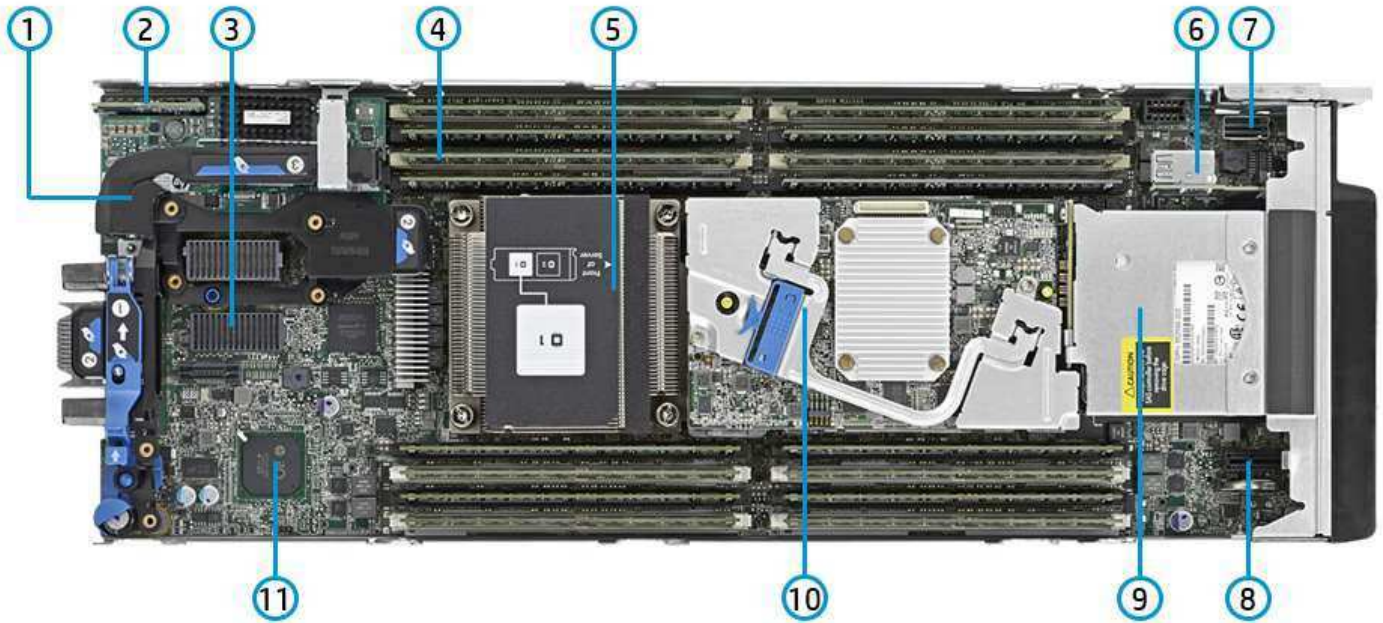


Overview

HP ProLiant BL460c Generation 9 (Gen9) Server Blade



HP ProLiant BL460c Generation 9 (Gen9) Server Blade – Internal View

1. FlexibleLOM adapter
2. Nand Flash & Micro SD
3. Mezzanine Slots (x16 PCI 3.0)
4. Sixteen (16) DDR4 DIMM memory slots (8 per processor)
5. Up to two (2) Intel® Xeon® E5-2600 v3 family processors
6. USB 3.0 and TPM
7. Embedded SATA Connector
8. Solid State Device Connector
9. Two hot-plug drive bays
10. HP Smart Array P244br Controller with 1GB FBWC
11. iLO Management Engine

What's New

- Flexible Controller Options
- Support for 2133MHz DDR4 memory
- Support for 12Gb SAS internal hard drives and 12Gb SAS storage controller offerings

Support for the Intel E5-2600 v3 Product Family

Standard Features

NOTE: This document covers the HP ProLiant BL460c Gen9 server blade only. For information on HP BladeSystems c-Class Enclosures and HP BladeSystem c-Class Interconnect and Mezzanine Components, please see the following:

HP BladeSystem c-Class Enclosures QuickSpecs:

- HP BladeSystem c3000 Enclosure QuickSpecs at <http://www8.hp.com/h20195/v2/GetDocument.aspx?docname=c04123379>
NOTE: The c3000 HP c-Class enclosures have full backwards and forwards compatibility, existing server blades are supported in the new enclosures and any future server blades will be supported in the existing enclosures.
- HP BladeSystem c7000 Enclosure QuickSpecs at <http://www8.hp.com/h20195/v2/GetDocument.aspx?docname=c04229580>
NOTE: The c7000 HP c-Class enclosures have full backwards and forwards compatibility, existing server blades are supported in the new enclosures and any future server blades will be supported in the existing enclosures.
- HP BladeSystem c-Class Interconnect and Mezzanine Components at <http://h18004.www1.hp.com/products/blades/components/c-class-interconnects.html>
<http://h18004.www1.hp.com/products/blades/components/c-class-adapters.html>

NOTE: For optimal cooling and system performance the BL460c Gen9 Server Blade requires the c7000 enclosure to be configured with 10 fans and the c3000 enclosure to be configured with 6 fans.

NOTE: For proper BladeSystem operation, the minimum required versions of HP Onboard Administrator and HP Virtual Connect are required and available via the HP Service Pack for ProLiant, please see <http://www.hp.com/go/spp/download>.

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

Processor

One of the following depending on Model

E5-2600 v3 series Processors

HP BL460c Gen9 Intel® Xeon® E5-2690v3 (2.6GHz/12-core/30MB/135W) Processor Kit
HP BL460c Gen9 Intel® Xeon® E5-2680v3 (2.5GHz/12-core/30MB/120W) Processor Kit
HP BL460c Gen9 Intel® Xeon® E5-2670v3 (2.3GHz/12-core/30MB/120W) Processor Kit
HP BL460c Gen9 Intel® Xeon® E5-2660v3 (2.6GHz/10-core/25MB/105W) Processor Kit
HP BL460c Gen9 Intel® Xeon® E5-2650v3 (2.3GHz/10-core/25MB/105W) Processor Kit
HP BL460c Gen9 Intel® Xeon® E5-2640v3 (2.6GHz/8-core/20MB/90W) Processor Kit
HP BL460c Gen9 Intel® Xeon® E5-2683v3 (2GHz/14-core/35MB/120W) Processor Kit
HP BL460c Gen9 Intel® Xeon® E5-2630v3 (2.4GHz/8-core/20MB/85W) Processor Kit
HP BL460c Gen9 Intel® Xeon® E5-2620v3 (2.4GHz/6-core/15MB/85W) Processor Kit
HP BL460c Gen9 Intel® Xeon® E5-2623v3 (3GHz/4-core/10MB/105W) Processor Kit
HP BL460c Gen9 Intel® Xeon® E5-2609v3 (1.9GHz/6-core/15MB/85W) Processor Kit
HP BL460c Gen9 Intel® Xeon® E5-2603v3 (1.6GHz/6-core/15MB/85W) Processor Kit
HP BL460c Gen9 Intel® Xeon® E5-2650Lv3 (1.8GHz/12-core/30MB/65W) Processor Kit
HP BL460c Gen9 Intel® Xeon® E5-2698v3 (2.3GHz/16-core/40MB/135W) Processor Kit
HP BL460c Gen9 Intel® Xeon® E5-2630Lv3 (1.8GHz/8-core/20MB/55W) Processor Kit
HP BL460c Gen9 Intel® Xeon® E5-2695v3 (2.3GHz/14-core/35MB/120W) Processor Kit
HP BL460c Gen9 Intel® Xeon® E5-2637v3 (3.5GHz/4-core/15MB/135W) Processor Kit
HP BL460c Gen9 Intel® Xeon® E5-2697v3 (2.6GHz/14-core/35MB/145W) Processor Kit
HP BL460c Gen9 Intel® Xeon® E5-2667v3 (3.2GHz/8-core/20MB/135W) Processor Kit
HP BL460c Gen9 Intel® Xeon® E5-2643v3 (3.4GHz/6-core/20MB/135W) Processor Kit
HP BL460c Gen9 Intel® Xeon® E5-2699v3 (2.3GHz/18-core/45MB/145W) Processor Kit

Standard Features

NOTE: DIMM slots 4 and 5 are not accessible when either the E5-2699 v3, the E5-2697 v3, the E5-2643 v3, the E5-2637 v3, or the E5-2667 v3 is used. In a 2 processor configuration, there are twelve (12) total available DIMM slots.

NOTE: For the maximum supported memory speeds for each processor listed above, please reference the 'Memory Speed by Processor Model' table in the Memory section of the QuickSpecs.

NOTE: HT indicates that the processor model supports Intel® Hyper-Threading Technology.

NOTE: Turbo indicates the maximum potential frequency when using Intel® Turbo Boost Technology.

The frequency boost increment is dependent on the processor SKU and the number of active cores. In general, a higher boost increment is obtained when fewer cores are active.

NOTE: DDR4 speed is the maximum memory speed of the processor. Actual memory speed may depend on the quantity and type of DIMMs installed.

NOTE: Supports 1 or 2 processors. Mixing different processor models is not supported.

NOTE: For the Intel® C610 Chipset E5-2600 v3 Series, the letter preceding the model number indicates the Product Line (E3, E5, E7); 2600x, 2 = number of CPUs in a Node, 6 is socket/segment designation, 00 = Processor SKU, and x = L for low power SKUs.

NOTE: The BL460c Gen9 includes two I/O mezzanine expansion slots. A processor must be installed in processor slot 1 for access to the first mezzanine expansion slot (expansion slot 1). A processor must be installed in processor slot 2 for access to the second mezzanine expansion slot (expansion slot 2).

NOTE: All processors within the server must be identical.

NOTE: All processors support Intel® Hyper-Threading and Intel® Turbo Boost Technologies except the E5-2603 v3 and E5-2609 v3.

NOTE: The letter "L" following the model number indicates denotes lower wattage.

NOTE: The processor model as well as the memory configuration determines the maximum speed memory can operate. Please see the see the "Memory" section later in this document.

Cache Memory

One of the following depending on Model

45MB (1x45MB) L3 cache

NOTE: For Eighteen-core processors.

40MB (1x40MB) L3 cache

NOTE: For Sixteen-core processors.

35MB (1x35MB) L3 cache

NOTE: For Fourteen-core processors.

30MB (1x30MB) L3 cache

NOTE: For Twelve-core processors.

25MB (1x25MB) L3 cache

NOTE: For Ten-core processors.

20MB (1x20MB) L3 cache

NOTE: For Six or Eight-core processors.

15MB (1x15MB) L3 cache

NOTE: For Quad or Six-core processors.

10MB (1x10MB) L3 cache

NOTE: For Quad-core processors.

Chipset

Intel® C610 Series Chipset

Intel® E5-2600v3 Processor Family

NOTE: For more information regarding Intel chipsets, please see the following: <http://www.intel.com/products/server/chipsets/>.

Upgradeability

Upgradeable to two (2) processors

On System Management Chipset

HP iLO (Firmware: HP iLO Management)

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

Standard Features

Memory Protection

Advanced ECC
Memory Online Spare Mode (Rank Spare Mode)

Memory

One of the following depending on Model

| | |
|----------------------------------|---|
| Type | HP SmartMemory DDR4 Load Reduced (LRDIMM), or Registered (RDIMM) |
| Standard (Pre-configured Models) | 128GB (4 x 32GB) DDR4 2133MHz RDIMMs at 1.2V 64GB (4 x 16GB) DDR4 2133MHz RDIMMs at 1.2V 32GB (2 x 16GB) DDR4 2133MHz RDIMMs at 1.2V 32GB (2 x 16GB) DDR4 2133MHz RDIMMs at 1.2V 16GB (2 x 8GB) DDR4 2133MHz RDIMMs at 1.2V 16GB (2 x 8GB) DDR4 2133MHz RDIMMs at 1.2V |
| Maximum (LRDIMM) | 512GB (16 x 32GB) up to 2133MHz at 1.2V |
| Maximum (RDIMM) | 256GB (16 x 16GB) up to 2133MHz at 1.2V |

NOTE: HP memory from previous generation servers (DDR3) is not compatible with this server. HP SmartMemory is required to realize the memory performance improvements and enhanced functionality listed in this document for Gen9. For additional information, please see the HP SmartMemory QuickSpecs at:
<http://www8.hp.com/h20195/v2/GetHTML.aspx?docname=c04111535>

NOTE: LRDIMM and RDIMM are distinct memory technologies and cannot be mixed within a server.

NOTE: Depending on the memory configuration and processor model, the memory speed may run at 2133MHz, 1866MHz, or 1600MHz. Please see Memory Population Table or the Online Memory Configuration Tool at: <http://h22195.www2.hp.com/MemoryTool/Home/Legal>

Network Controller

One of the following depending on Model

One (1) 20Gb 2-port FlexFabric FLB, 10Gb 2-port HP FlexFabric FLB, or 10Gb 2-port Ethernet FLB

NOTE: Supports FCoE, TCP/IP offload engine, hardware-based accelerated iSCSI, iSCSI boot, and autosensing 10Gb/1Gb Ethernet.

NOTE: Each port is autosensing the speed, and can interoperate with 1Gb HP BladeSystem c-Class interconnect components. Both ports will operate at the same speed.

NOTE: FlexFabric capabilities require the use of an HP Virtual Connect FlexFabric module.

Fibre Channel over Ethernet (FCoE) is supported with HP interconnects. Learn more at:

<http://www.hp.com/go/bladessystem/interconnects>

One (1) HP FlexFabric 10Gb 2-port 536FLB FlexibleLOM

One (1) HP FlexFabric 20Gb 2-port 650FLB FlexibleLOM

NOTE: FlexibleLOMs are not compatible with prior generation c-Class server blades

Standard iLO Network Controller:

One (1) 10/100 Mbps port for the HP iLO 4 to Onboard Administrator link. The Onboard Administrator (with 10/100/1000 Mbps) to BladeSystem link is 1Gbps

Expansion Slots

Two (2) I/O expansion mezzanine slots:

- x16 PCIe 3.0 Type A (supports Type A mezzanine cards) (expansion slot 1).
NOTE: This expansion slot supports dual-port mezzanine cards: one port is routed to interconnect module bay 3 and the other to bay 4.
- x16 PCIe 3.0 Type B (supports Type A and Type B mezzanine cards) (expansion slot 2).
NOTE: This expansion slot supports dual-port and quad-port mezzanine cards. For dual-port cards, one port is routed to interconnect module bay 5 and the other to bay 6. For quad-port cards, one port is routed to interconnect module bay 5, one to bay 6, one to bay 7, and one to bay 8.
NOTE: A second processor must be installed (in processor slot 2) to have access to the second expansion slot (expansion slot 2).

