*Overview*
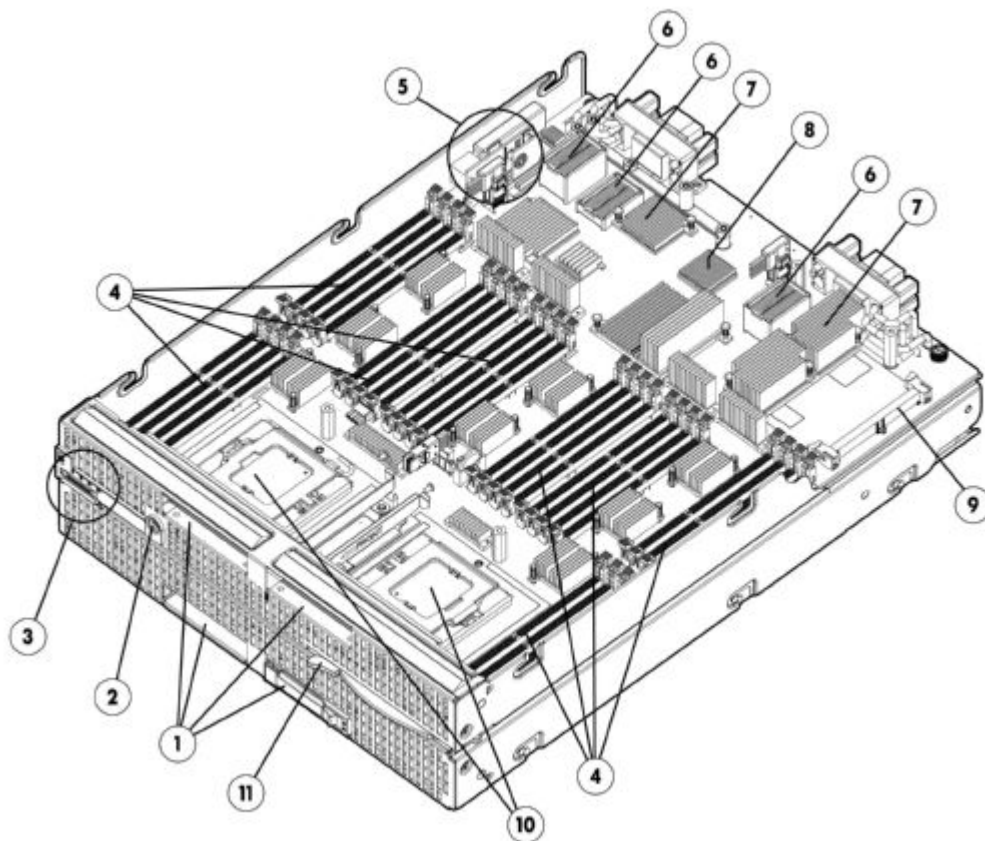


**HP ProLiant BL680c Generation 7 (G7) Server Blade**
**Front view image showing side "A"**

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 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

## 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_div/12790_div.html

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

HP BladeSystem c-Class Interconnect and Mezzanine Components:

## Overview

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. The ProLiant BL680c G7 supports the Intel® Xeon® E7-4800 family and E7-8867L processors. Fully utilizing the design architecture of the Intel® Xeon® 7500 chipset, up to four top performing 130W processors are supported along with 64 RDIMM slots creating the first blade server to offer 2.0TB of memory. The six 10Gb FlexFabric ports with built-in FCoE, Flex-10, hardware-based accelerated iSCSI, iSCSI boot, TCP/IP offload engine, and autosensing 10GbE and 1GbE combined with the seven (7) PCIe Gen2 mezzanine expansion slots. The extensive expandability and performance of the BL680c G7 creates an extremely powerful database engine while handling a variety of very demanding workloads and 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® portfolio creating a new class of scale-up HP ProLiant server blades delivering the reliability and performance you need to handle demanding workloads with confidence.

