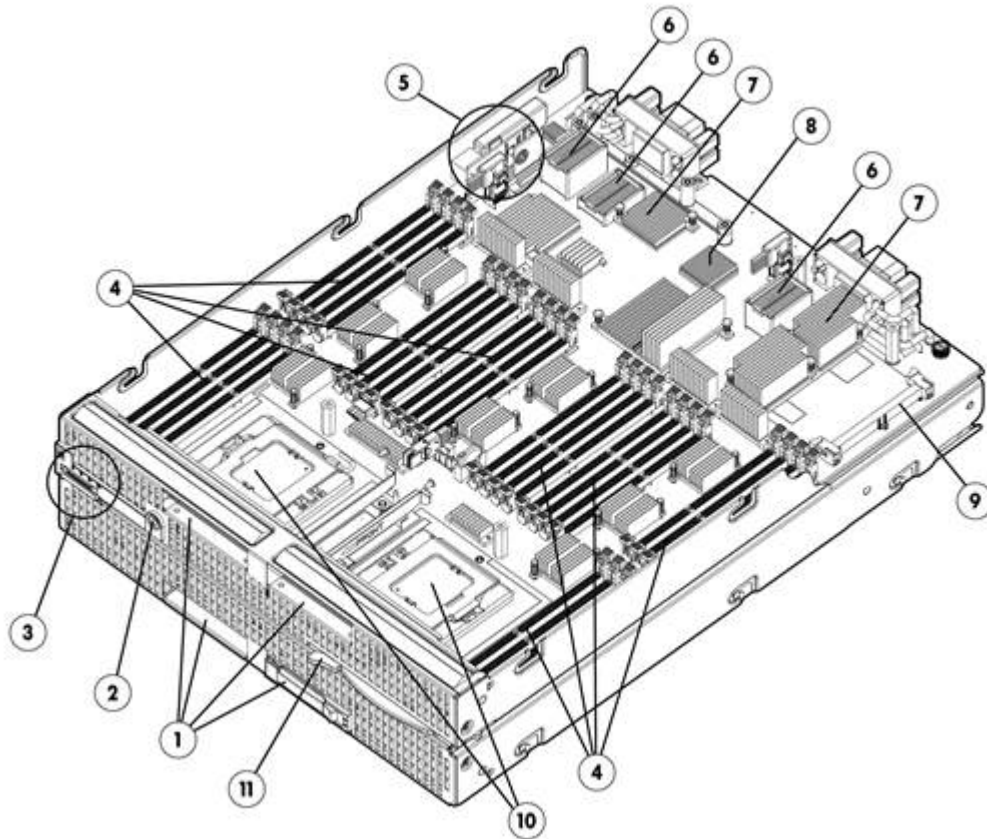## Overview

HP ProLiant BL680c Gen7 Server Blade
Front view image showing side "A"

1. Four hot-plug SAS/SATA/SSD drive bays

2. Power on/standby button

3. UID, health, and network adapter LEDs

4. 64 RDIMM slots supporting up to 2.0TB of DDR3-1333MHz memory (operating up to 1066 MHz) (32 RDIMMs per side)

5. One USB 2.0 port, one MicroSD high capacity (SDHC) port, and one TPM 1.2 connector

6. Seven PCIe Gen2 I/O expansion mezzanine slots (3 on one side, 4 on the other)

7. Six NC553i 10Gb FlexFabric adapter ports (4 one on side, 2 on the other)

8. iLO 3 Management adapter port

9. HP P410i Smart Array flash cache connector

10. Two, three or four Intel® Xeon® 4800 family processors (below the hard drives) (two per side)

11. Server release lever

What's New

- Support for the HP OneView Software integrated management platform and a HP 8GB USB Enterprise Mainstream Flash Media Drive Key Kit

Standard Features

This document covers the HP ProLiant BL680c G7 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
NOTE: The c3000 HP c-Class enclosures have full backwards and forwards compatibility, existing server blades are supported in the new enclosures and any future server blades will be supported in the existing enclosures.

HP BladeSystem c7000 Enclosure QuickSpecs:
http://h18000.www1.hp.com/products/quickspecs/12810_div/12810_div.html
NOTE: The c7000 HP c-Class enclosures have full backwards and forwards compatibility, existing server blades are supported in the new enclosures and any future server blades will be supported in the existing enclosures.

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

Processors One or more of the following depending on model	**NOTE:** All processors within the server must be identical.
	NOTE: The server supports two, three, or four processors. One processor is not supported.
	NOTE: The minimum processor configuration is two processors that must be installed in socket CPU1 and CPU3.
	NOTE: If upgrading an existing BL680c G7 server to a different processor, the server's ROM must be flashed to the latest BIOS prior to the upgrade.
	NOTE: All processors support Intel® Hyper-threading.
	NOTE: All processors support Intel® Turbo Boost Technology except the E7-4807.
	NOTE: Intel® Xeon® E7-4800/8867L series processors cannot be used to upgrade a ProLiant BL680c G7 server blade with Intel® Xeon® 6500/7500 series processors.
	Ten-Core Processors
	Intel® Xeon® E7-4870 (2.40GHz/10-core/30MB, 6.40GT/s QPI, 130W) Processor **NOTE:** Offered as Configure-To-Order. See the Factory Integrated Models section for more details.
	Intel® Xeon® E7-4860 (2.26GHz/10-core/24MB, 6.40GT/s QPI, 130W) Processor
	Intel® Xeon® E7-4850 (2.00GHz/10-core/24MB, 6.40GT/s QPI, 130W) Processor
	Intel® Xeon® E7-8867L (2.13GHz/10-core/30MB, 6.40GT/s QPI, 105W) Processor **NOTE:** Offered as Configure-To-Order. See the Factory Integrated Models section for more details.
	Eight-Core Processors
	Intel® Xeon® E7-4830 (2.13GHz/8-core/24MB, 6.40GT/s QPI, 105W) Processor
	Intel® Xeon® E7-4820 (2.0GHz/8-core/18MB, 5.86GT/s QPI, 105W) Processor **NOTE:** Offered as Configure-To-Order. See the Factory Integrated Models section for more details.
	Six-Core Processors
	Intel® Xeon® E7-4807 (1.86GHz/6-core/18MB, 4.80GT/s QPI, 95W) Processor **NOTE:** Offered as Configure-To-Order. See the Factory Integrated Models section for more details.
Cache Memory	Up to 30MB level 3 cache memory

QuickSpecs

Standard Features

Chipset	Intel® 7500 chipset	

Upgradeability Upgradeable to three and four processors
NOTE: All processors within the server must be identical.
NOTE: All servers support two, thee, or four processors. One processor is not supported.
NOTE: The minimum processor configuration is two processors that must be installed in socket CPU1 and CPU3.
NOTE: If upgrading an existing BL680c G7 server to a different processor, the server's ROM must be flashed to the latest BIOS prior to the upgrade.
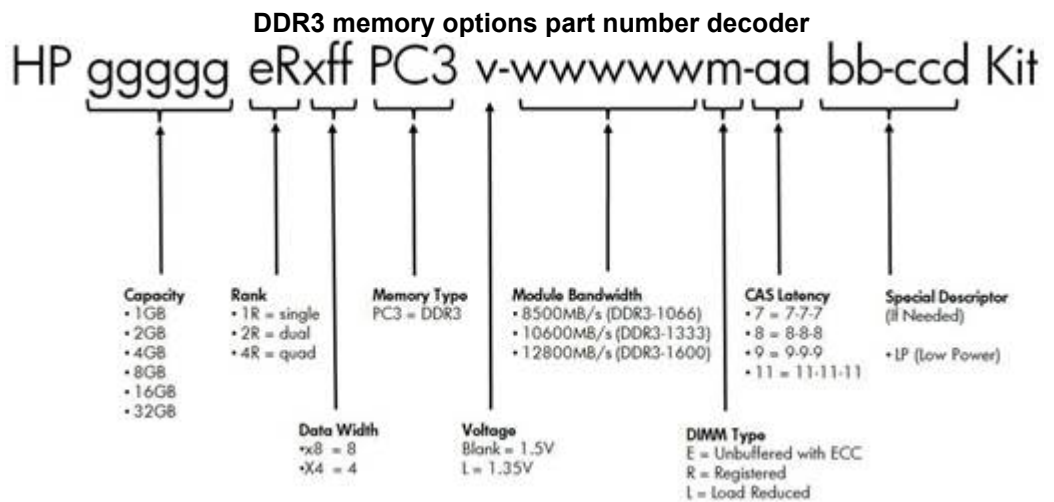**NOTE:** Intel® Xeon® E7-4800/8867L series processors cannot be used to upgrade a ProLiant BL680c G7 server blade with Intel® Xeon® 6500/7500 series processors.

Integrated Manageability HP Integrated Lights-Out 3 (iLO 3)

Memory

Type	DDR3-1333 and DDR3-1066 Registered (RDIMM) (operating up to 1066 MHz)	
Standard	64GB (8 x 8GB)	
Maximum	2.0TB (64 x 32GB RDIMMs)	

DDR3 memory options part number decoder

HP ggggg eRxff PC3 v-wwwwwm-aa bb-ccd Kit

Capacity	• 1GB • 2GB • 4GB • 8GB • 16GB • 32GB
Rank	• 1R = single • 2R = dual • 4R = quad
Data Width	• x8 = 8 • X4 = 4
Memory Type	PC3 = DDR3
Voltage	Blank = 1.5V L = 1.35V
Module Bandwidth	• 8500MB/s (DDR3-1066) • 10600MB/s (DDR3-1333) • 12800MB/s (DDR3-1600)
DIMM Type	E = Unbuffered with ECC R = Registered L = Load Reduced
CAS Latency	• 7 = 7-7-7 • 8 = 8-8-8 • 9 = 9-9-9 • 11 = 11-11-11
Special Descriptor (If Needed)	• LP (Low Power)

NOTE: See the "Memory" section for memory guidelines, installation rules, and additional general information.

Standard Features

Network Controllers	Six (6) embedded HP NC553i 10Gb FlexFabric adapter ports supporting autosensing 10Gb/1Gb Ethernet, FCoE, Flex-10, TCP/IP offload engine, hardware-based accelerated iSCSI, and iSCSI boot

One Ethernet-specific slot (mezzanine slot 6) supporting a dual-port mezzanine card for a total of eight (8) "embedded" Ethernet adapter ports

NOTE: Fibre Channel over Ethernet (FCoE) capability requires the use of an HP Virtual Connect FlexFabric 10Gb/24-port Module or HP 10GbE Pass-Thru Module.