Standard Features

Mezzanine card options include:

- Dual-port 20Gb FlexFabric, Dual-port 10Gb FlexFabric, 10GbE options, and quad-port 1Gb Ethernet server adapter mezzanine options for additional network ports.
- Dual-port 16Gb Fibre Channel HBA for SAN connectivity.
- QDR and FDR InfiniBand for low latency and high bandwidth server interconnectivity.
- I/O accelerator mezzanine options for high transaction rate local storage

HP Server ROM

HP ROM (read only memory) is now digitally signed using HP's Corporate Signing Service. This signature is verified before the flash process starts, reducing accidental programming and preventing malicious efforts to corrupt system ROM.

HP ROM provides for essential initialization and validation of hardware components before control is passed to the customer-installed operating system. The ROM also provides the capability of booting from various fixed media (HDD, CD-ROM) and removable media (USB), to continue operation to the operating system.

HP ROM performs very early configuration of the video controller, to allow monitoring of initialization progress via an attached monitor. If configuration or hardware errors are discovered during this early phase of hardware initialization, suitable messages are now displayed on the connected monitor. Additionally, these configuration or hardware errors are logged to the Integrated Management Log (IML) to assist in diagnosis.

HP's ProLiant ROM is used to configure the following:

- Processor and chipset status registers
- System memory, memory map, and memory initialization
- System hardware configuration (integrated PCI devices and optional PCIe cards).
- Customer-specific BIOS configuration using the HP ROM-Based Setup Utility (RBSU).

NOTE: For further information, please refer to HP's RBSU (ROM based setup utility) user guide: www.hp.com/support/rbsu

HP Server Unified Extensible Firmware Interface (UEFI) or Legacy Mode

HP's ProLiant System BIOS is an EDK2 UEFI solution, and adheres to the latest revisions of UEFI Class 2 specifications which supports both legacy boot and UEFI boot operation. The HP ProLiant BL460c Gen9 defaults to UEFI boot operation and can be factory or field configured for Legacy boot operation.

NOTE: For UEFI boot operation, boot environment and OS image installations should be configured properly to support UEFI.

NOTE: For more information on HP's ProLiant System BIOS and UEFI, see the UEFI Information Library: <http://www.hp.com/go/uefi/docs>.

NOTE: HP Legacy FIO Mode Setting (758959-B22) can be selected to configure the system in UEFI mode in the factory.

To modify the server configuration ROM default settings, press F9 in the HP ProLiant POST screen to enter the UEFI System Utilities screen. By default, the System Utilities menus are in the English language.

UEFI enables numerous new capabilities, including both industry standard functionality and features specific to HP ProLiant servers. Following are some of the features that UEFI enables and that the HP ProLiant BL460c Gen9 can support when configured for UEFI boot operation:

Standard Features

- Secure Boot - A new feature in which the system firmware, option card firmware, operating systems, and software collaborate to greatly enhance platform security.
- Operating system specific functionality - Microsoft Windows 2012 supports several features only when installed in UEFI mode.
- Support for > 2.2 TB (using GPT) boot drives - Such drives could previously only be used for boot drives when using RAID solutions such as HP Smart Array.
- UEFI Shell - Provides a pre-boot environment for running scripts and tools. The HP ProLiant UEFI Shell provides both standard capabilities as well as numerous enhancements.
- PXE boot support for IPv6 networks.
- PXE Multicast Boot allowing for faster PXE deployments for large numbers of servers.
- Boot support for option cards that only support a UEFI option ROM.

NOTE:

- When the server is configured for UEFI Boot Mode, PXE servers must be configured with a UEFI boot image.
- When the server boots in UEFI mode, it does not boot media with a legacy OS installation. This includes DOS targets and Windows or Linux systems installed in Legacy mode. The reverse is also true for servers that boot in Legacy mode.
- If Microsoft Windows 2008 or Windows 2008 R2 is used in UEFI Boot Mode, UEFI Optimized Mode must be disabled (this option is enabled by default). This is required to work around an issue in Windows 2008 / 2008 R2 that requires legacy BIOS components necessary for video operations in Windows.

Storage Controller **All Preconfigured Models** One (1) HP Smart Array P244br Controller with 1GB Flash-Backed Write Cache (FBWC) supporting RAID 0 and RAID 1, or HP H244br Smart HBA.

NOTE: The HP Smart Array P244br, the HP H244br Smart HBA, and the HP B140i (chipset SATA). Support two (2) small form factor (SFF) hot plug drive bays.

| | | | |
|--|-----------------------|-------|-----------|
| Maximum Internal Storage One of the following depending on Model | Hot Plug SFF SAS | 2.4TB | 2 x 1.2TB |
| | Hot Plug SFF SATA | 2.0TB | 2 x 1.0TB |
| | Hot Plug SFF SAS SSD | 3.2TB | 2 x 1.6TB |
| | Hot Plug SFF SATA SSD | 1.6TB | 2 x 800GB |

NOTE: The ProLiant BL460c Gen9 server includes the HP hot plug small form factor (SFF) SmartDrive carrier for enhanced management and reduced maintenance errors. HP drives from previous generation servers (prior to Gen8) are not compatible with the ProLiant BL460c Gen9 drive bays.

| | | |
|-------------------|-----------------|--|
| Interfaces | Micro SDHC Slot | One (1) internal Micro Secure Digital High Capacity (Micro SDHC) card slot |
| | USB 3.0 Port | One (1) internal USB 3.0 connector for USB flash media drive keys |

NOTE: The above options are intended for integrated hypervisor virtualization environments.

| | |
|-------------------------------------|--|
| Industry Standard Compliance | ACPI 2.0 |
| | Microsoft® Logo certifications |
| | USB 3.0 Support |
| | IPMI 2.0 |
| | Secure Digital 2.0 |
| | TPM 1.2 Support |
| | IEEE (specific IEEE standards depending on Ethernet adapter card(s) installed) |
| Advanced Encryption Standard (AES) | |

Standard Features

Triple Data Encryption Standard (3DES)
SNMP
SSL 2.0
DMTF Systems Management Architecture for Server Hardware Command Line Protocol (SMASH CLP)
Active Directory v1.0
PCIe 3.0
ASHRAE 3.0 (PUT in alphabetical order)
FIPS 140-2 Level-2 certification pending

Operating Systems and Virtualization Software Support for ProLiant Servers

[Microsoft Windows Server](#)
[Red Hat Enterprise Linux \(RHEL\)](#)
[SUSE Linux Enterprise Server \(SLES\)](#)
[Canonical Ubuntu](#)
[Oracle Solaris](#)
[VMware](#)
[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, please visit our Support Matrix at: <http://www.hp.com/go/ossupport> and our driver download page: <http://www.hp.com/support/BL460cGen9>

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 sixteen (16) ProLiant BL460c Gen9 servers plugged vertically.
- The HP BladeSystem c3000 rack enclosure is 6U high and holds up to eight (8) HP ProLiant BL460c Gen9 servers plugged horizontally.

Server blades, storage blades, interconnect modules, power supplies, fans, and redundant Onboard Administrator modules are all designed to fit into the c3000 and c7000 enclosures.

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

Graphics

Integrated Matrox G200eh video controller

- 1600 x 1200 (32 bpp)
- 1920 x 1200 (16 bpp)

HP iLO Management On System Management Memory

- 16 MB Flash Video Memory
- 256 MB DDR 3 with ECC (112 MB after ECC and video)

Form Factor

HP ProLiant BL460c Gen9 is a half-height server blade that plugs into the HP BladeSystem c3000 and c7000 enclosures.

Embedded Management **HP Integrated Lights Out** Monitor your servers for ongoing management, service alerting, reporting and remote management with iLO. Learn more at www.hp.com/go/ilo.

UEFI Configure and boot your servers securely with industry standard Unified

Standard Features

Extensible Firmware Interface (UEFI). Learn more at www.hp.com/go/ProLiant/uefi.

- HP RESTful API** RESTful API is an application programming interface. RESTful Web Service API served by iLO's web server. www.hp.com/go/restfulapi.
- Intelligent Provisioning** Provision servers by discovering and deploying 1 to few servers with Intelligent Provisioning. Learn more at www.hp.com/go/intelligentprovisioning.

Server Utilities

- HP Smart Update** Optimize firmware and driver updates with HP Smart Update solutions. Learn more at www.hp.com/go/smartupdate.
- HP Systems Insight Manager (HP SIM)** HP SIM allows you to monitor the health of your HP ProLiant Servers and HP Integrity Servers, and also provides you with basic support for non-HP servers. HP SIM also integrates with HP SUM to provide quick and seamless firmware updates. Learn more at www.hp.com/go/sim
- Scripting Tool Kit and Windows PowerShell** Provision 1 to many servers using your own scripts to discover and deploy them with HP Scripting Tool Kit for Windows and Linux or HP Scripting Tools for Windows PowerShell. Learn more at www.hp.com/go/ProLiantSTK or www.hp.com/go/powershell.
- HP RESTful Interface Tool** HP RESTful API tool is a scripting tool to provision servers using RESTful API Interface to discover and deploy servers at scale. Learn more at www.hp.com/go/restfulapi
- HP iLO Mobile Application** Enables the ability to access, deploy, and manage your server anytime from anywhere from select smartphones and mobile devices. For additional information please visit: www.hp.com/go/ilo/mobileapp
- HP Insight Online** HP Insight Online, available at no additional cost as part of your HP warranty, Care Pack or contractual support agreement with HP, is a personalized dashboard for simplified tracking of IT operations and support information from anywhere, anytime. Learn more at www.hp.com/go/insightonline/info.

Security

- Power-on password
- Administrator's password
- Keyboard password (QuickLock)
- HP iLO Management On System Management Chipset with:
 - 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
- External USB port enable/disable
- Network server mode
- Serial interface control
- TPM (Trusted Platform Module) 1.2 option
- Advanced Encryption Standard (AES)
- Intel® Advanced Encryption Standard-New Instructions (AES-NI)
- FIPS 140-2 Level-2 certification pending

Standard Features

Availability

Memory

- Advanced ECC uses single device data correction (SDDC) to detect and correct single and all multi-bit error that occurs within a single DRAM chip. Both x4 and x8 SDDC are supported (x8 requires lockstep mode).
- Memory online spare mode (also known as rank spare mode) detects a rank that is degrading and switches operation to the spare rank.
- Memory demand and patrol scrubbing to prevent accumulation of correctable errors and reducing the likelihood of unplanned downtime.
- Failed DIMM isolation improves the service time thus improving the overall system availability.
- Address parity protection available on RDIMMs and LRDIMMs detects address bit errors to improve service time and overall system availability.

Mezzanine options and I/O

- Support for one (1) FlexibleLOM, providing two (2) (i.e. redundant) Ethernet ports
- Multiple mezzanine I/O expansion slots that support a wide variety of mezzanine cards each supporting multiple data paths routed to redundant interconnect modules.
- Network Adapter Teaming (bonding) provides network fault tolerance, transmit load balancing, and switch-assisted load balancing.

Storage

- Two (2) Small Form Factor hot-plug SAS/SATA HDD or SSD drive bays.
- Choice of the HP Smart Array P244br Controller with 1GB FBWC/HP, Smart HBA H244br, or the HP B140i (chipset SATA). RAID 0 and 1 support for all three storage controller offerings.
- Optional dual-port Fibre Channel mezzanine card(s) for redundant SAN connections.

Processor/Chipset

- Processor internal sensors & thermal control protection against over-temperature conditions.
- Cache parity/ECC protects cache data from accidental data corruption.
- Machine Check Architecture (MCA) detects and captures hardware errors such as system bus, memory ECC, parity, and cache, and improves service time.
- Intel® QPI Protocol Protection allows detection of data errors using a checksum of 8-bits.
- Core Disable for FRB (fault resilient boot) allows a system to power-on despite a failing core-pair. It uses BIST (built-in self-test) results to detect a failure and disables the target core-pair upon subsequent boot.

Server Blade Enclosure Infrastructure

- Pooled power for true N+N power redundancy through up to six (6) hot-plug, high-efficiency, common slot enclosure-based power supplies (configuration dependent).
- Up to ten (10) enclosure-based hot-plug HP Active Cool fans that scale to meet future demands, optimize airflow, reduce power draw, and improve acoustic performance.
- Dual grid power providing redundant rack enclosure power feeds to the server blade enclosure.
- HP Dynamic Power Saver Mode monitors the total enclosure power consumption in real time and automatically adjusts with change in demand for improved efficiency and reliability. HP Dynamic Power Capping safely limits power usage without impacting performance by capping peak usage instead of average power usage, removes risk to electrical infrastructure with a

Standard Features

fast-acting, hardware-based capping algorithm, and reclaims more power by dynamically controlling power limits based on workload demand.

- Up to eight interconnect modules per server blade enclosure providing four simultaneous redundant fabrics for FlexFabric, Virtual Connect Ethernet, Fibre Channel, InfiniBand, Pass Thru Ethernet, etc.
- Enclosure crosslinks between adjacent enclosures to provide interconnect module-to-module connections or as Virtual Connect module stacking links.
- Optional enclosure redundant Onboard Administrator system management module.

Warranty

This product is covered by a global limited warranty and supported by HP Services and a worldwide network of HP Authorized Channel Partners. 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. Certain restrictions and exclusions apply. Hard drives have either a one year or three year warranty; refer to 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>.

Optional Features

Fibre Channel Support Up to two (2) optional Fibre Channel mezzanine HBAs are supported on the HP ProLiant BL460c Gen9.

