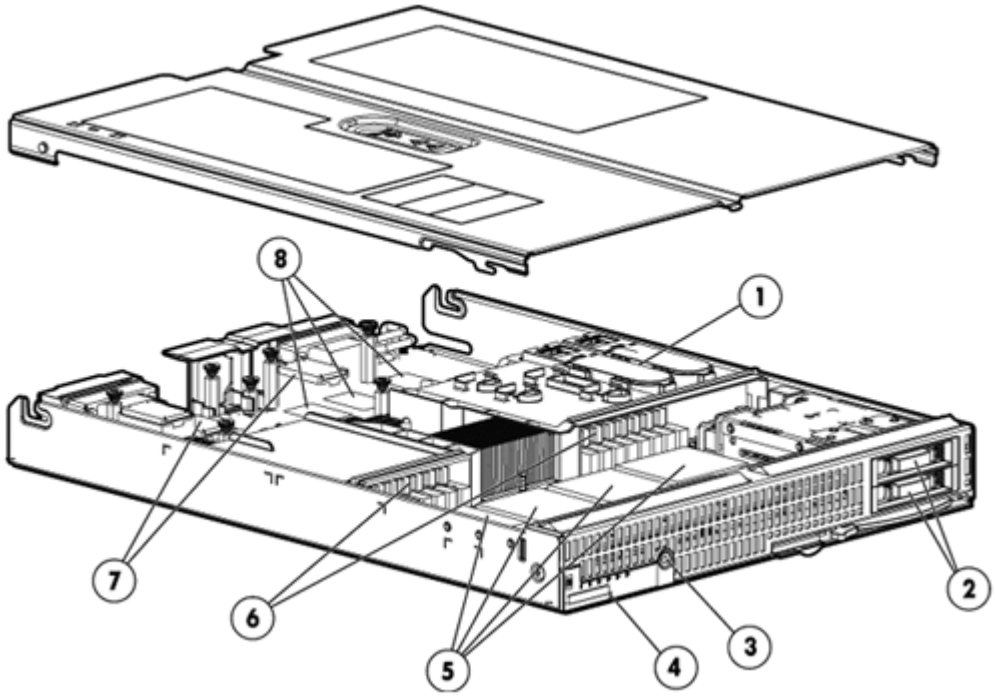
Overview



HP ProLiant BL680c Generation 5 (G5) Server Blade

Front view image

1. Cache battery modules
2. Two small form factor (SFF) hot-plug drive bays
3. Power button
4. Local I/O connector
5. Two or four Intel® Xeon® 7400 series processors providing up to 6 cores
6. To 128 GB PC2-5300, DDR2 FB memory via 16 DIMMs
7. Three I/O expansion mezzanine slots
8. Four embedded Gigabit Ethernet adapter ports

At A Glance

This document covers the HP ProLiant BL680c G5 server blade only. For more information on the HP BladeSystem c-Class Enclosure and HP BladeSystem c-Class Interconnect and Mezzanine Components, please see the following:
HP BladeSystem c3000 Enclosure QuickSpecs:
http://h18000.www1.hp.com/products/quickspecs/12790_div/12790_div.html
HP BladeSystem c7000 Enclosure QuickSpecs:
http://h18000.www1.hp.com/products/quickspecs/12810_div/12810_div.html
HP BladeSystem c-Class Interconnect and Mezzanine Components:
http://h18004.www1.hp.com/products/blades/components/c-class-interconnects.html
http://h18004.www1.hp.com/products/blades/components/c-class-adapters.html

- The HP ProLiant BL680c G5 Server Blade delivers no-compromise performance and expansion for a 4-core to 6-core BladeSystem Server. With two or four Intel Xeon 7400 series processors, 128 GB of fully buffered memory, two hot-plug serial attached SCSI (SAS) or serial ATA (SATA) hard drives, four embedded Gigabit Ethernet adapters (two multifunction) and three I/O expansion slots, the HP ProLiant BL680c G5 delivers the density you want with the performance you need to handle the most demanding enterprise class applications. The HP ProLiant BL680c G5 server blade includes:

Overview

- **Processor:**
  - Two or four Intel Xeon 7400 series processors with up to 6 cores
    NOTE: The BL680c G5 supports either two or four processors. One and three processors are not supported.
    NOTE: All processors within the server must be identical.
  - Intel 7300 chip set supporting a 1066 MT/s Dedicated High-Speed Interconnect (DHSI)
  - Demand Based Switching (DBS) with Enhanced Intel SpeedStep® Technology on select models
  - Up to 16 MB of L3 cache
  - Intel® Virtualization Technology
- **Memory:**
  - Sixteen (16) DIMM slots supporting:
    - 128 GB PC2-5300, fully buffered DDR2-667MHz memory
    - 64 GB PC2-5300, fully buffered DDR2-667MHz low power memory
    - Advanced ECC memory technology
    - Memory interleaving (2 x 1), memory mirroring, and online spare capacity
- **Storage Controller:**
  - Integrated HP Smart Array P400i Controller with 256MB ECC protected cache and RAID 0 and 1
  - Upgrades include:
    - Battery-backed write cache (BBWC) for standard 256MB cache
    - 512MB ECC protected cache upgrade with BBWC
  - Optional Storage Works P700m Controller with either 256MB cache, or 512MB cache with or without BBWC
  - Optional IO Accelerator cards for high I/O performance
- **Internal Drive Support:**
  - Up to two (2) small form factor (SFF) SAS or SATA hot-plug hard drives
  - Support for the optional SB40c Storage Blade
- **Network Controller:**
  - Four (4) embedded network adapter ports, plus one (1) additional management network adapter port:
    - Two (2) embedded NC373i Multifunction Gigabit Server Adapters with TCP/IP offload engine for Microsoft Windows iSCSI boot, and optional accelerated iSCSI
    - One (1) NC326i Dual Port Gigabit Server Adapter
    - One (1) additional embedded 10/100 network adapter dedicated to iLO 2management
      NOTE: The Gigabit Ethernet adapters transmit from the server at 2000 Mbps, full duplex per port. For more information, see the "Network Controller" item in Standards Features section.
- **Mezzanine Support:**
  - Three (3) mezzanine expansion slots; one Type I x4 PCIe (15 watts) and two x8 PCIe (25 watts). The expansion slots provide a choice of for additional I/O mezzanine including:
    - Dual Port 4Gb Fibre Channel for SAN connectivity (choice of Emulex or QLogic)
    - Multiple dual port 10Gb Ethernet adapter options for high bandwidth network connectivity
    - Multiple dual and quad port Gigabit Ethernet network adapter options for increased bandwidth and additional network ports
    - I/O Accelerators for high transaction rate local storage
    - 4X DDR InfiniBand (20Gb) for low latency, high bandwidth server interconnectivity
  - For additional I/O expansion, the BL680c G5 supports the PCI Expansion Blade, see: http://h18004.www1.hp.com/products/blades/expansion/index.html?jumpid=reg_R1002_USEN
- **Internal USB Support:**
  - One (1) internal USB 2.0 connector for security key devices and USB drive keys
- **Infrastructure Management:**
  - The server blade requires the latest version of the Onboard Administrator firmware. This firmware release may also require other subsystem firmware upgrades. For information on the latest firmware versions, please see the Blades Firmware Maintenance website at: http://h18004.www1.hp.com/products/blades/components/c-class-compmatrix.html.

