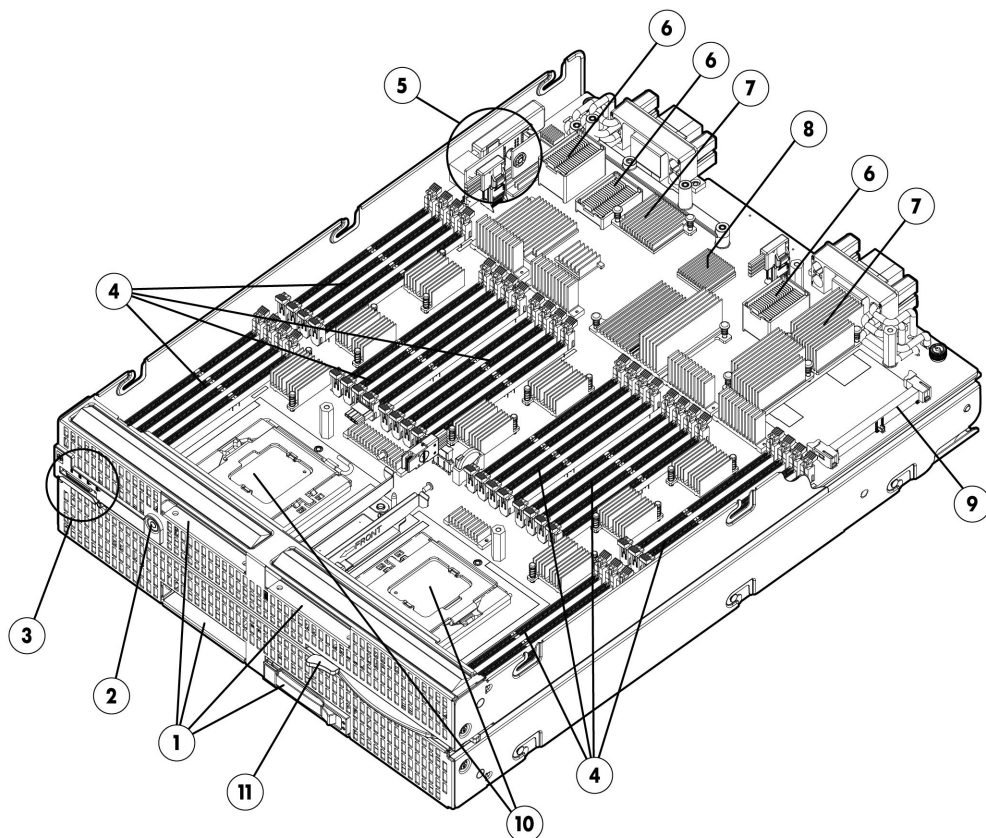*Overview*

HP ProLiant BL680c Generation 7 (G7) 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 1.0TB of DDR3-1333MHz memory (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

9. HP P410i Smart Array cache connector

10. Two, three or four Intel® Xeon® 7500 Series processors (below the hard drives) (two per side)

11. Server release lever

At A Glance

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_na/12790_na.html

Overview

HP BladeSystem c7000 Enclosure QuickSpecs:
http://h18000.www1.hp.com/products/quickspecs/12810_na/12810_na.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 G7 Server Blade provides maximum performance and unparalleled scale-up expansion never before seen in a four-processor x86 server blade. Fully utilizing the design architecture of the Intel® Xeon® 7500 chipset, up to four top performing 130W 7500 processors are supported along with 64 DIMM slots creating the first blade server to offer 1.0TB of memory. The six 10GbE FlexFabric ports with built-in FCoE, Flex-10, hardware-based accelerated iSCSI, iSCSI boot, and TCP/IP offload engine combined with the seven PCIe Gen2 mezzanine expansion slots yield an outstanding 192Gb of I/O bandwidth. The extensive expandability and performance of the BL680c G7 creates an extremely powerful virtualization engine for large consolidation projects and a variety of demanding workloads while making traditional multi-processor (MP) rack to blade transition a true reality.

Traditional MP server blades are typically unbalanced providing processor performance and density at the expense of proportional memory capacity and I/O bandwidth. As such, these unbalanced servers fail when faced with larger databases higher-density virtualization applications. Today, you have a better alternative. By designing a balanced architecture, the BL680c G7 is a very progressive 4P blade offering that ensures that all subsystems can be used effectively under a broad range of enterprise applications and workloads. The 4P BL680c G7 along with the 2P BL620c G7 together provide a complete Intel® Xeon® 6500/7500 portfolio creating a new class of scale-up HP ProLiant servers delivering the reliability and performance you need to handle demanding workloads with confidence- while simplifying management and driving down operating costs.