Compatible SAN HP ProLiant BL460c Gen9 server blades are optimized for HP MSA, EVA and XP.

HP ProLiant BL460c Gen9 server blades are compatible with select 3rd party SANs. Please see blade storage page for more details at <http://h18004.www1.hp.com/products/blades/components/c-class-sans.html>.

HP Virtual Connect HP Virtual Connect is an interconnect option for **c-Class** BladeSystem that simplifies server connectivity to data and storage networks, and reduces costs. Unique HP Flex-10 technology makes maximum use of network bandwidths, provide dynamic tuning and enable extreme flexibility to meet individual server and infrastructure requirements by allocating up to 4 network connections per server port. Virtual Connect FlexFabric modules extend those capabilities to allocate one function per port to storage connections (FCoE).

HP OneView's software-defined approach to infrastructure management enables central console to administer network connections and workloads for thousands of servers, see hp.com/go/oneview

For more information on Virtual Connect Ethernet, Fibre Channel, Converged Network and management options, see <http://www.hp.com/go/virtualconnect>.

| | | |
|--------------------------|---|---|
| Server Management | HP Insight Control | HP Insight Control, lets you deploy, migrate, monitor, remote control, and optimize your IT infrastructure through a single, simple management console. For more information, see http://www.hp.com/go/insightcontrol . |
| | iLO Advanced for BladeSystem | HP iLO Advanced for BladeSystem licenses offer smart remote functionality without compromise, for all HP ProLiant servers. The license includes the full integrated remote console, virtual keyboard, video, and mouse (KVM), multi-user collaboration, console record and replay, and GUI-based and scripted virtual media and virtual folders. You can also activate the enhanced security and power management functionality. Learn more about HP iLO Advanced at www.hp.com/go/iloadvanced |
| | HP OneView | Powerful converged management of servers, storage, and network for IT service automation and infrastructure simplicity, see www.hp.com/go/oneview . |
| | HP Matrix Operating Environment | The HP Matrix Operating Environment (Matrix OE) for ProLiant and Integrity servers is an integrated command center that helps you instantly adjust to dynamic business demands. This advanced infrastructure management software lets you reduce the cost of common data center tasks by up to 40 percent while keeping pace with your changing business. The HP Matrix OE includes the automated provisioning, optimization, and recovery management capabilities for HP CloudSystem Matrix, the ideal platform for private cloud and Infrastructure as a Service (IaaS). NOTE: For more information, visit: http://www.hp.com/go/matrixoe |
| | HP Insight Cluster Management Utility (CMU) | HP Insight Cluster Management Utility is a Hyperscale management framework that includes software for the centralized provisioning, management and monitoring of nodes and infrastructure. Learn more at www.hp.com/go/cmu . |

Optional Features

High Performance Clusters

HP Cluster Platforms

HP Cluster Platforms are specifically engineered, factory-integrated large-scale ProLiant clusters optimized for High Performance Computing, with a choice of servers, networks and software. Operating system options include specially priced offerings for Red Hat Enterprise Linux and SUSE Linux Enterprise Server, as well as Microsoft Windows HPC Server. A Cluster Platform Configurator simplifies ordering. <http://www.hp.com/go/clusters>

HP HPC Interconnects

High Performance Computing (HPC) interconnect technologies are available for this server as part of the HP Cluster Platform portfolio. These high-speed InfiniBand and Gigabit interconnects are fully supported by HP when integrated within an HP cluster. Flexible, validated solutions can be defined with the help of configuration tools. <http://www.hp.com/techservers/clusters/ucp/index.html>

Storage Software

Whether you need to solve a specific data protection, archiving, or storage command and control challenge, or deliver on strategic consolidation, compliance, or continuity initiatives, look no further than HP storage software. Our storage software helps you reduce costs, simplify storage infrastructure, protect vital assets and respond faster to business opportunities.

Storage software that gets the job done:

- **Data Protection and Recovery Software**
Whether you're a large enterprise or a smaller business, HP data protection and recovery software will cost-effectively protect you against disaster and ensure business continuity.
- **Data Archive and Migration Software**
HP's storage software enables you to comply with data retention and retrieval requirements, improve application performance, and reduce costs by efficiently migrating infrequently accessed or less valuable data to lower cost storage.
- **Storage Resource Management Software (SRM)**
HP's storage resource management software reduces operational costs and provides the command and control foundation you need to efficiently manage and visualize your physical and virtual environments.
- **Data Replication Software**
HP offers array-based and host-based replication software for use in disaster recovery, testing, application development and reporting.
- **Storage Device Management Software**
Maximize your investment in HP storage and networking with software that enables hardware-specific configuration, performance tuning and connectivity management.
- **HP StoreVirtual VSA**
HP StoreVirtual VSA allows you to create fully featured shared storage on a VMware vSphere or Microsoft Hyper-V virtualized server. This server model starting November 2013, includes a limited license for HP StoreVirtual VSA software with 1TB of capacity. To download the license key and StoreVirtual VSA software, visit: www.hp.com/go/unlockVSA.
NOTE: You will need your server serial number in order to complete the registration form. Fully functional, capacity-based licenses are available in 4TB, 10T and 50TB sizes. For more information and access to the 60-day free trial, visit: www.hp.com/go/tryVSA

NOTE: For more information available Storage Software including QuickSpecs, please see: www.hp.com/go/storage/software.

HP Insight Online

HP Insight Online is a new addition to the HP Support Center for one stop, secure access to product and HP support information personalized to your IT environment. Insight Online can automatically display devices remotely monitored by HP Insight Remote Support. With Insight Online's easy navigation you can efficiently track your IT support contracts and device status from anywhere and at any time. <http://www.hp.com/go/insightonline>

Optional Features

HP Proactive Insight experience Prevent problems with innovative, automated monitoring tools and proactive services. The HP Proactive Insight experience consist of using Insight Online, Insight Remote Support, and Proactive Care Support Service as one integrated solution. The Proactive Insight experience provides you with expert advice and personalized, cloud-based automated IT support, helping to prevent unplanned down time and solve problems quickly. For more information, visit: www.hp.com/go/proactiveinsightexperience

Expansion Blade Support Supports one (1) optional tape blade.

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.html>

HP Simple Configurator SCE is a guided self-service tool to help sales and non-technical people provide customers with initial configurations in 3 to 5 minutes. You may then send the configuration on for configuration help, or use in your existing ordering processes. If you require "custom" rack configuration or configuration for products not available in SCE, please contact HP's Customer Business Center or an Authorized Partner for assistance. <http://www.hp.com/products/configurator>

Service and Support

Service and Support

HP Technology Services for Industry Standard Servers and BladeSystem

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

Protect your business beyond warranty with HP Care Pack Services

HP Care Pack services offer complete care and support expertise with committed response choices designed to meet your IT and business needs.

HP Foundation Care services offer scalable reactive support-packages for HP industry-standard servers and software. You can choose the type and level of service that is most suitable for your IT and business needs. HP Proactive Care delivers high levels of system availability through proactive service management and advanced technical response.

Service and Support

Service and Support

HP Technology Services for HP BL460c Blade Servers

Utilize HP Technology Services consulting and support to help reap the benefits of today's server technology as you successfully deploy and operate new IT with minimal disruption to your current environment. HP Technology Services delivers confidence, reduces risk and helps customers realize agility and stability.

Connect to HP to help prevent problems and solve issues faster. Our support technology lets you to tap into the knowledge of millions of devices and thousands of experts to stay informed and in control, anywhere, any time.

Protect your business beyond warranty with HP Care Pack Services

HP Care Pack Services enable you to order the right level of service as you purchase your hardware. Choose three or more years of your desired level of support, then select the response time and coverage window to meet your service level and budget needs.

Service and Support

Recommended Support Services for BL460

Optimized Support recommendation

HP Proactive Care Advanced - 24x7 coverage, three year Care Pack Service

Achieve a higher return on your product investment with the personal attention from a locally assigned Account Support Manager who delivers recommendations designed to improve availability and performance. Leverage your system's ability to connect to HP for automated problem detection and rapid critical event management to increase stability and reduce unplanned downtime. This recommendation provides 24x7 coverage with four-hour response for hardware and two-hour callback for supported software. Collaborative call management comes with Proactive Care Advanced or you may choose full support from HP where we own all cases through to resolution. HP is a leading provider of support services for most operating systems used on HP BladeSystems with long, successful partnerships with vendors such as Microsoft, Red Hat, VMware, SUSE and others. Purchasing software support from HP simplifies troubleshooting and shortens time to resolution with one call for hardware or software questions.

HP ProLiant Blade Server Hardware Installation

This easy-to-buy, easy-to-use HP Care Pack service helps ensure your new HP BladeSystem hardware is installed smoothly, efficiently and with minimal disruption to your IT and business operations.

www.hp.com/services/ bladesystems services

Standard Support recommendation

HP Proactive Care - 24x7 coverage, three year Care Pack Service

This service helps prevent problems and stabilize IT by utilizing secure, real-time, predictive analytics and proactive consultations when your products are connected to HP. It combines three years' proactive reporting and advice with 24x7 four hour response coverage and enhanced escalation management. It also includes collaborative call management with two hour call back on software questions to reduce troubleshooting on hardware and industry leading software.

<http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA3-8855ENW.pdf>

HP ProLiant Blade Server Hardware Installation

This easy-to-buy, easy-to-use HP Care Pack service helps ensure your new HP BladeSystem hardware is installed smoothly, efficiently and with minimal disruption to your IT and business operations.

www.hp.com/services/ bladesystems services

Related Services

Data Center Platform Consulting Services

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

www.hp.com/services/ consulting

Service and Support

Data Privacy Services

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

www.hp.com/services/dataprivacy

Factory Express for Servers and storage

HP Factory Express offers configuration, customization, integration and deployment services for HP servers and storage products. Choose how your factory solutions are built, tested, integrated, shipped and deployed. <http://www.hp.com/go/factory-express>

Additional hardware Installation services for HP BladeSystem In addition to hardware installation of your Blade server, HP offers installation and startup services for your BladeSystem and Network infrastructure.

www.hp.com/services/bladesystems-services

HP Foundation Care

Hardware and software support services provide easy connection to HP to resolve support issues quickly. Includes collaborative call management for industry leading software; full software support may also be purchased, giving you one place to call for help.

www.hp.com/services/foundationcare

Parts and Materials

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

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

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

Pre-configured Models

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

NOTE: Pre-configured models ship with the configurations below. Options can be selected from the Core or Additional options section of this QuickSpecs.

NOTE: HP does not allow factory integration of options into pre-configured models. Any additional options purchased will be shipped separately.

NOTE: If you desire a custom configuration please see "Configuration Information - Factory Integrated Models" section of this QuickSpecs.

NOTE: All Pre-configured Models come populated with some hard drive blanks installed.

E5-2600 v3 series Processors

| | | |
|--|---|---|
| HP ProLiant BL460c Gen9 E5-2609 v3 1P 16GB-R H244br Server 727026-B21 | Processor(s) Cache Memory Memory Network Controller Storage Controller Hard Drive Internal Storage Optical Drive Bay Expansion Slots Management Form Factor Warranty | (1) Intel® Xeon® E5-2609 v3 (1.9GHz/6-core/15MB/6.4GT-s QPI/85W, DDR4-1600) 15MB (1x15MB) Level 3 cache 16GB (2x 8GB) PC4-2133P-R (DDR4-2133) Registered DIMMS at 1.2V) NOTE: Total of 16 DIMM slots. HP FlexFabric 10Gb 2-port 536FLB FlexibleLOM HP Smart HBA H244br Controller with RAID 0,1 None ship standard Supports up to two (2) HP hot-plug SFF SAS/SATA/SDD drives SAS: 2.4TB; SATA: 2.0TB; SAS SSD: 3.2TB; SATA SSD: 1.6TB None 2 standard - Slot 1 supports Type A mezzanine Cards. Slot 2 supports Type A and Type B mezzanine cards. HP iLO Management (standard) Optional: HP OneView or HP Insight Control Up to eight (8) half-height blades supported in the HP BladeSystem c3000 Enclosure Up to sixteen (16) half-height blades supported in HP BladeSystem c7000 Enclosure Server warranty includes 3-year Parts, 3-year Labor, 3-year on-site support. |
|--|---|---|

| | | |
|--|--|--|
| HP ProLiant BL460c Gen9 E5-2620 v3 1P 16GB-R H244br Server 727027-B21 | Processor(s) Cache Memory Memory Network Controller Storage Controller Hard Drive Internal Storage Optical Drive Bay Expansion Slots Management Form Factor | (1) Intel® Xeon® E5-2620 v3 (2.40GHz/6-core/15MB/8.0GT-s QPI/85W, DDR4-1866, HT, Turbo2) 15MB (1x15MB) Level 3 cache 16GB (2x 8GB) PC4-2133P-R (DDR4-2133) Registered DIMMS at 1.2V) NOTE: Total of 16 DIMM slots. HP FlexFabric 10Gb 2-port 536FLB FlexibleLOM HP Smart HBA H244br Controller with RAID 0,1 None ship standard Supports up to two (2) HP hot-plug SFF SAS/SATA/SDD drives SAS: 2.4TB; SATA: 2.0TB; SAS SSD: 3.2TB ; SATA SSD: 1.6TB None 2 standard - Slot 1 supports Type A mezzanine Cards. Slot 2 supports Type A and Type B mezzanine cards. HP iLO Management (standard) Optional: HP OneView or HP Insight Control Up to eight (8) half-height blades supported in the HP BladeSystem c3000 |
|--|--|--|