Overview

- HP Integrated Lights-Out 2 (iLO 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, 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 System Support**:
  - Microsoft Windows, RHEL, SLES, OEL, Sun Solaris, VMware ESX, and HP Essentials Citrix for XenServer
- **Form Factor:**
  - The HP ProLiant BL680c G5 is a full height server blade that plugs into the HP BladeSystem c3000 and c7000 enclosures
- **Enclosures:**
  - HP offers two different c-Class server blade enclosures to meet your individual needs:
    - The HP BladeSystem c7000 rack enclosure is 10U high and holds up to 8 HP ProLiant BL680c servers plugged vertically.
    - The HP BladeSystem c3000 rack enclosure is 6U high and holds up to 4 HP ProLiant BL680c servers plugged horizontally.
  - Server blades, storage blades, and interconnect modules are all designed to fit into the c7000 and c3000 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 resellers. 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. 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 3 year Parts, 3 year Labor, 3-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

Processor One of the following depending on Model	**Six-Core Processors** Intel® Xeon® E7458 (2.40GHz/6-core/16MB/90W) Processor Intel® Xeon® E7450 (2.40GHz/6-core/12MB/90W) Processor Intel® Xeon® L7455 (2.13GHz/6-core/12MB/65W) Processor **NOTE:** Offered as Configure-To-Order. See the Factory Integrated Models section for more details. **Four-Core Processors** Intel® Xeon® E7440 (2.40GHz/4-core/16MB/90W) Processor Intel® Xeon® E7430 (2.13GHz/4-core/12MB/90W) Processor Intel® Xeon® E7420 (2.13GHz/4-core/8MB/90W) Processor **NOTE:** Offered as Configure-To-Order. See the Factory Integrated Models section for more details. Intel® Xeon® L7445 (2.13GHz/4-core/12MB/50W) Processor **NOTE:** Offered as Configure-To-Order. See the Factory Integrated Models section for more details. **NOTE:** All processors within the server must be identical. **NOTE:** The BL680c G5 supports either two or four processors. One and three processors are not supported. **NOTE:** The letter preceding the model number indicates the performance/wattage of the processor. The "E" denotes enterprise performance/wattage and the "L" denotes lower wattage. **NOTE:** If upgrading an existing BL680c G5 server to a different processor, the server's ROM must be flashed to the latest BIOS prior to the upgrade.	
Upgradeability	Upgradeable to four processors **NOTE:** The server supports two or four processors. One and three processors are not supported. **NOTE:** All processors within the server must be identical. **NOTE:** If upgrading an existing BL680c G5 server to a different processor, the server's ROM must be flashed to the latest BIOS prior to the upgrade.	
Cache Memory	Up to 16 MB level 3 cache memory	
Chipset	Intel® 7300 chipset	
Memory	Type	PC2-5300 Fully Buffered DIMMs operating at 667 MHz
	Standard	8GB (2 x 4GB)
	Maximum	128GB (16 x 8GB DIMMs) 64GB (16 x 4GB Low Power DIMMs)
	NOTE: See the "DIMM installation guidelines" section for memory installation rules.	

Standard Features

Network Controllers

Four (4) embedded Gigabit Ethernet network adapter ports, plus (1) additional management network adapter port:

- Two (2) embedded NC373i Multifunction Gigabit Server Adapters with TCP/IP offload engine for Microsoft Windows, iSCSI boot, and optional accelerated iSCSI
- One (1) NC326i Dual Port Gigabit Server Adapter
- One (1) additional embedded 10/100 network adapter dedicated to iLO 2 management

NOTE: The Gigabit Ethernet adapters transmit from the server 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.

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 speeds.

Multifunction Networking

The embedded multifunction NC373i combines standard Gigabit Ethernet networking, TCP/IP offload engine (TOE) acceleration for Windows, iSCSI boot, and optional accelerated iSCSI into a single adapter.

- TOE moves the processing of data in the TCP protocol stack from the server CPU to the network card, freeing CPU cycles for other activities. With TOE, network communications are improved, and server efficiency is increased. The NC373i offers TOE for Microsoft® Windows.
- The iSCSI boot allows the BL680c G5 to boot from a remote operating system (OS) image located on a storage area network (SAN) within a Red Hat or SUSE Linux environment. The BL680c G5 uses an iSCSI firmware image (iSCSI boot option ROM) making the remote disk drive appear as a local, bootable C: drive. The BL680c G5 is configured to connect to and boot from the iSCSI target disk on the network and download the OS image from the iSCSI target disk. The iSCSI boot option ROM is supplied by HP at no cost. The additional cost and mezzanine slot usage of an add-in iSCSI HBA card is not required. Additionally, the HP iSCSI boot solution includes scripts to significantly simplify the installation process.

I/O Expansion Slots

Three I/O expansion mezzanine slots; one Type I x4 PCIe (15 watts) and two x8 PCIe (25 watts).

Integrated Manageability

HP Integrated Lights-Out 2 (iLO 2) - (includes but not limited to functionality in Integrated Lights-Out 2 Standard Blade Edition (iLO 2)

Standard Features

Storage Controller

The BL680c G5 includes an integrated Smart Array P400i Controller. The P400i is an x8 PCI Express serial attached SCSI (SAS) v1.0 embedded RAID controller and provides server performance and reliability through its support of advanced SCSI technology and RAID capabilities. The P400i includes 256MB of 40-bit ECC protected cache and supports RAID levels 0 (striping) and 1 (mirroring).

The controller supports both SAS and SATA hard drives letting you deploy drive technology as needed to fit your computing environment. The BL680c G5 provides two hot-plug drive bays for up to 1.0TB of SAS and 500GB of SATA storage.

Providing high availability data cache retention, the Smart Array P400i supports two battery backed write cache (BBWC) options:

- BBWC for the existing 25MB cache.
- Upgrade to 72-bit 512MB ECC protected cache with BBWC.