NOTE: The Flex-10 capability requires the use of an HP Virtual Connect Flex-10 10Gb Ethernet module or HP 10GbE Pass-Thru Module.

One (1) 10/100 network adapter port dedicated to iLO 3 Management

I/O Expansion Slots   Seven (7) mezzanine expansion slots as follows:

- Four (4) Type II (25 watts) x8 PCIe Gen2, mezzanine slots 2, 3, 4, 7 supporting QDR IB, 4Gb and 8Gb FC, 10Gb FlexFabric, 10Gb Flex10, 10GbE, 1GbE, and the Smart Array RAID controllers.
  - Mezzanine slots 2 and 7 ports are routed to interconnect bays 5,6,7,8 (c7000 Enclosure) and 3,4,3,4 (c3000 Enclosure)
  - Mezzanine slots 3 and 4 ports are routed to interconnect bays 7,8,5,6 (c7000 Enclosure) and 3,4,3,4 (c3000 Enclosure
- Two (2) Type I (15 watts) x4 PCIe Gen2, mezzanine slots 1 and 5 supporting 4Gb and 8Gb FC,10Gb FlexFabric, 10Gb Flex10, 10GbE , and 1GbE
  - Mezzanine slots 1 and 5 ports are routed to interconnect bays 3, 4, 3, 4 (c7000 Enclosure) and 2,2,2,2 (c3000 Enclosure)
- One (1) Type I (15 watts) x8 PCI Gen 2 dual-port Ethernet-specific slot (mezzanine slot 6)
  - Mezzanine slots 6 ports are routed to interconnect bays 1, 2 (c7000 Enclosure) and 1, 1 (c3000 Enclosure)
    NOTE: This Ethernet-specific mezzanine slot allows the customer to decide if the additional 7th and 8th "embedded" Ethernet ports are desired and allows them to choose between dual-port 10Gb FlexFabric, 10GbFlex-10, 10GbE, or 1GbE per the Ethernet mezzanine adapters listed in the "Additional Options" section.

NOTE: HP recommends 10Gb adapters be installed in a x8 PCIe slot for optimal performance.

NOTE: Type II slots accept both Type I or Type II cards. Type I slots accepted Type I cards only.

Storage Controller   Integrated SAS version 2.0 (6Gb) HP Smart Array P410i Controller with RAID 0, 1 and 1+0.
NOTE: The P410i is configured with no cache allowing the end user to select the desired cache option (if cache is desired in the first place). This provides RAID 0, 1 and 1+0 in the standard configuration. However, options are available to add RAID 5 and 6.
NOTE: RAID 0, 1, and 1+0 are supported on the P410i without the need for a cache option. P410i 512MB and 1GB flash backed write cache (FBWC) and Smart Array Advanced Pack (SAAP) options.
NOTE: RAID 5 is supported on the P410i with the addition of any FBWC option.
NOTE: RAID 6 support on the P410i may be added with addition of any FBWC option and the Smart Array Advanced Pack (SAAP) option.

Optional Smart Array RAID mezzanine controllers (with BBWC and FBWC) for connection to external storage
NOTE: The server supports up to a combined total of four (4) battery cache options for the P410i and/or optional Smart Array RAID controllers.

Standard Features

Maximum Internal Storage	Hot-plug SAS	4.8TB	4 x 1.2TB drives
One or more of the following depending on model	Hot-plug SATA	4.0TB	4 x 1.0TB drives
	Hot-plug SAS SSD	3.2TB	4 x 800GB drives
	Hot-plug SATA SSD	3.2TB	4 x 800GB drives

NOTE: SAS, SATA, and/or SSD drives cannot be mixed within the server.

Industry Standard Compliance

- ACPI 2.0 Compliant
- PCI 2.2 Compliant
- Microsoft® Logo certifications
- USB 2.0
- Secure Digital 2.0
- TMP 1.2
- IEEE (see the NC553i Technical Specifications section)
- Advanced Encryption Standard (AES)
- Triple Data Encryption Standard (3DES)
- SNMP
- SSL 2.0
- Active Directory v1.0 (Windows 2003)
- IPMI 2.0
- DMTF Systems Management Architecture for Server Hardware Command Line Protocol (SMASH CLP)

Operating Systems and Virtualization Software Support for ProLiant Servers

Microsoft Windows Server
Red Hat Enterprise Linux (RHEL)
SUSE Linux Enterprise Server (SLES)
Oracle Solaris
VMware Server
Citrix 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/BL680cG7

Standard Features

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 BL620c G7 servers plugged vertically.
- The HP BladeSystem c3000 rack enclosure is 6U high and holds up to 4 HP ProLiant BL620c G7 servers plugged horizontally.

Server blades, storage blades, and interconnect modules are all designed to fit into the c7000 and c3000 enclosures.

NOTE: For optimal cooling and system performance the HP ProLiant BL680c G7 server requires the c7000 enclosure to be configured with 10 fans and the c3000 enclosure to be configured with 6 fans.

For additional enclosure information, please see:
http://h18004.www1.hp.com/products/blades/components/enclosures/c-class/index.html

Graphics

Integrated ATI RN-50 1280 x 1024 x 16M color

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

Form Factor

Full height, double wide server blade that plugs into the HP BladeSystem c3000 and c7000 enclosures

HP Insight management software

HP Service Pack for ProLiant

HP Service Pack for ProLiant (SPP) and HP Smart Update Manager (HP SUM) version 5 provide a new, comprehensive approach to firmware and system software maintenance. Together they provide better operating stability and ensure maximum uptime. The SPP will be updated at a predictable cadence, typically coinciding with new HP server hardware launches. By enabling firmware to be updated online and integrating firmware and system software updates in one operation HP SUM and the SPP offer faster updates of individual servers and dramatically faster updates of entire BladeSystem enclosures. Further improving system uptime and stability is the fact that HP provides 12 months of support on each Service Pack for ProLiant.

The user experience around HP SUM and the SPP has been improved in several ways, starting with the web download. A single web page provides access to a single download containing both the latest version of HP SUM version 5 and the latest SPP. Optional smaller subsets with only specific types of servers or specific operating systems are offered to save on download time. The HP SUM application has been re-written to provide a more straightforward, intuitive user interface that guides the user through the steps of discovery, analyses and update, providing comprehensive information on available updates, criticality and interdependencies. This information is also available in reports. By providing the option of multiple local or shared repositories which can be easily updated from hp.com, HP SUM provides the tools to optimize stability and consistency throughout the company. While HP SUM and

Standard Features

	the SPP will recommend the combinations of firmware and system software that HP has found to be the best practice, the application gives customers the flexibility to set their own specific baseline.
	The Service Pack for ProLiant has been rigorously tested with specific attention for interaction between firmware, drivers and agents both within the server as well as in interaction with the BladeSystem enclosure components (Onboard Administrator and Virtual Connect). This testing ensures the highest quality as well as providing the input for HP SUM to deploy updates taking into account all interdependencies, when determining the correct updates and order of update deployment.
	The Service Pack for ProLiant (which includes HP SUM 5) can be downloaded from www.hp.com/go/spp/download. More information can be found: www.hp.com/go/spp and http://www.hp.com/go/hpsum
HP Insight Foundation	Insight Foundation is being baselined at version v8.70 which means the following:

- Its Media Kit (contains 2 SmartStart CDs, the Firmware DVD, and the Management DVD) will continue to ship with all supported ProLiant G7 or earlier BTO servers until the last supported server is no longer shipping.
- The Media Kit will not be updated past version 8.70.
- ProLiant G7 or earlier CTO servers are able to order the Media Kit with the understanding that the media is not updated. Please check specific server QuickSpecs for availability of CTO Kit.
- PSP and Firmware DVD downloads will be updated through 2Q 2012 at the HP Insight Foundation Suite for ProLiant downloads tab: http://www.hp.com/go/foundation

Customers are urged to use the replacement product, HP Service Pack for ProLiant, instead of Insight Foundation Suite which is found at these location:

- www.hp.com/go/spp
- www.hp.com/go/spp/download

Security	- Intel® AES-NI
- Power-on password
- Administrator's password
- Integrated Lights-Out 3 with:
- 12 customizable user accounts
- SSL encryption
- Secure Shell version 2
- Advanced Encryption Standard (AES) and Triple Data Encryption Standard (3DES) on browser, CLP and XML scripting interface
- AES and RC4 encryption of video
- Disable via a global setting
- Keyboard password
- External USB port enable/disable
- Network server mode
- Serial interface control
- TPM (Trusted Platform Module) 1.2 option

Availability	**Memory**
	-

Standard Features

- HP Memory Quarantine (based on Intel MCA Recovery technology). In conjunction with the operating system support, allows a server to recover from uncorrectable memory errors which would have otherwise caused a system crash.
- Double Device Data Correction (DDDC). DDDC provides the ability to save a DIMM from being replaced due to a bad dram device.
- Data Bus ECC protection for automatic correction from a single data bit error and detection of double data error bits.
- Advanced ECC / SDDC provides continued memory operation in the event of a single memory device failure and allows removal of a single DRAM from the memory map if it exhibits a failure and recovers its data into a new device.
  - Supports for both x4 and x8 Intel® SDDC.
- Demand Scrubbing writes corrected data back to the memory once a correctable error is detected on a read transaction.
- DIMM Address/Control Bus Parity Protection provides a means to detect and protect command and address errors.
- Memory Failover uses a mirrored DIMM once a failed DIMM in a mirrored set is detected.
- Memory Mirroring provides a copy of memory stored with dynamic failover in case of failure within socket (intra-socket) memory mirroring.
  - The system will operate in non-hemisphere mode when mirroring is enabled.
- Rank Sparing (On Line Spare) provides dynamic failover to a spare DIMM rank or spare rank pair behind the same memory controller. Cannot be enabled concurrently with memory mirroring.
  NOTE: HP offers the rank sparing rather than DIMM sparing as rank sparing uses less spare memory resulting in less overhead.
- Failed DIMM Isolation identifies a specific failing DIMM lockstep pair thereby enabling the user to replace only the failed DIMM pair. Identifies a single DIMM for correctable errors and DIMM pair for uncorrectable errors.