Pre-configured Models

| | | |
|---|---------------------------|---|
| | | Enclosure Up to sixteen (16) half-height blades supported in HP BladeSystem c7000 Enclosure |
| | Warranty | Server warranty includes 3-year Parts, 3-year Labor, 3-year on-site support. |
| HP ProLiant BL460c Gen9 E5-2640 v3 1P 32GB-R P244br/1GB FBWC Server 727028-B21 | Processor(s) | (1) Intel® Xeon® E5-2640 v3 (2.6GHz/8-core/20MB/8.0GT-s QPI/95W, DDR4-1866, HT, Turbo2) |
| | Cache Memory | 20MB (1x20MB) Level 3 cache |
| | Memory | 32GB (2x 16GB) PC4-2133P-R (DDR4-1866 Registered DIMMs at 1.2V) NOTE: Total of 16 DIMM slots. Only eight (8) usable with single processor. |
| | Network Controller | HP FlexFabric 10Gb 2-port 536FLB FlexibleLOM |
| | Storage Controller | HP Smart Array P244br Controller with 1GB FBWC RAID 0,1 |
| | Hard Drive | None ship standard Supports up to two (2) HP hot-plug SFF SAS/SATA/SDD drives |
| | Internal Storage | SAS: 2.4TB; SATA: 2.0TB; SAS SSD: 3.2TB; SATA SSD: 1.6TB |
| | Optical Drive Bay | None |
| | Expansion Slots | 2 standard - Slot 1 supports Type A mezzanine Cards. Slot 2 supports Type A and Type B mezzanine cards. |
| | Management | HP iLO Management (standard) Optional: HP OneView or HP Insight Control |
| | Form Factor | Up to eight (8) half-height blades supported in the HP BladeSystem c3000 Enclosure Up to sixteen (16) half-height blades supported in HP BladeSystem c7000 Enclosure |
| | Warranty | Server warranty includes 3-year Parts, 3-year Labor, 3-year on-site support. |
| HP ProLiant BL460c Gen9 E5-2650 v3 1P 32GB-R P244br/1GB FBWC Server 727029-B21 | Processor(s) | (1) Intel® Xeon® E5-2650 v3 (2.3GHz/10-core/25MB/9.6GT-s QPI/105W, DDR4-2133, HT, Turbo2) |
| | Cache Memory | 25MB (1x25MB) Level 3 cache |
| | Memory | 32GB (2x 16GB) PC4-2133P-R (DDR4-2133 Registered DIMMs at 1.2V) NOTE: Total of 16 DIMM slots. Only eight (8) usable with single processor. |
| | Network Controller | HP FlexFabric 10Gb 2-port 536FLB FlexibleLOM |
| | Storage Controller | HP Smart Array P244br Controller with 1GB FBWC RAID 0,1 |
| | Hard Drive | None ship standard Supports up to two (2) HP hot-plug SFF SAS/SATA/SDD drives |
| | Internal Storage | SAS: 2.0TB; SATA: 2.0TB; SAS SSD: 3.2TB; SATA SSD: 1.6TB |
| | Optical Drive Bay | None |
| | Expansion Slots | 2 standard - Slot 1 supports Type A mezzanine Cards. Slot 2 supports Type A and Type B mezzanine cards. |
| | Management | HP iLO Management (standard) Optional: HP OneView or HP Insight Control |
| | Form Factor | Up to eight (8) half-height blades supported in the HP BladeSystem c3000 Enclosure Up to sixteen (16) half-height blades supported in HP BladeSystem c7000 Enclosure |
| | Warranty | Server warranty includes 3-year Parts, 3-year Labor, 3-year on- |

Pre-configured Models

| | | site support. |
|---|--|---|
| HP ProLiant BL460c Gen9 E5-2660 v3 2P 64GB-R P244br/1GB FBWC Server 727030-B21 | Processor(s) | (2) Intel® Xeon® E5-2660 v3 (2.6GHz/10-core/25MB/9.6GT-s QPI/105W, DDR4-2133, HT, Turbo2) |
| | Cache Memory | 25MB (1x25MB) Level 3 cache |
| | Memory | 64GB (4x 16GB) PC4-2133P-R (DDR4-2133 Registered DIMMs at 1.2V) NOTE: Total of 16 DIMM slots. Only eight (8) usable with single processor. |
| | Network Controller | HP FlexFabric 20Gb 2-port 650FLB FlexibleLOM |
| | Storage Controller | HP Smart Array P244br Controller with 1GB FBWC RAID 0,1 |
| | Hard Drive | None ship standard Supports up to two (2) HP hot-plug SFF SAS/SATA/SDD drives |
| | Internal Storage | SAS: 2.0TB; SATA: 2.0TB; SAS SSD: 3.2TB; SATA SSD 1.6TB |
| | Optical Drive Bay | None |
| | Expansion Slots | 2 standard - Slot 1 supports Type A mezzanine Cards. Slot 2 supports Type A and Type B mezzanine cards. |
| | Management | HP iLO Management (standard) Optional: HP OneView or HP Insight Control |
| | Form Factor | Up to eight (8) half-height blades supported in the HP BladeSystem c3000 Enclosure Up to sixteen (16) half-height blades supported in HP BladeSystem c7000 Enclosure |
| | Warranty | Server warranty includes 3-year Parts, 3-year Labor, 3-year on-site support. |
| | HP ProLiant BL460c Gen9 E5-2670 v3 2P 128GB-L P244br/1GB FBWC Server 727031-B21 | Processor(s) |
| Cache Memory | | 30MB (1x130MB) Level 3 cache |
| Memory | | 128GB (4x 32GB) PC4-2133P-L (DDR4-2133) Registered DIMMs at 1.2V NOTE: Total of 16 DIMM slots. Only eight (8) usable with single processor. |
| Network Controller | | HP FlexFabric 20Gb 2-port 650FLB FlexibleLOM |
| Storage Controller | | Smart Array P244br Controller with 1GB FBWC RAID 0,1 |
| Hard Drive | | None ship standard Supports up to two (2) HP hot-plug SFF SAS/SATA/SDD drives |
| Internal Storage | | SAS: 2.4TB; SATA: 2.0TB; SAS SSD: 3.2TB; SATA SSD: 1.6TB |
| Optical Drive Bay | | None |
| Expansion Slots | | 2 standard - Slot 1 supports Type A mezzanine Cards. Slot 2 supports Type A and Type B mezzanine cards. |
| Management | | HP iLO Management (standard) Optional: HP OneView or HP Insight Control |
| Form Factor | | Up to eight (8) half-height blades supported in the HP BladeSystem c3000 Enclosure Up to sixteen (16) half-height blades supported in HP BladeSystem c7000 Enclosure |
| Warranty | | Server warranty includes 3-year Parts, 3-year Labor, 3-year on-site support. |

Configuration Information - Factory Integrated Models

NOTE: This section lists some of the steps required to configure a Factory Integrated Model (configure-to-order or CTO server). To ensure only valid configurations are ordered, HP recommends the use of an HP approved configurator. Contact your local sales representative for information on CTO product offerings and requirements.

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

NOTE: FIO indicates that this option is only available as a factory installable option.

NOTE: All Factory Integrated Models will be populated with sufficient hard drive blanks based on the number of initial hard drives ordered with the server.

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

| | | |
|---------------|---|------------|
| Models | HP ProLiant BL460c Gen9 E5-v3 10Gb/20Gb FlexibleLOM Configure-to-order Blade Server | 727021-B21 |
| | Configurable Models ship with: | |
| | One (1) FlexibleLOM connector providing a choice for one (1) of the supported 10Gb/20Gb FlexibleLOMs (see Step 2) | |
| | Two (2) HP small form factor hot-plug SAS/SATA/ HDD or SSD hard drive bays | |
| | Two (2) x16 PCIe I/O expansion slots (one Type A, one Type A/B) | |
| | One (1) integrated USB connector and one (1) MicroSDHC connector | |
| | One (1) TPM connector | |
| | HP iLO Management (standard) | |

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

| | | |
|----------------------|--|------------|
| HP Processors | NOTE: All FIO processor kits (i.e. xxxxxx-L21) contain one (1) processor. | |
| | NOTE: If two processors are desired, select one xxxxxx-L21 here in Step 2 and one xxxxxx-B21 in Step 4. | |
| | E5-2600 v3 series Processors | |
| | HP BL460c Gen9 Intel® Xeon® E5-2690v3 (2.6GHz/12-core/30MB/135W) FIO Processor Kit | 726987-L21 |
| | HP BL460c Gen9 Intel® Xeon® E5-2680v3 (2.5GHz/12-core/30MB/120W) FIO Processor Kit | 726988-L21 |
| | HP BL460c Gen9 Intel® Xeon® E5-2670v3 (2.3GHz/12-core/30MB/120W) FIO Processor Kit | 726989-L21 |
| | HP BL460c Gen9 Intel® Xeon® E5-2660v3 (2.6GHz/10-core/25MB/105W) FIO Processor Kit | 726990-L21 |
| | HP BL460c Gen9 Intel® Xeon® E5-2650v3 (2.3GHz/10-core/25MB/105W) FIO Processor Kit | 726991-L21 |
| | HP BL460c Gen9 Intel® Xeon® E5-2640v3 (2.6GHz/8-core/20MB/90W) FIO Processor Kit | 726992-L21 |
| | HP BL460c Gen9 Intel® Xeon® E5-2683v3 (2GHz/14-core/35MB/120W) FIO Processor Kit | 726993-L21 |
| | HP BL460c Gen9 Intel® Xeon® E5-2630v3 (2.4GHz/8-core/20MB/85W) FIO Processor Kit | 726994-L21 |
| | HP BL460c Gen9 Intel® Xeon® E5-2620v3 (2.4GHz/6-core/15MB/85W) FIO Processor Kit | 726995-L21 |
| | HP BL460c Gen9 Intel® Xeon® E5-2623v3 (3GHz/4-core/10MB/105W) FIO Processor Kit | 726996-L21 |
| | HP BL460c Gen9 Intel® Xeon® E5-2609v3 (1.9GHz/6-core/15MB/85W) FIO Processor Kit | 726997-L21 |
| | HP BL460c Gen9 Intel® Xeon® E5-2685v3 (2.6GHz/12-core/30MB/120W) FIO Processor Kit | 726998-L21 |
| | HP BL460c Gen9 Intel® Xeon® E5-2603v3 (1.6GHz/6-core/15MB/85W) FIO Processor Kit | 726999-L21 |
| | HP BL460c Gen9 Intel® Xeon® E5-2650Lv3 (1.8GHz/12-core/30MB/65W) FIO Processor Kit | 727000-L21 |
| | HP BL460c Gen9 Intel® Xeon® E5-2698v3 (2.3GHz/16-core/40MB/135W) FIO Processor Kit | 727001-L21 |
| | HP BL460c Gen9 Intel® Xeon® E5-2630Lv3 (1.8GHz/8-core/20MB/55W) FIO Processor Kit | 727002-L21 |
| | HP BL460c Gen9 Intel® Xeon® E5-2695v3 (2.3GHz/14-core/35MB/120W) FIO Processor Kit | 727003-L21 |
| | HP BL460c Gen9 Intel® Xeon® E5-2637v3 (3.5GHz/4-core/15MB/135W) FIO Processor Kit | 765268-L21 |
| | HP BL460c Gen9 Intel® Xeon® E5-2697v3 (2.6GHz/14-core/35MB/145W) FIO Processor Kit | 767049-L21 |
| | HP BL460c Gen9 Intel® Xeon® E5-2667v3 (3.2GHz/8-core/20MB/135W) FIO Processor Kit | 773123-L21 |
| | HP BL460c Gen9 Intel® Xeon® E5-2643v3 (3.4GHz/6-core/20MB/135W) FIO Processor Kit | 773124-L21 |
| | HP BL460c Gen9 Intel® Xeon® E5-2699v3 (2.3GHz/18-core/45MB/145W) FIO Processor Kit | 779795-L21 |

Configuration Information - Factory Integrated Models

NOTE: DIMM slots 4 and 5 are not accessible when either the E5-2699 v3, the E5-2697 v3, the E5-2643 v3, the E5-2637 v3, or the E5-2667 v3 is used. In a 2 processor configuration, there are twelve (12) total available DIMM slots.

NOTE: For the maximum supported memory speeds for each processor listed above, please reference the 'Memory Speed by Processor Model' table in the Memory section of the QuickSpecs.

NOTE: HT indicates that the processor model supports Intel® Hyper-Threading Technology.

NOTE: Turbo indicates the maximum potential frequency when using Intel® Turbo Boost Technology. The frequency boost increment is dependent on the processor SKU and the number of active cores. In general, a higher boost increment is obtained when fewer cores are active.

NOTE: DDR4 speed is the maximum memory speed of the processor. Actual memory speed may depend on the quantity and type of DIMMs installed.

NOTE: Supports 1 or 2 processors. Mixing different processor models is not supported.

NOTE: For the Intel® C610 Chipset E5-2600 v3 Series, the letter preceding the model number indicates the Product Line (E3, E5, E7); 2600x, 2 = number of CPUs in a Node, 6 is socket/segment designation, 00 = Processor SKU, and x = L for low power SKUs.

NOTE: The BL460c Gen9 includes two I/O mezzanine expansion slots. A processor must be installed in processor slot 1 for access to the first mezzanine expansion slot (expansion slot 1). A processor must be installed in processor slot 2 for access to the second mezzanine expansion slot (expansion slot 2).

NOTE: All processors within the server must be identical.

NOTE: All processors support Intel® Hyper-Threading and Intel® Turbo Boost Technologies except the E5-2603 v3 and E5-2609 v3.

NOTE: The letter "L" following the model number indicates denotes lower wattage.

NOTE: The processor model as well as the memory configuration determines the maximum speed memory can operate. Please see the see the "Memory" section later in this document.

HP Memory

NOTE: HP memory from previous generation servers (DDR3) is not compatible with this server. HP SmartMemory is required to realize the memory performance improvements and enhanced functionality listed in this document for Gen9. For additional information, please see the HP SmartMemory QuickSpecs at: <http://www8.hp.com/h20195/v2/GetHTML.aspx?docname=c04111535>

NOTE: LRDIMM and RDIMM are distinct memory technologies and cannot be mixed within a server.

NOTE: Depending on the memory configuration and processor model, the memory speed may run at 2133MHz, 1866MHz, or 1600MHz. Please see Memory Population Table or the Online Memory Configuration Tool at: <http://h22195.www2.hp.com/MemoryTool/Home/Legal>

HP SmartMemory

Registered DIMMs (RDIMMs) - E5-2600 v3 series Processors

HP 8GB (1x8GB) Single Rank x4 PC4-2133P-R (DDR4-2133) Registered 726718-B21

HP 16GB (1x16GB) Dual Rank x4 PC4-2133P-R (DDR4-2133) Registered 726719-B21

Load Reduced DIMMs (LRDIMMs) - E5-2600 v3 series Processors

HP 32GB (1x32GB) Quad Rank x4 PC4-2133P-L (DDR4-2133) Load Reduced 726722-B21

NOTE: All DDR4 memory option kits consist of one DIMM per kit. For detailed memory configuration rules and guidelines, please use the Online DDR4 Memory Configuration Tool.