If additional direct or shared storage SAS or SATA drives are desired within the server blade enclosure, the BL680c G5 supports the SB40c Storage Blade through use of the HP PCI Express Mezzanine Pass-Thru Card installed in mezzanine slot 3. For additional information see the "Additional Options" section below and http://h18006.www1.hp.com/products/storageworks/sb40c/index.html

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Maximum Internal Storage
One of the following depending on Model

Hot Plug Serial Attach SCSI (SAS)	1.0TB SAS	2 x 500GB SAS
Hot Plug Serial Attach (SATA)	1.0TB SATA	2 x 500GB SATA

Graphics

Integrated ATI RN-50 1280 x 1024 x 16M color (32 MB DDR1 memory)

Resolution Color Depths	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

Fibre Channel

Up to three 4 Gb Fibre Channel HBA mezzanines are supported ordered separately:

- Emulex LPe1105-HP 4Gb FC HBA for HP c-Class BladeSystem (403621-B21)
- QLogic QMH2462 4Gb FC HBA for HP c-Class BladeSystem (403619-B21)

NOTE: For additional information on the optional 4 Gb Fibre Channel HBA mezzanines, see: http://h18004.www1.hp.com/products/blades/components/c-class-interconnects.html

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Compatible SAN

HP ProLiant BL680c G5 server blades are optimized for HP MSA, EVA, and XP
HP ProLiant BL680c G5 server blades are compatible with select third party SANs (please see blade storage page for more details: http://h18004.www1.hp.com/products/blades/components/c-class-sans.html

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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: www.hp.com/go/foundation. The foundation pack includes: • HP SmartStart • HP Management DVD • HP ProLiant Smart Update Firmware DVD • Minimum SmartStart version supported is SmartStart 7.60, see: http://www.hp.com/servers/smartstart **NOTE:** In an effort to support reducing our environmental impact, the HP Insight Foundation Suite for ProLiant media will be available as a selectable option for this server at time of order of a CTO SKU. This will allow customers to order the number of media kits that best meet their needs and eliminate receiving unnecessary duplicate media.
HP Integrated Lights-Out (iLO)	HP Integrated Lights-Out (iLO) simplifies server setup, health monitoring, power and thermal control, and lights-out remote administration of ProLiant ML, DL, and BL servers. HP iLO functions without additional software and can be accessed from any location via a web browser. HP iLO works hand-in-hand with HP Systems Insight Manager, Insight Control, and Insight Dynamics for ProLiant, helping customers unleash the value of the ProLiant platform and deliver the highest possible quality of IT service. For more information, visit: www.hp.com/go/iLO
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, 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 www.hp.com/go/insightcontrol HP Insight Control includes one year of 24 x 7 HP Software Technical Support and Update Service ensuring rapid access to HP support staff and proactive delivery of software updates. For more information about this service, please visit: http://www.hp.com/services/insight
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, 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 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
High Performance Clusters	HP Cluster Platforms	HP Cluster Platforms are specifically engineered, factory-integrated large-scale ProLiant clusters optimized for High Performance Computing, with a choice of servers, networks and software. Operating system options include specially priced offerings for Red Hat Enterprise Linux and SUSE Linux Enterprise Server, as well as Microsoft Windows HPC Server. A Cluster Platform Configurator simplifies ordering. http://www.hp.com/go/clusters
	HP HPC Interconnects	High Performance Computing (HPC) interconnect technologies are available for this server as part of the HP Cluster Platform portfolio. These high-speed InfiniBand and Gigabit interconnects are fully supported by HP when integrated within an HP cluster. Flexible, validated solutions can be defined with the help of configuration tools. http://www.hp.com/techservers/clusters/ucp/index.html
	HP Cluster Management Utility	HP Cluster Management Utility (CMU) is an HP-licensed and HP-supported suite of tools that are used to manage large-scale Linux ProLiant systems. CMU includes software for the centralized provisioning, management and monitoring of nodes. CMU makes the administration of clusters user friendly, efficient, and effective. http://www.hp.com/go/cmu
	HP HPC Linux Value Pack	HP HPC Linux Value Pack (Value Pack) is an HP-licensed and HP-supported specially priced software bundle for the development and deployment of applications on HPC Cluster Platforms. Value Pack includes the Platform HPC Enterprise Edition suite of tools including the LSF workload scheduler, the HP-MPI parallelization library. Also included are the HP Unified Parallel C compiler and the HP Shmem library, as well as the execution environments for the libraries and compiler. HP HPC Linux Value Pack

Standard Features

Operating Systems and Virtualization Software Support for ProLiant Servers

Microsoft Windows Server
Microsoft Windows Server Hyper V
Red Hat Enterprise Linux (RHEL)
SUSE Linux Enterprise Server (SLES)
Oracle Enterprise Linux (OEL)
Sun Solaris 10 for x86/x64 based Systems
VMware ESX Server
HP Citrix Essentials for XenServer

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, including how to purchase from HP, please visit our OS Support Site at: http://www.hp.com/go/ossupport and our driver download page: http://www.hp.com/support/BL680cG5

Availability

- Optional dual-port 4Gb Fibre Channel mezzanine cards for redundant SAN connection
- Four (4) embedded Gigabit Ethernet adapters for redundant LAN connections
- Multiple mezzanine I/O expansion slots each routed to redundant interconnect modules
- Two (2) hot-plug SAS/SATA hard drive bays
- Integrated Smart Array P400i Controller with ECC protected cache and battery backed write cache options
- Advanced ECC Memory that can correct a multi-bit error (up to 4 bits) that occurs within one memory chip
- Memory mirroring with memory online spare capacity
- Network adapter teaming (network fault tolerance, transmit load balancing, switch-assisted load balancing)

Industry Standard Compliance

- ACPI 2.0 Compliant
- PCI 2.2 Compliant
- WOL Support
- Microsoft® Logo certifications
- USB 2.0 Support
- PXE 2.1
- IEEE (see the Technical Specifications section)

Security

- One (1) internal USB 2.0 connector for security key devices and USB drive keys
- 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

Standard Features

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 MSAxxxx, 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

Service and Support

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

What HP ProLiant and BladeSystem Services can do for you
HP ProLiant and BladeSystem Services can help you design, deploy, test, integrate, support, and manage IT and infrastructure solutions. This way, HP proposes services solutions that include more than just uplift of base warranty. You can get the support you need by choosing from one of a number of service packaged solutions we have designed to address wider set of customer support needs.

HP Technology Services meets business challenges with services offered in three packages
Optimized Care Package, Standard Care Package, and Basic Care Package - available for each product group. Such packaged solutions enable customers to optimize technology operations, minimize risk and drive better business outcomes with easy-to-buy, easy-to-use scalable support packages for servers, storage, networking and software.

Optimized Care Package

Supports maintaining servers at optimum performance availability

HP Installation and Startup Service for HP BladeSystem c-Class Infrastructure for c3000/c7000 enclosure
Provides for the installation and startup of a BladeSystem c3000 Infrastructure in a single blade enclosure including hardware and software, including deployment of OS, HP SIM, RDP, RDP, PMP and VPM.
http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA0-5964ENW

3-Year HP Critical Advantage L3 for c3000/c7000 enclosure + 3-Year HP Critical Advantage for Blade server
Provides end-to-end infrastructure support solution for business critical applications running on virtualized/x86 infrastructures, enabling the customers to cost effectively build, operate, and continuously improve their IT environment.
http://h20195.www2.hp.com/V2/GetDocument.aspx?docname=4AA3-1772ENW

Additional Services: Virtualization Services - Strategy, Design, Transition, Operation, Continual Service Improvement.