- **Processor**:
  - Two, three, or four Intel® Xeon® 7500 Series processors each up to 8 cores and 130 watts
    NOTE: One processor is not supported.
    NOTE: All processors within the server must be identical.
  - Intel® 7500 chipset with two integrated memory controllers and four Intel® Scalable Memory Buffers (SMI) per processor supporting sixteen 16GB DIMMs/processor
  - Meshed network of ten Intel® QuickPath Interconnects (Intel® QPI) each up to 6.4GT/s (25.6GB/s data bandwidth) for point-to-point high speed links increasing bandwidth and lowering latency
  - Intel® Hyper-threading resulting in higher processing throughput and improved multi-threaded application performance
  - Intel® Turbo Boost Technology that can automatically operate the processor(s) at a faster frequency than the base operating frequency under certain circumstances.
  - Up to 24MB of L3 cache per processors increasing efficiency of cache-to-cache data transfers maximizing memory bandwidth while reducing latency through storing greater amount of data thus reducing data transfers to memory.
  - Intel® Virtualization Technology that assist virtualization software in generating more efficient virtualization solutions.
  - PCI Gen2 increasing bandwidth up to 4 GB/s on each x8 PCI Express Gen2 connection.
  - Extensive list of over 35 system-wide reliability, serviceability, and availability (RAS) features
- **Memory**:
  - Sixty-four (64) DDR-3 RDIMM slots
  - 1.0TB of DDR3-1333 and DDR3-1066 registered DIMMs (RDIMMs) operating up to 1066MHz
    NOTE: DDR3 memory speed is a function of the processor Intel® QPI speed. See the "Memory" section below for details.
  - For increased memory bandwidth, performance, and capacity, two integrated memory controllers per each processor that connect to a total of four Intel® Scalable Memory Buffers (SMB)
  - Memory RAS features including:
    - Data bus ECC protection and advanced ECC / Chip Spare / SDDC
    - Patrol and demand scrubbing

- DIMM address/control bus parity protection
- Memory mirroring and memory failover
- Rank sparring (online spare)
- Intel® Scalable Memory Interface (SMI) lane and clock failover
- Intel® SMI packet retry
- Failed DIMM isolation
- **Storage Controller**:
  - 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 what cache option of the three different options they want (if cache is desired in the first place). This limits the standard configuration to RAID 0 and 1. However, several cache options are available to add RAID 1+0, 5, and 6.
  - P410i battery backed write cache (BBWC) and flash backed write cache (FBWC) options to 1GB. RAID 1+0 and 5 support is added with any cache option. RAID 6 may be added with addition of a cache battery back-up and the Smart Array Advanced Pack (SAAP) options.
  - Optional P700m Controller with 512MB cache and optional BBWC for connection to external storage.
  - Four (4) slots for BBWC and/or FBWC battery options.
  - Optional StorageWorks IO Accelerator cards for high performance I/O.
- **Internal Drive Support**:
  - Four (4) hot-plug small form factor (SFF) drive bays
  - Support for SAS, SATA, and SSD hot-plug hard drives
- **Network Controller**:
  - Six (6) embedded HP NC553i 10Gb FlexFabric Converged Network Adapters supporting autosensing 10Gb/1Gb Ethernet, FCoE, Flex-10, TCP/IP offload engine, hardware-based accelerated iSCSI, and iSCSI boot
    - The embedded adapter ports are routed interconnect bays 1 and 2 (c7000) and interconnect bay 1 (c3000)
  - 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.
  - One Ethernet-specific mezzanine slot supporting a dual-port mezzanine card [routed interconnect bays 1 and 2 (c7000) and interconnect bay 1 (c3000)] for a total of eight (8) "embedded" Ethernet adapters
    NOTE: The 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.
  - One (1) 10/100 network adapter dedicated to iLO 3 Management
- **Mezzanine Support**:
  - 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, I/O accelerator cards, and the P700m.
      - Mezzanine slots' 2 and 7 ports are routed to interconnect bays 5,6,7,8 (c7000) and 3,4,3,4 (c3000)
      - Mezzanine slots' 3 and 4 ports are routed to interconnect bays 7,8,5,6 (c7000) and 3,4,3,4 (c3000)
    - Two (2) Type I (15 watts) x4 PCIe Gen2, mezzanine slots 1 and 5 supporting 4Gb and 8Gb FC,10Gb FlexFabric, 10Gb Flex10, 10GbE , 1GbE, and the I/O accelerator cards
      - Mezzanine slots' 1 and 5 ports are routed to interconnect bays 3, 4, 3, 4 (c7000) and 2,2,2,2 (c3000)
    - NOTE: HP recommends 10Gb adapters be installed in a x8 PCIe slot for optimal performance.
    - One (1) Type I (15 watts) x8 PCI Gen 2 dual-port Ethernet-specific slot (mezzanine slot 6); see above "Network Controller" section for more information
      - Mezzanine slot's 6 ports are routed to interconnect bays 1, 2 (c7000) and 1, 1 (c3000)
    - NOTE: Type II slots accept both Type I or Type II cards. Type I slots accepted Type I cards only.
- **Internal USB and SD Support**:
  - One (1) internal USB 2.0 connector for USB flash media drive keys
  - One (1) internal micro secure digital high capacity (SDHC) card slot for planned future use
- **Trusted Platform Module** (TPM):
  - One (1) internal TPM 1.2 module connector
- **Infrastructure Management**:

Overview

- ○ HP Integrated Lights-Out 3 (iLO 3) 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, VMware, and Citrix XenServer
- **Form Factor**:
  - ○ Full height, double wide server blade that plugs into the HP BladeSystem c3000 and c7000 enclosures
- **Enclosures**:
  - ○ HP offers three different c-Class server blade enclosures to meet your individual needs:
    - The HP BladeSystem c7000 rack enclosure is 10U high and holds up to 4 HP ProLiant BL680c G7 servers plugged vertically.
    - The HP BladeSystem c3000 rack enclosure is 6U high and holds up to 2 HP ProLiant BL680c G7 servers plugged horizontally.
    - The HP BladeSystem c3000 tower enclosure is designed with casters for sites without racks and holds up to 2 HP ProLiant BL680c G7 servers plugged vertically.
  - ○ 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