- **Processor**:
  - Two, three, or four Intel® Xeon® E7-4800/8867L series processors each up to 10 cores and 130 watts
    **NOTE:** One processor is not supported.
    **NOTE:** All processors within the server must be identical.
  - Extensive list of 40 key system-wide availability features
  - Advanced Core Disable feature allowing more control over enabling/disabling processor cores
  - Intel® Advanced Encryption Standard New Instructions (Intel® AES-NI) delivering robust encryption without the need for additional appliances or increased performance overhead for improved encryption performance and efficiency
  - Intel® 7500 chipset with two integrated memory controllers per processor for maximum system performance
  - Low power Intel 7510 Scalable Memory Buffer
  - Intel Intelligent Power Technology including:
    - Lower partial active power that automatically pleases processor, memory, and I/O controller into the lowest available power states to meet the current workload while minimizing performance impact
    - Lower idle power that allows idling cores to be reduced to near-zero power independent of other cores, reducing server idle power consumption
  - 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 30MB 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.
- **Memory**:
  - 2.0TB memory capacity via sixty-four (64) DDR3 registered DIMMs (RDIMM) slots operating up to 1066MHz
    **NOTE:** The DDR3 memory speed is a function of the processor Intel® QPI speed. See the "Memory" section below for details.
  - 8GB, 16GB and 32GB 1.35V DDR3L RDIMM low power memory options providing up to a 0.15V power savings per each DIMM compared to standard 1.5V DDR3 RDIMMs
  - For maximum 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 availability features including:

## Overview

- Data bus ECC protection and advanced ECC / SDDC
- Double Device Data Correction (DDDC)
- HP Memory Quarantine (based on Intel MCA Recovery technology)
- Demand and patrol 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, 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.
  - Four (4) slots for battery cache options.
  - Optional 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
    **NOTE:** SAS, SATA, and/or SSD drives cannot be mixed within the server.
- **Network Controller**:
  - 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
    **NOTE:** A maximum of six dual-port 10Gb Ethernet mezzanine cards may be added for a total of eighteen 10Gb Ethernet ports (six embedded plus twelve optional). 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:** VMware VSpherev4 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:** 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.
    - The embedded adapter ports are routed interconnect bays 1 and 2 (c7000) and interconnect bay 1 (c3000)
  - 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.
    **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:** 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.
  - One (1) 10/100 network adapter port 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

*Overview*

- FC, 10Gb FlexFabric, 10Gb Flex10, 10GbE, 1GbE, I/O accelerator cards, and the Smart Array RAID controllers.
  - 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
- **Trusted Platform Module** (TPM):
  - One (1) internal TPM 1.2 module connector
- **Infrastructure Management**:
  - This server blade requires the latest version of the Onboard Administrator firmware. This firmware release may also require other subsystem firmware upgrades. For information on the latest firmware versions, please see the Blades Firmware Maintenance website at:
    http://h18004.www1.hp.com/products/blades/components/c-class-compmatrix.html
  - 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 Matrix Operating Environment 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, Oracle Solaris, 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 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 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.
  - 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)

*Overview*

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

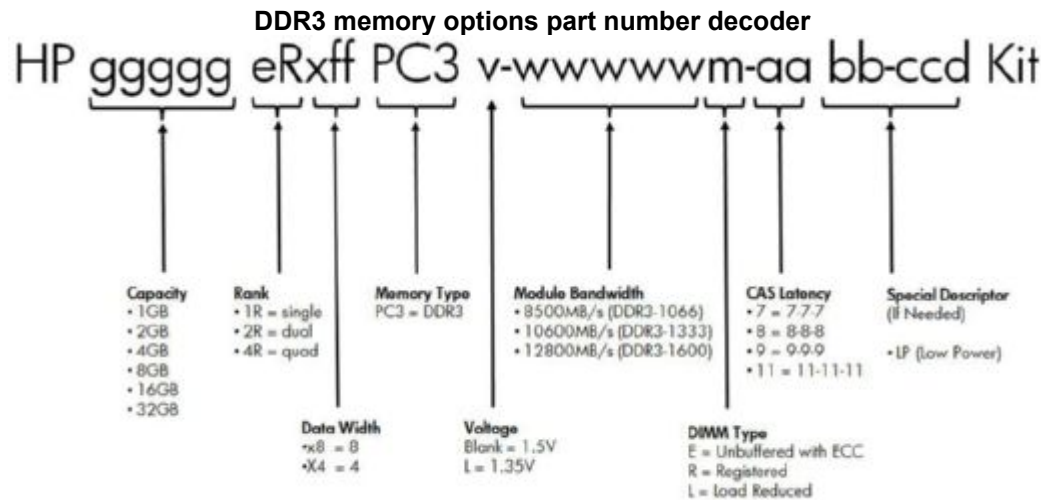| | |
|---|---|
| **Processors** One or more of the following depending on model | **Ten-Core Processors** Intel® Xeon® E7-4870 (2.40GHz/10-core/30MB, 6.40GT/s QPI, 130W) Processor **NOTE:** Offered as Configure-To-Order. See the Factory Integrated Models section for more details. Intel® Xeon® E7-4860 (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. **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. |
| **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. |
| **Cache Memory** | Up to 30MB 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 | 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 | Rank | Memory Type | Module Bandwidth | CAS Latency | Special Descriptor |
|---|---|---|---|---|---|
| • 1GB | • 1R = single | PC3 = DDR3 | • 8500MB/s (DDR3-1066) | • 7 = 7-7-7 | (If Needed) |
| • 2GB | • 2R = dual | | • 10600MB/s (DDR3-1333) | • 8 = 8-8-8 | • LP (Low Power) |
| • 4GB | • 4R = quad | | • 12800MB/s (DDR3-1600) | • 9 = 9-9-9 | |
| • 8GB | | | | • 11 = 11-11-11 | |
| • 16GB | | | | | |
| • 32GB | | | | | |