Service and Support

Standard Care Package

Package that maintains high level of server availability

HP Installation and Startup Service for HP BladeSystem c-Class Infrastructure for c3000/c7000 enclosure
Provides for the installation and startup of a BladeSystem c3000 Infrastructure in a single blade enclosure including hardware and software, including deployment of OS, HP SIM, RDP, RDP, PMP and VPM.
http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA0-5964ENW

HP Installation and Startup Service for HP BladeSystem c-Class Enhanced Network
HP Provides for the configuration and testing of BladeSystem Ethernet interconnect switches to facilitate proper implementation of network protocols and access to advanced features.
http://h20195.www2.hp.com/V2/GetPDF.aspx/4aa0-5969ENW

3-Year, HP 6 hour Hardware Support Onsite Call-to-Repair Service for c3000/c7000 enclosure + 3-Year, HP 6 hour Hardware Support Onsite Call-to-Repair Service for Blade server
Provides an IT manager with a team of support specialists who will quickly begin troubleshooting the system to help return the hardware to operating condition within 6 hours of the initial service request to the HP Global Solution Center. http://h20195.www2.hp.com/V2/GetPDF.aspx/5982-6547EN.pdf

3-Year , HP 24x7 Software Support for Insight Control
Provides for the deployment and basic configuration of HP Insight Control on HP ProLiant ML and DL series servers or HP BladeSystem servers.
http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-6645EEE.pdf

1-Year HP Proactive Select 30 Credit
Provides a flexible way to purchase HP best-in-class consultancy and technical services.
http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA2-3842ENN.pdf

Additional Services: Software OS (Microsoft, Linux (SUSE/Red Hat) & VMware Installation & Start Up and Software Support); Microsoft or Linux or VMware education courses; +60 Proactive Select Credits, Factory Express.

Basic Care Package

Delivers minimum recommended support service level

HP Installation and Startup Service for HP BladeSystem c-Class Infrastructure for c3000/c7000 enclosure
Provides for the installation and startup of a BladeSystem c3000 Infrastructure in a single blade enclosure including hardware and software, including deployment of OS, HP SIM, RDP, RDP, PMP and VPM.
http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA0-5964ENW

3-Year, HP 24x7 4 hour Response, Hardware Support Onsite Service for c3000/c7000 enclosure + 3-Year, HP 24x7 4 hour Response, Hardware Support Onsite Service for Blade server
Provides you with rapid remote support and if required an HP authorized representative who will arrive on site any time and day of the year to begin hardware maintenance service within 4 hours of the service request being logged. http://h20195.www2.hp.com/V2/GetPDF.aspx/5982-6547EEE

3-Year , HP 24x7 Software Support for Insight Control
Provides for the deployment and basic configuration of HP Insight Control on HP ProLiant ML and DL series servers or HP BladeSystem servers.

Service and Support

http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-6645EEE.pdf

1-Year HP Proactive Select 10 Credit
Provides a flexible way to purchase HP best-in-class consultancy and technical services.
http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA2-3842ENN.pdf

Additional Services: Startup Blade System c-Cass Enhanced Network Service; Software OS (Microsoft, Linux (SUSE/Red Hat) & VMware Installation & Start Up and Software Support); +30 Proactive Select Credits, Factory Express.

Insight Remote Support	The packages include HP Insight Remote Support that uses proven technology to deliver secure, reliable 24x7 remote monitoring, diagnoses, and problem resolution. It is available at no additional cost to all warranty, HP Care Pack Service, and service agreement customers.
For more information	To learn more on HP ProLiant servers and HP BladeSystem servers, please contact your HP sales representative or HP Authorized Channel Partner. Or visit: www.hp.com/services/bladesystem

Models

4 or 6-Core 7400 Series Models

NOTE: Not all models are available in all regions. Check with your local country HP offices for availability.

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

HP ProLiant BL680c G5 E7458 2P 8GB-R P400i/256 SAS/SATA 2 SFF Server 517409-B21 **HP ProLiant BL680c G5 E7450 2P 8GB-R P400i/256 SAS/SATA 2 SFF Server** 492334-xx1 **HP ProLiant BL680c G5 E7440 2P 8GB-R P400i/256 SAS/SATA 2 SFF Blade Server** 492335-B21 **HP ProLiant BL680c G5 E7430 2P 8GB-R P400i/256 SAS/SATA 2 SFF Server** 492336-xx1	**Processor(s)** Two of the following depending on Model	(2) Intel® Xeon® E7458 (2.40GHz/6-core/16MB/90W) Processor (2) Intel® Xeon® E7450 (2.40GHz/6-core/12MB/90W) Processor (2) Intel® Xeon® E7440 (2.40GHz/4-core/16MB/90W) Processor (2) Intel® Xeon® E7430 (2.13GHz/4-core/12MB/90W) Processor
	Cache Memory One of the following depending on Model	16 MB Level 3 cache memory 12 MB Level 3 cache memory 8 MB Level 3 cache memory
	Memory	8 GB (2x4 GB) PC2-5300, FBD DDR2-667
	Network Controllers	Four (4) embedded Gigabit Ethernet network adapter ports, plus one (1) additional management network adapter port: • Two (2) embedded NC373i Multifunction Gigabit Server Adapters with TCP/IP offload engine for Microsoft Windows, iSCSI boot, and optional accelerated iSCSI • One (1) NC326i Dual Port Gigabit Server Adapter • One (1) additional embedded 10/100 network adapter dedicated to iLO 2 management
	Storage Controller	Integrated HP Smart Array P400i Controller with 256MB cache and RAID 0 and 1. Optional battery-backed write cache upgrades.
	Hard Drives	No drives included; supports up to two (2) SFF SAS/SATA drives
	Internal Storage	SAS: 1TB; SATA: 1TB
	Optical Drive	None
	Form Factor	Up to 4 full-height blades in the HP BladeSystem c3000 enclosure Up to 8 full-height blades in the HP BladeSystem c7000 enclosure

Country Code Key	xx=B2	Worldwide
	xx=20	Brazil

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: Not all models are available in all regions. Check with your local country HP offices for availability.
NOTE: Configure-to-order servers must start with a CTO Blade.
NOTE: FIO indicates that this option is a factory installable option.

Step 1: Base Server Blade Configuration (Select a configurable Blade)

HP Models	HP ProLiant BL680c G5 Configure-to-order Server	443527-B21

Configurable model ships with:

1. Four (4) embedded Gigabit Ethernet network adapter ports, plus one (1) additional management network adapter port:
   - Two (2) embedded NC373i Multifunction Gigabit Server Adapters with TCP/IP offload engine for Microsoft Windows, iSCSI boot, and optional accelerated iSCSI
   - One (1) NC326i Dual Port Gigabit Server Adapter
   - One (1) additional embedded 10/100 network adapter dedicated to iLO 2 management
2. Integrated HP Smart Array P400i Controller with RAID 0 and 1.
   NOTE: A controller cache module selection is required. In the "HP Storage Controllers" section of step 2 below, select either the 256 MB module (with or without optional BBWC) or the 512 MB module with BBWC.
3. Two (2) small form factor (SFF) SAS/SATA hot-plug hard drive bays
4. Three I/O expansion slots: one Type I x4 PCIe (15 watts) and two x8 PCIe (25 watts)
5. Integrated Lights-Out 2 Standard Blade Edition

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

HP Processors

NOTE: The BL680c G5 supports either two or four processors. One and three processors are not supported.
NOTE: All processors within the server must be identical.
NOTE: All processor kits contain two (2) processors.
NOTE: If 4 processors are desired, select one xxxxxx-L21 and one xxxxxx-B21.