Virtualization

- Intel® VT-x (FlexMigration, FlexPriority, and Extended Page Tables) provides:
  - Platform control between the VMM and guest OSs for faster, more reliable and secure transfers.
  - VM migration features that enhance flexibility for failover, load balancing, disaster recovery, and maintenance.
- Intel® VT-x Real Mode & Pause Loop Exiting:
  - Real Mode allows guests to operate in real mode, removing the performance overhead and complexity of an emulator.
  - Pause Loop Exiting provides detection of spin locks in guest software and helps avoid lock-holder preemption to reduce overhead and improve performance
- Intel® VT-d (Intel® Virtualization Technology for Directed I/O) enables the VMM to assign specific I/O devices to specific guest OSs improving security and availability.

Mezzanine options and I/O

- Optional dual-port Fibre Channel mezzanine cards for redundant SAN connections.
- Optional dual-port InfiniBand mezzanine cards for redundant high performance connections.
- Six embedded Ethernet adapter ports for redundant LAN connections.
- Multiple mezzanine I/O expansion slots each supported multiple data paths routed to redundant interconnect modules.
- Network Adapter Teaming (Bonding) provides network fault tolerance, transmit load balancing, and switch-assisted load balancing.

Processor/Chipset

- Processor Internal Sensors & Thermal Control protection against over-temperature conditions.
- Cache parity/ECC protects cache data from accidental data corruption due to particle hits.
- Machine Check Architecture (MCA) detects and captures hardware errors such as system
-

Standard Features

bus, ECC, parity, cache, other.

- Enhanced MCA handling & error logging builds upon the original Machine Check Architecture to: offers more "banks" and increased "resolution" for reporting errors that cause MCA events and 2) sets check flags for the OS to poll.
- External Bus Error Recovery (ECC) enables automatic correction from a single data bit error and detection of double data error bits on the memory data bus.
- Corrupt Data Containment tags faulty data before it is consumed (often called data poisoning) to limit the impact to the currently running program and to greatly reduce the need to reset the system.
- On-Die Error Protection protects registers from particle hits.

Storage

- Four hot-plug SAS/SATA/SSD drive bays.
- Integrated HP Smart Array P410i Controller with RAID 0 and 1 standard; optional RAID 1+0, 5, and 6.
- Integrated HP Smart Array P410i Controller upgradeable firmware with recovery ROM capability.
- HP Smart Array P410i flash backed write cache (FBWC) options to 1GB.
- Optional multiple Smart Array RAID mezzanine controllers (with BBWC and FBWC) for direct attach and shared SAS storage external to the c-Class enclosure.

Intel® QuickPath Interconnect (QPI)

- QPI Link Retry restarts as cycle when a failure is detected on the link.
- QPI Clock Failover redirects the forwarded clock to one of the two failover clock lanes in the event of a forwarded clock failure.
- QPI Self-Healing enables a QPI link to map a failed lane and downshift from full to ½ width (or ½ width to ¼ width) QPI link if there are errors on the link.
- QPI Cycle Redundancy Checking (CRC) automatically detects data errors using a checksum of either 8 bits or 16 bits.
- QPI Poisoning tags an erroneous packet with a "poisoned bit" on the QPI fabric.
- QPI Lane Failover identifies a faulty lane within data paths removing them from operation reducing command/address errors.

Server Blade Enclosure Infrastructure

- Up to 10 hot-plug redundant Active Cool fans per enclosure.
- Up to 6 hot-plug high efficiency redundant power supplies per enclosure.
- Dual grid power providing redundant rack enclosure power feeds to the enclosure.
- Up to eight interconnect modules per enclosure providing four simultaneous redundant fabrics for FlexFabric, Virtual Connect Ethernet, Fibre Channel, InfiniBand, iSCSI, SAS, etc.
- Optional enclosure redundant Onboard Administrator system management module.

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

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Additional Features

Fibre Channel	Up to six (6) optional 4Gb and/or 8Gb Fibre Channel HBA mezzanine adapters (Brocade, Emulex and QLogic options)

Compatible SAN	HP ProLiant BL680c G7 server blades are optimized for HP MSA, EVA, and XPHP and are compatible with select third party SANs. Se blade storage page for more details at: http://h18004.www1.hp.com/products/blades/components/c-class-sans.html

HP Insight management software	HP Insight Control	HP Insight Control, a product option, delivers essential infrastructure management that can help save time and money by making it easy to deploy, monitor, remote control, and optimize your IT infrastructure through a single, simple management console. For more information about this service, please visit: http://www.hp.com/services/insight
	HP Matrix Operating Environment	The HP Matrix Operating Environment (Matrix OE) for ProLiant and Integrity servers is an integrated command center that helps you instantly adjust to dynamic business demands. This advanced infrastructure management software lets you reduce the cost of common data center tasks by up to 40 percent while keeping pace with your changing business. The HP Matrix OE includes the automated provisioning, optimization, and recovery management capabilities for HP CloudSystem Matrix, the ideal platform for private cloud and Infrastructure as a Service (IaaS). **NOTE:** For more information, visit: http://www.hp.com/go/matrixoe
	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 Matrix Operating Environment 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 OneView	The HP OneView architecture combines server, storage, and networking with control of datacenter environmentals into a single, integrated management platform. Architected to deliver lifecycle management for the complete Converged Infrastructure, it facilitates collaboration, removes friction, collapses cycle times, eliminates error-prone work, and accelerates time to value. HP OneView v1.0 combines management of servers and virtual connect with open integration to automate and customize existing tools and processes. With OneView, you'll work smarter-with greater visibility and control-and fully capitalize on the benefits of a Converged Infrastructure. For more information on HP OneView management, see: http://www.hp.com/go/oneview

Additional Features

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
	HPC Interconnects	High Performance Computing (HPC) interconnect technologies are available for this server as part of the HP Cluster Platform portfolio. These high-speed InfiniBand and Gigabit interconnects are fully supported by HP when integrated within an HP cluster. Flexible, validated solutions can be defined with the help of configuration tools. http://www.hp.com/techservers/clusters/ucp/index.html
	HP Insight Cluster Management Utility	HP Insight Cluster Management Utility (CMU) is an HP-licensed and HP-supported suite of tools that are used for lifecycle management of hyperscale clusters of Linux ProLiant systems. CMU includes software for the centralized provisioning, management and monitoring of nodes. CMU makes the administration of clusters user friendly, efficient, and effective. http://www.hp.com/go/cmu

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 Simple Configurator

SCE is a guided self-service tool to help sales and non-technical people provide customers with initial configurations in 3 to 5 minutes. You may then send the configuration on for configuration help, or use in your existing ordering processes. If you require "custom" rack configuration or configuration for products not available in SCE, 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** HP Technology Services delivers confidence, reduces risk and helps customers realize agility and stability. Connect to HP to help prevent problems and solve issues faster. Our support technology lets you to tap into the knowledge of millions of devices and thousands of experts to stay informed and in control, anywhere, any time. **Protect your business beyond warranty with HP Care Pack Services** HP Care Pack Services enable you to order the right service level, length of coverage and response time as you purchase your new server, giving you full entitlement for the term you select.

Recommended HP Care Pack Services for your HP product

Optimized Care	**HP Proactive Care with 6 hour call-to-repair commitment, three year Care Pack Service** HP Proactive Care helps prevent problems and stabilize IT by utilizing secure, real-time, predictive analytics and proactive consultations when your products are connected to HP. This Care Pack Service combines three years' proactive reporting and advice with our highest level reactive coverage and enhanced escalation management, HP's 24x7, six hour call-to-repair hardware commitment. HP is the only leading manufacturer who makes this level of coverage available as a standard service offering for your most valuable servers. Service includes 24x7 collaborative software support for leading industry standard software running on your HP ProLiant server. http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA3-8855ENW.pdf
Standard Care	**HP Proactive Care with 24x7 coverage, three year Care Pack Service** HP Proactive Care helps prevent problems and stabilize IT by utilizing secure, real-time, predictive analytics and proactive consultations when your products are connected to HP. This Care Pack Service combines three years' proactive reporting and advice with our 24x7 coverage and enhanced escalation management, four hour hardware response time and two hour call back for software questions on leading industry standard software running on your HP ProLiant server. http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA3-8855ENW.pdf

Service and Support

Related Services

Data Center Platform Consulting Services
Choose HP Technology Services Consulting to modernize and migrate your key systems. These services help fine tune your data center to improve security, management and efficiency across IT infrastructure, operations, and facilities and prepare you for the new style of IT. HP understands the needs of the data center of the future and will serve as your guide for the journey.

www.hp.com/services/consulting

HP ProLiant Server Hardware Installation
Provides for the basic hardware installation of HP branded servers, storage devices and networking options to assist you in bringing your new hardware into operation in a timely and professional manner.
http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-9356EN.pdf

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

Data Privacy Services
Protect your data through better media management. HP Data privacy services help manage and protect sensitive data to reduce the risk of unauthorized access to private information and help meet compliance requirements. Our retention services allow you to keep drives and other devices upon failure, our removal services provide convenient data sanitization and our recovery services allow you to safely retire IT assets and capture any remaining value from the hardware.
www.hp.com/services/dataprivacy

Additional HP Care Pack services can be found at: http://www.hp.com/go/cpc

Get connected to HP to improve your support experience
Connecting products to HP will help prevent problems with 24x7monitoring, prefailure alerts, automatic call logging, and parts dispatch, plus current data will be available for the proactive reports that are part of Proactive Care Services. With Connected products, you can have a dashboard to manage your IT anywhere, anytime, from any device.

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

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

NOTE: HP Support Center Mobile App is subject to local availability.

Service and Support

Parts and Materials   HP will provide HP-supported replacement parts and materials necessary to maintain the covered hardware product in operating condition, including parts and materials for available and recommended engineering improvements.

Parts and components that have reached their maximum supported lifetime and/or the maximum usage limitations as set forth in the manufacturer's operating manual, product quick-specs, or the technical product data sheet will not be provided, repaired, or replaced as part of these services.

The defective media retention service feature option applies only to Disk or eligible SSD/Flash Drives replaced by HP due to malfunction.

For more information   To learn more on HP ProLiant servers and HP BladeSystem servers, please contact your HP sales representative or HP Authorized ServiceOne Channel Partner. Or visit:
www.hp.com/services/bladesystem

Pre-Configured Models

NOTE: For the Standard Features shipped in the "Factory Integrated Models", please see the "Configuration Information - Factory Integrated Models" section.
NOTE: Not all models are available in all regions. Check with your local country HP offices for availability.