Processors	**Eight-Core Processors**
	Intel® Xeon® X7560 (8 core, 2.26GHz, 24MB L3 cache, 6.40GT/s QPI, 130W)
	NOTE: Offered as Configure-To-Order. See the Factory Integrated Models section for more details.
	Intel® Xeon® X7550 (8 core, 2.00GHz, 18MB L3 cache, 6.40GT/s QPI, 130W)
	Intel® Xeon® L7555 (8 core, 1.86GHz, 24MB L3 cache, 6.40GT/s QPI, 95W)
	NOTE: Offered as Configure-To-Order. See the Factory Integrated Models section for more details.
	Six-Core Processors
	Intel® Xeon® E7540 (6 core 2.00GHz, 18MB L3 cache, 6.40GT/s QPI, 105W)
	Intel ®Xeon® E7530 (6 core 1.86GHz, 12MB L3 cache, 5.86GT/s QPI, 105W)
	Four-Core Processor
	Intel® Xeon® E7520 (4 core 1.86GHz, 18MB L3 cache, 4.80GT/s QPI, 95W)
	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 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 E7520.

Upgradeability	Upgradeable to three and four processors
	NOTE: All processors within the server must be identical.
	NOTE: The server supports 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.

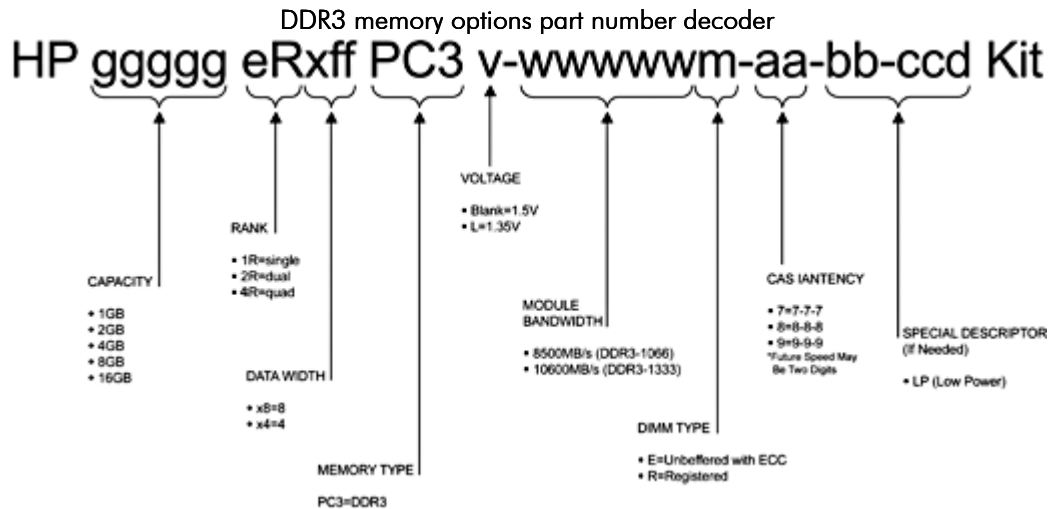|	
Cache Memory	Up to 24MB level 3 cache memory

Chipset	Intel® 7500 chipset

Standard Features

Memory	Type	DDR3-1333 and DDR3-1066 Registered (RDIMM) (operating up to 1066 MHz)
	Standard	16GB (4 x 4GB) (pre-configured models only)
	Maximum	1.0TB (64 x 16GB RDIMMs)

DDR3 memory options part number decoder

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

CAPACITY
- 1GB
- 2GB
- 4GB
- 8GB
- 16GB

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)

DIMM TYPE
- E=Unbuffered with ECC
- R=Registered

CAS IANTENCY
- 7=7-7-7
- 8=8-8-8
- 9=9-9-9
- *Future Speed May Be Two Digits

SPECIAL DESCRIPTOR (If Needed)
- LP (Low Power)

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

Network Controllers	Six (6) embedded HP NC553i 10Gb FlexFabric Converged Network Adapters 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 adapters
	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 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
- Two (2) Type I (15 watts) x4 PCIe Gen2
- One (1) Type I (15 watts) x8 PCI Gen 2 dual-port Ethernet-specific mezzanine slot

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

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

Standard Features

Storage Controller	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 what cache option of the three different options they desire (if cache is desired in the first place). This defines the standard configuration to RAID 0 and 1. However, several cache options are available to add RAID 1+0, 5, and 6.

P410i battery backed write cache (BBWC) and flash backed write cache (FBWC) options to 1GB

RAID 1+0 and 5 support is added with any cache option. RAID 6 may be added with addition of a cache battery back-up and the Smart Array Advanced Pack (SAAP) options

Optional P700m Controller with 512MB cache and optional BBWC for connection to external storage

NOTE: The server supports up to a combined total of four (4) cache BBWC and/or FBWC options for the P410i and/or optional P700m mezzanine cards.