Data Width
• x8 = 8
• X4 = 4

Voltage
Blank = 1.5V
L = 1.35V

DIMM Type
E = Unbuffered with ECC
R = Registered
L = Load Reduced

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

| 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
- 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, 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.

Optional IO Accelerator cards for high performance I/O

| **Maximum Internal Storage** | | | |
|---|---|---|---|
| One or more of the following depending on model | Hot-plug SAS | 4.0TB | 4 x 1.0TB drives |
| | Hot-plug SATA | 4.0TB | 4 x 1.0TB drives |
| | Hot-plug SAS SSD | 3.2TB | 4 x 800GB drives |
| | Hot-plug SATA SSD | 1.6TB | 4 x 400GB drives |

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

| **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 |

| **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 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 |

## Standard Features

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 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 interdepencies, 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

**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

## Standard Features

| | HP Insight Control | more information, visit: www.hp.com/go/iLO. |
|---|---|---|
| | | 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 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. |
| **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 |
| | HP HPC Linux Value Pack | HP HPC Linux Value Pack (Value Pack) is an HP-licensed and HP-supported option to HP Insight CMU, for the development and deployment of applications on HPC Cluster Platforms. Value Pack includes the Platform LSF workload scheduler and Platform Application Center, as well as the HP-MPI parallelization library. HP HPC Linux Value Pack |

## Standard Features

| | |
|---|---|
| **Operating Systems and Virtualization Software Support for ProLiant Servers** | Microsoft Windows Server<br>Red Hat Enterprise Linux (RHEL)<br>SUSE Linux Enterprise Server (SLES)<br>Oracle Solaris<br>VMware Server<br>Citrix XenServer<br><br>**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 |

**Availability**

**Memory**

- 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**

## Standard Features

- 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 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.
-

## Standard Features

- Optional enclosure redundant Onboard Administrator system management module.