HP ProLiant BL680c G7 E7-4860 2P 64GB-R Server 643780-B21	**Processor(s)** One of the following depending on Model	(2) Intel® Xeon® E7-4860 (2.26GHz/10-core/24MB, 6.40GT/s QPI, 130W) Processors (2) Intel® Xeon® E7-4850 (2.00GHz/10-core/24MB, 6.40GT/s QPI, 130W) Processors (2) Intel® Xeon® E7-4830 (2.13GHz/8-core/24MB, 6.40GT/s QPI, 105W) Processors
HP ProLiant BL680c G7 E7-4850 2P 64GB-R Server 643781-B21	**Cache Memory**	24MB L3 cache
	Memory	64GB (8 x 8GB) DDR3-1333 RDIMMs (operating up to 1066MHz) **NOTE:** Total 64 DIMM slots.
HP ProLiant BL680c G7 E7-4830 2P 64GB-R Server 643782-B21	**Network Controllers**	Six (6) integrated HP NC553i 10Gb FlexFabric adapter ports supporting 10Gb/1Gb autosensing Ethernet, FCoE, Flex-10, TCP/IP offload engine, hardware-based accelerated iSCSI, and iSCSI boot One (1) 10/100 network adapter port dedicated to iLO 3 Management
	Storage Controller	Integrated SAS version 2.0 (6Gb) HP Smart Array P410i Controller with RAID 0, 1, and 1+0 **NOTE:** The P410i is configured with no cache allowing the end user to select the desired cache option (if cache is desired in the first place). This provides RAID 0, 1 and 1+0 in the standard configuration. However, options are available to add RAID 5 and 6; see the "Optional Upgrades" section for P410i options. **NOTE:** RAID 0, 1, and 1+0 are supported on the P410i without the need for a cache option. Four (4) slots for battery cache options. **NOTE:** The server supports up to a combined total of four (4) battery cache options for the P410i and/or optional Smart Array RAID controllers.
	Hard Drives	No drives included; supports up to four (4) hot-plug SFF SAS/SATA/SSD drives
	Internal Storage	SAS: 4.8TB; SATA: 4.0TB; SAS SSD: 3.2TB; SATA SSD: 1.6TB
	Optical Drive	None
	Form Factor	Up to 2 blades in the HP BladeSystem c3000 enclosure Up to 4 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 Factory Integrated Model product offerings and requirements.
NOTE: HP does not allow factory integration of options into standard models listed above. Configure-to-order servers must start with a Factory Integrated Model (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 G7 W Configure-to-order Server	643785-B21

Configurable model ships with:

Six (6) embedded HP NC553i 10Gb FlexFabric adapter ports supporting autosensing 10Gb/1Gb Ethernet, FCoE, Flex-10, TCP/IP offload engine, hardware-based accelerated iSCSI, and iSCSI boot

One (1) 10/100 network adapter port dedicated to iLO 3 Management

One (1) Integrated SAS version 2.0 (6Gb) HP Smart Array P410i Controller with RAID 0 and 1
NOTE: The P410i is configured with no cache allowing the end user to select the desired cache option (if cache is desired in the first place). This provides RAID 0, 1 and 1+0 in the standard configuration. However, options are available to add RAID 5 and 6; see the "Optional Upgrades" section for P410i options.
NOTE: RAID 0, 1, and 1+0 are supported on the P410i without the need for a cache option.

Four (4) slots for battery cache options.
NOTE: The server supports up to a combined total of four (4) battery cache options for the P410i and/or optional Smart Array RAID controllers.

Four (4) small form factor hot-plug SAS/SATA/SSD hard drive bays

Seven (7) I/O expansion slots: six general purpose, and one Ethernet-specific for an additional two "embedded" Ethernet ports

One (1) integrated Lights-Out 3

Integrated USB, MicroSDHC, and TPM connectors

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

HP Processors	**NOTE:** The BL680c G7 supports two, three or four processors. One processor is not supported. **NOTE:** The minimum processor configuration is two processors that must be installed in sockets CPU1 and CPU3. **NOTE:** All processors within the server must be identical. **NOTE:** All Configure-to-Order processor kits contain two (2) processors. **NOTE:** If 3 or 4 processors are desired, select one xxxxxx-L21 kit and one (or two) xxxxxx-B21 kit(s).	

Ten-Core Processors

HP BL680c G7 Intel® Xeon® E7-4870 (2.40GHz/10-core/30MB/130W) FIO 2-processor Kit		643766-L21
HP BL680c G7 Intel® Xeon® E7-4860 (2.26GHz/10-core/24MB/130W) FIO 2-processor Kit		643768-L21
HP BL680c G7 Intel® Xeon® E7-4850 (2.00GHz/10-core/24MB/130W) FIO 2-processor Kit		643770-L21

Configuration Information - Factory Integrated Models

	HP BL680c G7 Intel® Xeon® E7-8867L (2.13GHz/10-core/30MB/105W) FIO 2-processor Kit	643778-L21
	Eight-Core Processors	
	HP BL680c G7 Intel® Xeon® E7-4830 (2.13GHz/8-core/24MB/105W) FIO 2-processor Kit	643772-L21
	HP BL680c G7 Intel® Xeon® E7-4820 (2.0GHz/8-core/18MB/105W) FIO 2-processor Kit	643774-L21
	Six-Core Processors	
	HP BL680c G7 Intel® Xeon® E7-4807 (1.86GHz/6-core/18MB/95W) FIO 2-processor Kit	643776-L21
HP Memory	**NOTE:** All DDR3 memory option kits consist of one RDIMM per kit. **NOTE:** See the "Memory" section for memory guidelines, installation rules, and additional general information.	
	HP 4GB (1x4GB) Dual Rank x4 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	500658-B21
	HP 4GB (1x4GB) Single Rank x4 PC3L-10600 (DDR3-1333) Registered CAS-9 Low Power Memory Kit	604504-B21
	HP 8GB (1x8GB) Dual Rank x4 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	500662-B21
	HP 8GB (1x8GB) Dual Rank x4 PC3L-10600 (DDR3-1333) Registered CAS-9 Low Power Memory Kit	604506-B21
	HP 16GB (1x16GB) Dual Rank x4 PC3L-10600 (DDR3-1333) Registered CAS-9 LP Memory Kit	627812-B21
	HP 32GB (1x32GB) Quad Rank x4 PC3L-8500 (DDR3-1066) Registered CAS-7 LP Memory Kit	627814-B21

Step 3: Choose Additional Factory Integration Options

HP Insight Software	HP Insight Control including 1yr 24x7 Support ProLiant ML/DL/BL-bundle Single Server FIO License	C6N36A

Step 4: 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

NOTE: The c3000 HP c-Class enclosures have full backwards and forwards compatibility, existing server blades are supported in the new enclosures and any future server blades will be supported in the existing enclosures.

HP BladeSystem c7000 Enclosure QuickSpecs:

http://h18000.www1.hp.com/products/quickspecs/12810_div/12810_div.html

NOTE: The c7000 HP c-Class enclosures have full backwards and forwards compatibility, existing server blades are supported in the new enclosures and any future server blades will be supported in the existing enclosures.

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

NOTE: For optimal cooling and system performance the HP ProLiant BL680c G7 server requires the c7000 enclosure to be configured with 10 fans and the c3000 enclosure to be configured with 6 fans.

Core Options

NOTE: For additional "Core Options" and "Additional Options" please see the options sections below.

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

NOTE: A maximum of six dual-port 10Gb Ethernet mezzanine cards may be added for a total of eighteen 10Gb Ethernet ports (6 embedded plus 12 optional).

NOTE: VMware VSphere v4 supports a maximum of four 10GbE network ports on any server. Therefore, in a VMware VSphere v4 environment, two BL680c G7 embedded network adapter ports must be disabled via the server BIOS. VMware VSphere v5 supports up to eight 10GbE network ports. See http://www.vmware.com for more information.

NOTE: When installing more than four dual-port 10Gb Ethernet mezzanine cards, an overall Ethernet performance trade-off may be experienced depending on system configuration, application, and optimization.

NOTE: A 10 Gigabit Ethernet adapter is required for each server blade connecting to a 10Gb interconnect in bays 3-8 (HP BladeSystem c7000 Enclosure) or bays 2-4 (HP BladeSystem c3000 Enclosure).

NOTE: Each 10 Gigabit Ethernet adapter requires a minimum of 2GB of server memory.

NOTE: A 10 Gigabit Ethernet adapter will down speed to 1Gb if paired with a 1GbE interconnect.

NOTE: HP recommends 10Gb adapters be installed in a x8 PCIe slot for optimal performance.

NOTE: The Flex-10 capability requires the use of an HP Virtual Connect Flex-10 10Gb Ethernet module or HP 10GbE Pass-Thru Module.

HP NC532m Dual Port 10GbE Multifunction BL-c Adapter	467799-B21
HP NC542m Dual Port Flex-10 10GbE BL-c Adapter	539857-B21
HP NC552m 10Gb 2-port Flex-10 Ethernet Adapter	610609-B21
HP NC553m 10Gb 2-port FlexFabric Adapter	613431-B21

HP Fibre Channel Mezzanine Options

8Gb Fibre Channel mezzanine adapters

Emulex LPe1205 8Gb Fibre Channel Host Bus Adapter for c-Class BladeSystem	456972-B21
QLogic QMH2562 8Gb Fibre Channel Host Bus Adapter for c-Class BladeSystem	451871-B21

Core Options

HP Processors	**NOTE:** The BL680c G7 supports two, three, or four processors. One processor is not supported. **NOTE:** The minimum processor configuration is two processors that must be installed in sockets CPU1 and CPU3. **NOTE:** All processors within the server must be identical. **NOTE:** All -B21 processor kits listed below contain one (1) processor. **NOTE:** If upgrading an existing BL680c G7 server to a different processor, the server's ROM must be flashed to the latest BIOS prior to the upgrade. **NOTE:** Intel® Xeon® E7-4800/8867L series processors cannot be used to upgrade a ProLiant BL680c G7 server blade with Intel® Xeon® 6500/7500 series processors.	
	Ten-Core Processors	
	HP BL680c G7 Intel® Xeon® E7-4870 (2.40GHz/10-core/30MB/130W) Processor Kit	643766-B21
	HP BL680c G7 Intel® Xeon® E7-4860 (2.26GHz/10-core/24MB/130W) Processor Kit	643768-B21
	HP BL680c G7 Intel® Xeon® E7-4850 (2.00GHz/10-core/24MB/130W) Processor Kit	643770-B21
	HP BL680c G7 Intel® Xeon® E7-8867L (2.13GHz/10-core/30MB/105W) Processor Kit	643778-B21
	Eight-Core Processors	
	HP BL680c G7 Intel® Xeon® E7-4830 (2.13GHz/8-core/24MB/105W) Processor Kit	643772-B21
	HP BL680c G7 Intel® Xeon® E7-4820 (2.0GHz/8-core/18MB/105W) Processor Kit	643774-B21
	Six-Core Processors	
	HP BL680c G7 Intel® Xeon® E7-4807 (1.86GHz/6-core/18MB/95W) Processor Kit	643776-B21

HP Memory	**NOTE:** All DDR3 memory option kits consist of one RDIMM per kit. **NOTE:** See the "Memory" section for memory guidelines, installation rules, and additional general information.	
	HP 4GB (1x4GB) Dual Rank x4 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	500658-B21
	HP 4GB (1x4GB) Single Rank x4 PC3L-10600 (DDR3-1333) Registered CAS-9 Low Power Memory Kit	604504-B21
	HP 8GB (1x8GB) Dual Rank x4 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	500662-B21
	HP 8GB (1x8GB) Dual Rank x4 PC3L-10600 (DDR3-1333) Registered CAS-9 Low Power Memory Kit	604506-B21
	HP 16GB (1x16GB) Dual Rank x4 PC3L-10600 (DDR3-1333) Registered CAS-9 LP Memory Kit	627812-B21
	HP 32GB (1x32GB) Quad Rank x4 PC3L-8500 (DDR3-1066) Registered CAS-7 LP Memory Kit	627814-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.