Optional StorageWorks IO Accelerator cards for high performance I/O

Maximum Internal Storage	Hot-plug SAS	2.0TB	4 x 500GB drives
	Hot-plug SATA	2.0TB	4 x 500GB drives
	Hot-plug SSD	480GB	4 x 120GB drives

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

Graphics Resolution	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 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 StorageWorks 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 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

Standard Features

SmartStart version supported (minimum): SmartStart 8.60.
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 StorageWorks Continuous Access software for both the Enterprise Virtual Array and the XP storage array allowing application environments to be reactivated in minutes with the touch of a button to a remote location.

NOTE: For more information, visit:

Standard Features

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 Novell SLES, 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 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 LSF workload scheduler, the HP-MPI parallelization library, 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

Operating Systems and Virtualization Software Support for ProLiant Servers	Microsoft Windows Server Red Hat Enterprise Linux (RHEL) SUSE Linux Enterprise Server (SLES) Oracle Enterprise Linux (OEL) 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/supportos and our driver download page at: www.hp.com/support/BL680cG7

Availability	Memory

- Data Bus ECC protection for automatic correction from a single data bit error and detection of double data error bits.
- Advanced ECC / Chip Spare / 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.
- Patrol Scrubbing proactively searches the system memory, repairing correctable errors.
- Demand Scrubbing writes corrected data back to the memory once a correctable error is detected

Standard Features

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.
  o 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:
  o Platform control between the VMM and guest OSs for faster, more reliable and secure transfers.
  o VM migration features that enhance flexibility for failover, load balancing, disaster recovery, and maintenance.
- 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 adapters 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 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

Standard Features

- 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 battery backed write cache (BBWC) and flash backed write cache (FBWC) options to 1GB.
- Optional multiple P700 Smart Array controllers with 512MB cache (includes RAID 0, 1, 1+0, 5, and 6), and optional BBWC.
- Optional HP StorageWorks D2200sb PCIe Storage Blade for direct attached or shared storage within the BladeSystem 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.

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)

Standard Features

Security	• 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

Security - Trusted Platform Module

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.

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.

QuickSpecs

Service and Support

Service and Support

HP Care Pack Services: Packaged server and storage services for increased uptime, productivity and ROI
When you buy HP server and storage products and solutions, it's also a good time to think about what levels of support you may need. Our portfolio of service options reduce deployment and management worries while helping you get the most out of your server and storage investments. We take a holistic approach to your environment, bridging servers, blades, storage, software and network infrastructures with our packaged HP Care Pack Services for servers and storage.

Protect your business beyond warranty
When it comes to robustness and reliability, standard computing equipment warranties have matured along with technology. Good news that can also create problems stemming from depending on standard warranties designed to only protect against product defects and some downtime causes. Using a standard approach to warranty uplifts, such as HP Care Pack Services, helps reduce downtime risks and provides operational consistency for mission-critical and standard business computing.

HP Care Pack Services: Upgrading or extending standard server and storage warranties cost effectively
HP Care Pack Services offer a standard reactive hardware and software support services suite sold separately, or combined with our Support Plus and Support Plus 24 services. The portfolio also provides a combination of integrated proactive and reactive services, such as Proactive 24 Service and Critical Service. In addition with HP Proactive Select, you can acquire the specific proactive constancy and technical services. HP Proactive Select menu offers a broad set of service options that you can mix and match depending on your specific requirements. Proactive service options include offers for server, storage, network, SAN device, software, environment and education services.

HP server and storage lifecycle support services offers a full spectrum of customer care-from technology support to complex migrations to complete managed services. HP Factory Express provides customization, integration and deployment services for turnkey solutions. HP Education Services offer flexible, comprehensive training on to help your IT staff get the most out of your server and storage investments. HP Financial solutions extend innovative financing and cost-effective asset management programs-from purchase to equipment retirement.

Learn more: www.hp.com/services/servers and www.hp.com/services/storage

NOTE: Care Pack Services availability may vary by product and country.

HP Care Pack Services are sold by HP and HP Authorized Service Partners:

- Services for customers purchasing from HP or an enterprise reseller are quoted using HP order configuration tools.
- Customers purchasing from a commercial reseller can find HP Care Pack Services at http://www.hp.com/go/lookuptool

Service and Support

Recommended HP Care Pack Services for optimal satisfaction with your HP product

Recommended Services

3-Year HP Hardware Support Onsite Call-to-Repair (CTR) Service, 6- or 24-hour
Provides your 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 or 24 hours of the initial service request to the HP Global Solution Center.

HP is committed to repairing your hardware within a maximum of six or twenty four hours. The benefits include:

- Improved system uptime
- Predictable repair times
- More effective IT resource planning
- Consistent level of hardware support across your multi-technology systems

http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-6636ENN

3-Year HP Hardware Support Onsite Service, 4-hour response, 24x7
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.

This service provides a trained HP service specialist to perform an installation that meets HP quality standards, for:

- Help improve or maintain system uptime
- Convenient onsite support
- Committed response time

http://h20195.www2.hp.com/V2/GetPDF.aspx/5982-6547EEE

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.