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

**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

**Factory Express Portfolio for Servers and Storage**

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

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

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

**HP Enterprise Configurator**

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

## Service and Support

| | |
|---|---|
| **Service and Support** | **HP Technology Services for Industry Standard Servers and BladeSystem**<br><br>Capitalizing on HP ProLiant server and HP BladeSystem capabilities requires a service partner who understands your increasingly complex business technology environment. That's why it makes sense to team up with the people who know HP infrastructure hardware and software best - the experienced professionals at HP Services.<br><br>**What HP ProLiant and BladeSystem Services can do for you**<br><br>HP ProLiant and BladeSystem Services can help you design, deploy, test, integrate, support, and manage IT and infrastructure solutions. This way, HP proposes services solutions that include more than just uplift of base warranty. You can get the support you need by choosing from one of a number of service packaged solutions we have designed to address wider set of customer support needs.<br><br>**HP Technology Services meets business challenges with services offered in three packages** - Optimized Care Package, Standard Care Package, and Basic Care Package - available for each product group. Such packaged solutions enable customers to optimize technology operations, minimize risk and drive better business outcomes with easy-to-buy, easy-to-use scalable support packages for servers, storage, networking and software. |
| **Optimized Care Package** | **Supports maintaining servers at optimum performance availability**<br><br>**HP Installation and Startup Service for HP BladeSystem c-Class Infrastructure for c3000/c7000 enclosure**<br><br>Provides for the installation and startup of a BladeSystem c3000 Infrastructure in a single blade enclosure including hardware and software, including deployment of OS, HP SIM, RDP, RDP, PMP and VPM<br>http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA0-5964ENW.pdf<br><br>**3-Year HP Critical Advantage L3 for c3000/c7000 enclosure + 3-Year HP Critical Advantage L3 for Blade server**<br><br>Provides end-to-end infrastructure support solution for business critical applications running on virtualized/x86 infrastructures, enabling the customers to cost effectively build, operate, and continuously improve their IT environment<br>http://h20195.www2.hp.com/V2/GetDocument.aspx?docname=4AA3-1772ENW.pdf<br><br>**HP Installation and Startup Service for HP BladeSystem c-Class Enhanced Network**<br><br>HP Provides for the configuration and testing of BladeSystem Ethernet interconnect switches to facilitate proper implementation of network protocols and access to advanced features.<br>http://h20195.www2.hp.com/V2/GetPDF.aspx/4aa0-5969ENW.pdf<br><br>**Additional Services**: Virtualization Services - Strategy, Design, Transition, Operation, Continual Service Improvement. |

## Service and Support

| | |
|---|---|
| **Standard Care Package** | **Package that maintains high level of server availability** |

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

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

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

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

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

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

| | |
|---|---|
| **Basic Care Package** | **Delivers minimum recommended support service level** |

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

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

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

## Service and Support

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

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

**Insight Remote Support**

The packages include HP Insight Remote Support that uses proven technology to deliver secure, reliable 24x7 remote monitoring, diagnoses, and problem resolution. It is available at no additional cost to all warranty, HP Care Pack Service, and service agreement customers.

**For more information**

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

## Models

| | | |
|---|---|---|
| **HP ProLiant BL680c G7 E7-4860 2P 64GB-R Server**<br>643780-B21<br><br>**HP ProLiant BL680c G7 E7-4850 2P 64GB-R Server**<br>643781-B21<br><br>**HP ProLiant BL680c G7 E7-4830 2P 64GB-R Server**<br>643782-B21 | **Processor(s)**<br>One of the following depending on Model | (2) Intel® Xeon® E7-4860 (2.26GHz/10-core/24MB, 6.40GT/s QPI, 130W) Processors<br>(2) Intel® Xeon® E7-4850 (2.00GHz/10-core/24MB, 6.40GT/s QPI, 130W) Processors<br>(2) Intel® Xeon® E7-4830 (2.13GHz/8-core/24MB, 6.40GT/s QPI, 105W) Processors |
| | **Cache Memory** | 24MB L3 cache |
| | **Memory** | 64GB (8 x 8GB) DDR3-1333 RDIMMs (operating up to 1066MHz) |
| | **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<br>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<br>**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.<br>**NOTE:** RAID 0, 1, and 1+0 are supported on the P410i without the need for a cache option.<br>Four (4) slots for battery cache options.<br>**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: 4.0TB; 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<br>Up to 4 blades in the HP BladeSystem c7000 enclosure |

| | | |
|---|---|---|
| **Country Code Key** | xx=B2<br>xx=20 | Worldwide<br>Brazil |

## Configuration Information - Factory Integrated Models

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

| | | |
|---|---|---|
| **HP Models** | HP ProLiant BL680c G7 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 |
| HP BL680c G7 Intel® Xeon® E7-8867L (2.13GHz/10-core/30MB/105W) FIO 2-processor Kit | 643778-L21 |

**Eight-Core Processors**

## Configuration Information - Factory Integrated Models

|  | | |
|---|---|---|
| | 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.<br>**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 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 16GB (1x16GB) Quad Rank x4 PC3-8500 (DDR3-1066) Registered CAS-7 Memory Kit | 500666-B21 |
| | HP 32GB (1x32GB) Quad Rank x4 PC3L-8500 (DDR3-1066) Registered CAS-7 LP Memory Kit | 627814-B21 |