Core Options

NOTE: A minimum of two drives are required for RAID 0 and 1, three dries for RAID 5, and four drives for RAID 1+0 and 6.
NOTE: SAS, SATA, and/or SSD drives cannot be mixed within the server.

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

HP 1.2TB 6G SAS 10K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	718160-B21
HP 900GB 6G SAS 10K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	619291-B21
HP 600GB 12G SAS 15K rpm SFF (2.5-inch) Enterprise 3yr Warranty Hard Drive	785103-B21
HP 600GB 6G SAS 10K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	581286-B21
HP 450GB 12G SAS 15K rpm SFF (2.5-inch) Enterprise 3yr Warranty Hard Drive	785101-B21
HP 450GB 6G SAS 10K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	581284-B21
HP 300GB 12G SAS 15K rpm SFF (2.5-inch) Enterprise 3yr Warranty Hard Drive	785099-B21
HP 300GB 6G SAS 15K rpm SFF (2.5-inch) Hot Plug Enterprise 3yr Warranty Hard Drive	627117-B21
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

6G SAS Hot Plug SFF (2.5-inch) Midline (MDL) Drives

HP 1TB 6G SAS 7.2K rpm SFF (2.5-inch) Dual Port Midline 1yr Warranty Hard Drive	605835-B21
HP 500GB 6G SAS 7.2K rpm SFF (2.5-inch) Dual Port Midline 1yr Warranty Hard Drive	507610-B21

NOTE: Please see the QuickSpecs for additional information:
http://h18000.www1.hp.com/products/quickspecs/12244_div/12244_div.html (Worldwide)

SAS Hot Plug ME SFF (2.5-inch) Enterprise Mainstream SSD

HP 800GB 12G SAS Mainstream Endurance SFF 2.5-in Enterprise Mainstream 3yr Wty Solid State Drive	741144-B21
HP 400GB 12G SAS Mainstream Endurance SFF 2.5-in Enterprise Mainstream 3yr Wty Solid State Drive	741140-B21
HP 200GB 12G SAS Mainstream Endurance SFF 2.5-in Enterprise Mainstream 3yr Wty Solid State Drive	741136-B21

12G SAS Hot Plug HE SFF (2.5-inch) EP SSD

HP 800GB 12G SAS High Endurance SFF 2.5-in Enterprise Performance 3yr Wty Solid State Drive	741157-B21
HP 400GB 12G SAS High Endurance SFF 2.5-in Enterprise Performance 3yr Wty Solid State Drive	741153-B21
HP 200GB 12G SAS High Endurance SFF 2.5-in Enterprise Performance 3yr Wty Solid State Drive	741148-B21

3G SATA Hot Plug SFF (2.5-inch) Midline (MDL) Drives

HP 1TB 3G SATA 7.2K rpm SFF (2.5-inch) Hot Plug Midline 1yr Warranty Hard Drive	625609-B21
HP 500GB 3G SATA 7.2K rpm SFF (2.5-inch) Midline 1yr Warranty Hard Drive	507750-B21

NOTE: Please see the QuickSpecs for additional information:
http://h18000.www1.hp.com/products/quickspecs/13021_div/13021_div.html (Worldwide)

Core Options

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

HP 1.6TB 6G SATA Value Endurance SFF 2.5-in Enterprise Value 3yr Wty Solid State Drive	757351-B21
HP 800GB 6G SATA Value Endurance SFF 2.5-in Enterprise Value 3yr Wty Solid State Drive	728743-B21
HP 480GB 6G SATA Value Endurance SFF 2.5-in Enterprise Value 3yr Wty Solid State Drive	728739-B21
HP 240GB 6G SATA Value Endurance SFF 2.5-in Enterprise Value 3yr Wty Solid State Drive	728735-B21

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

NOTE: These drives support G7 servers only.

HP 120GB 6G SATA Value Endurance SFF 2.5-in Enterprise Boot 3yr Wty Solid State Drive	728726-B21
HP 80GB 6G SATA Value Endurance SFF 2.5-in Enterprise Boot 3yr Wty Solid State Drive	734366-B21

6G SATA Value Endurance Hot Plug SFF (2.5-inch) EV G1 Solid State Drives

HP 480GB 6G SATA Value Endurance SFF 2.5-in Enterprise Value 3yr Wty G1 Solid State Drive	756666-B21
HP 240GB 6G SATA Value Endurance SFF 2.5-in Enterprise Value 3yr Wty G1 Solid State Drive	756651-B21
HP 120GB 6G SATA Value Endurance SFF 2.5-in Enterprise Value 3yr Wty G1 Solid State Drive	756630-B21

6G SATA Value Endurance Hot Plug SFF (2.5-inch) EL G1 Solid State Drives

HP 960GB 6G SATA Light Endurance SFF 2.5-in Enterprise Light 3yr Wty G1 Solid State Drive	756611-B21

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

NOTE: These drives support G7 servers only.

HP 600GB 6G SATA Value Endurance SFF 2.5-in Enterprise Value 3yr Wty Solid State Drive	739904-B21

NOTE: This drive supports G7 servers only.

HP 300GB 6G SATA Value Endurance SFF 2.5-in Enterprise Value 3yr Wty Solid State Drive	739894-B21

NOTE: This drive supports G7 servers only.

6G SATA ME Hot Plug SFF (2.5-inch) Enterprise Mainstream Solid State Drives

NOTE: These drives support G6 and G7 servers only.

HP 800GB 6G SATA Mainstream Endurance SFF 2.5-in Enterprise Mainstream 3yr Wty Solid State Drive	730065-B21
HP 400GB 6G SATA Mainstream Endurance SFF 2.5-in Enterprise Mainstream 3yr Wty Solid State Drive	730063-B21
HP 200GB 6G SATA Mainstream Endurance SFF 2.5-in Enterprise Mainstream 3yr Wty Solid State Drive	730061-B21
HP 100GB 6G SATA Mainstream Endurance SFF 2.5-in Enterprise Mainstream 3yr Wty Solid State Drive	730059-B21

NOTE: Please see the QuickSpecs for additional information:
http://h18000.www1.hp.com/products/quickspecs/14038_div/14038_div.html (Worldwide)

Additional Options

HP Insight Software	**Insight Control**	
	HP Insight Control including 1yr 24x7 Technical Support and Updates Single Server License	C6N27A
	HP Insight Control including 1yr 24x7 Technical Support and Updates Electronic License	C6N28ABE
	HP iLO Advanced for BladeSystem including 1yr 24x7 Support Eight Server License	512489-B21
	HP Insight Control including 1yr 24x7 Support ProLiant ML/DL/BL-bundle FIO Electronic License	C6N36ABE
	HP Insight Control Server Provisioning Media Kit	BD883A
	HP Insight Management Media Kit	C6N31A

NOTE: HP Insight Management Media Kit contains DVDs without licenses. Contains HP Systems Insight Manager, HP Insight Control, HP Matrix Operating Environment, and Virtual Connect Enterprise Manager software. Uses an integrated installer to perform quick and accurate software installation and updates.

NOTE: In HP Insight Control 7.2 introduces Insight Control server provisioning, a new capability ideal for multi-server OS and firmware provisioning to ProLiant and BladeSystem servers. Insight Control server provisioning is included and licensed as part of HP Insight Control.

A media kit, "HP Insight Control server provisioning USB media kit" (# BD883A), including a USB, is available for customers who require a physical copy of the media loaded with Insight Control server provisioning software. Please note that this media kit is separate and in addition to the "HP Insight Management DVD media kit" (#C6N31A).

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: 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

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

HP iLO Advanced for BladeSystem including 3yr 24x7 Technical Support and Updates E-LTU	E6U63ABE
HP iLO Advanced Blade 1 Server License with 3yr 24x7 Tech Support and Updates	BD502A
HP iLO Advanced for BladeSystem including 1yr 24x7 Technical Support and Updates E-LTU	E6U60ABE
HP iLO Advanced for BladeSystem including 1yr 24x7 Support Single Server License	512488-B21

NOTE: Licenses ship without media.

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 delivery options, please see the iLO QuickSpecs at: http://h18000.www1.hp.com/products/quickspecs/12362_div/12362_div.html (Worldwide)

Additional Options

Converged Infrastructure Management Software	**HP OneView**	
	HP OneView without iLO Advanced	
	HP OneView w/o iLO Adv incl 3yr 24x7 Supp Phys 1 Svr Lic	E5Y38A
	HP OneView w/o iLO Adv inc 3yr 24x7 Supp Flex Qty E-LTU	E5Y39AAE
	NOTE: For additional license kits please see the QuickSpecs at http://h18004.www1.hp.com/products/quickspecs/14621_div/14621_div.html.	