- Expedited installation, with all service prerequisites met before the installation is performed
- Installation in accordance with manufacturer's specifications, enhancing the supportability of your HP-installed hardware and software
- Service delivery at a mutually scheduled time
- Allows your IT resources to stay focused on their core tasks and priorities
- Availability of an HP service specialist to answer questions during the onsite delivery of this service

http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-9356EN

Service and Support

Optional HP Care Pack Services that will enhance your HP product experience

Optional Services

HP Enhanced Network Installation & Startup for BladeSystem Switches
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 Proactive 24
As an alternative to our recommended support level, for customers who want enhanced operational effectiveness and proactive problem identification:

Provides improved stability, availability and operational effectiveness with an integrated hardware and software support service that combines industry-leading reactive technical assistance with proactive account services, giving your IT manage support from a team of service specialists.

http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA0-1614ENUC

HP Proactive Select Service
Customer needs on demand access to consulting, technical proactive services and education courses

Provides a flexible way to purchase HP best-in-class consultancy and technical services. You can buy Proactive Select Service Credits when you purchase your hardware and then use the credits over the next 12 months.

http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA2-3842ENN

eSupport

HP eSupport is a portfolio of technology-based services that assist you with managing your business environment - from the desktop to the data center.

Support Portal
The HP support portal provides one-stop access to the information, tools and services you need to manage the daily operations of your IT environment.

Features include:

- Access to self-solve tools (including search technical knowledge base)
- Efficient logging and tracking of support cases
- Collaboration with other business and IT professionals
- Download of patches and drivers
- Access to diagnostic tools
- Proactive notification of relevant information

Access to certain features of the support portal requires an HP service agreement. To access the support portal, visit: http://www.hp.com/support

HP Insight Remote Support software delivers secure remote support for your HP Servers and Storage, 24 X 7, so you can spend less time solving problems and more time focused on your business. You can have your systems remotely monitored for hardware failure using secure technology that's been proven at thousands of companies around the world. In many cases, you can avoid problems before they occur.

QuickSpecs

Service and Support

Customer Technical Training

In today's cost-conscious business environment, IT professionals, developers, consultants and users face an interesting challenge: how to keep up with the latest technologies and expand important skills while delivering profitable results on current projects. To help address this challenge, HP offers innovative training solutions that help keep you up-to-date on virtualization, server, storage, Insight Control, Citrix, Microsoft® and open source/Linux-related topics-while spending less time away from business-critical activities.

HP Services Awards

HP Technology Services continues to be recognized for service and support excellence by customers, partners, industry organizations and publications around the world. Recent honors and award reflect our services team's dedications, technical expertise, professionalism and uncompromising commitment to customer satisfaction.

Additional Services Information

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

Models

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

HP BL680c G7 X7550 2P 16GB Server 589045-B21	Processor(s) One of the following depending on model	(2) Intel® Xeon® X7550 (8 core, 2.00GHz, 18MB L3 cache, 6.40GT/s QPI, 130W) (2) Intel® Xeon® E7540 (6 core, 2.00GHz, 18MB L3 cache, 6.40GT/s QPI, 105W) (2) Intel® Xeon® E7530 (6 core, 1.86GHz, 12MB L3 cache, 5.86GT/s QPI, 105W)
HP BL680c G7 E7540 2P 16GB Server 589046-B21	Cache Memory One of the following depending on model	18MB L3 cache (X7550 and E7540) 12MB L3 cache (E7530)
HP BL680c G7 E7530 2P 16GB Server 589047-B21	Memory	16GB (4 x 4GB) DDR3-1333 RDIMMs (operating up to 1066 MHz)
	Network Controllers	Six (6) embedded HP NC553i 10Gb FlexFabric Converged Network Adapters 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 dedicated to iLO 3 Management
	Storage Controller	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 what cache option of the three different options they desire (if cache is desired in the first place). This defines the standard configuration to RAID 0 and 1. However, several cache options are available to add RAID 1+0, 5, and 6; see the "Additional Options" section for P410i options. NOTE: The server supports up to a combined total of four (4) cache BBWC and/or FBWC options for the P410i and/or optional P700m mezzanine cards.
	Hard Drives	No drives included; supports up to four (4) hot-plug SFF SAS/SATA/SAS drives
	Internal Storage	SAS: 2.0TB; SATA: 2.0TB; SSD: 480GB
	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

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 CTO Blade   600334-B21

Configurable model ships with:

Six (6) embedded HP NC553i 10Gb FlexFabric Converged Network Adapters 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 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 what cache option of the three different options they desire (if cache is desired in the first place). This defines the standard configuration to RAID 0 and 1. However, several cache options are available to add RAID 1+0, 5, and 6; see the "Additional Options" section for P410i options.

Four (4) cache slots for BBWC and/or FBWC battery options.
NOTE: The server supports up to a combined total of four (4) cache BBWC and/or FBWC options for the P410i and/or optional P700m mezzanine cards.

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).

Eight-Core Processors

HP BL680c G7 Intel® Xeon® X7560 (2.26GHz/8-core/24MB/130W) FIO 2-processor Kit   589073-L21

HP BL680c G7 Intel® Xeon® X7550 (2.00GHz/8-core/18MB/130W) FIO 2-processor Kit   589088-L21