Six-Core Processors	
HP BL680c G5 Intel® Xeon® E7458 (2.40GHz/6-core/16MB/90W) FIO Processor Kit	517411-L21
HP BL680c G5 Intel® Xeon® E7450 (2.40GHz/6-core/12MB/90W) FIO 2-processor Kit	492344-L21
HP BL680c G5 Intel® Xeon® L7455 (2.13GHz/6-core/12MB/65W) FIO 2-processor Kit	492348-L21
Four-Core Processors	
HP BL680c G5 Intel® Xeon® E7440 (2.40GHz/4-core/16MB/90W) FIO 2-processor Kit	492345-L21
HP BL680c G5 Intel® Xeon® E7430 (2.13GHz/4-core/12MB/90W) FIO 2-processor Kit	492346-L21
HP BL680c G5 Intel® Xeon® E7420 (2.13GHz/4-core/8MB/90W) FIO 2-processor Kit	492347-L21
HP BL680c G5 Intel® Xeon® L7445 (2.13GHz/4-core/12MB/50W) FIO 2-processor Kit	493577-L21

HP Memory	HP 4GB Fully Buffered DIMM PC2-5300 2x2GB Low Power DDR2 Memory Kit	461828-B21

Configuration Information - Factory Integrated Models

	HP 8GB Fully Buffered DIMM PC2-5300 2x4GB DDR2 Memory Kit	397415-B21
	HP 8GB Fully Buffered DIMM PC2-5300 2x4GB Low Power DDR2 Memory Kit	466440-B21
	HP 16GB Fully Buffered DIMM PC2-5300 2x8GB DDR2 Memory Kit	413015-B21
	HP 64GB Fully Buffered DIMM PC2-5300 8x8GB DDR2 Memory Kit	495604-B21
	NOTE: For more information low power memory option kits and other ProLiant energy efficient features, see: http://h18004.www1.hp.com/products/servers/platforms/energyefficient/	
	NOTE: Two-way memory interleaving is enabled when an identical pair of DIMMs is installed.	
HP Storage Controllers	**NOTE:** Selection of either the 256 MB cache module or the 512 MB cache module with BBWC is required.	
	HP Smart Array P400 256MB FIO Cache Module **NOTE:** Supports Smart Array P400 Controller and Smart Array P400i Controller.	405139-B21
	HP 512MB w/Battery Smart Array Battery Back Write Cache Enabler **NOTE:** Supports Smart Array P400 Controller and Smart Array P400i Controller.	405148-B21

Step 3: Choose Additional Options for Factory Integration

NOTE: For additional options, including server blade enclosures interconnect and mezzanine options and power subsystem options; please see the Core Options and Additional sections below and the following:
HP BladeSystem c3000 Enclosure QuickSpecs:
http://h18000.www1.hp.com/products/quickspecs/12790_div/12790_div.html
HP BladeSystem c7000 Enclosure QuickSpecs:
http://h18000.www1.hp.com/products/quickspecs/12810_div/12810_div.html
HP BladeSystem c-Class Interconnect and Mezzanine Components:
http://h18004.www1.hp.com/products/blades/components/c-class-interconnects.html
http://h18004.www1.hp.com/products/blades/components/c-class-adapters.html

Core Options

NOTE: For additional "Core Options" and "Additional Options" please see the options sections below.
NOTE: Some options may not be integrated at the factory. To ensure only valid configurations are ordered, HP recommends the use of an HP approved configurator. Contact your local sales representative for additional information.

HP Ethernet Mezzanine Options	**Gigabit Ethernet Mezzanines**	
	HP NC325m PCI Express Quad Port Gigabit Server Adapter	416585-B21
	HP NC360m Dual Port 1GbE BL-c Adapter	445978-B21
	HP NC364m Quad Port 1GbE BL-c Adapter	447883-B21
	HP NC382m PCI Express Dual Port Multifunction Gigabit Server Adapter	453246-B21
	10 Gigabit Ethernet Mezzanines	
	HP NC532m Dual Port 10GbE Multifunction BL-c Adapter **NOTE:** The NC532m network adapter card is required for each server blade connecting to a 10Gb interconnect in bays 3-8 (HP BladeSystem c7000 Enclosure) or bays 3-4 (HP BladeSystem c3000 Enclosure). **NOTE:** The NC532m requires a minimum of 2 GB of server memory. **NOTE:** The NC532m will downspeed to 1Gb if paired with a 1GbE interconnect.	467799-B21
	HP NC550m 10Gb 2-port PCIe x8 Flex-10 Ethernet Adapter **NOTE:** The NC550m network adapter card is required for each server blade connecting to a 10Gb interconnect in bays 3-8 (HP BladeSystem c7000 Enclosure) or bays 3-4 (HP BladeSystem c3000 Enclosure) **NOTE:** The NC550m requires a minimum of 2 GB of server memory. **NOTE:** The NC550m supports linking at 1000Mbps or 10000Mbps when not connected to a Flex-10 device. The NC550m will only support 1000Mbps when connected to a 1Gb Ethernet interconnect.	581204-B21
HP Fibre Channel Mezzanine Options	Emulex LPe1105 4Gb Fibre Channel Host Bus Adapter for c-Class BladeSystem	403621-B21
	QLogic QMH2462 4Gb Fibre Channel Host Bus Adapter for c-Class BladeSystem	403619-B21
HP Processors	**NOTE:** The BL680c G5 supports either two or four processors. One and three processors are not supported. **NOTE:** All processors within the server must be identical. **NOTE:** All processor kits contain two (2) processors. **NOTE:** If upgrading an existing BL680c G5 server to a different processor, the server's ROM must be flashed to the latest BIOS prior to the upgrade.	
	Six-Core Processors	
	HP BL680c G5 Intel® Xeon® E7458 (2.40GHz/6-core/16MB/90W) Processor Kit	517411-B21
	HP BL680c G5 Intel® Xeon® E7450 (2.40GHz/6-core/12MB/90W) 2-processor Kit	492344-B21
	HP BL680c G5 Intel® Xeon® L7455 (2.13GHz/6-core/12MB/65W) 2-processor Kit	492348-B21
	Four-Core Processors	
	HP BL680c G5 Intel® Xeon® E7440 (2.40GHz/4-core/16MB/90W) 2-processor Kit	492345-B21
	HP BL680c G5 Intel® Xeon® E7430 (2.13GHz/4-core/12MB/90W) 2-processor Kit	492346-B21
	HP BL680c G5 Intel® Xeon® E7420 (2.13GHz/4-core/8MB/90W) 2-processor Kit	492347-B21
	HP BL680c G5 Intel® Xeon® L7445 (2.13GHz/4-core/12MB/50W) 2-processor Kit	493577-B21