High Performance Clusters	**HP Cluster Management Utility**	
	HP Insight Cluster Management Utility 1yr 24x7 Flexible License	QL803B
	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 Insight Cluster Management Utility 3yr 24x7 Flexible License	BD476A
	NOTE: These part numbers can be used to purchase one certificate for multiple licenses and support with a single activation key. Each license is for one node (server). Customer will receive a printed end user license agreement and license entitlement certificate via physical shipment. The license entitlement certificate must be redeemed online in order to obtain a license key. Customer also will receive a support agreement.	
	HP Insight Cluster Management Utility Media	BD477A
	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 Insight 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 (Worldwide)	

HP Security	HP Trusted Platform Module Option	488069-B21
	NOTE: The BL680c G7 server includes a Trusted Platform Module (TPM) connector for an optional TPM 1.2 upgrade. The TPM 1.2 option is a microcontroller chip that can securely store artifacts used to authenticate the server platform. These artifacts can include passwords, certificates and encryption keys. Windows® BitLocker™ Drive Encryption (BitLocker) is a data protection feature available in Windows Server® 2008. BitLocker leverages the enhanced security capabilities of TPM version 1.2. The TPM works with BitLocker to help protect user data and to ensure that a server operating Windows Server 2008 has not been tampered with while the system was offline.	
	NOTE: For more information about TPM, including a white paper, go to: http://www.hp.com/go/TPM	
	NOTE: ProLiant OS pre-installed units will come with the partition required for TPM deployment.	
	NOTE: The TPM key is unique to every TPM deployed server and must be retained. Misplacing or losing the key could result in data loss.	

Additional Options

HP Storage Controllers

NOTE: The P410i is configured with no cache allowing the end user to select the desired cache option (if cache is desired in the first place). This provides RAID 0, 1 and 1+0 in the standard configuration. However, options are available to add RAID 5 and 6; see the "Optional Upgrades" section below for P410i options.
NOTE: RAID 0, 1, and 1+0 are supported on the P410i without the need for a cache option.

NOTE: The server supports up to a combined total of four (4) battery cache options for the P410i and/or optional Smart Array RAID controllers.

HP Smart Array P711m Controller

HP Smart Array P711m/1G 6Gb FBWC 4-ports Ext Mezzanine SAS Controller	513778-B21

HP Smart Array P712m Controller

HP Smart Array P712m/256 6Gb 2-ports Int/2-ports Ext Mezzanine SAS Controller	488348-B21

Optional Upgrades

HP 512MB Flash Backed Write Cache	534916-B21

NOTE: This is an option for the HP Smart Array P410i Controller (P410i is standard integrated controller).

HP 1GB Flash Backed Cache	534562-B21

NOTE: This is an option for the HP Smart Array P410i Controller (P410i is the standard integrated controller).

NOTE: All the P410i FBWC options add RAID 1+0 and 5.

HP Smart Array P-Series Low Profile Battery	452348-B21

NOTE: Supports the HP Smart Array P700m Controller.

HP Smart Array Advanced Pack including 1yr 24x7 Technical Support and Updates Single Server License	516471-B21

NOTE: The above Smart Array Advanced Pack and above cache option are required to enable Smart Array Advanced Pack features, including RAID 6, on the P410i. For more information go to: http://www.hp.com/go/saap

NOTE: The Smart Array Advanced Pack is hosted on the P410i Smart Array Controller hardware firmware stack.

NOTE: Please see the QuickSpecs for Technical Specifications and additional information:
http://h18000.www1.hp.com/products/quickspecs/14035_div/14035_div.html (Smart Array P711m Controller)
http://h18000.www1.hp.com/products/quickspecs/13296_div/13296_div.html (Smart Array P712m Controller)
http://h18000.www1.hp.com/products/quickspecs/13200_div/13200_div.html (Worldwide)
(Smart Array Advanced Pack)

HP InfiniBand Mezzanine Options

HP 4X QDR QLogic InfiniBand Dual Port Mezzanine HCA for c-Class BladeSystem	583210-B21

Additional Options

HP Flash Media Kits for USB Drives	HP USB Standard Keyboard DT528A ABA	DT528A#ABA
	HP Enterprise Mainstream Flash Media Kits for Memory Cards	
	HP 8GB USB Enterprise Mainstream Flash Media Drive Key Kit	737953-B21
	HP 8GB microSD Enterprise Mainstream Flash Media Kit	726116-B21

NOTE: Please see the QuickSpecs for Technical Specifications and additional information:
http://h18000.www1.hp.com/products/quickspecs/13971_div/13971_div.html

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HP Care Pack Services **Proactive Care** - Collaborative Support plus Proactive services delivered by the on shore/near shore Advanced Solution Center (ASC) and backed by the global delivery organization, end-to-end case ownership from a Technical Solution Specialists and Technical Account Manager who remotely delivers firmware/software revision management, proactive scans and incident trend reports. Recommended for customers running a virtualized infrastructure and/or customers who desire an enhanced call support experience.

HP 3 year 4 hour 24x7 ProLiant BL6xxc Proactive Care Service	U3B32E
HP 3 year 4 hour 24x7 with Defective Media Retention ProLiant BL6xxc Proactive Care Service	U3B35E
HP 3 year 6 hour Call To Repair 24x7 ProLiant BL6xxc Proactive Care Service	U3B38E
HP 3 year 6hr Call To Repair 24x7 with Defective Media Retention ProLiant BL6xxc Proactive Care SVC	U3B41E

Proactive Care Personalized Support Environmental Option - to add an onsite Account Support Manager (ASM) to Proactive Care. ASM is an assigned resource who delivers support planning and brings technical expertise and best practices advice for the customer's environment.

HP 3 year ISS ProactiveCare Personalized Support	U6W98E

Installation Services - reduce the time required to get your system up and running and help minimize disruptions to your business.

HP Install c-Class Server Blade Service	UE493E
HP Hardware Installation during Non Standard Hours c-Class Server Blade Service	UG869E

Additional HP Care Pack services can be found at:
http://www.hp.com/go/cpc

Memory

Memory Subsystem Architecture

For maximum memory bandwidth, performance, and capacity, each processor socket contains two memory controllers. Each memory controller connects to two Intel® Scalable Memory Buffers (SMB) for a total of four SMBs per processor. Each SMB connects to four RDIMMs for grand total of sixteen RDIMMs per installed processor (64 RDIMMs total per BL680c G7 server) providing up to 2.0TB of memory (32GB RDIMMs x 64 DIMM slots).

All RDIMMs will operate at the highest possible speed for a given processor. Memory speed is not affected by number of RDIMMs or ranks. However, memory speed is a function of the processors QPI bus speed per the following:

- Processors with a QPI speed of 6.40GT will operate memory at 1066MHz
- Processors with a QPI speed of 5.86GT will operate memory at 978MHz
- Processors with a QPI speed of 4.80GT will operate memory at 800MHz

DDR3 and DDR3L Memory Population Guidelines

An overview of the RDIMM installation guidelines are summarized below. For detailed memory configuration rules and guidelines, please see the BL680c G7 user guide at: www.hp.com/support and the Online DDR3 Memory Configuration Tool at: www.hp.com/go/ddr3memory-configurator

1. Install only HP BL680c G7 supported DDR3 and DDR3L RDIMMs.
2. RDIMMs must be installed for processor 1.
3. Populate RDIMM slots for a processor only if the processor is installed.
4. To maximize performance in multi-processor configurations, distribute the total memory capacity between all processors as evenly as possible.
5. The minimum configuration is two RDIMMs installed on processor 1.
6. RDIMMs must be installed in pairs with identical characteristics. When possible, for configuration simplicity, HP recommends using RDIMMs with identical part numbers throughout the system.
7. For best performance, HP recommends that RDIMM pairs be populated in sequence by letter designation. Install RDIMM pair (4A, 5A) first, followed by RDIMM pair (12B, 16B), RDIMM pair (2C, 7C), RDIMM pair (10D, 14D), RDIMM pair (3E, 6E), RDIMM pair (11F, 15F), and RDIMM pair (1G, 8G).
8. When installing mixed rank RDIMMs for any processor, RDIMMs with the highest number of ranks must be installed in the white RDIMM connector locations. This guarantees proper electrical signaling on the DDR3 channel since RDIMMs with higher rank counts present larger electrical loading on the DDR3 channel and must be populated at the end point of the channel.
9. 1.5V DDR3 and 1.35V DDR3L RDIMMs may be installed within the same socket. In this case, all RDIMMs on that socket will operate at 1.5V.
10. The BL680c G7 supports memory hemisphere mode (for a high-performance memory interleaving technology) as well as several advanced memory modes (AMP) including advanced ECC, online spare, and mirrored memory. Please see the BL680c G7 user guide at: www.hp.com/support for a description of each of these features and their memory configuration guidelines.
11. There are several additional recommended steps for memory performance optimization, please see the BL680c G7 user guide at: www.hp.com/support for a complete list.

Standard Memory

64GB (8 x 8GB) of dual-rank DDR3-1066 RDIMMs

Standard Memory Plus Optional Memory

Up to 1.8TB of memory is available with the installation of optional DDR3 RDIMM memory expansion kits

Standard Memory Replaced with Optional Memory

Up to 2.0TB of memory is available with the removal of standard memory and the installation of optional DDR3 RDIMM memory expansion kits

Memory

ProLiant BL680c G7 Memory Configurations

Memory		Processor 1 and 2 RDIMM Slots (Processors 3 and 4 have the same DIMM slot numeration, but all slots are empty)							
Standard	32GB per CPUs 1 and 2 (64GB total)	**1G**	**2C**	**3E**	**4A**	**5A**	**6E**	**7C**	**8G**
		Empty	Empty	Empty	8GB	8GB	Empty	Empty	Empty
		9H	**10D**	**11F**	**12B**	**13H**	**14D**	**15F**	**16B**
		Empty	Empty	Empty	8GB	Empty	Empty	Empty	8GB
		Processor 1 and 2 RDIMM Slots (Processors 3 and 4 DIMM slots are all populated with 32GB DIMMs)							
Optional	416GB per CPUs 1 and 2, 512MB per CPUs 3 and 4 (1.8TB total)	**1G**	**2C**	**3E**	**4A**	**5A**	**6E**	**7C**	**8G**
		32GB	32GB	32GB	8GB	8GB	32GB	32GB	32GB
		9H	**10D**	**11F**	**12B**	**13H**	**14D**	**15F**	**16B**
		32GB	32GB	32GB	8GB	32GB	32GB	32GB	8GB
		Processor 1 through 4 RDIMM Slots							
Maximum	512GB per CPU (2.0TB total)	**1G**	**2C**	**3E**	**4A**	**5A**	**6E**	**7C**	**8G**
		32GB	32GB	32GB	32GB	32GB	32GB	32GB	32GB
		9H	**10D**	**11F**	**12B**	**13H**	**14D**	**15F**	**16B**
		32GB	32GB	32GB	32GB	32GB	32GB	32GB	32GB