Configuration Information - Factory Integrated Models

	HP BL680c G7 Intel® Xeon® L7555 (1.86GHz/8-core/24MB/95W) FIO 2-processor Kit	589077-L21
	Six-Core Processors	
	HP BL680c G7 Intel® Xeon® E7540 (2.00GHz/6-core/12MB/105W) FIO 2-processor Kit	589090-L21
	HP BL680c G7 Intel® Xeon® E7530 (1.86GHz/6-core/12MB/105W) FIO 2-processor Kit	589075-L21
	Four-Core Processor	
	HP BL680c G7 Intel® Xeon® E7520 (1.86GHz/4-core/18MB/95W) FIO 2-processor Kit	630839-L21
HP Memory	**NOTE:** All DDR3 memory option kits consist of one DIMM per kit. **NOTE:** See the "Memory" section for memory guidelines, installation rules, and additional general information.	
	HP 2GB (1x2GB) Dual Rank x8 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	500656-B21
	HP 4GB (1x4GB) Dual Rank x4 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	500658-B21
	HP 8GB (1x8GB) Dual Rank x4 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	500662-B21
	HP 16GB (1x16GB) Quad Rank x4 PC3-8500 (DDR3-1066) Registered CAS-7 Memory Kit	500666-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_na/12790_na.html

HP BladeSystem c7000 Enclosure QuickSpecs:

http://h18000.www1.hp.com/products/quickspecs/12810_na/12810_na.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.

HP Ethernet Mezzanine Options	Gigabit Ethernet Mezzanines	
	HP NC325m PCI Express Quad Port 1Gb Server Adapter for c-Class BladeSystem	416585-B21
	HP NC364m Quad Port 1GbE BL-c Adapter	447883-B21
	HP NC382m Dual Port 1GbE Multifunction BL-c Adapter	453246-B21
	HP BLc QLogic iSCSI Dual Port Adapter with Virtual Connect Kit	488074-B22

10 Gigabit Ethernet Mezzanines
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 NC522m Dual Port Flex-10 10GbE Multifunction BL-c Adapter	467801-B21
	HP NC532m Dual Port Flex-10 10GbE Multifunction BL-c Adapter	467799-B21
	HP NC542m Dual Port Flex-10 10GbE Multifunction BL-c Adapter	539857-B21
	HP NC552m Dual Port Flex-10 Adapter	610609-B21

HP Fibre Channel Mezzanine Options	4Gb Fibre Channel mezzanine adapters	
	Emulex LPe1105 FC Dual Channel 4Gb, PCI-E-to-Fibre Channel Host Bus Adapter	403621-B21
	QLogic QMH2462 4Gb FC HBA for HP c-Class BladeSystem	403619-B21
	8Gb Fibre Channel mezzanine adapters	
	HP BLc Emulex LPe1205- 8Gb FC HBA for HP c-Class BladeSystem	456972-B21
	QLogic QMH2562 8Gb FC HBA for HP BladeSystem c-Class	451871-B21
	Brocade 804 8Gb FC HBA for HP BladeSystem c-Class	590647-B21

QuickSpecs

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.	
	Eight-Core Processors	
	HP BL680c G7 Intel® Xeon® X7560 (2.26GHz/8-core/24MB/130W) Processor Kit	589073-B21
	HP BL680c G7 Intel® Xeon® X7550 (2.0GHz/8-core/18MB/130W) Processor Kit	589088-B21
	HP BL680c G7 Intel® Xeon® L7555 (1.86GHz/8-core/24MB/95W) Processor Kit	589077-B21
	Six-Core Processors	
	HP BL680c G7 Intel® Xeon® E7540 (2.0GHz/6-core/12MB/105W) Processor Kit	589090-B21
	HP BL680c G7 Intel® Xeon® E7530 (1.86GHz/6-core/12MB/105W) Processor Kit	589075-B21
	Four-Core Processor	
	HP BL680c G7 Intel® Xeon® E7520 (1.86GHz/4-core/18MB/95W) Processor Kit	630839-B21

HP Memory	NOTE: All DDR3 memory option kits consist of one DIMM per kit. NOTE: See the "Memory" section for memory guidelines, installation rules, and additional general information.	
	HP 2GB (1x2GB) Dual Rank x8 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	500656-B21
	HP 4GB (1x4GB) Dual Rank x4 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	500658-B21
	HP 8GB (1x8GB) Dual Rank x4 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit	500662-B21
	HP 16GB (1x16GB) Quad Rank x4 PC3-8500 (DDR3-1066) Registered CAS-7 Memory Kit	500666-B21

QuickSpecs

Core Options

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: 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: Different hard drives types may be mixed, but logical drive partitioning (i.e. RAID capability) is not supported.

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 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_na/12244_na.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

SATA Hot Plug Midline (MDL) Solid State Drives

HP 120GB 3G SATA SFF (2.5-inch) Midline 1yr Warranty Solid State Drive	572073-B21
HP 60GB 3G SATA SFF (2.5-inch) Midline 1yr Warranty Solid State Drive	572071-B21

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

Additional Options

HP Insight Software	**Insight Control**	
	HP Insight Control, No Media, Electronic License including 1 year of 24x7 Technical Support and Updates	T9074BAE
	HP Insight Control, Single-Server License including 1 year of 24x7 Technical Support and Updates	452148-B22
	HP Insight Software Media Kit	436222-B21

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.
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_na/12631_na.html

HP Insight Control for Linux

	HP Insight Control for Linux, No Media, 1-Server license, including one year of 24x7 Technical Support and Updates	TC209A
	HP Insight Control for Linux, 1-server license, including one year of 24x7 Technical Support and Updates, Electronic	TC213AAE

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.

