5300 2 x 2 GB Dual Rank Kit	408853-B21
8 GB REG PC2-5300 2 x 4 GB Dual Rank Kit	408854-B21
8 GB REG PC2-5300 2 x 4 GB Low Power Dual Rank Kit	483403-B21
16 GB REG PC2-5300 2 x 8 GB Dual Rank Kit	408855-B21

### I/O Map

#### HP ProLiant BL2x220c Server Blade

The BL2x220c Blade has a different I/O mapping for server I/O ports to expansion bays than existing half-height servers. The BL2x220c contains 2 server nodes that share a single half-height bay. Each server has 2x 1-Gbit Ethernet ports, so each half-height bay must therefore support 4 1Gbit Ethernet connections to the Interconnect bays. Full access to all embedded Ethernet ports therefore requires 64 Ethernet connections in the HP BladeSystem c7000 Enclosure or 16 Ethernet connections in the HP BladeSystem c3000 Enclosure. Single server half-height devices, such as the HP ProLiant BL460c and HP ProLiant BL465c Server Blades, only require 32 connections (c7000) and 16 connections (c3000).

As each Ethernet Interconnect device only supports 16 downlinks to the servers it is necessary to dedicate additional bays to Ethernet. To gain access to all embedded Ethernet connections users must install 4 Ethernet Interconnects in Bays 1,2,3,4 for the c7000 enclosure and 2 Ethernet Interconnects in Bays 1 & 2 in the c3000 enclosure.

When installing a BL2x220c into an existing enclosure the following rules must be followed otherwise the Blade will not boot due to an e-keying error.

#### c7000 Enclosure

- Interconnect bays 1,2,3,4 are reserved for Ethernet
- Fibre Channel, InfiniBand or other Interconnects must be placed in bays 5 & 6 and 7 & 8
- Bays 5 & 6 must match the mezzanine type plugged into Server A
- Bays 7 & 8 must match the mezzanine type plugged into Server B

#### c3000 Enclosure

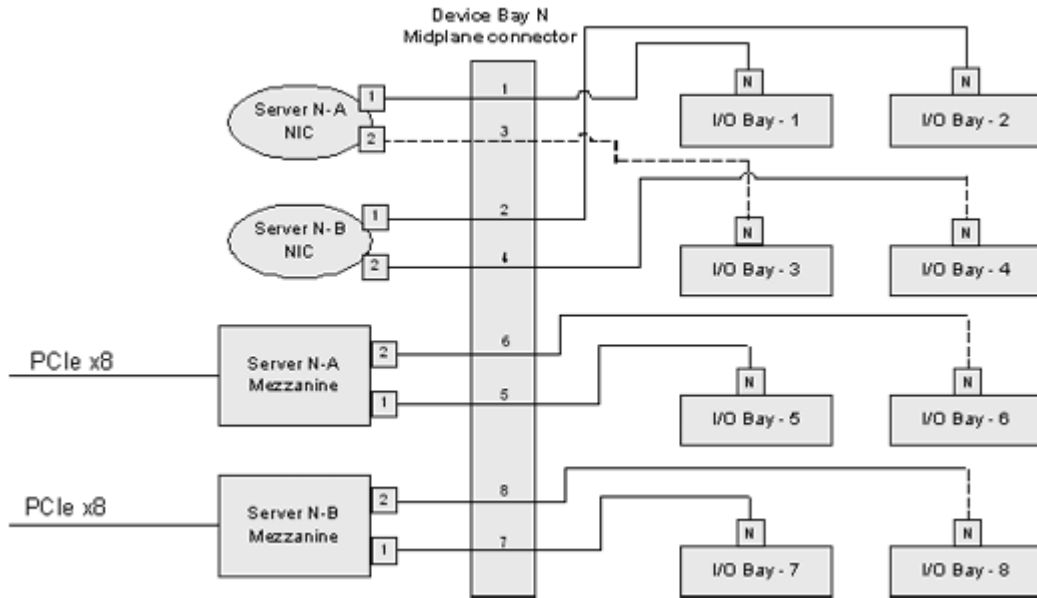
- Interconnect bays 1 & 2 are reserved for Ethernet
- Fibre Channel or other Interconnects must be placed in bays 3 & 4
- Bays 3 & 4 must have interconnects of the same type or be empty

#### Mixing BL2x220c and other Blades in the same enclosure

Mixing of BL2x220c and other Server Blades in the same enclosure is supported but not recommended. The unique I/O mapping used by the BL2x220c requires that the I/O requirements of other blades in the enclosure conform to the rules defined for the BL2x220c.