NOTE: Depending on the memory configuration and processor model, 2133MHz memory may operate at a lower speed. Please see the see the "Memory" section later in this document for details.

NOTE: For additional memory rules and guidelines, see the "Memory" section later in this document.

NOTE: For more information on ProLiant Energy Efficient Features, see: www.hp.com/go/proliant-energy-efficient

HP Networking

FlexibleLOM Adapters

NOTE: The server requires one (1) FlexibleLOM that is installed in the FlexibleLOM connectors. All FlexibleLOMs are dual port: One port is routed to interconnect module bay 1 and the other to bay 2.

Configuration Information - Factory Integrated Models

20Gb FlexibleLOM Adapters

| | |
|--|------------|
| HP FlexFabric 20Gb 2-port 630FLB FIO Adapter | 700066-B21 |
| HP FlexFabric 20Gb 2-port 650FLB FIO Adapter | 700764-B21 |

10Gb FlexibleLOM Adapters

| | |
|--|------------|
| HP FlexFabric 10Gb 2-port 536FLB FIO Adapter | 766491-B21 |
| HP Ethernet 10Gb 2-port 560FLB FIO Adapter | 684214-B21 |

NOTE: Please see the QuickSpecs for Technical Specifications and additional information:
www.hp.com/go/ProLiantNICs

Step 3: Choose Additional Factory Integration Options

| | | |
|---|--|------------|
| HP Insight Software | HP Insight Control including 1yr 24x7 Support ProLiant ML/DL/BL-bundle Single Server FIO License | C6N36A |
| Converged Infrastructure Management Software | HP OneView with iLO Advanced - Server hardware required on same purchase order | |
| | HP OneView incl 3yr 24x7 Supp FIO Bundle 1 Svr E-LTU | E5Y43AAE |
| | HP OneView for Blade Server incl 3yr 24x7 Supp FIO Bundle Physical 1 Svr Lic | F6Q89A |
| | HP OneView for Blade Server incl 3yr 24x7 Supp FIO Bundle 1 Svr E-LTU | F6Q89AAE |
| HP Storage Controllers | HP Smart Array P244br Controller FIO Kit | 761871-B21 |
| | HP H244br FIO Smart HBA Controller | 761878-B21 |
| | HP FIO B140i RAID Enable Kit - BIOS Setting | 784308-B21 |

NOTE: The HP Smart Array B140i Controller (chipset SATA) comes standard with the HP BL460c Gen9 10Gb/20Gb FLB CTO Blade (727021-B21). If neither the HP Smart Array P244br nor the HP H244br controllers are chosen, a SATA cable will be provided to support SATA devices for the two internal drives. If RAID is required when using the B140i, please choose 'HP FIO B140i RAID Enable Kit - BIOS Setting' (784308-B21).

Step 4: Choose Additional Options for Factory Integration

NOTE: For additional options, please refer to the "Core Options" and "Additional Options" section below. For additional options, including server blade enclosures interconnect, mezzanine options and power subsystem options; please see the Core Options and Additional sections below; or the following:

- HP BladeSystem c3000 Enclosure QuickSpecs:
<http://www8.hp.com/h20195/v2/GetDocument.aspx?docname=c04123379>
NOTE: The c3000 HP c-Class enclosures have full backwards and forwards compatibility, existing server blades are supported in the new enclosures and any future server blades will be supported in the existing enclosures.
- HP BladeSystem c7000 Enclosure QuickSpecs:
<http://www8.hp.com/h20195/v2/GetDocument.aspx?docname=c04229580>
NOTE: The c7000 HP c-Class enclosures have full backwards and forwards compatibility, existing server blades are supported in the new enclosures and any future server blades will be supported in the existing enclosures.
- HP BladeSystem c-Class Interconnect and Mezzanine Components:
<http://h18004.www1.hp.com/products/blades/components/c-class-interconnects.html> and
<http://h18004.www1.hp.com/products/blades/components/c-class-adapters.html>

NOTE: For optimal cooling and system performance the BL460c Gen9 Server Blade requires the c7000 enclosure to be configured with 10 fans and the c3000 enclosure to be configured with 6 fans.

Core Options

HP Networking

NOTE: A 10 Gigabit Ethernet adapter supports linking at 1Gbps or 10Gbps when connected to an interconnect module with 10Gb Ethernet downlinks.

NOTE: A 10 Gigabit Ethernet adapter supports linking at only 1Gbps when connected to an interconnect module with 1Gb Ethernet downlinks.

NOTE: The 10 Gigabit Ethernet adapters on each server blade connect to a 10Gb interconnect in bays 3-6 (HP BladeSystem c7000 Enclosure) or bays 2-4 (HP BladeSystem c3000 Enclosure).

20 Gigabit Ethernet Mezzanine Cards

HP FlexFabric 20Gb 2-port 630M Adapter 700076-B21

NOTE: Please see QuickSpecs for technical specifications and additional information at <http://www8.hp.com/h20195/v2/GetDocument.aspx?docname=c04312720>

HP FlexFabric 20Gb 2-port 650M Adapter 700767-B21

NOTE: Please see QuickSpecs for technical specifications and additional information at <http://www8.hp.com/h20195/v2/GetDocument.aspx?docname=c04347342>

10 Gigabit Ethernet Mezzanine Cards

HP FlexFabric 10Gb 2-port 534M Adapter 700748-B21

NOTE: Please see QuickSpecs for technical specifications and additional information at: http://h18000.www1.hp.com/products/quickspecs/14619_na/14619_na.html

HP Ethernet 10Gb 2-port 560M Adapter 665246-B21

NOTE: Please see QuickSpecs for technical specifications and additional information at: http://h18000.www1.hp.com/products/quickspecs/14478_na/14478_na.html.

HP Ethernet 10Gb 2-port 570M Adapter 718935-B21

NOTE: Please see QuickSpecs for technical specifications and additional information at <http://www8.hp.com/h20195/v2/GetDocument.aspx?docname=c04227607>

1 Gigabit Ethernet Mezzanine Cards

HP Ethernet 1Gb 4-port 366M Adapter 615729-B21

NOTE: Please see QuickSpecs for technical specifications and additional information at: http://h18000.www1.hp.com/products/quickspecs/14335_na/14335_na.html

FlexibleLOM Adapters

NOTE: The server supports one (1) FlexibleLOM that is installed in the FlexibleLOM connectors and is already included in the pre-configured models. However, it must be added in Step 2 for Configure-to-Order Models. The FlexibleLOM options below are used to change these original FlexibleLOMs.

20Gb FlexibleLOM Adapters

HP FlexFabric 20Gb 2-port 630FLB Adapter 700065-B21

NOTE: Please see QuickSpecs for technical specifications and additional information at <http://www8.hp.com/h20195/v2/GetDocument.aspx?docname=c04312719>

HP FlexFabric 20Gb 2-port 650FLB Adapter 700763-B21

NOTE: Please see QuickSpecs for technical specifications and additional information at <http://www8.hp.com/h20195/v2/GetDocument.aspx?docname=c04347341>

10Gb FlexibleLOM Adapters

HP FlexFabric 10Gb 2-port 536FLB Adapter 766490-B21

NOTE: Please see QuickSpecs for technical specifications and additional information at <http://www8.hp.com/h20195/v2/GetDocument.aspx?docname=c04347246>

HP Ethernet 10Gb 2-port 560FLB Adapter 655639-B21

NOTE: Please see QuickSpecs for technical specifications and additional information at http://h18000.www1.hp.com/products/quickspecs/14331_na/14331_na.html

HP Ethernet 10Gb 2-port 570FLB Adapter 718939-B21

NOTE: Please see QuickSpecs for technical specifications and additional information at <http://www8.hp.com/h20195/v2/GetDocument.aspx?docname=c04312718>

HP Infiniband Mezzanine Adapters

NOTE: When an InfiniBand adapter is installed in mezzanine slot 1, only one port is active (regardless of operating mode). When installed in mezzanine slot 2, both ports are active.

Core Options

NOTE: InfiniBand QDR and FDR speeds are only supported on the HP BladeSystem c7000 Enclosure. For additional information, please see the HP BladeSystem c7000 Enclosure and InfiniBand QuickSpecs at:
http://h18004.www1.hp.com/products/quickspecs/12586_na/12586_na.html
http://h18000.www1.hp.com/products/quickspecs/13078_na/13078_na.html

HP InfiniBand QDR/Ethernet 10Gb 2-port 544+M Adapter 764282-B21

NOTE: The QDR InfiniBand adapter may be installed in either mezzanine slot of the server.

HP InfiniBand FDR/Ethernet 10Gb/40Gb 2-port 544+M Adapter 764283-B21

NOTE: The FDR InfiniBand adapter must be installed in mezzanine slot 1 for FDR mode and may be installed in either mezzanine slot if operated in any other mode.

HP InfiniBand FDR 2-port 545M Adapter 702213-B21

HP Fibre Channel HP LPe1605 16Gb Fibre Channel HBA for BladeSystem c-Class 718203-B21

NOTE: Please see QuickSpecs for technical specifications and additional information at
http://h18000.www1.hp.com/products/quickspecs/14742_na/14742_na.html

HP QMH2672 16Gb Fibre Channel Host Bus Adapter 710608-B21

NOTE: Please see QuickSpecs for technical specifications and additional information at
<http://www8.hp.com/h20195/v2/GetDocument.aspx?docname=c04126962>

HP Processors **E5-2600 v3 series Processors**

HP BL460c Gen9 Intel® Xeon® E5-2690v3 (2.6GHz/12-core/30MB/135W) Processor Kit 726987-B21

HP BL460c Gen9 Intel® Xeon® E5-2680v3 (2.5GHz/12-core/30MB/120W) Processor Kit 726988-B21

HP BL460c Gen9 Intel® Xeon® E5-2670v3 (2.3GHz/12-core/30MB/120W) Processor Kit 726989-B21

HP BL460c Gen9 Intel® Xeon® E5-2660v3 (2.6GHz/10-core/25MB/105W) Processor Kit 726990-B21

HP BL460c Gen9 Intel® Xeon® E5-2650v3 (2.3GHz/10-core/25MB/105W) Processor Kit 726991-B21

HP BL460c Gen9 Intel® Xeon® E5-2640v3 (2.6GHz/8-core/20MB/90W) Processor Kit 726992-B21

HP BL460c Gen9 Intel® Xeon® E5-2683v3 (2GHz/14-core/35MB/120W) Processor Kit 726993-B21

HP BL460c Gen9 Intel® Xeon® E5-2630v3 (2.4GHz/8-core/20MB/85W) Processor Kit 726994-B21

HP BL460c Gen9 Intel® Xeon® E5-2620v3 (2.4GHz/6-core/15MB/85W) Processor Kit 726995-B21

HP BL460c Gen9 Intel® Xeon® E5-2623v3 (3GHz/4-core/10MB/105W) Processor Kit 726996-B21

HP BL460c Gen9 Intel® Xeon® E5-2609v3 (1.9GHz/6-core/15MB/85W) Processor Kit 726997-B21

HP BL460c Gen9 Intel® Xeon® E5-2685v3 (2.6GHz/12-core/30MB/120W) Processor Kit 726998-B21

HP BL460c Gen9 Intel® Xeon® E5-2603v3 (1.6GHz/6-core/15MB/85W) Processor Kit 726999-B21

HP BL460c Gen9 Intel® Xeon® E5-2650Lv3 (1.8GHz/12-core/30MB/65W) Processor Kit 727000-B21

HP BL460c Gen9 Intel® Xeon® E5-2698v3 (2.3GHz/16-core/40MB/135W) Processor Kit 727001-B21

HP BL460c Gen9 Intel® Xeon® E5-2630Lv3 (1.8GHz/8-core/20MB/55W) Processor Kit 727002-B21

HP BL460c Gen9 Intel® Xeon® E5-2695v3 (2.3GHz/14-core/35MB/120W) Processor Kit 727003-B21

HP BL460c Gen9 Intel® Xeon® E5-2637v3 (3.5GHz/4-core/15MB/135W) Processor Kit 765268-B21

HP BL460c Gen9 Intel® Xeon® E5-2697v3 (2.6GHz/14-core/35MB/145W) Processor Kit 767049-B21

HP BL460c Gen9 Intel® Xeon® E5-2667v3 (3.2GHz/8-core/20MB/135W) Processor Kit 773123-B21

HP BL460c Gen9 Intel® Xeon® E5-2643v3 (3.4GHz/6-core/20MB/135W) Processor Kit 773124-B21

HP BL460c Gen9 Intel® Xeon® E5-2699v3 (2.3GHz/18-core/45MB/145W) Processor Kit 779795-B21

NOTE: DIMM slots 4 and 5 are not accessible when either the E5-2699 v3, the E5-2697 v3, the E5-2643 v3, the E5-2637 v3, or the E5-2667 v3 is used. In a 2 processor configuration, there are twelve (12) total available DIMM slots.

NOTE: For the maximum supported memory speeds for each processor listed above, please reference the 'Memory Speed by Processor Model' table in the Memory section of the QuickSpecs.

NOTE: HT indicates that the processor model supports Intel® Hyper-Threading Technology.

Core Options

NOTE: Turbo indicates the maximum potential frequency when using Intel® Turbo Boost Technology. The frequency boost increment is dependent on the processor SKU and the number of active cores. In general, a higher boost increment is obtained when fewer cores are active.

NOTE: DDR4 speed is the maximum memory speed of the processor. Actual memory speed may depend on the quantity and type of DIMMs installed.

NOTE: Supports 1 or 2 processors. Mixing different processor models is not supported.

NOTE: For the Intel® C610 Chipset E5-2600 v3 Series, the letter preceding the model number indicates the Product Line (E3, E5, E7); 2600x, 2 = number of CPUs in a Node, 6 is socket/segment designation, 00 = Processor SKU, and x = L for low power SKUs.