Core Options

HP Memory	HP 4GB Fully Buffered DIMM PC2-5300 2x2GB Low Power DDR2 Memory Kit	461828-B21
	HP 8GB Fully Buffered DIMM PC2-5300 2x4GB DDR2 Memory Kit	397415-B21
	HP 8GB Fully Buffered DIMM PC2-5300 2x4GB Low Power DDR2 Memory Kit	466440-B21
	HP 16GB Fully Buffered DIMM PC2-5300 2x8GB DDR2 Memory Kit	413015-B21
	HP 64GB Fully Buffered DIMM PC2-5300 8x8GB DDR2 Memory Kit	495604-B21
HP Hard Drives	**NOTE:** The components of a storage subsystem (e.g. the drive, the HBA/controller, firmware, and the server backplane) should operate at the same data transfer rate or the system bandwidth will be negotiated down to an acceptable level for all components.	
	NOTE: Hard drives have either a one year or three year warranty; refer to the specific hard drive QuickSpecs for details.	
	SAS Hot Plug SFF (2.5-inch) Enterprise (ENT) Drives	
	HP 300GB 6G SAS 10K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	507127-B21
	HP 146GB 6G SAS 15K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	512547-B21
	HP 146GB 6G SAS 10K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	507125-B21
	HP 72GB 6G SAS 15K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	512545-B21
	SAS Hot Plug SFF (2.5-inch) Midline (MDL) Drives	
	HP 500GB 6G SAS 7.2K rpm SFF (2.5-inch) Dual Port Midline 1yr Warranty Hard Drive	507610-B21
	NOTE: SAS Enterprise drives have a 3 year warranty.	
	NOTE: Please see the QuickSpecs for additional information: http://h18000.www1.hp.com/products/quickspecs/12244_div/12244_div.html	
	SATA Hot Plug SFF (2.5-inch) Midline (MDL) Drives	
	HP 500GB 3G SATA 7.2K rpm SFF (2.5-inch) Midline 1yr Warranty Hard Drive	507750-B21
	HP 160GB 3G SATA 7.2K rpm SFF (2.5-inch) Midline 1yr Warranty Hard Drive	530888-B21
	NOTE: Please see the QuickSpecs for additional information: http://h18004.www1.hp.com/products/quickspecs/13021_div/13021_div.html	

Additional Options

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

HP Insight Software	**Insight Control**	
	HP Insight Control including 1yr 24x7 Technical Support and Updates Electronic License	T9074BAE
	HP Insight Control including 1yr 24x7 Technical Support and Updates Single Server License	452148-B22
	HP Insight Software Media Kit **NOTE:** Insight Software DVD media without licenses. Contains HP Systems Insight Manager, HP Insight Control, HP Insight Dynamics, HP Insight Control for Microsoft System Center, and Virtual Connect Enterprise Manager software. Uses an integrated installer to perform quick and accurate software installation and updates. **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:** 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, please see the QuickSpecs at: http://h18000.www1.hp.com/products/quickspecs/12631_div/12631_div.html	436222-B21
	HP Insight Control for Linux	
	HP Insight Control for Linux including 1yr 24x7 Support Single Server License	TC209A
	HP Insight Control for Linux including 1yr 24x7 Support Electronic License **NOTE:** This part number can be purchased as a single license or as multiple licenses with a single activation key. Customer will receive a license entitlement certificate via e-mail. The license entitlement certificate 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 and Update Service. **NOTE:** Electronic LTUs are only available through limited points of sales; if not available, order a printed license entitlement certificate instead.	TC213AAE
	HP Insight Control for Linux Media Kit **NOTE:** This optional Media pack DVD contains the ISO image for HP Insight Control for Linux, HP Systems Insight Manager, HP Insight Control power management, HP Insight Control virtual machine management, and an integrated installer. Servers must be acquired separately. **NOTE:** This Media pack is optional because the latest ISO image and latest updates may be downloaded at no cost from: http://www.hp.com/go/ic-linux (click on Download button). **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:** 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	TC208A

Additional Options

x 7 HP Software Technical Support Service.
NOTE: For additional License Kits, please see the QuickSpecs at:
http://h18000.www1.hp.com/products/quickspecs/13019_div/13019_div.html

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

HP iLO Advanced for BladeSystem including 1yr 24x7 Support Electronic License	TA851AAE
HP iLO Advanced for BladeSystem including 1yr 24x7 Support Single Server License	512488-B21

NOTE: This license allows 1 server to be managed via HP iLO Advanced for BladeSystem. Customer will receive a printed license entitlement certificate via physical shipment. The license entitlement certificate 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 delivery options, please see the iLO QuickSpecs at:
http://h18000.www1.hp.com/products/quickspecs/12362_div/12362_div.html

HP Insight Control server deployment

HP Insight Control Server Deployment including 1yr 24x7 Support Electronic License	T9082AAE
HP Insight Control Server Deployment including 1yr 24x7 Support Single Server License	452151-B21

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/insightupdates.
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

High Performance Clusters

HP Cluster Management Utility

HP Cluster Management Utility Compute Node Flexible License	QL803A

NOTE: This part number can be used to purchase one certificate for multiple licenses with a single activation key. Each license is for one node (server). Customer will receive a printed end user license agreement and license entitlement certificate via physical shipment. The license entitlement certificate must be redeemed online in order to obtain a license key.

HP Cluster Management Utility License and Media	433257-B21

NOTE: Order a minimum of one license per cluster to purchase media including software and documentation, which will be delivered to the customer, and also licenses CMU management. No license key is delivered or required.

NOTE: For additional license kits please see the QuickSpecs at:
http://h18004.www1.hp.com/products/quickspecs/12612_div/12612_div.html

HP HPC Linux Value Pack

HP High Performance Computing Linux Value Pack 1 Processor Flexible License	TC293B

NOTE: This part number can be used to purchase one certificate for multiple licenses with a single activation key. Each license is for one socket (a.k.a. processor). Customer

Additional Options

	will receive a printed end user license agreement and license entitlement certificate via physical shipment. The license entitlement certificate must be redeemed online in order to obtain a license key.	
	HP High Performance Computing Linux Value Pack Media Kit **NOTE:** This part number can be used to purchase media including software and documentation, which will be delivered to the customer.	TC294A
	NOTE: For additional license kits please see the QuickSpecs at: http://h18004.www1.hp.com/products/quickspecs/13485_div/13485_div.html	
HP Storage Controllers	HP Smart Array P700m/256 4-ports Ext PCIe x8 SAS Controller	507925-B21
	HP Smart Array P700m/512 4-ports Ext PCIe x8 SAS Controller	508226-B21
	Optional Upgrades	
	HP 512MB w/Battery Smart Array Battery Back Write Cache Enabler **NOTE:** Supports Smart Array P400 Controller and Smart Array P400i Controller.	405148-B21
	HP Smart Array Cache Battery Kit **NOTE:** Supports Smart Array P400 Controller and Smart Array P400i Controller.	383280-B21
	HP Smart Array P-Series Low Profile Battery	452348-B21
HP I/O Expansion Options	HP 320GB IO Accelerator for BladeSystem c-Class	AJ878B
	HP 640GB IO Accelerator for BladeSystem c-Class	BK836A
	NOTE: Please see the QuickSpecs for technical specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/13220_div/13220_div.html	
HP c-Class Mezzanines	**HP Pass Thru Card for HP BladeSystem c-Class**	
	HP BL c-Class SB40c PCI Express Mezzanine Pass Thru Option Kit **NOTE:** Required to support the HP SB40c Storage Blade (P/N 411243-B21), PCI expansion Blade (P/N 448018-B21), and Ultrium tape blades with HP c-Class BladeSystem full-height server blades. The PCI Express Mezzanine Pass-Thru Card must be installed in mezzanine slot 3.	431643-B21
HP Tape Blades	HP SB1760c Tape Blade	AQ697A
	HP LTO-5 SB3000c Tape Blade	BS580A
	NOTE: The HP PCI Express Mezzanine Pass-Thru Card for HP BladeSystem c-Class (P/N 431643-B21) is required to support the HP Tape Blades. The PCI Express Mezzanine Pass-Thru Card must be installed in mezzanine slot 3 of the BL680c G5. Please see the QuickSpecs for technical specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/12729_div/12729_div.html	