#### HP ProLiant BL2x220c - c7000 I/O Map

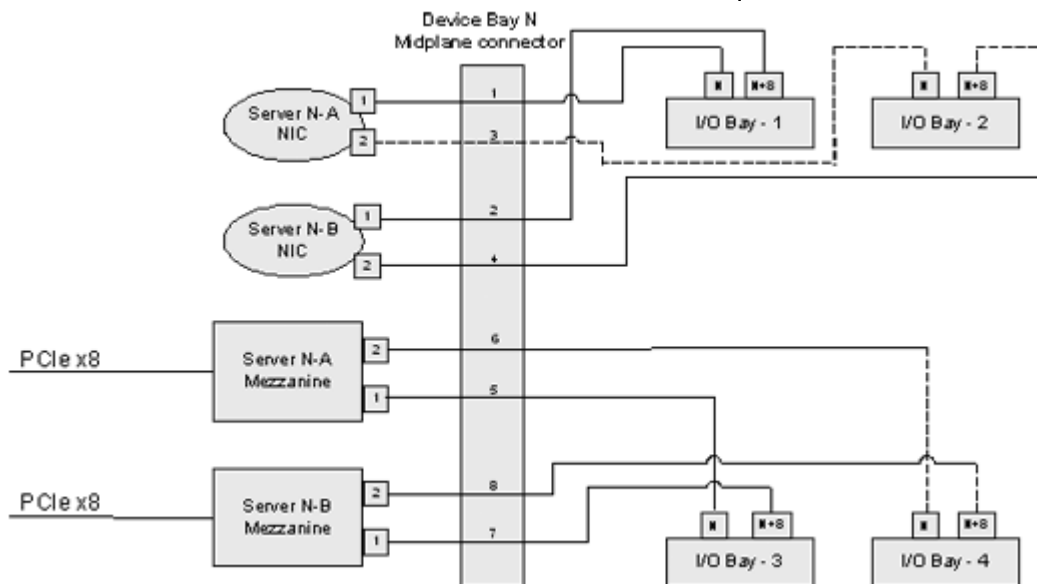
### I/O Map



#### c7000 Enclosure Notes:

- Embedded NIC Port 1 from each server (Server A and Server B) is mapped to Interconnect bays 1 and 2 which support only Ethernet devices
- Embedded NIC Port 2 from each server (Server A and Server B) is mapped to Interconnect bays 3 & 4 which support only Ethernet devices in configurations using the BL2x220
- The BL2x220 mezzanine slots connect to interconnect devices in Interconnect Bays 5 & 6 or 7 & 8

### HP ProLiant BL2x220c - c3000 I/O Map



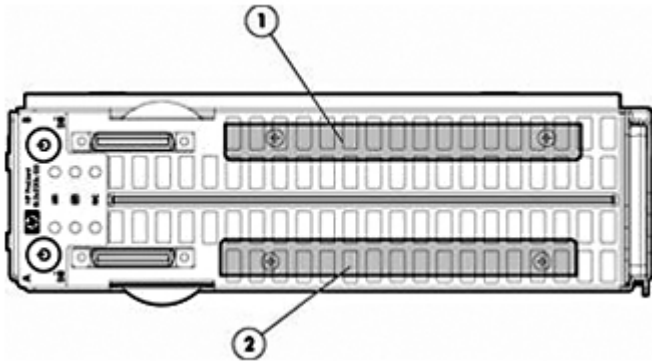
#### c3000 Enclosure Notes:

- Embedded NIC Port 1 from each server (Server A and Server B) can be accessed with an Ethernet interconnect in Interconnect bay 1
- Embedded NIC Port 2 from each server (Server A and Server B) is mapped to interconnect bay 2

### *I/O Map*

- The BL2x220 mezzanine slots connect to interconnect devices in Interconnect Bays 3 & 4. The fabric type for the mezzanine slots and their interconnects must all be the same for c3000 configurations with the BL2x220.

### Storage



- 1 1 x SFF SATA Non-Hot Plug Hard Drives
- 2 1 x SFF SATA Non-Hot Plug Hard Drives

#### Hard Drives

##### SATA Non-Hot Plug Solid State Drive (SSD)

**NOTE:** The components of a storage subsystem (e.g. the drive, the HBA/controller, 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; refer to the specific hard drive QuickSpecs for details.