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

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.
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/13019_na/13019_na.html

Additional Options

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

HP Integrated Lights-Out Advanced for BladeSystem, No Media, Electronic License, including 1 year of 24x7 Technical Support and Updates	TA851AAE
HP Integrated Lights-Out (iLO) Advanced for ProLiant BladeSystem (1) Server License/(1) Key for BladeSystem, No Media, including 1 year of 24x7 Technical Support and Updates	512488-B21

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.
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_na/12362_na.html

HP Insight Control server deployment

HP Insight Control server deployment Electronic License including 1 year 24x7 Technical Support and Updates	T9082AAE
HP Insight Control server deployment 1-Server License including 1 year 24x7 Technical Support and Updates	452151-B21

NOTE: Licenses ship without media. The 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.
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_na/12631_na.html

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High Performance Clusters

High Performance Clusters

HP Cluster Management Utility Compute Node Flexible License	436284-B21

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_na/12612_na.html

HP HPC Linux Value Pack

Additional Options

	HP High Performance Computing Linux Value Pack 1 Processor Flexible License 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 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.	TC293A
	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_na/13485_na.html	

HP Storage Controllers	NOTE: The P410i is configured with no cache allowing the end user to select what cache option of the three different options they desire (if cache is desired in the first place). This defines the standard configuration to RAID 0 and 1. However, several cache options are available to add RAID 1+0, 5, and 6 listed below.	
	NOTE: The server supports up to a combined total of four (4) cache BBWC and/or FBWC options for the P410i and/or optional P700m mezzanine cards.	
	HP Smart Array P700m Controller	
	HP Smart Array P700m/512 4-ports Ext PCIe x8 SAS Controller NOTE: The P700m 512MB cache option adds RAID 1+0, 5, and 6 capability.	508226-B21
	Optional Upgrades	
	HP 512MB P-Series Battery Backed Write Cache Upgrade NOTE: This is an option for the HP Smart Array P410i Controller (P410i is standard integrated controller).	462967-B21
	HP 512MB Flash Backed Write Cache NOTE: This is an option for the HP Smart Array P410i Controller (P410i is standard integrated controller).	534916-B21
	HP 1GB Flash Backed Cache NOTE: This is an option for the HP Smart Array P410i Controller (P410i is standard integrated controller).	534562-B21
	NOTE: All the P410i BBWC or FBWC options add RAID 1+0 and 5.	
	HP Smart Array P-Series Low Profile Battery NOTE: Supports the HP Smart Array P700m Controller.	452348-B21
	HP Smart Array Advanced Pack including 1yr 24x7 Technical Support and Updates Single Server License	516471-B21
	NOTE: The above SAAP license and any above cache option is required to enable Smart Array Advanced Pack features 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/13175_na/13175_na.html (Smart Array P700m Controller) http://h18000.www1.hp.com/products/quickspecs/13200_na/13200_na.html (Smart Array Advanced Pack)	

Additional Options

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

NOTE: Please see the QuickSpecs for technical specifications and additional information:
http://h18000.www1.hp.com/products/quickspecs/13220_na/13220_na.html

HP InfiniBand Mezzanine Options	QLogic 4X QDR IB Dual Port Mezzanine HCA for HP BladeSystem c-Class	583210-B21
	HP 4X QDR IB CX2 Dual Port Mezz HCA for HP BladeSystem c-Class	592519-B21

HP USB Options	HP USB 2-Button Optical Scroll Mouse (Carbonite/Silver)	DC172B
	HP USB 04 Standard Keyboard	DT528A#ABA
	HP 2GB USB Flash Media Drive Key Kit	608447-B21

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

HP Security - TPM	HP Trusted Platform Module (TPM) Kit	488069-B21

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.

HP Care Pack Services

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

Hardware Services On-site Service

4-Hour On-site Service, 5-Day x 13-Hour Coverage, 3 Years, Electronic		UK108E
4-Hour On-site Service, 7-Day x 24-Hour Coverage, 3 Years, Electronic		UK109E
6-Hour Call to Repair, On-site Service, 7-Day x 24-Hour Coverage, 3 Years, Electronic		UK110E

Memory

NOTE: Standard memory configurations listed do not apply to "Factory Integrated Models."

Memory Subsystem Architecture

For maximum memory bandwidth, performance, and capacity, each Intel® Xeon® 7500 Series processor socket contains two memory controllers. Each memory controller has two Intel® Scalable Memory Interface (SMI) buses operating in lockstep for a total of four SMIs per processor. Each SMI in turn connects to an Intel® Scalable Memory Buffer (SMB). The purpose of the memory buffer is to convert SMI to DDR3. Each of the four memory buffers has two DDR3 channels that support four DIMMs each for grand total of sixteen DIMMs per installed processor (64 DIMMs or 1.0TB memory total per BL680c G7 server).

All DIMMs will operate at the highest possible speed for a given processor. Memory speed is not affected by number of DIMMs 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 Memory Population Guidelines

An overview of the DIMM 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 DDR3-1333 DIMMs.
2. DIMMs must be installed for processor 1.
3. Populate DIMM 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 DIMMs installed on processor 1.
6. DIMMs must be installed in pairs with identical characteristics. When possible, for configuration simplicity, HP recommends using DIMMs with identical part numbers throughout the system.
7. For best performance, HP recommends that DIMM pairs be populated in sequence by letter designation. Install DIMM pair (4A, 5A) first, followed by DIMM pair (12B, 16B), DIMM pair (2C, 7C), DIMM pair (10D, 14D), DIMM pair (3E, 6E), DIMM pair (11F, 15F), and DIMM pair (1G, 8G).
8. When installing mixed rank DIMMs for any processor, DIMMs with the highest number of ranks must be installed in the white DIMM connector locations. This guarantees proper electrical signaling on the DDR3 channel since DIMMs with higher rank counts present larger electrical loading on the DDR3 channel and must be populated at the end point of the channel.
9. 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.
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.