HP ProLiant BL680c G7 memory options:

HP Memory   The following are the BL680c G7 memory options available from HP:

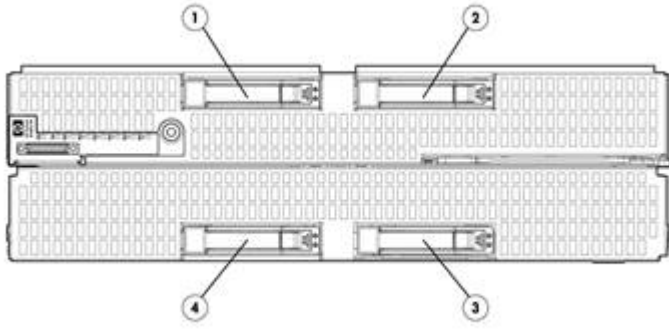|	
HP 4GB (1x4GB) Dual Rank x4 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	500658-B21
HP 4GB (1x4GB) Single Rank x4 PC3L-10600 (DDR3-1333) Registered CAS-9 Low Power Memory Kit	604504-B21
HP 8GB (1x8GB) Dual Rank x4 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	500662-B21
HP 8GB (1x8GB) Dual Rank x4 PC3L-10600 (DDR3-1333) Registered CAS-9 Low Power Memory Kit	604506-B21
HP 16GB (1x16GB) Dual Rank x4 PC3L-10600 (DDR3-1333) Registered CAS-9 LP Memory Kit	627812-B21
HP 32GB (1x32GB) Quad Rank x4 PC3L-8500 (DDR3-1066) Registered CAS-7 LP Memory Kit	627814-B21

NOTE: All DDR3 memory option kits consist of one DIMM per kit.
NOTE: For detailed memory configuration rules and guidelines, please see the BL680c G7 user guide at: www.hp.com/support and use the Online DDR3 Memory Configuration Tool at: www.hp.com/go/ddr3memory-configurator

Storage

1-4   4 x SFF SAS/SATA/SDD 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.
NOTE: SAS, SATA, and/or SSD drives cannot be mixed within the server.

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

	Quantity Supported	Position Supported	Controller
1.2TB 6G SAS 10K	4	1-4	Smart Array P410i Controller
900GB 6G SAS 10K			
600GB 6G SAS 10K			
450GB 6G SAS 10K			
300GB 6G SAS 15K			
300GB 6G SAS 10K			
146GB 6G SAS 15K			

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

	Quantity Supported	Position Supported	Controller
1.0TB 6G SAS 7.2K	4	1-4	HP Smart Array P410i Controller
500GB 6G SAS 7.2K			

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

	Quantity Supported	Position Supported	Controller
1.0TB 3G SATA 7.2K	4	1-4	HP Smart Array P410i Controller
500GB 3G SATA 7.2K			

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

	Quantity Supported	Position Supported	Controller
120GB 6G SATA VE SFF	4	1-4	HP Smart Array P410i Controller
80GB 6G SATA VE SFF			

Storage

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

	Quantity Supported	Position Supported	Controller
800GB 6G SAS ME 600GB 6G SAS ME 480GB 6G SAS ME 300GB 6G SAS ME 240GB 6G SAS ME	4	1-4	HP Smart Array P410i Controller

6G SATA ME Hot Plug SFF (2.5-inch) Enterprise Mainstream Solid State Drives

	Quantity Supported	Position Supported	Controller
800GB 6G SAS ME 400GB 6G SAS ME 200GB 6G SAS ME 100GB 6G SAS ME	4	1-4	HP Smart Array P410i Controller

6G SAS ME Hot Plug SFF (2.5-inch) Enterprise Mainstream Solid State Drives

	Quantity Supported	Position Supported	Controller
400GB 6G SAS SLC 200GB 6G SAS SLC	4	1-4	HP Smart Array P410i Controller

SATA Hot Plug 2.5" Enterprise Mainstream Solid State Drives

	Quantity Supported	Position Supported	Controller
400GB 3G SATA MLC 200GB 3G SATA MLC 100GB 3G SATA MLC	4	1-4	HP Smart Array P410i Controller

System Unit	**Dimensions** (H x W x D)	Full height, double-wide server blade: 14.46 x 4.22x 20.09 in (36.73 x 10.72 x 51.03 cm)	
	Weight (approximate)	Maximum (all hard drives, DIMMs, mezzanine cards, and processors installed)	47.96lbs (21.75kg)
		Minimum (two hard drives, four DIMMs, no mezzanine cards, and two processors installed)	35.13lbs (15.93kg)
	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	

Storage

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

Storage

Smart Array P410i Controller	Disk Drive and Enclosure Interface	6G SAS (Serial Attached SCSI)
		3G SATA (Serial Advanced Technology Attachment)
	SAS Connectors	Two (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	x4 5G PCIe Gen2 provides 2GB/s maximum bandwidth.
	SAS Speed	x2 6G SAS provides 1.2GB/s maximum bandwidth.
	Cache Memory	72-bit 1GB cache; ECC protection, capacitor-backed
	Logical Drives Supported	Up to 32 logical drives
	Maximum Logical Drive Capacity	2 TB (2 x 1 TB)
	Host Memory Addressing	64-bit, supporting greater than 4GB server memory space

	RAID Support	Standard:	RAID 0 (Striping)
			RAID 1 (Mirroring)
			RAID 1+0 (Stripping and Mirroring)
			NOTE: RAID 0, 1, and 1+0 are supported on the P410i without the need for a cache option.
			NOTE: A minimum of two drives are required for RAID 0 and 1 and four drives for RAID 1+0.
		Optional:	RAID 5 (Distributed Data Guarding)
			RAID 6 (Advanced Data Guarding)
			NOTE: A minimum of three drives for RAID 5 and four drives for RAID 6.

	Upgradeable Firmware	Upgradeable firmware with recovery ROM capability

Integrated HP NC553i 10Gb FlexFabric Adapter	Type	Integrated KR 10GbE with FlexFabric (Flex-10, FCoE, accelerated iSCSI, iSCSI boot, 10GbE, 1GbE, TCP/IP offload engine)
	Network Processor	Blade Engines 3 (BE3)
	Data Transfer Method	x8 PCI Express 2.0
	Network Transfer Rate	20Gbps per port full duplex only (theoretical maximum value)
		NOTE: Each port is autosensing 1Gb / 10Gb, and can interoperate with 1Gb HP BladeSystem c-Class interconnect components.
		NOTE: Each port on the NC553i adapter transmits from the server at 20Gbps (theoretical) full duplex.
	IEEE Compliance	802.1p QoS, 802.1Q VLAN tagging, 802.3ad link aggregation, 802.3ap 10GBase-KR, and 802.3x flow control
	Standard Features	- ProLiant Teaming including Network Fault Tolerance, Transmit Load Balancing, and Switch-Assisted Load Balancing 9K Jumbo frames (4K Jumbo frames when in FCoE mode) - Microsoft Windows Receive Side Scaling (RSS) - FCoE or accelerated iSCSI mode - iSCSI boot - Flex-10 support - TCP/IP offload engine 10Gb Ethernet ort 1Gb Ethernet autosensing - Microsoft TCP chimney compliant - Supports 8 Physical Functions (PF) - Supports 128 Virtual Functions (VF):

Storage

    ○ Up to 32 VFs per PF
    ○ Support 128 MAC address
- Traffic Shaping and QoS across each VF and PF:
- NIC Fine-grain QoS 10 Mbps to 10Gbps in steps of 10Mbps
- HBA fine-grain QoS 1000 IOPs to 500,000 IOPs in steps of 1000 IOPS
- On-chip VM-VM switching
- Traffic steering and isolation
- Hardware based filtering for 128 VLANIDs with QinQ tag filtering
- Protection against denial-of-service attacks & malfunctioning VMs

HP Integrated Lights-Out 3 (iLO 3)	**Architecture**	PCI Express based health and remote management ASIC
	Processor	PCI Express RISC processor core operating at 250MHz
	Upgradeability	Option firmware upgradeable via Flash ROM
	Video Support	1600 x 1200 DVR max resolution
	Interfaces	One Ethernet network connection (10/100Mbps)
	Memory	128-MB DDR with ECC
	Operating System Support	Microsoft Windows 2008 R2
		Microsoft Windows 2008 (32 bit and 64 bit)
		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 2008 R2
	Client System Support	Microsoft Windows 7
		Microsoft Windows XP Professional Edition
		Microsoft Windows Vista Business and Ultimate Editions
		Red Hat Enterprise Desktop 5.00
		SUSE Linux Enterprise Desktop 11
		SUSE Linux Enterprise Desktop 10
	Client Browser Support	Microsoft Internet Explorer 8
		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	Secure Shell and serial port access
		Secure Socket Layer
		Secure Shell version 2

Storage

	Security	Advanced Encryption Standard (AES) and Triple Data Encryption Standard (3DES) on browser, CLP and XML scripting interface
		AES encryption of video
		RC4 encryption of video
	Directory Support Services	Active Directory v1.0 (Windows 2003)
	Driver Support	HP ProLiant iLO3 Management Controller Driver Package
	Management protocols supported	SNMP, IPMI 2.0 (system and LAN interface), DMTF Systems Management Architecture for Server Hardware Command Line Protocol (SMASH CLP), HP RIBCL XML

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.