NOTE: The BL460c Gen9 includes two I/O mezzanine expansion slots. A processor must be installed in processor slot 1 for access to the first mezzanine expansion slot (expansion slot 1). A processor must be installed in processor slot 2 for access to the second mezzanine expansion slot (expansion slot 2).

NOTE: All processors within the server must be identical.

NOTE: All processors support Intel® Hyper-Threading and Intel® Turbo Boost Technologies except the E5-2603 v3 and E5-2609 v3.

NOTE: The letter "L" following the model number indicates denotes lower wattage.

NOTE: The processor model as well as the memory configuration determines the maximum speed memory can operate. Please see the see the "Memory" section later in this document.

HP Memory

NOTE: HP memory from previous generation servers (DDR3) is not compatible with this server. HP SmartMemory is required to realize the memory performance improvements and enhanced functionality listed in this document for Gen9. For additional information, please see the HP SmartMemory QuickSpecs at:

<http://www8.hp.com/h20195/v2/GetHTML.aspx?docname=c04111535>

NOTE: LRDIMM and RDIMM are distinct memory technologies and cannot be mixed within a server.

NOTE: Depending on the memory configuration and processor model, the memory speed may run at 2133MHz, 1866MHz, or 1600MHz. Please see Memory Population Table or the Online Memory Configuration Tool at:

<http://h22195.www2.hp.com/MemoryTool/Home/Legal>

HP SmartMemory

Registered DIMMs (RDIMMs) - E5-2600 v3 series Processors

HP 8GB (1x8GB) Single Rank x4 PC4-2133P-R (DDR4-2133) Registered 726718-B21

HP 16GB (1x16GB) Dual Rank x4 PC4-2133P-R (DDR4-2133) Registered 726719-B21

Load Reduced DIMMs (LRDIMMs) - E5-2600 v3 series Processors

HP 32GB (1x32GB) Quad Rank x4 PC4-2133P-L (DDR4-2133) Load Reduced 726722-B21

NOTE: Depending on the memory configuration and processor model, 2133MHz memory may operate at a lower speed. Please see the see the "Memory" section later in this document and the Online Memory Configuration Tool for details at: <http://h22195.www2.hp.com/MemoryTool/Home/Legal> .

HP Hard Drives

NOTE: The ProLiant BL460c Gen9 server includes the HP hot-plug small form factor (SFF) SmartDrive carrier for enhanced management and reduced maintenance errors. HP drives from generation G7 servers and before are not compatible with the BL460c Gen9 drive bays.

NOTE: The mixing of standard SAS drives with SAS SSD is supported within the server, but limits the RAID configuration to two separate RAID 0 volumes. Mixing of other drives types is not supported.

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

6G SATA Hot Plug with SmartDrive SFF (2.5-inch) Midline (MDL) Drives

HP 1TB 6G SATA 7.2K rpm SFF (2.5-inch) SC Midline 1yr Warranty Hard Drive 655710-B21

NOTE: Please see the QuickSpecs for technical specifications and additional information at <http://www8.hp.com/h20195/v2/GetDocument.aspx?docname=c04111725>.

SAS Hot Plug with SmartDrive SFF (2.5-inch) Enterprise Drives

HP 1.2TB 6G SAS 10K rpm SFF (2.5-inch) SC Dual Port Enterprise 3yr Warranty Hard Drive 718162-B21

HP 900GB 6G SAS 10K rpm SFF (2.5-inch) SC Enterprise 3yr Warranty Hard Drive 652589-B21

Core Options

| | |
|---|------------|
| HP 600GB 6G SAS 10K rpm SFF (2.5-inch) SC Enterprise 3yr Warranty Hard Drive | 652583-B21 |
| HP 450GB 6G SAS 10K rpm SFF (2.5-inch) SC Enterprise 3yr Warranty Hard Drive | 652572-B21 |
| HP 300GB 6G SAS 10K rpm SFF (2.5-inch) SC Enterprise 3yr Warranty Hard Drive | 652564-B21 |
| HP 146GB 6G SAS 15K rpm SFF (2.5-inch) SC Enterprise 3yr Warranty Hard Drive | 652605-B21 |
| SAS Hot Plug SmartDrive SFF (2.5-inch) Midline Drives | |
| HP 1TB 6G SAS 7.2K rpm SFF (2.5-inch) SC Midline 1yr Warranty Hard Drive | 652749-B21 |
| HP 500GB 6G SAS 7.2K rpm SFF (2.5-inch) SC Midline 1yr Warranty Hard Drive | 652745-B21 |
| NOTE: Please see QuickSpecs for technical specifications and additional information at http://h18000.www1.hp.com/products/quickspecs/12244_na/12244_na.html . | |
| 12G SAS High Endurance Hot Plug SFF (2.5-inch) Enterprise Performance Solid State Drives | |
| HP 800GB 12G SAS High Endurance SFF 2.5-in SC Enterprise Performance 3yr Wty Solid State Drive | 741159-B21 |
| HP 400GB 12G SAS High Endurance SFF 2.5-in SC Enterprise Performance 3yr Wty Solid State Drive | 741155-B21 |
| HP 200GB 12G SAS High Endurance SFF 2.5-in SC Enterprise Performance 3yr Wty Solid State Drive | 741151-B21 |
| 12G SAS Mainstream Endurance Hot Plug SFF (2.5-inch) Enterprise Mainstream Solid State Drives | |
| HP 800GB 12G SAS Mainstream Endurance SFF 2.5-in SC Enterprise Mainstream 3yr Wty Solid State Drive | 741146-B21 |
| HP 400GB 12G SAS Mainstream Endurance SFF 2.5-in SC Enterprise Mainstream 3yr Wty Solid State Drive | 741142-B21 |
| HP 200GB 12G SAS Mainstream Endurance SFF 2.5-in SC Enterprise Mainstream 3yr Wty Solid State Drive | 741138-B21 |
| 6G SATA Value Endurance Hot Plug SFF (2.5-inch) Enterprise Boot Solid State Drives | |
| HP 120GB 6G SATA Value Endurance SFF 2.5-in SC Enterprise Boot 3yr Wty Solid State Drive | 717965-B21 |
| HP 80GB 6G SATA Value Endurance SFF 2.5-in SC Enterprise Boot 3yr Wty Solid State Drive | 734360-B21 |
| 6G SATA Value Endurance Hot Plug SFF (2.5-inch) Enterprise Value Solid State Drives | |
| HP 800GB 6G SATA Value Endurance SFF 2.5-in SC Enterprise Value 3yr Wty Solid State Drive | 717973-B21 |
| HP 600GB 6G SATA Value Endurance SFF 2.5-in SC Enterprise Value 3yr Wty Solid State Drive | 739898-B21 |
| HP 480GB 6G SATA Value Endurance SFF 2.5-in SC Enterprise Value 3yr Wty Solid State Drive | 717971-B21 |
| HP 300GB 6G SATA Value Endurance SFF 2.5-in SC Enterprise Value 3yr Wty Solid State Drive | 739888-B21 |
| HP 240GB 6G SATA Value Endurance SFF 2.5-in SC Enterprise Value 3yr Wty Solid State Drive | 717969-B21 |
| 6G SATA ME Hot Plug SFF (2.5-inch) Enterprise Mainstream Solid State Drives | |
| HP 800GB 6G SATA Mainstream Endurance SFF 2.5-in SC Enterprise Mainstream 3yr Wty Solid State Drive | 691868-B21 |
| HP 400GB 6G SATA Mainstream Endurance SFF 2.5-in SC Enterprise Mainstream 3yr Wty Solid State Drive | 691866-B21 |
| HP 200GB 6G SATA Mainstream Endurance SFF 2.5-in SC Enterprise Mainstream 3yr Wty Solid State Drive | 691864-B21 |
| HP 100GB 6G SATA Mainstream Endurance SFF 2.5-in SC Enterprise Mainstream 3yr Wty Solid State Drive | 691862-B21 |
| HP 400GB 6G SAS Mainstream Endurance SFF 2.5-in SC Enterprise Mainstream 3yr Wty Solid State Drive | 767499-B21 |
| HP 800GB 6G SAS Mainstream Endurance SFF 2.5-in SC Enterprise Mainstream 3yr Wty Solid State Drive | 767501-B21 |

Core Options

HP 1.6TB 6G SAS Mainstream Endurance SFF 2.5-in SC Enterprise Mainstream 3yr Wty Solid State Drive 767503-B21

6G SAS VE (2.5-inch) SC EV Solid State Drives

HP 120GB 6G SATA Light Endurance SFF 2.5-in SC Enterprise Light-S 3yr Wty Solid State Drive 756621-B21

HP 240GB 6G SATA Light Endurance SFF 2.5-in SC Enterprise Light-S 3yr Wty Solid State Drive 756636-B21

HP 480GB 6G SATA Light Endurance SFF 2.5-in SC Enterprise Light-S 3yr Wty Solid State Drive 756657-B21

6G SAS LE (2.5-inch) SC EI Solid State Drives

HP 400GB 6G SAS Light Endurance SFF 2.5-in SC Enterprise Light 3yr Wty Solid State Drive 767904-B21

HP 800GB 6G SAS Light Endurance SFF 2.5-in SC Enterprise Light 3yr Wty Solid State Drive 767906-B21

HP 1.6TB 6G SAS Light Endurance SFF 2.5-in SC Enterprise Light 3yr Wty Solid State Drive 767908-B21

6G SATA LE (2.5-inch) SC EI Solid State Drives

HP 960GB 6G SATA Light Endurance SFF 2.5-in SC Enterprise Light 3yr Wty Solid State Drive 756601-B21

12G SAS VE SFF (2.5-inch) SC EV Solid State Drives

HP 1.6TB 12G SAS Value Endurance SFF 2.5-in SC Enterprise Value 3yr Wty Solid State Drive 762263-B21

HP 800GB 12G SAS Value Endurance SFF 2.5-in SC Enterprise Value 3yr Wty Solid State Drive 762261-B21

SAS Hot Plug with SmartDrive SFF (2.5-inch) Enterprise Drives

HP 300GB 12G SAS 15K rpm SFF (2.5-inch) SC Enterprise 3yr Warranty Hard Drive 759208-B21

HP 450GB 12G SAS 15K rpm SFF (2.5-inch) SC Enterprise 3yr Warranty Hard Drive 759210-B21

HP 600GB 12G SAS 15K rpm SFF (2.5-inch) SC Enterprise 3yr Warranty Hard Drive 759212-B21

NOTE: The mixing of standard SAS drives with SAS SSD is supported within the server, but limits the RAID configuration to two separate RAID 0 volumes. Mixing of other drives types is not supported

NOTE: Please see the QuickSpecs for technical specifications and information at http://h18000.www1.hp.com/products/quickspecs/14038_na/14038_na.html.

Additional Options

| | | |
|----------------------------|---|----------|
| HP Insight software | HP Insight Control | |
| | HP Insight Control including 1yr 24x7 Technical Support and Updates Single Server License | C6N27A |
| | HP Insight Control including 1yr 24x7 Technical Support and Updates Electronic License | C6N28ABE |
| | HP Insight Control including 1yr 24x7 Support ProLiant ML/DL/BL-bundle FIO Electronic License | C6N36ABE |
| | HP Insight Control Server Provisioning Media Kit | BD883A |
| | HP Insight Management Media Kit | C6N31A |
| | NOTE: HP Insight Management Media Kit contains DVDs without licenses. Contains HP Systems Insight Manager, HP Insight Control, HP Matrix Operating Environment, and Virtual Connect Enterprise Manager software. Uses an integrated installer to perform quick and accurate software installation and updates. | |
| | NOTE: Electronic and Flexible-Quantity 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: Licenses ship without media. The HP Insight Management Media Kit can be ordered separately, or can be downloaded at http://www.hp.com/go/insightupdates | |
| | NOTE: For additional license kits, please see the QuickSpecs at: http://www8.hp.com/h20195/v2/GetHTML.aspx?docname=c04123391 | |

| | | |
|--------------------------------|---|------------|
| HP iLO Advanced License | HP Integrated Lights-Out (iLO) Advanced for ProLiant BladeSystem Remote Management | |
| | HP iLO Advanced for BladeSystem including 3yr 24x7 Technical Support and Updates E-LTU | E6U63ABE |
| | HP iLO Advanced Blade 1 Server License with 3yr 24x7 Tech Support and Updates | BD502A |
| | HP iLO Advanced for BladeSystem including 1yr 24x7 Technical Support and Updates E-LTU | E6U60ABE |
| | HP iLO Advanced for BladeSystem including 1yr 24x7 Support Single Server License | 512488-B21 |
| | NOTE: 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 or three years 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://www.hp.com/go/iLO | |
| | 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 or three year of 24 x 7 HP Software Technical Support Service. | |
| | NOTE: For additional license kits, please see the QuickSpecs at: http://h18004.www1.hp.com/products/quickspecs/14276_na/14276_na.html | |

| | | |
|---|--|----------|
| Converged Infrastructure Management Software | HP OneView | |
| | HP OneView with iLO Advanced | |
| | HP OneView incl 3yr 24x7 Supp Phys 1 Svr Lic | E5Y34A |
| | HP OneView incl 3yr 24x7 Supp Flex Qty E-LTU | E5Y35AAE |
| | HP OneView Media Kit Phys No Lic | E5Y37A |
| | HP OneView without iLO Advanced | |
| | HP OneView w/o iLO Adv incl 3yr 24x7 Supp Phys 1 Svr Lic | E5Y38A |
| | HP OneView w/o iLO Adv inc 3yr 24x7 Supp Flex Qty E-LTU | E5Y39AAE |
| | NOTE: For additional license kits please see the QuickSpecs at http://h18004.www1.hp.com/products/quickspecs/14621_na/14621_na.html . | |

| | | |
|----------------------------------|--|--------|
| High Performance Clusters | HP Cluster Management Utility | |
| | HP Insight Cluster Management Utility 1yr 24x7 Flexible License | QL803B |
| | HP Insight Cluster Management Utility 3yr 24x7 Flexible License | BD476A |
| | NOTE: These part numbers can be used to purchase one certificate for multiple licenses and support with a single activation key. Each license is for one node (server). Customer will receive a printed end user license agreement and license entitlement certificate via physical | |

Additional Options

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: For additional license kits please see the QuickSpecs at

http://h18004.www1.hp.com/products/quickspecs/12612_na/12612_na.html.