Pre-configured Model Standard Memory

16GB (4 x 4GB) of dual-rank DDR3-1066 RDIMMs

Pre-configured Model Standard Memory Plus Optional Memory

Up to 976GB of memory is available with the installation of optional DDR3 RDIMM memory expansion kits.

Pre-configured Model Standard Memory Replaced with Optional Memory

Up to 1.0TB of memory is available with the removal of standard memory and the installation of optional DDR3 RDIMM memory expansion kits.

QuickSpecs

Memory

Memory		Processor 1 and 2 DIMM Slots (Processors 3 and 4 have the same DIMM slot numeration, but all slots are empty)							
Standard	8GB per CPUs 1 and 2 (16GB total)	1G	2C	3E	4A	5A	6E	7C	8G
		Empty	Empty	Empty	4GB	4GB	Empty	Empty	Empty
		9H	10D	11F	12B	13H	14D	15F	16B
		Empty	Empty	Empty	Empty	Empty	Empty	Empty	Empty
		Processor 1 and 2 DIMM Slots (Processors 3 and 4 DIMM slots are all populated with 16GB DIMMs)							
Optional	232GB per CPUs 1 and 2, 256MB per CPUs 3 and 4 (976GB total)	1G	2C	3E	4A	5A	6E	7C	8G
		16GB	16GB	16GB	4GB	4GB	16GB	16GB	16GB
		9H	10D	11F	12B	13H	14D	15F	16B
		16GB	16GB	16GB	16GB	16GB	16GB	16GB	16GB
		Processor 1 through 4 DIMM Slots							
Maximum	256GB per CPU (1.0TB total)	1G	2C	3E	4A	5A	6E	7C	8G
		16GB	16GB	16GB	16GB	16GB	16GB	16GB	16GB
		9H	10D	11F	12B	13H	14D	15F	16B
		16GB	16GB	16GB	16GB	16GB	16GB	16GB	16GB

HP ProLiant BL680c G7 memory options:

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

HP 2GB (1x2GB) Dual Rank x8 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit   500656-B21

HP 4GB (1x4GB) Dual Rank x4 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit   500658-B21

HP 8GB (1x8GB) Dual Rank x4 PC3-10600 (DDR3-1333) Registered CAS-9 Memory Kit   500662-B21

HP 16GB (1x16GB) Quad Rank x4 PC3-8500 (DDR3-1066) Registered CAS-7 Memory Kit   500666-B21
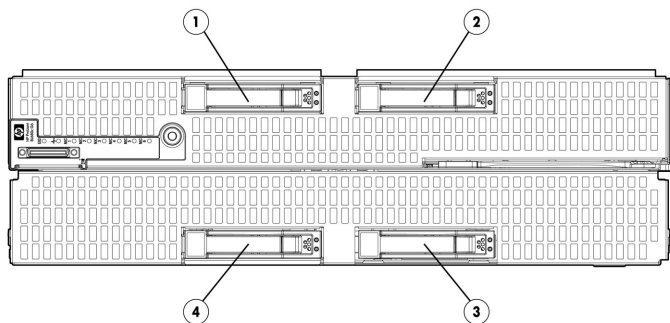
NOTE: All DDR3 memory option kits consist of one DIMM per kit.
NOTE: For detailed memory configuration rules and guidelines, please see the BL680c G7 user guide at www.hp.com/support and use the Online DDR3 Memory Configuration Tool at: www.hp.com/go/ddr3memory-configurator.

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: Different hard drives types may be mixed, but logical drive partitioning (i.e. RAID capability) is not supported.
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 15K 72GB 6G SAS 15K	4	1-4	Smart Array P410i Controller

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

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

SATA Hot Plug Midline (MDL) Solid State Drives

	Quantity Supported	Position Supported	Controller
120GB 3G SATA SSD 60GB 3G SATA SSD	4	1-4	HP Smart Array P410i Controller

Technical Specifications

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_na/12790_na.html HP BladeSystem c7000 Enclosure QuickSpecs: http://h18000.www1.hp.com/products/quickspecs/12810_na/12810_na.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	

Technical Specifications

Enclosures QuickSpecs located at:
HP BladeSystem c3000 Enclosure QuickSpecs:
http://h18000.www1.hp.com/products/quickspecs/12790_na/
12790_na.html
HP BladeSystem c7000 Enclosure QuickSpecs:
http://h18000.www1.hp.com/products/quickspecs/12810_na/
12810_na.html

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)
		Optional: RAID 1+0 (Stripping and Mirroring) RAID 5 (Distributed Data Guarding) RAID 6 (Advanced Data Guarding) NOTE: The RAID support available is dependent on the number of drives installed in the server.
	Upgradeable Firmware	Upgradeable firmware with recovery ROM capability

Integrated HP NC553i 10Gb FlexFabric Converged Network 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

Technical Specifications

- 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):
  - 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

QuickSpecs

Technical Specifications

	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
	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.