## Step 3: Choose Additional Options for Factory Integration

**NOTE:** For additional options, including server blade enclosures interconnect and mezzanine options and power subsystem options; please see the Core Options and Additional sections below and the following:

HP BladeSystem c3000 Enclosure QuickSpecs:

http://h18000.www1.hp.com/products/quickspecs/12790_div/12790_div.html

HP BladeSystem c7000 Enclosure QuickSpecs:

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

HP BladeSystem c-Class Interconnect and Mezzanine Components:

http://h18004.www1.hp.com/products/blades/components/c-class-interconnects.html

http://h18004.www1.hp.com/products/blades/components/c-class-adapters.html

## Core Options

| 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:** 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 | | |
|---|---|---|
| | **4Gb Fibre Channel mezzanine adapters** | |
| | Emulex LPe1105 4Gb Fibre Channel Host Bus Adapter for c-Class BladeSystem | 403621-B21 |
| | QLogic QMH2462 4Gb Fibre Channel Host Bus Adapter for c-Class BladeSystem | 403619-B21 |
| | **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 |
| | HP BLc Brocade 804 8Gb Fibre Channel Host Bus Adapter | 590647-B21 |

## Core Options

| | | |
|---|---|---|
| **HP Processors** | **NOTE:** The BL680c G7 supports two, three, or four processors. One processor is not supported.<br>**NOTE:** The minimum processor configuration is two processors that must be installed in sockets CPU1 and CPU3.<br>**NOTE:** All processors within the server must be identical.<br>**NOTE:** All -B21 processor kits listed below contain one (1) processor.<br>**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. | |
| | **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.<br>**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 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 16GB (1x16GB) Quad Rank x4 PC3-8500 (DDR3-1066) Registered CAS-7 Memory Kit | 500666-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.<br>**NOTE:** Hard drives have either a one year or three year warranty; refer to the specific hard drive QuickSpecs for details.<br>**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.<br>**NOTE:** SAS, SATA, and/or SSD drives cannot be mixed within the server. | |

## Core Options

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

| | |
|---|---|
| HP 900GB 6G SAS 10K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive | 619291-B21 |
| HP 600GB 6G SAS 10K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive | 581286-B21 |
| HP 450GB 6G SAS 10K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive | 581284-B21 |
| HP 300GB 6G SAS 15K rpm SFF (2.5-inch) Hot Plug Enterprise 3 yr 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 |
| 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 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)

**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)

**6G SAS Hot Plug Enterprise Performance Solid State Drives**

| | |
|---|---|
| HP 400GB 6G SAS SLC SFF (2.5-inch) Enterprise Performance 3yr Warranty Solid State Drive | 632494-B21 |
| HP 200GB 6G SAS SLC SFF (2.5-inch) Enterprise Performance 3yr Warranty Solid State Drive | 632492-B21 |

**6G SAS Hot Plug Enterprise Mainstream Solid State Drives**

| | |
|---|---|
| HP 800GB 6G SAS MLC SFF (2.5-inch) Enterprise Mainstream 3yr Warranty Solid State Drive | 632506-B21 |
| HP 400GB 6G SAS MLC SFF (2.5-inch) Enterprise Mainstream 3yr Warranty Solid State Drive | 632504-B21 |
| HP 200GB 6G SAS MLC SFF (2.5-inch) Enterprise Mainstream 3yr Warranty Solid State Drive | 632502-B21 |

**SATA Hot Plug 2.5" Enterprise Mainstream Solid State Drives**

| | |
|---|---|
| HP 400GB 3G SATA MLC SFF (2.5-inch) Enterprise Mainstream 3yr Warranty Solid State Drive | 636597-B21 |
| HP 200GB 3G SATA MLC SFF (2.5-inch) Enterprise Mainstream 3yr Warranty Solid State Drive | 636595-B21 |
| HP 100GB 3G SATA MLC SFF (2.5-inch) Enterprise Mainstream 3yr Warranty Solid State Drive | 636593-B21 |

*Core Options*

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

# QuickSpecs

## Additional Options

| | | |
|---|---|---|
| | HP iLO Advanced for BladeSystem including 1yr 24x7 Support Single Server License | 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:** 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)