Additional Options

HP SB40c Storage Blade	HP SB40c Storage Blade **NOTE:** The HP PCI Express Mezzanine Pass-Thru Card for HP BladeSystem c-Class (P/N 431643-B21) is required to support the HP SB40c Storage Blade. The PCI Express Mezzanine Pass-Thru Card must be installed in mezzanine slot 3 of the BL680c G5. Please see the QuickSpecs for technical specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/12587_div/12587_div.html	411243-B21
HP Expansion Blade	HP BLc PCI Expansion Blade **NOTE:** Ships with one pre-installed PCI-X connect board. Also includes one PCIe connect board which requires installation. **NOTE:** The HP PCI Express Mezzanine Pass-Thru Card for HP BladeSystem c-Class (P/N 431643-B21) is required to support the HP PCI Expansion Blade with HP c-Class BladeSystem full-height server blades. The PCI Express Mezzanine Pass-Thru Card must be installed in mezzanine slot 3. Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/12753_div/12753_div.html	448018-B21
HP USB and SD Options	HP USB 2-Button Optical Scroll Mouse	DC172B
	HP USB 04 Standard Keyboard	DT528A#xxx
	HP 2GB USB Flash Media Drive Key Kit **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.	608447-B21
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	
	HP 3 year 4 hour 13x5 BL6xxc Server Blade Hardware Support	UK108E
	HP 3 year 4 hour 24x7 BL6xxc Server Blade Hardware Support	UK109E
	HP 3 year 6 hour 24x7 Call to Repair BL6xxc Server Blade Hardware Support	UK110E

Memory

NOTE: Memory configurations listed do not apply to "Factory Integrated Models".
NOTE: For a specific memory level, the best performance is achieved using a homogenous memory configuration.

DIMM installation guidelines:

1. All memory must be PC2-5300 fully buffered DDR2 DIMMs operating at 667 MHz.
2. Both DIMM slots in a memory bank must be populated.
3. Banks must be populated in sequential alphabetic order, starting with bank A.
4. Both DIMMs in a memory bank must be identical. Install identical DIMMs as pairs only, starting with DIMM socket 1, bank A.
5. Standard memory and lower power DIMMs may be mixed within the same server, but not within the same memory bank (see #4 above).
6. Low power DIMM kits save approximately 2 watts per server DIMM, plus any datacenter power savings resulting from reduced cooling of heat dissipated from the lower server watt usage.
7. Multiple advanced memory protection (AMP) modes are supported based on fully buffered DIMM population and RBSU selection. The server blade defaults to advanced ECC.

Standard Memory
8GB (2 x 4GB) of PC2-5300, FBD DDR2-667 ECC DIMMs

Standard Memory Plus Optional Memory
Up to 116GB of memory is available with the installation of optional PC2-5300, FBD DDR2-667 DIMM memory expansion kits.

Standard Memory Replaced with Optional Memory
Up to 128GB of memory is available with the removal of standard memory and the installation of optional PC2-5300, FBD DDR2-667 DIMM memory expansion kits.

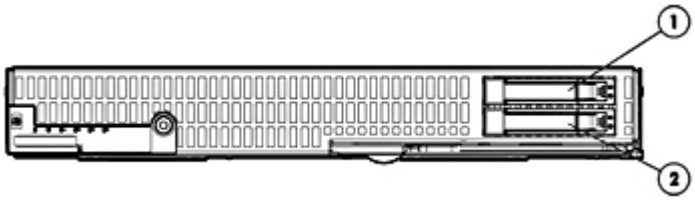
Memory		Slot							
Standard	8GB	1A	2C	3E	4G	5A	6C	7E	8G
		4 GB	Empty	Empty	Empty	4 GB	Empty	Empty	Empty
		9B	10D	11F	12H	13B	14D	15F	16H
		Empty	Empty	Empty	Empty	Empty	Empty	Empty	Empty
Optional	116GB	1A	2C	3E	4G	5A	6C	7E	8G
		4 GB	8 GB	8 GB	8 GB	4 GB	8 GB	8 GB	8 GB
		9B	10D	11F	12H	13B	14D	15F	16H
		8 GB	8 GB	8 GB	8 GB	8 GB	8 GB	8 GB	8 GB
Maximum	128GB	1A	2C	3E	4G	5A	6C	7E	8G
		8 GB	8 GB	8 GB	8 GB	8 GB	8 GB	8 GB	8 GB
		9B	10D	11F	12H	13B	14D	15F	16H
		8 GB	8 GB	8 GB	8 GB	8 GB	8 GB	8 GB	8 GB

Memory

HP ProLiant BL680c G5 memory options:

HP Memory	Following are memory options available from HP:	
	HP 4GB Fully Buffered DIMM PC2-5300 2x2GB Low Power DDR2 Memory Kit	461828-B21
	HP 8GB Fully Buffered DIMM PC2-5300 2x4GB DDR2 Memory Kit	397415-B21
	HP 8GB Fully Buffered DIMM PC2-5300 2x4GB Low Power DDR2 Memory Kit	466440-B21
	HP 16GB Fully Buffered DIMM PC2-5300 2x8GB DDR2 Memory Kit	413015-B21
	HP 64GB Fully Buffered DIMM PC2-5300 8x8GB DDR2 Memory Kit	495604-B21

Storage



1-2 2 x SFF SAS or SATA hot-plug hard drives

Hard Drives

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

NOTE: Hard drives have either a one year or three year warranty; refer to the specific hard drive QuickSpecs for details.