	Quantity Supported	Position Supported	Controller
64GB 1.5G SATA	1 per server node	1	Embedded SATA
32GB 1.5G SATA			

##### SATA Non-Hot Plug SFF (2.5-inch) Entry (ETY) Drives

	Quantity Supported	Position Supported	Controller
250GB 3G SATA 5.4K	1 per server node	1	Embedded SATA
120GB 1.5G SATA 5.4K			

#### External Storage

	Quantity Supported	Position Supported	Host Controller or Adapter
XP Disk Array Systems	Please see the XP Disk Array Systems QuickSpecs below to determine configuration requirements	External	Please see the XP Disk Array Systems Quick Specs for the latest list of supported HBAs

HP StorageWorks XP10000 Disk Array:

<http://h18006.www1.hp.com/products/storageworks/xp10000/index.html> (Worldwide)

Enterprise Virtual Array Systems	Please see the XP Disk Array Systems QuickSpecs below to determine configuration	External	Please see the XP Disk Array Systems Quick Specs for the latest list of supported HBAs
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### Storage

[requirements](#)

HP StorageWorks Enterprise Virtual Array Family

[http://h18006.www1.hp.com/products/quickspecs/12408\\_div/12408\\_div.html](http://h18006.www1.hp.com/products/quickspecs/12408_div/12408_div.html) (Worldwide)

### Technical Specifications

<b>System Unit</b>	<b>Dimensions</b> (H x W x D) (with bezel)	7.154 x 2.19 x 20.058 in (18.17 x 5.56 x 50.95 cm)				
	<b>Weight</b> (approximate)	<table border="0"> <tr> <td>Maximum (all hard drives and processors installed)</td> <td>13 lb (5.9 kg)</td> </tr> <tr> <td>Minimum (one hard drive and processor installed)</td> <td>10.75 lb (4.87 kg)</td> </tr> </table>	Maximum (all hard drives and processors installed)	13 lb (5.9 kg)	Minimum (one hard drive and processor installed)	10.75 lb (4.87 kg)
Maximum (all hard drives and processors installed)	13 lb (5.9 kg)					
Minimum (one hard drive and processor installed)	10.75 lb (4.87 kg)					
	<b>Power Specifications</b>	<p>For power specifications including Input Requirements, BTU Rating, and Power Supply Output, please see the HP BladeSystem c-Class Enclosures QuickSpecs located at URL:            HP BladeSystem c-Class c7000 Enclosure QuickSpecs:  <a href="http://h18004.www1.hp.com/products/quickspecs/12810_div/12810_div.html">http://h18004.www1.hp.com/products/quickspecs/12810_div/12810_div.html</a>            HP BladeSystem c-Class c3000 Enclosure QuickSpecs:  <a href="http://h18004.www1.hp.com/products/quickspecs/12790_div/12790_div.html">http://h18004.www1.hp.com/products/quickspecs/12790_div/12790_div.html</a></p> <p>To review typical system power ratings use the HP BladeSystem Power Sizer which is available via the online tool located at URL:  <a href="http://www.hp.com/go/ bladesystem/powercalculator">http://www.hp.com/go/ bladesystem/powercalculator</a></p>				
	<b>System Inlet Temperature</b>	<table border="0"> <tr> <td>Operating</td> <td>10° to 35°C (50° to 95°F) at sea level with an altitude derating of 1.0°C per every 305 m (1.8°F per every 1000 ft) above sea level to a maximum of 3050 m (10,000 ft), no direct sustained sunlight. Maximum rate of change is 10°C/hr (18°F/hr). The upper limit may be limited by the type and number of options installed.</td> </tr> <tr> <td>Non-operating</td> <td>-30° to 60°C (-22° to 140°F). Maximum rate of change is 20°C/hr (36°F/hr).</td> </tr> </table>	Operating	10° to 35°C (50° to 95°F) at sea level with an altitude derating of 1.0°C per every 305 m (1.8°F per every 1000 ft) above sea level to a maximum of 3050 m (10,000 ft), no direct sustained sunlight. Maximum rate of change is 10°C/hr (18°F/hr). The upper limit may be limited by the type and number of options installed.	Non-operating	-30° to 60°C (-22° to 140°F). Maximum rate of change is 20°C/hr (36°F/hr).
Operating	10° to 35°C (50° to 95°F) at sea level with an altitude derating of 1.0°C per every 305 m (1.8°F per every 1000 ft) above sea level to a maximum of 3050 m (10,000 ft), no direct sustained sunlight. Maximum rate of change is 10°C/hr (18°F/hr). The upper limit may be limited by the type and number of options installed.					
Non-operating	-30° to 60°C (-22° to 140°F). Maximum rate of change is 20°C/hr (36°F/hr).					
	<b>Relative Humidity</b> (non-condensing)	<table border="0"> <tr> <td>Operating</td> <td>10 to 90% relative humidity (Rh), 28°C (82.4°F) maximum wet bulb temperature, non-condensing.</td> </tr> <tr> <td>Non-operating</td> <td>5 to 95% relative humidity (Rh), 38.7°C (101.7°F) maximum wet bulb temperature, non-condensing.</td> </tr> </table>	Operating	10 to 90% relative humidity (Rh), 28°C (82.4°F) maximum wet bulb temperature, non-condensing.	Non-operating	5 to 95% relative humidity (Rh), 38.7°C (101.7°F) maximum wet bulb temperature, non-condensing.
Operating	10 to 90% relative humidity (Rh), 28°C (82.4°F) maximum wet bulb temperature, non-condensing.					
Non-operating	5 to 95% relative humidity (Rh), 38.7°C (101.7°F) maximum wet bulb temperature, non-condensing.					
	<b>Altitude</b>	<table border="0"> <tr> <td>Operating</td> <td>3050 m (10,000 ft). This value may be limited by the type and number of options installed. Maximum allowable altitude change rate is 457 m/min (1500 ft/min).</td> </tr> <tr> <td>Non-operating</td> <td>9144 m (30,000 ft). Maximum allowable altitude change rate is 457 m/min (1500 ft/min).</td> </tr> </table>	Operating	3050 m (10,000 ft). This value may be limited by the type and number of options installed. Maximum allowable altitude change rate is 457 m/min (1500 ft/min).	Non-operating	9144 m (30,000 ft). Maximum allowable altitude change rate is 457 m/min (1500 ft/min).
Operating	3050 m (10,000 ft). This value may be limited by the type and number of options installed. Maximum allowable altitude change rate is 457 m/min (1500 ft/min).					
Non-operating	9144 m (30,000 ft). Maximum allowable altitude change rate is 457 m/min (1500 ft/min).					
	<b>Acoustic Noise</b>	For acoustic noise specifications, please see the HP BladeSystem c-Class Enclosures QuickSpecs located at URL:				