**HP Insight Control server deployment**

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

**NOTE:** Licenses ship without media. The Media Kit for Insight Control for Linux can be ordered separately, or can be downloaded at:
http://www.hp.com/go/insightupdates.
**NOTE:** Customer will receive a license entitlement certificate, which must be redeemed online or via fax in order to obtain the license activation key(s). Includes one year of 24 x 7 HP Software Technical Support Service.
**NOTE:** For additional license kits please see the Insight Control QuickSpecs at:
http://h18004.www1.hp.com/products/quickspecs/12631_div/12631_div.html
(Worldwide)

| | | |
|---|---|---|
| **High Performance Clusters** | **HP Cluster Management Utility** | |
| | HP Cluster Management Utility 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 Flexible License with 3 years of 24x7 updates and technical support | 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 HPC Linux Value Pack**

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

**NOTE:** This part number can be used to purchase one certificate for multiple

## Additional Options

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.

| | |
|---|---|
| HP High Performance Computing Linux Value Pack Media Kit | TC294A |

**NOTE:** This part number can be used to purchase media including software and documentation, which will be delivered to the customer.

**NOTE:** For additional license kits please see the QuickSpecs at: http://h18004.www1.hp.com/products/quickspecs/13485_div/13485_div.html (Worldwide)

---

**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 P700m Controller**

| | |
|---|---|
| HP Smart Array P700m/512 4-ports Ext PCIe x8 SAS Controller | 508226-B21 |

**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 |
| HP Smart Array P712m/ZM 2-ports Int PCIe x8 SAS Controller | 484299-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/13175_div/13175_div.html (Worldwide)
(Smart Array P700m Controller)
http://h18000.www1.hp.com/products/quickspecs/14035_div/14035_div.html (Smart Array P711m Controller)

## Additional Options

| | 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 I/O Expansion Options** | HP 320GB IO Accelerator for BladeSystem c-Class | AJ878B |
| | HP 640GB IO Accelerator for BladeSystem c-Class | BK836A |
| | **NOTE:** Please see the QuickSpecs for technical specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/13220_div/13220_div.html (Worldwide) | |
| **HP InfiniBand Mezzanine Options** | HP 4X QDR QLogic InfiniBand Dual Port Mezzanine HCA for c-Class BladeSystem | 583210-B21 |
| | HP 4X QDR InfiniBand ConnectX-2 Dual Port Mezzanine HCA for c-Class BladeSystem | 592519-B21 |
| **HP USB and SD Options** | HP USB 2-Button Optical Scroll Mouse | 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 4GB Micro SDHC Flash Media Kit | 647444-B21 |
| | **NOTE:** Blank SD media devices are supported for use with VMware and Citrix. SD media must be installed in the internal slot of the ProLiant server. Learn more at: http://www.hp.com/go/proliantvirtualization. | |
| **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 Care Pack Services**   **NOTE:** The HP Care Pack service part numbers below for ProLiant BL c-Class server blades, cover the server blade and all HP branded hardware options qualified for the server, purchased at the same time or afterwards, internal to the server.

**Hardware Services On-site Service**

| | |
|---|---|
| HP 3 year 4 hour 13x5 BL6xxc Server Blade Hardware Support | UK108E |
| HP 3 year 4 hour 24x7 BL6xxc Server Blade Hardware Support | UK109E |
| HP 3 year 6 hour 24x7 Call to Repair BL6xxc Server Blade Hardware Support | UK110E |

*Memory*

## Memory Subsystem Architecture

For maximum memory bandwidth, performance, and capacity, each processor socket contains two memory controllers. Eac memory controller connects to two Intel® Scalable Memory Buffers (SMB) for a total of four SMBs per processor. Each SME 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
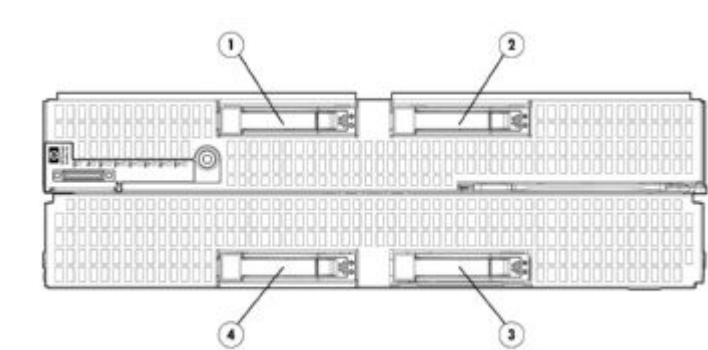
## Memory