HP Security HP Trusted Platform Module Option 488069-B21

NOTE: The TPM (Trusted Platform Module) 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 a Trusted Platform Module (TPM) version 1.2. The TPM works with BitLocker to help protect user data and to ensure that a server running 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.

HP Storage Controllers HP Smart Array P244br/1GB FBWC 12Gb 2-ports Int SAS Controller 749680-B21

HP H244br 12Gb 2-ports Int Smart Host Bus Adapter

726809-B21

HP Secure Encryption HP Secure Encryption No Media E-LTU per Drive D8S85AAE

HP Secure Encryption No Media Flexible License per Drive

D8S84A

NOTE: HP Secure Encryption is supported on the HP Smart Array P244br and H244br (running in RAID mode) as an option. HP Secure Encryption licensing is based on the number of physical drives requiring encryption.

NOTE: For more information about HP Secure Encryption, go to www.hp.com/go/hpsecureencryption.

HP InfiniBand Mezzanines **NOTE:** When an InfiniBand adapter is installed in mezzanine slot 1, only one port is active (regardless of operating mode). When installed in any other mezzanine slot, both ports are active.

NOTE: InfiniBand QDR and FDR speeds are only supported on the HP BladeSystem c7000 Enclosure. For additional information, please see the HP BladeSystem c7000 Enclosure and InfiniBand QuickSpecs at:

http://h18004.www1.hp.com/products/quickspecs/12586_na/12586_na.html

http://h18000.www1.hp.com/products/quickspecs/13078_na/13078_na.html

HP Infiniband QDR/Ethernet 10Gb 2-port 544M Adapter

644160-B21

NOTE: The QDR InfiniBand adapter may be installed in any mezzanine slot of the server.

HP Infiniband FDR/Ethernet 10Gb/40Gb 2-port 544M Adapter

644161-B22

NOTE: The FDR InfiniBand adapter must be installed in mezzanine slot 1 for FDR mode and may be installed in any mezzanine slot if operated in any other mode.

HP InfiniBand FDR 2-port 545M Adapter

702213-B21

HP Flash Media Kits for USB Drives **HP Flash Media Kits for USB Drives**

HP Enterprise Mainstream Flash Media Kits for Memory Cards

HP 8GB USB Enterprise Mainstream Flash Media Drive Key Kit

737953-B21

HP 8GB microSD Enterprise Mainstream Flash Media Kit

726116-B21

HP 32GB microSD Enterprise Mainstream Flash Media Kit

700139-B21

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

http://h18000.www1.hp.com/products/quickspecs/13971_na/13971_na.html

Additional Options

| | |
|------------------------------|---|
| HP Care Pack Services | <p>Proactive Care - Collaborative Support plus Proactive services delivered by the on shore/near shore Advanced Solution Center (ASC) and backed by the global delivery organization, end-to-end case ownership from a Technical Solution Specialists and Technical Account Manager who remotely delivers firmware/software revision management, proactive scans and incident trend reports. Recommended for customers running a virtualized infrastructure and/or customers who desire an enhanced call support experience.</p> <p>HP 3 year 4 hour 24x7 ProLiant BL4xxc Proactive Care Service U3B14E</p> <p>HP 3 year 4 hour 24x7 with Defective Media Retention ProLiant BL4xxc Proactive Care Service U3B17E</p> <p>HP 3 year 6 hour Call To Repair 24x7 ProLiant BL4xxc Proactive Care Service U3B20E</p> <p>HP 3 year 6hr Call To Repair 24x7 with Defective Media Retention ProLiant BL4xxc Proactive Care SVC U3B23E</p> <p>Proactive Care Personalized Support Environmental Option - to add an onsite Account Support Manager (ASM) to Proactive Care. ASM is an assigned resource who delivers support planning and brings technical expertise and best practices advice for the customer's environment.</p> <p>HP 3 year ISS ProactiveCare Personalized Support U6W98E</p> <p>Installation Services - reduce the time required to get your system up and running and help minimize disruptions to your business.</p> <p>HP Install c-Class Server Blade Service UE493E</p> <p>HP Hardware Installation during Non Standard Hours c-Class Server Blade Service UG869E</p> <p>Additional HP Care Pack services can be found at: http://www.hp.com/go/cpc</p> |
|------------------------------|---|

Memory

For detailed memory configuration rules and guidelines, please use the Online DDR4 Memory Configuration Tool: <http://h22195.www2.hp.com/MemoryTool/Home/Legal>

Memory Subsystem Architecture

Each Intel® Xeon® E5-2600 v3 family or Intel® Xeon® E5-2600 v3 family processor socket contains four memory channels that support two DIMMs each for a total of eight (8) DIMM per installed processor or a grand total of sixteen (16) DIMMs for the server. Up to 32GB capacity DIMMs are supported for 512GB of memory (16 DIMM slots x 32GB per DIMM).

Memory Population Rules and Guidelines:

- A minimum of one DIMM is required per processor.
- Install DIMMs only if the corresponding processor is installed.
- If only one processor is installed in a two processor system, only half of the DIMM slots are available.
- DIMM sizes can be mixed in channel. To maximize performance, it is recommended to balance the total memory capacity between all installed processors and to load the channels similarly whenever possible.
- LRDIMM and RDIMMs are all distinct memory technologies and cannot be mixed within a server. The majority of ProLiant Gen9 servers support RDIMM and LRDIMM.
- DIMMs of different speeds may be mixed in any order; the server will select a common optimal speed.
- The maximum memory speed is a function of the memory type, memory configuration, and processor model.
- The maximum memory capacity is a function of the memory type and number of installed processors.
- HP memory from previous generation servers is not compatible with the BL460c Gen9 Server Blade.
- To realize the performance memory capabilities listed in this document, HP SmartMemory is required. For additional information, please see the HP SmartMemory QuickSpecs at: <http://www8.hp.com/h20195/v2/GetHTML.aspx?docname=c04111535>
- For memory population rules and additional memory guidelines, please see the BL460c Gen9 user guide at <http://www.hp.com/support>.

Supported Memory Bandwidth on Intel® Xeon® E5-2600 v3 series Processors

| DIMM Rank | Register DIMM (RDIMM) | | Load Reduced (LRDIMM) |
|---|-----------------------|------------------|-----------------------|
| | Single Rank (1R) | Dual Rank (2R) | Quad Rank (4R) |
| DIMM Capacity | 8GB | 16GB | 32GB |
| Voltage | Std Voltage 1.2V | Std Voltage 1.2V | Std Voltage 1.2V |
| SLOTS THAT CAN BE POPULATED | | | |
| 12 slot servers | 12 | 12 | 12 |
| 16 slot servers | 16 | 16 | 16 |
| MAXIMUM CAPACITY (GB)* | | | |
| 12 slot servers | 96 | 192 | 384 |
| 16 slot servers | 128 | 256 | 512 |
| POPULATED DIMM SPEED (MT/s) | | | |
| 1 DIMM Per Channel | 2133 | 2133 | 2133 |
| 2 DIMM Per Channel | 2133 | 2133 | 2133 |
| *Maximum Capacity will vary based on individual serve platform qualification schedule | | | |

Memory

Memory Speed by E5-2600 v3 Series Processor Model

| Processor Models | Supported Memory Speeds |
|---|-------------------------|
| E5-2690 v3, E5-2695 v3, E5-2697 v3, E5-2698 v3, E5-2699 v3, E5-2687W v3, E5-2683 v3, E5-2680 v3, E5-2670 v3, E5-2667 v3, E5-2660 v3, E5-2650 v3, E5-2650L, E5-2643 v3, E5-2637 v3 | 2133MHz |
| E5-2640 v3, E5-2630 v3, E5-2630L v3, E5-2623 v3, E5-2620 v3 | 1866MHz |
| E5-2609 v3, E5-2603 v3 | 1600MHz |

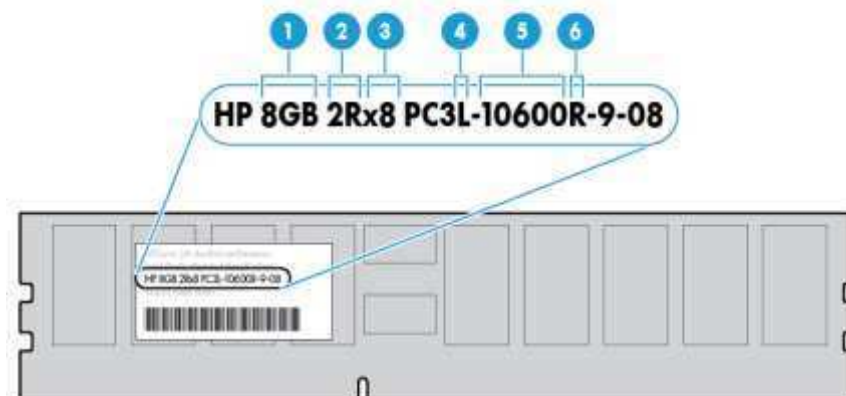
Standard and Maximum Memory Capacity (Pre-configured Models) for E5-2600 v3 Series

| Pre-Configured Models | Standard Memory | Maximum Memory Plus Optional Memory | Standard Memory Replaced with Optional Memory |
|-----------------------------------|--------------------|-------------------------------------|---|
| Intel Xeon E5-2670 v3 | 128GB (4x 32GB) | 512GB (4x 32GB + 12x 32GB) | 512GB (16x 32GB) |
| Intel Xeon E5-2660 v3 | 64GB (4x 16GB) | 256GB (4x 16GB + 12x 16GB) | 512GB (16x 32GB) |
| Intel Xeon E5-2650 v3, E5-2640 v3 | 32GB (2x 16GB) | 256GB (2x 16GB + 14x 16GB) | 512GB (16x 32GB) |
| Intel Xeon E5-2620 v3, E5-2609 v3 | 16GB (2x 8GB) | 240GB (2x 8GB + 14x 16GB) | 512GB (16x 32GB) |

NOTE: Capacity references are rounded to the common gigabyte (GB) values.

- 2GB = 2,048MB
- 4GB = 4,096MB
- 8GB = 8,192MB
- 16GB = 16,384MB
- 32GB = 32,768MB

Memory options part number decoder



| Item | Description | Definition |
|------|-------------|---------------------|
| 1 | Capacity | 8 GByte 16 GByte |

Memory

| | | |
|---|-------------------|--|
| | | 32 GByte |
| 2 | Rank | 1R = Single-rank 2R = Dual-rank 4R = Quad-rank |
| 3 | Data width | x4 = 4-bit x8 = 8-bit |
| 4 | Memory generation | DDR4 |
| 5 | Max. Memory speed | 2133MT/s |
| 6 | CasLatency | P = 15 |
| 6 | DIMM type | R = RDIMM (registered) L = LRDIMM (load reduced) |

Following are memory options available from HP:

HP Memory

NOTE: HP memory from previous generation servers (DDR3) is not compatible with this server. HP SmartMemory is required to realize the memory performance improvements and enhanced functionality listed in this document for Gen9. For additional information, please see the HP SmartMemory QuickSpecs at:

<http://www8.hp.com/h20195/v2/GetHTML.aspx?docname=c04111535>

NOTE: LRDIMM and RDIMM are distinct memory technologies and cannot be mixed within a server.

NOTE: Depending on the memory configuration and processor model, the memory speed may run at 2133MHz, 1866MHz, or 1600MHz.

HP SmartMemory

Registered DIMMs (RDIMMs)

Registered DIMMs (RDIMMs) - E5-2600 v3 series Processors

HP 8GB (1x8GB) Single Rank x4 PC4-2133P-R (DDR4-2133) Registered 726718-B21

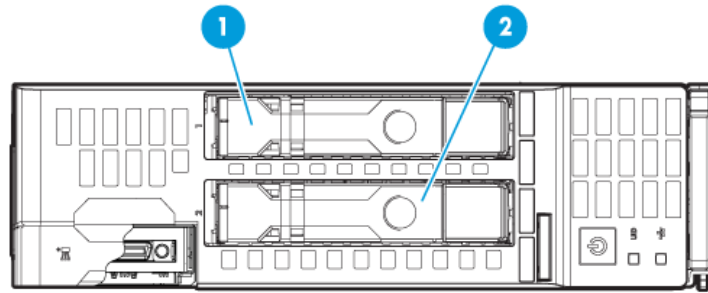
HP 16GB (1x16GB) Dual Rank x4 PC4-2133P-R (DDR4-2133) Registered 726719-B21

Load Reduced DIMMs (LRDIMMs) - E5-2600 v3 series Processors

HP 32GB (1x32GB) Quad Rank x4 PC4-2133P-L (DDR4-2133) Load Reduced 726722-B21

NOTE: Depending on the memory configuration and processor model, 2133MHz memory may operate at a lower speed. Please see the "Memory" section later in this document.