Summary of Changes

Date	Version History	Action	Description of Change:
Date	Version History	Action	Description of Change:
10-Apr-2015	From Version 41 to 42	Removed	Not supported sku removed: • ~~698536-B21~~
09-Feb-2015	From Version 40 to 41	Changed	Service and Support, Additional Features sections were updated
01-Dec-2014	From Version 39 to 40	Changed	Core Options and Additional Options sections were updated
		Added	Sku Added on Hard Drives: • ~~757351-B21~~ • ~~756666-B21~~ • ~~756651-B21~~ • ~~756630-B21~~ • ~~756611-B21~~
		Removed	Obsolete skus deleted: • ~~690823-B21~~ • ~~T9082AAE~~ • ~~452151-B21~~
01-Nov-2014	From Version 38 to 39	Changed	Service and Support section was updated
18-Aug-2014	From Version 37 to 38	Added	SKUs added on HP Memory: • ~~604504-B21~~ SKUs added on HP Hard Drives: • ~~785103-B21~~ • ~~785101-B21~~ • ~~785099-B21~~ • ~~741144-B21~~ • ~~741140-B21~~ • ~~741136-B21~~ • ~~741157-B21~~ • ~~741153-B21~~ • ~~741148-B21~~ • ~~728743-B21~~ • ~~728739-B21~~ • ~~728735-B21~~
		Removed	Obsolete SKUs removed: • ~~500666-B21~~ • ~~403621-B21~~ • ~~403619-B21~~ • ~~590647-B21~~ • ~~693648-B21~~ • ~~690821-B21~~ • ~~690819-B21~~ • ~~DC172B~~ • ~~608447-B21~~
10-Jun-2014	From Version 36 to 37	Changed	Enclosures on Standard Features was updated Descriptions were updated Technical Specifications section was updated
		Added	4Gb Fibre Channel mezzanine adapters 8Gb Fibre Channel mezzanine adapter Hard drive added
18-Feb-2014	From Version 35 to 36	Changed	HP Smart Array P731m Controller was added to Storage Controllers HP Flash Media Kits for USB Drives and HP Care Pack Services were revised.
13-Dec-2013	From Version 34 to 35	Changed	HP OneView was added to Optional Features

Summary of Changes

			HP 1.2TB 6G SAS 10K rpm SFF Dual Port Enterprise 3yr Warranty Hard Drive to was added Hard Drives Converged Infrastructure Management Software was added to Additional Options HP 4X QDR InfiniBand ConnectX-2 Dual Port Mezzanine HCA for c-Class BladeSystem was removed from HP InfiniBand Mezzanine Options HP 8GB USB Enterprise Mainstream Flash Media Drive Key Kit was added and HP 4GB MicroSD Enterprise Performance Flash Media Kit was removed from HP Flash Media Kits for USB Drives
11-Oct-2013	From Version 33 to 34	Changed	HP 300 GB and 600 GB SATA Value Endurance SFF Enterprise Boot Solid State Drives were added to Hard Drives HP 8GB microSD Enterprise Mainstream Flash Media Kit was added to HP Flash Media Kits for USB Drives HP I/O Accelerator Options was removed from Additional Options
10-Sep-2013	From Version 32 to 33	Changed	High Performance Clusters and Hard Drives were revised HP I/O Accelerator Options was added to Additional Options
10-Jun-2013	From Version 31 to 32	Changed	SATA Hot Plug 2.5" Enterprise Mainstream Solid State Drives were revised in Core Options HP I/O Expansion Options was removed from Additional Options
13-May-2013	From Version 30 to 31	Changed	Standard Features: Changed order of section. Updated I/O Expansion Slots Additional Features: Moved Fibre Channel, Compatible SAN, HP Insight management software, High Performance Clusters, HP Proactive Insight and Factory Express Portfolio for Servers and Storage. Core Options: Updated HP Ethernet Mezzanine Options and HP Hard Drives. Additional Options: Updated HP Insight Software, HP USB and SD Options and HP Care Pack Services sections.
		Removed	Overview: Removed What's New and At A Glance sections.
		Added	Standard Features: Added information and notes before Processors section. Added Additional Features section.
25-Mar-2013	From Version 29 to 30	Removed	Removed Platinum reference throughout QS
		Added	Overview: Added notes to the At A Glance section Configuration Information - Factory Integrated Models: Added noted to Step 4
25-Feb-2013	From Version 28 to 29	Changed	Overview Section: Added What's New and updated At A Glance Standard Features: Updated notes in Processors and Upgradeability, Updated Maximum Internal Storage space, updated HP Insight Control in HP Insight management Software and updated note in Operating Systems and Virtualization Software Support for ProLiant Servers. Configuration Information - Factory Integrated Models: Updated p/n in Step 3 HP Insight Software and added Platinum to Step 4. Core Options: updated notes in HP Processors and Updated HP Hard Drives. Additional Options: Completely updated HP Insight Software

Summary of Changes

04-Dec-2012	From Version 27 to 28	Removed	Removed Insight Control support for Linux throughout the document. HP Smart Array P712m/ZM 2-ports Int PCIe x8 SAS Controller
		Changed	Service and Support and Care Pack Services were completely revised. Added the number of DIMM slots under Memory in Models. In Configuration Information, updated the model name in Step 1, added a new Step 3, and updated the name of Step 3 to Step 4. In Core Options, updated the Hard Drives/6G SAS ME Hot Plug SFF (2.5-inch) Enterprise Mainstream Solid State Drives section. In Additional Options, updated HP Insight Software, removing Insight Control for Linux. Updated the part descriptions in High Performance Clusters. Updated the Note in HP SD and USB Options. In Memory, updated the description of the first 16GB Memory Kit. In Storage, updated the Hard Drives/6G SAS ME Hot Plug SFF (2.5-inch) Enterprise Mainstream Solid State Drives section.
24-Sep-2012	From Version 26 to 27	Changed	Changes made in the Standard Features section.
13-Aug-2012	From Version 25 to 26	Changed	Changes made to the Core Options, Memory, and Storage sections.
18-May-2012	From Version 24 to 25	Changed	Changes made throughout the QuickSpec.
26-Mar-2012	From Version 23 to 24	Changed	Insight Dynamics was changed to Matrix Operating Environment Part numbers were revised in High Performance Clusters Models were added to HP Insight Software
06-Mar-2012	From Version 22 to 23	Changed	Changed a link in the Hard Drives section of Core Options.
13-Feb-2012	From Version 21 to 22	Changed	Changes made to the What's New, Standard Features, Models and Options sections.
20-Jan-2012	From Version 20 to 21	Removed	Removed a NOTE from the Hard Drives section within Core Options and Storage sections.
20-Dec-2011	From Version 19 to 20	Changed	SAS, SATA, and/or SSD drives cannot be mixed within the server note was added to Internal Storage and Hard Drives HP 120GB SATA SFF (2.5-inch) Midline 1yr Warranty Solid State Drive was removed from Hard Drives
14-Nov-2011	From Version 18 to 19	Changed	DDR3 memory options part number decoder image, HP Insight management software, High Performance Clusters and Hard Drives were revised.
14-Oct-2011	From Version 17 to 18	Changed	Availability was revised in Standard Features Optimized, Standard and Basic Care Packages were updated in Service and Support Intel Trusted Execution Technology (TXT) Ready was removed from Security
26-Sep-2011	From Version 16 to 17	Changed	Hot-plug SATA SSD maximum internal storage was increased to 1.6TB Service and Support and Hard Drives were completely revised Mentions of E7-4800/8867L were added
01-Aug-2011	From Version 15 to 16	Changed	Hard Drive descriptions were revised.
20-Jun-2011	From Version 14 to 15	Changed	Changes made throughout the QuickSpec.
20-May-2011	From Version 13 to 14	Changed	Change made in the Standard Features section.

Summary of Changes

11-May-2011	From Version 12 to 13	Changed	Processor descriptions were revised HP 900GB 6G SAS 10K rpm SFF Enterprise Drive was added to Hard Drives
25-Apr-2011	From Version 11 to 12	Removed	HP 250GB 3G SATA 7.2K rpm SFF Midline Drive was removed from Hard Drives.
15-Apr-2011	From Version 10 to 11	Changed	Changes made to processors sections.
06-Apr-2011	From Version 9 to 10	Changed	Formatting changes made to the Storage Controllers section within Overview, Configuration Information and Additional Options sections.
05-Apr-2011	From Version 7 to 9	Changed	Hot plug SAS and SATA Maximum Internal Storage was increased to 4.0TB Service and Support and HP I/O Expansion Options were completely revised Ten Core Processors and Intel Xeon E7-4830, E7-4820 and E7-4807 were added to Processors Up to 30MB level 3 cache was added to Cache Memory Oracle Solaris was added to Operating Systems and Virtualization Software Support for ProLiant Servers Intel AES-NI and Intel Trusted Execution Technology (TXT) Ready were added to Security HP ProLiant BL680c G7 W Configure-to-order Server was added to Models in Step 1 HP 8GB and 16GB Dual Rank x4 PC3L-10600 Registered CAS-9 Low Power Memory Kit and HP 32GB Quad Rank x4 PC3L-8500 Registered CAS-7 LP Memory Kit were added to Memory HP 1TB 6G SAS 7.2K rpm SFF Hot plug Midline and HP 250GB and 1TB 3G SATA 7.2K rpm SFF Midline Hard Drives were added to Hard Drives HP Smart Array P711m/1G 6Gb FBWC 4-ports Ext Mezzanine SAS Controller was added to HP Storage Controllers HP 4GB Micro SDHC Flash Media Drive Kit was added to HP USB and SD Options QLogic QMH4062 1GbE iSCSI Adapter for c-Class BladeSystem and HP NC522m Dual Port Flex-10 10GbE Multifunction BL-c Adapter were removed from HP Ethernet Mezzanine Options
25-Feb-2011	From Version 6 to 7	Changed	Ethernet Mezzanine Options notes were revised and Portal Scrubbing was removed throughout.
14-Feb-2011	From Version 5 to 6	Changed	Hot-plug SAS Maximum Internal Storage was increased to 2.4TB HP 450GB and 600GB 6G SAS 10K rpm SFF Dual Port Enterprise 3yr Warranty Hard Drives were added to Hard Drives
28-Jan-2011	From Version 4 to 5	Changed	Storage Controllers were revised throughout A maximum of three dual-port 10Gb Ethernet mezzanine cards may be added for a total of twelve 10Gb Ethernet ports (six embedded plus six optional) note was added to HP Ethernet Mezzanine Options
10-Jan-2011	From Version 3 to 4	Changed	HP Fibre Channel Mezzanine Options and HP Insight Software product descriptions were revised What's New was added to the Overview HP NC553m 10Gb 2-port FlexFabric Adapter was added to HP Ethernet Mezzanine Options Converged Network was removed from the HP NC553i 10Gb FlexFabric Adapter description Oracle Enterprise Linux (OEL) was removed from

Summary of Changes

			Operating Systems and Virtualization Software Support for ProLiant Servers
27-Dec-2010	From Version 2 to 3	Changed	Note for the embedded adapter ports are routed interconnect bays 1 and 2 (c7000) and interconnect bay 1 (c3000) was revised and HP Insight Control for Linux was modified in HP Insight Software.
10-Dec-2010	From Version 1 to 2	Changed	Minor edits were made to Memory and Storage Controllers.