### 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 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 | 627812-B21 |
| | HP 16GB (1x16GB) Quad Rank x4 PC3-8500 (DDR3-1066) Registered CAS-7 Memory Kit | 500666-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 |
|---|---|---|---|
| 900GB 6G SAS 10K | 4 | 1-4 | Smart Array P410i Controller |
| 600GB 6G SAS 10K | | | |
| 450GB 6G SAS 10K | | | |
| 300GB 6G SAS 15K | | | |
| 300GB 6G SAS 10K | | | |
| 146GB 6G SAS 15K | | | |
| 72GB 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 | | | |
| 160GB 3G SATA 7.2K | | | |

**SATA Hot Plug 2.5" Enterprise Mainstream Solid State Drives**

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

**6G SAS Hot Plug Enterprise Performance Solid State Drives**

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

## Storage

**6G SAS Hot Plug Enterprise Mainstream Solid State Drives**

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

## 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_div/ 12790_div.html HP BladeSystem c7000 Enclosure QuickSpecs: http://h18000.www1.hp.com/products/quickspecs/12810_div/ 12810_div.html | |
| | | To review typical system power ratings use the HP BladeSystem Power Sizer available at: http://www.hp.com/go/bladesystem/powercalculator. | |
| | **System Inlet Temperature** | Operating | 10° to 35°C (50° to 95°F) at sea level with an altitude derating of 1.0°C per every 305 m (1.8°F per every 1000 ft) above sea level to a maximum of 3050 m (10,000 ft), no direct sustained sunlight. Maximum rate of change is 10°C/hr (18°F/hr). The upper limit may be limited by the type and number of options installed. System performance may be reduced if operating with a fan fault or above 30°C (86°F). |
| | | Non-Operating | -30° to 60°C (-22° to 140°F), maximum rate of change is 20°C/hr (36°F/hr). |
| | **Relative Humidity** (non-condensing) | Operating | 10 to 85% relative humidity (Rh), 28°C (82.4°F) maximum wet bulb temperature, non-condensing. |
| | | Non-Operating | 10 to 95% relative humidity (Rh), 38.7°C (101.7°F) maximum wet bulb temperature, non-condensing. |
| | **Altitude** | Operating | 3050 m (10,000 ft). This value may be limited by the type and number of options installed. Maximum allowable altitude change rate is 457 m/min (1500 ft/min). |
| | | Non-operating | 9144 m (30,000 ft). Maximum allowable altitude change rate is 457 m/min (1500 ft/min). |
| | **Acoustic Noise** | For acoustic noise specifications, please see the HP BladeSystem c-Class Enclosures QuickSpecs located at: HP BladeSystem c3000 Enclosure QuickSpecs: http://h18000.www1.hp.com/products/quickspecs/12790_div/ 12790_div.html | |

*Technical Specifications*

HP BladeSystem c7000 Enclosure QuickSpecs:
http://h18000.www1.hp.com/products/quickspecs/12810_div/12810_div.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)<br>RAID 1 (Mirroring)<br>RAID 1+0 (Stripping and Mirroring)<br>**NOTE:** RAID 0, 1, and 1+0 are supported on the P410i without the need for a cache option.<br>**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)<br>RAID 6 (Advanced Data Guarding)<br>**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)<br>**NOTE:** Each port is autosensing 1Gb / 10Gb, and can interoperate with 1Gb HP BladeSystem c-Class interconnect components.<br>**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<br>• 9K Jumbo frames (4K Jumbo frames when in FCoE mode)<br>• Microsoft Windows Receive Side Scaling (RSS)<br>• FCoE or accelerated iSCSI mode<br>• iSCSI boot<br>• Flex-10 support<br>• TCP/IP offload engine<br>• 10Gb Ethernet ort 1Gb Ethernet autosensing |

*Technical Specifications*

- 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 |
| | **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 |

## *Technical Specifications*

| | | |
|---|---|---|
| | **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. |