Storage



1-2 2 x SFF hot-plug SAS, SATA, SAS SDD, and SATA SSD hard drives

Technical Specifications

| | | | | | | | | | | |
|---|---|---|---|---|--|--|--|---|---------------|--|
| System Unit | Dimensions (H x W x D) (with bezel) | 7.11 x 2.18 x 20.37 in (18.07 x 5.54 x 51.76 cm) | | | | | | | | |
| | Weight (approximate) | <table border="0"> <tr> <td>Maximum: all processors, 16 DIMMs, hard drives, mezzanine cards, and two flash cache batteries installed)</td> <td>14.00 lb (6.33 kg)</td> </tr> <tr> <td>Minimum: one processor and 2 DIMMs installed</td> <td>10.50 lb (4.75 kg)</td> </tr> </table> | Maximum: all processors, 16 DIMMs, hard drives, mezzanine cards, and two flash cache batteries installed) | 14.00 lb (6.33 kg) | Minimum: one processor and 2 DIMMs installed | 10.50 lb (4.75 kg) | | | | |
| Maximum: all processors, 16 DIMMs, hard drives, mezzanine cards, and two flash cache batteries installed) | 14.00 lb (6.33 kg) | | | | | | | | | |
| Minimum: one processor and 2 DIMMs installed | 10.50 lb (4.75 kg) | | | | | | | | | |
| | Power Specifications | <p>For power specifications including input requirements, BTU rating, and power supply output, please see the:</p> <ul style="list-style-type: none"> HP BladeSystem c3000 Enclosure QuickSpecs at http://www8.hp.com/h20195/v2/GetDocument.aspx?docname=c04123379 HP BladeSystem c7000 Enclosure QuickSpecs at http://www8.hp.com/h20195/v2/GetHTML.aspx?docname=c04229580 <p>To review typical system power ratings use the HP Power Advisor which is available via the online tool located at www.hp.com/go/hppoweradvisor.</p> <p>NOTE: For optimal cooling and system performance the BL460c Gen9 Server Blade requires the c7000 enclosure to be configured with 10 fans and the c3000 enclosure to be configured with 6 fans.</p> | | | | | | | | |
| | System Inlet Temperature | <table border="0"> <tr> <td>Operating</td> <td>10° to 35°C (50° to 95°F) at sea level with an altitude derating of 1.0°C per every 305 m (1.8°F per every 1,000 ft) above sea level to a maximum of 3,050 m (10,000 ft), no direct sustained sunlight.</td> </tr> <tr> <td></td> <td>Maximum rate of change is 10°C/hr (18°F/hr). The upper limit may be limited by the type and number of options installed.</td> </tr> <tr> <td></td> <td>System performance may be reduced if operating with a fan fault or above 30°C (86°F).</td> </tr> <tr> <td>Non-operating</td> <td>-30° to 60°C (-22° to 140°F). Maximum rate of change is 20°C/hr (36°F/hr).</td> </tr> </table> | Operating | 10° to 35°C (50° to 95°F) at sea level with an altitude derating of 1.0°C per every 305 m (1.8°F per every 1,000 ft) above sea level to a maximum of 3,050 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). |
| 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 1,000 ft) above sea level to a maximum of 3,050 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) | <table border="0"> <tr> <td>Operating</td> <td>10 to 90% relative humidity (Rh), 28°C (82.4°F) maximum wet bulb temperature, non-condensing.</td> </tr> <tr> <td>Non-operating</td> <td>5 to 95% relative humidity (Rh), 38.7°C (101.7°F) maximum wet bulb temperature, non-condensing.</td> </tr> </table> | Operating | 10 to 90% relative humidity (Rh), 28°C (82.4°F) maximum wet bulb temperature, non-condensing. | Non-operating | 5 to 95% relative humidity (Rh), 38.7°C (101.7°F) maximum wet bulb temperature, non-condensing. | | | | |
| Operating | 10 to 90% relative humidity (Rh), 28°C (82.4°F) maximum wet bulb temperature, non-condensing. | | | | | | | | | |
| Non-operating | 5 to 95% relative humidity (Rh), 38.7°C (101.7°F) maximum wet bulb temperature, non-condensing. | | | | | | | | | |
| | Altitude | <table border="0"> <tr> <td>Operating</td> <td>3,050 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 (1,500 ft/min).</td> </tr> <tr> <td>Non-operating</td> <td>9,144 m (30,000 ft). Maximum allowable altitude change rate is 457 m/min (1,500 ft/min).</td> </tr> </table> | Operating | 3,050 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 (1,500 ft/min). | Non-operating | 9,144 m (30,000 ft). Maximum allowable altitude change rate is 457 m/min (1,500 ft/min). | | | | |
| Operating | 3,050 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 (1,500 ft/min). | | | | | | | | | |
| Non-operating | 9,144 m (30,000 ft). Maximum allowable altitude change rate is 457 m/min (1,500 ft/min). | | | | | | | | | |

Technical Specifications

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

| | | |
|---|---------------------------------|---|
| HP Smart Array P244br Controller | Disk Drive Interface | 12Gb/s SAS (Serial Attached SCSI) 6Gb/s SATA (Serial ATA) |
| | Server Interface | x8 5G PCIe 3.0 provides 8GB/s maximum bandwidth |
| | Cache Memory | 1GB flash backed write cache (FBWC) cache standard |
| | Logical Drives Supported | 64 (with included 1GB cache) |
| | Host Memory Addressing | 64-bit, supporting servers memory space greater than 4GB |
| | RAID Support | RAID 1 (mirroring), RAID 0 (striping), RAID 10 |
| | Other | Upgradeable firmware with recovery ROM Online drive flash (with SAS drives) |
| HP Smart HBA H244br Controller | Disk Drive Interface | 12Gb/s SAS (Serial Attached SCSI) 6Gb/s SATA (Serial ATA) |
| | Server Interface | x8 5G PCIe 3.0 provides 8GB/s maximum bandwidth |
| | Cache Memory | None |
| | Logical Drives Supported | 64 |
| | Host Memory Addressing | 64-bit, supporting servers memory space greater than 4GB |
| | RAID Support | RAID 1 (mirroring) and RAID 0 (striping) |
| | Other | Upgradeable firmware with recovery ROM Online drive flash (with SAS drives) |
| HP Dynamic Smart Array B140i Controller | Disk Drive Interface | 6Gb/s SATA (Serial ATA) |
| | Server Interface | Embedded x4 PCIe 2.0 |
| | SAS Connectors | 2 internal SATA ports |
| | Cache Memory | None |
| | SAS Speed | 6Gb/s SATA links |
| | Logical Drives Supported | Up to 10 logical volumes (2 physical drives) |
| | Host Memory Addressing | 64-bit, supporting greater than 4GB server memory space |
| | Hot Plug Support | Yes |
| | RAID Support | RAID 1 (Mirroring) RAID 0 (Striping) |
| | Other | Upgradeable firmware with recovery ROM |
| HP FlexFabric 10Gb 2-port 536FLB FlexibleLOM | Type | Integrated dual-port KR 10Gb FlexibleLOM with FlexFabric (Flex-10, FCoE, hardware-based iSCSI, iSCSI boot, TCP/IP offload engine, and autosensing 1Gb/10Gb Ethernet capability) |

Technical Specifications

| | | | | | | | | | | | | | |
|---|---|-------------|--|--------------------------|---------------|-----------------------------|--------------------|------------------------------|---|------------------------|---|--------------------------|---|
| Network Processor | QLogic 57840S with integrated MAC/PHY | | | | | | | | | | | | |
| Data Transfer Method | x8 PCI Express 3.0 | | | | | | | | | | | | |
| Network Transfer Rate | Two ports, each at 20Gbps full duplex; 40Gbps aggregate full duplex theoretical bandwidth NOTE: Each port is autosensing 1Gb/10Gb, and can interoperate with 1Gb or 10Gb HP BladeSystem c-Class interconnect components. Both ports will operate at the same speed. NOTE: Each port on the 554FLB adapter transmits from the server at 20Gbps (theoretical) full duplex. | | | | | | | | | | | | |
| IEEE Compliance | 802.1p, 802.1q, 802.1qau, 802.3ad, 802.3ae, 802.3ap (10GBase-KX4) and 802.3x | | | | | | | | | | | | |
| Standard Features | Full hardware offload of iSCSI and FCoE storage protocol processing for highest performance converged Ethernet data and storage networks. Dual-port 10GbE Flex-10 FlexibleLOM network adapter that provides the flexibility to choose the type of LOM to meet growing infrastructure needs. Industry-leading throughput and latency performance. Supports HP's Flex-10 blade interconnect technology. User configurable bandwidth settings when combined with the 10Gb Flex-10 Virtual Connect module. From 100Mb/s to 10Gb/s on up to four "Physical Function" NICs per port, in increments of 100Mb/s for NIC. The combined bandwidth of NICs cannot exceed port bandwidth i.e. 10 Gb. Up to 40Gb/s bi-directional near line rate throughput. Hardware acceleration and offloads for stateless TCP/IP, TCP Offload Engine (TOE). Improved small packet performance. Support for Preboot eXecution Environment (PXE). Integrated PHY and MAC. Supports for SR-IOV. Support for Network Partitioning (NPAR) | | | | | | | | | | | | |
| HP FlexFabric 20Gb 2-port 650FLB FlexibleLOM | <table border="0"> <tr> <td style="vertical-align: top;">Type</td> <td>Integrated dual-port KR2 20Gb FlexibleLOM with FlexFabric (Flex-20, FCoE, RoCE, Tunnel Offload with VXLAN/NVGRE, hardware-based iSCSI, iSCSI boot, TCP/IP offload engine, and autosensing Ethernet speed capability)</td> </tr> <tr> <td style="vertical-align: top;">Network Processor</td> <td>Emulex XE-104</td> </tr> <tr> <td style="vertical-align: top;">Data Transfer Method</td> <td>x8 PCI Express 3.0</td> </tr> <tr> <td style="vertical-align: top;">Network Transfer Rate</td> <td>Two ports, each at 40 Gbps bi-directional; 80 Gbps aggregate bi-directional theoretical bandwidth</td> </tr> <tr> <td style="vertical-align: top;">IEEE Compliance</td> <td>802.3ae, 802.1Q, 802.3x, 802.1p, 802.3ad/LACP, 802.1AB(LLDP), 802.1Qbg, 802.1Qbb, 802.1Qaz, 802.3ap</td> </tr> <tr> <td style="vertical-align: top;">Standard Features</td> <td>Dual 20Gb ports provide up to 80Gb bi-directional per adapter. Multi-speed adapter operates at either 20GbE or 10GbE. Converges FCoE or RoCE with LAN traffic on a single Ethernet wire. Tunnel Offload support for VXLAN and NVGRE. RDMA over Converged Ethernet (RoCE) for greater server efficiency and lower latency (6125XLG only). Advanced storage offload processing freeing up valuable CPU cycles. Supports UEFI and legacy boot options. Mixed Storage – supports NIC + FCoE on one port, and NIC + iSCSI on the other. Concurrent Storage – concurrently supports NIC, FCoE, and iSCSI storage functions on the same port (NIC + FCoE + iSCSI). Industry-leading throughput and latency performance. Supports HP's Flex-20 blade interconnect</td> </tr> </table> | Type | Integrated dual-port KR2 20Gb FlexibleLOM with FlexFabric (Flex-20, FCoE, RoCE, Tunnel Offload with VXLAN/NVGRE, hardware-based iSCSI, iSCSI boot, TCP/IP offload engine, and autosensing Ethernet speed capability) | Network Processor | Emulex XE-104 | Data Transfer Method | x8 PCI Express 3.0 | Network Transfer Rate | Two ports, each at 40 Gbps bi-directional; 80 Gbps aggregate bi-directional theoretical bandwidth | IEEE Compliance | 802.3ae, 802.1Q, 802.3x, 802.1p, 802.3ad/LACP, 802.1AB(LLDP), 802.1Qbg, 802.1Qbb, 802.1Qaz, 802.3ap | Standard Features | Dual 20Gb ports provide up to 80Gb bi-directional per adapter. Multi-speed adapter operates at either 20GbE or 10GbE. Converges FCoE or RoCE with LAN traffic on a single Ethernet wire. Tunnel Offload support for VXLAN and NVGRE. RDMA over Converged Ethernet (RoCE) for greater server efficiency and lower latency (6125XLG only). Advanced storage offload processing freeing up valuable CPU cycles. Supports UEFI and legacy boot options. Mixed Storage – supports NIC + FCoE on one port, and NIC + iSCSI on the other. Concurrent Storage – concurrently supports NIC, FCoE, and iSCSI storage functions on the same port (NIC + FCoE + iSCSI). Industry-leading throughput and latency performance. Supports HP's Flex-20 blade interconnect |
| Type | Integrated dual-port KR2 20Gb FlexibleLOM with FlexFabric (Flex-20, FCoE, RoCE, Tunnel Offload with VXLAN/NVGRE, hardware-based iSCSI, iSCSI boot, TCP/IP offload engine, and autosensing Ethernet speed capability) | | | | | | | | | | | | |
| Network Processor | Emulex XE-104 | | | | | | | | | | | | |
| Data Transfer Method | x8 PCI Express 3.0 | | | | | | | | | | | | |
| Network Transfer Rate | Two ports, each at 40 Gbps bi-directional; 80 Gbps aggregate bi-directional theoretical bandwidth | | | | | | | | | | | | |
| IEEE Compliance | 802.3ae, 802.1Q, 802.3x, 802.1p, 802.3ad/LACP, 802.1AB(LLDP), 802.1Qbg, 802.1Qbb, 802.1Qaz, 802.3ap | | | | | | | | | | | | |
| Standard Features | Dual 20Gb ports provide up to 80Gb bi-directional per adapter. Multi-speed adapter operates at either 20GbE or 10GbE. Converges FCoE or RoCE with LAN traffic on a single Ethernet wire. Tunnel Offload support for VXLAN and NVGRE. RDMA over Converged Ethernet (RoCE) for greater server efficiency and lower latency (6125XLG only). Advanced storage offload processing freeing up valuable CPU cycles. Supports UEFI and legacy boot options. Mixed Storage – supports NIC + FCoE on one port, and NIC + iSCSI on the other. Concurrent Storage – concurrently supports NIC, FCoE, and iSCSI storage functions on the same port (NIC + FCoE + iSCSI). Industry-leading throughput and latency performance. Supports HP's Flex-20 blade interconnect | | | | | | | | | | | | |

Technical Specifications

technology. Over eight million small packets/s, ideal for web/mobile applications, mobile messaging, and social media. User configurable bandwidth settings when combined with the 20Gb Flex-20 Virtual Connect module. From 100Mb/s to 10Gb/s on up to four "Physical Function" NICs per port, in increments of 100Mb/s for NIC. The combined bandwidth of NICs cannot exceed port bandwidth i.e. 20 Gb/s. Greater bandwidth with PCIe 3.0. Jumbo Frames support. Supports Wake On LAN (WOL). Support for Preboot eXecution Environment (PXE). Support for Microsoft Windows SMB Direct. Optimized host virtualization density with SR-IOV support.

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.



hp.com/qref/bl460cgen9

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