### Technical Specifications

HP BladeSystem c-Class c7000 Enclosure QuickSpecs:

[http://h18004.www1.hp.com/products/quickspecs/12810\\_div/12810\\_div.html](http://h18004.www1.hp.com/products/quickspecs/12810_div/12810_div.html)

HP BladeSystem c-Class c3000 Enclosure QuickSpecs:

[http://h18004.www1.hp.com/products/quickspecs/12790\\_div/12790\\_div.html](http://h18004.www1.hp.com/products/quickspecs/12790_div/12790_div.html)

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<b>Embedded Dual-port NC326i Gigabit Server Adapter</b>	<b>Network Processor</b>	Broadcom 5715S
	<b>Data Transfer Method</b>	Four lane (x4) PCI Express
	<b>Network Transfer Rate</b>	2000 Mb/s full duplex (theoretical maximum value)
	<b>IEEE Compliance</b>	802.1p, 802.1Q, 802.3, 802.3ad, and 802.3x
	<b>Standard Features</b>	<ul style="list-style-type: none"><li>● 9K jumbo frames</li><li>● TCP/IP checksum offload (TCO)</li><li>● Large send offload (LSO)</li><li>● Interrupt coalescence</li><li>● Dual address cycles (DAC)</li><li>● Wake-on-LAN (WOL)</li><li>● Pre-boot execution environment (PXE)</li><li>● ProLiant Teaming including Network Fault Tolerance, Transmit Load Balancing, and Switch-Assisted Load Balancing</li><li>● IPv6 packet transmit and receive (excluding all offload capabilities); IPv6 aware SNMPv1 agents for Windows</li></ul>

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<b>Environment-friendly Products and Approach</b>	<b>End-of-life Management and Recycling</b>	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 <a href="http://www.hp.com/go/green">http://www.hp.com/go/green</a> . To recycle your product, please go to: <a href="http://www.hp.com/go/green">http://www.hp.com/go/green</a> 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 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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### *Technical Specifications*

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