SAS Hot Plug SFF (2.5-inch) Enterprise (ENT) Drives

	Quantity Supported	Position Supported	Controller
300GB 6G SAS 10K 146GB 6G SAS 10K 146GB 6G SAS 15K 72GB 6G SAS 15K	2	1-2	Smart Array P400i Controller

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

	Quantity Supported	Position Supported	Controller
500GB 6G SAS 7.2K	2	1-2	HP Smart Array P400i Controller

SATA Hot Plug SFF (2.5-inch) Midline (MDL) Drives

	Quantity Supported	Position Supported	Controller
500GB 3G SATA 7.2K 160GB 3G SATA 7.2K	2	1-2	HP Smart Array P400i Controller

Technical Specifications

System Unit	**Dimensions** (H x W x D)	Full height server blade: 14.42 x 2.03 x 20.06 in (36.17 x 5.16 x 50.95 cm)	
	Weight (approximate)	Maximum (all hard drives and processors installed)	21 lb (9.5 kg)
		Minimum (one hard drive and processor installed)	19 lb (8.6 kg)
	Power Specifications	For power specifications including input requirements, BTU rating, and power supply output, please see the HP BladeSystem c-Class Enclosures QuickSpecs located at: HP BladeSystem c3000 Enclosure QuickSpecs: http://h18000.www1.hp.com/products/quickspecs/12790_div/12790_div.html HP BladeSystem c7000 Enclosure QuickSpecs: http://h18000.www1.hp.com/products/quickspecs/12810_div/12810_div.html To review typical system power ratings use the HP BladeSystem Power Sizer available at: http://www.hp.com/go/bladesystem/powercalculator.	
	System Inlet Temperature	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. System performance may be reduced if operating with a fan fault or above 30°C (86°F).
		Non-Operating	-30° to 60°C (-22° to 140°F), maximum rate of change is 20°C/hr (36°F/hr).
	Relative Humidity (non-condensing)	Operating	10 to 85% relative humidity (Rh), 28°C (82.4°F) maximum wet bulb temperature, non-condensing.
		Non-Operating	10 to 95% relative humidity (Rh), 38.7°C (101.7°F) maximum wet bulb temperature, non-condensing.
	Altitude	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).
	Acoustic Noise	For acoustic noise specifications, please see the HP BladeSystem c-Class Enclosures QuickSpecs located at: HP BladeSystem c3000 Enclosure QuickSpecs: http://h18000.www1.hp.com/products/quickspecs/12790_div/12790_div.html	

HP BladeSystem c7000 Enclosure QuickSpecs:
http://h18000.www1.hp.com/products/quickspecs/12810_div/12810_div.html

Smart Array P400i Controller	**Disk Drive and Enclosure Interface**	3G SAS (Serial Attached SCSI) 1.5G SATA (Serial Advanced Technology Attachment)
	SAS Connectors	2 internal (SFF8484) x4 wide port connectors
	Cache Memory Speed	DDR2-533MHz with 40 or 72-bit wide bus provides up to 4.2 GB/s maximum bandwidth.
	Server Interface	x8 2.5G PCIe provides 2 GB/s maximum bandwidth.
	SAS Speed	x8 3G SAS provides 2.4 GB/s maximum bandwidth.
	Cache Memory	40-bit 256 MB cache (72-bit 512MB module upgrades available); ECC protection, battery-backed, and transportable
	Logical Drives Supported	Up to 32 logical drives
	Maximum Logical Drive Capacity	1.0 TB (2 x 500 GB) SAS 1.0 TB (2 x 500 GB) SATA
	Host Memory Addressing	64-bit, supporting greater than 4 GB server memory space
	RAID Support	RAID 1 (Mirroring), RAID 0 (Striping)
	Upgradeable Firmware	Upgradeable firmware with recovery ROM feature
Embedded NC326i Dual Port Gigabit Server Adapter	**Network Processor**	Broadcom 5715S
	Data Transfer Method	Four lane (x4) PCI Express
	Network Transfer Rate	Two ports, each at 2000 Mb/s full duplex only (theoretical maximum)
	IEEE Compliance	802.1p, 802.1Q, 802.3, 802.3ad, and 802.3x
	Standard Features	• 9K Jumbo frames • TCP/IP checksum offload (TCO) • Large send offload (LSO) • Interrupt coalescence • Dual address cycles (DAC) • Wake-on-LAN (WOL) • Pre-boot execution environment (PXE) v2.1 • ProLiant Teaming including Network Fault Tolerance, Transmit Load Balancing, and Switch-Assisted Load Balancing • IPv6 packet transmit and receive (excluding all offload capabilities); IPv6 aware SNMPv1 agents for Windows

Technical Specifications

Embedded NC373i Multifunction Gigabit Server Adapters	**Network Processor**	Broadcom 5708S
	Data Transfer Method	Four lane (x4) PCI Express
	Network Transfer Rate	2000 Mb/s per port full duplex only (theoretical maximum value)
	IEEE Compliance	802.1p, 802.1Q, 802.3, 802.3ad, and 802.3x
	Standard Features	• TCP/IP offload engine (TOE) for Microsoft Windows • iSCSI boot • Optional accelerated iSCSI • 9K Jumbo frames • TCP/IP checksum offload (TCO) • Large send offload (LSO) • Interrupt coalescence • Dual address cycles (DAC) • Wake-on-LAN (WOL) • Pre-boot execution environment (PXE) v2.1 • ProLiant Teaming including Network Fault Tolerance, Transmit Load Balancing, and Switch-Assisted Load Balancing • IPv6 packet transmit and receive (excluding all offload capabilities); IPv6 aware SNMPv1 agents for Windows

HP Integrated Lights-Out 2 (iLO 2) integrated on system board	**Architecture**	32-bit PCI-based health and remote management ASIC
	Processor	32-bit RISC processor core running at 66MHz
	Upgradeability	Option firmware upgradeable via Flash ROM
	Operating System Support	Microsoft Windows Server 2008 Standard Edition (32bit and 64bit) Microsoft Windows Server 2008 Enterprise Edition (32bit and 64bit) Microsoft Windows Server 2003 and Windows Server 2003 R2, and Windows Server 2003 for Extended Systems Standard Edition, Enterprise Edition Red Hat Enterprise Linux 5.4 (32bit and 64bit) SUSE LINUX Enterprise Server 11 (32bit and 64bit) SUSE LINUX Enterprise Server 10 (32bit and 64bit) VMware ESX 4.0 VMware ESX 3.5.0 Microsoft Windows XP Professional Edition Microsoft Windows Vista Business and Ultimate Editions Red Hat Enterprise Linux Desktop 5.00 SUSE Linux Enterprise Desktop 11 SUSE Linux Enterprise Desktop 10
	Client Browser Support	Microsoft Internet Explorer 7 Microsoft Internet Explorer 6 Firefox 3.5 (on supported Windows and Linux systems) Firefox 3.0 (on supported Windows and Linux systems)
	Command Line Support	Telnet, Secure Shell and serial port access Secure Socket Layer Secure Shell version 2 (Password and certificate)

Technical Specifications

	Security	Advanced Encryption Standard (AES) and Triple Data Encryption Standard (3DES) on browser, CLP and XML scripting interface RC4 encryption of video
	Directory Support Services	Active Directory v1.0 (Windows 2003)
	Driver Support	Health Driver (HP ProLiant iLO 2 Management Controller Driver) iLO Management Channel Interface Driver
	Management protocols supported	SNMP 2, IPMI 2.0 (KCS interface), DMTF Server Management Command Line Protocol Specification (SM CLP), DMTF Web Services Management Specification (WS Management)
Environment-friendly Products and Approach	**End-of-life Management and Recycling**	Hewlett-Packard offers end-of-life HP product return, trade-in, and recycling programs in many geographic areas. For trade-in information, please go to: http://www.hp.com/go/green. To recycle your product, please go to: http://www.hp.com/go/green or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner. 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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For hard drives, 1GB = 1 billion bytes (1,000 MB). Actual formatted capacity is less.