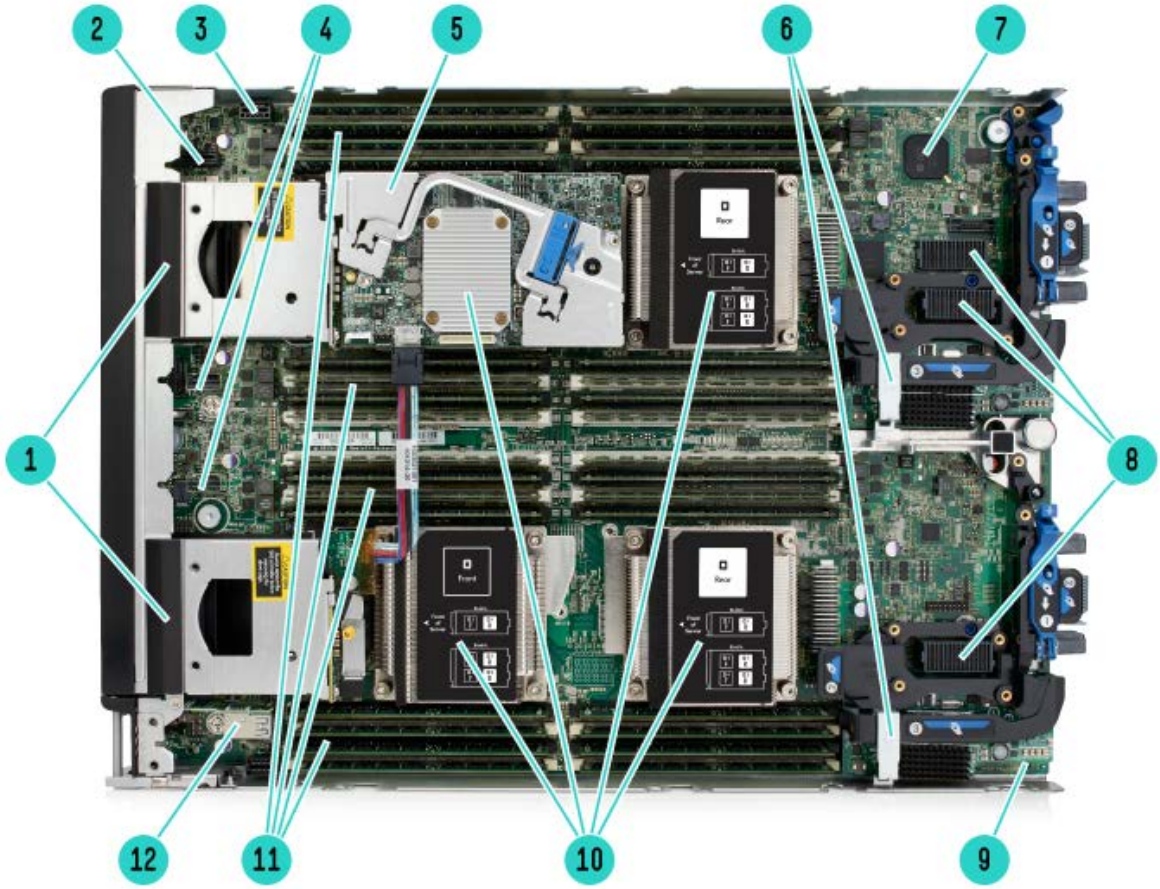
Overview

HPE ProLiant BL660c Gen9 Server Blade



HPE ProLiant BL660c Gen9 Server Blade – Internal View

1. Four hot-plug drive bays
2. M.2 Option Connector
3. HPE BLc 12W Smart Storage Battery connector
4. Embedded SATA Connectors
5. HPE Smart Array P246br Controller with 1GB FBWC
6. FlexibleLOM adapters
7. iLO Management Engine
8. Mezzanine Slots (x16 PCI 3.0)
9. Micro-SD slot
10. Two or Four Intel® Xeon® E5-4600 v3 or v4 family processors
11. Thirty two DDR4 DIMM slots (8 per processor)
12. USB 3.0 and TPM

What's New

- Support for the Intel E5-4600 v3 and v4 Product Family
- Support for 2 SFF NVMe SSDs
- Support for 120GB M.2 kit offerings
- Support for 2400MT/s DDR4 memory
- 4 SFF drive bays

Standard Features

NOTE: This document covers the HPE ProLiant BL660c Gen9 server blade only. For information on HPE BladeSystems c-Class Enclosures and HPE BladeSystem c-Class Interconnect and Mezzanine Components, please see the following:
HPE BladeSystem c-Class Enclosures QuickSpecs:

- HPE BladeSystem c3000 Enclosure QuickSpecs at
  https://www.hpe.com/h20195/v2/GetDocument.aspx?docname=c04123379
  NOTE: The c3000 HPE c-Class enclosures have full backwards and forwards compatibility, existing server blades are supported in the new enclosures and any future c-Class server blades will be supported in the existing enclosures.
- HPE BladeSystem c7000 Enclosure QuickSpecs at
  https://www.hpe.com/h20195/v2/GetDocument.aspx?docname=c04229580
  NOTE: The c7000 HPE 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.
- HPE BladeSystem c-Class Interconnect and Mezzanine Components at
  https://www.hpe.com/us/en/integrated-systems/bladesystem.html#portfolio
  https://www.hpe.com/us/en/integrated-systems/bladesystem.html#portfolio

NOTE: For optimal cooling and system performance the BL660c 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 HPE Onboard Administrator and HPE Virtual Connect are required and available via the HPE Service Pack for ProLiant, please see **http://www.hpe.com/info/spp/download**.
NOTE: For the Standard Features shipped in the "Factory Integrated Models", please see the "Configuration Information - Factory Integrated Models" section.

Processor Two or four of the following depending on Model	**E5-4600 v4 series Processors** HPE BL660c Gen9 Intel® Xeon® E5-4610v4 (1.8GHz/10-core/25MB/105W HPE BL660c Gen9 Intel® Xeon® E5-4620v4 (2.1GHz/10-core/25MB/105W HPE BL660c Gen9 Intel® Xeon® E5-4640v4 (2.1GHz/12-core/30MB/105W HPE BL660c Gen9 Intel® Xeon® E5-4650v4 (2.2GHz/14-core/35MB/105W HPE BL660c Gen9 Intel® Xeon® E5-4669v4 (2.2GHz/22-core/55MB/135W HPE BL660c Gen9 Intel® Xeon® E5-4667v4 (2.2GHz/18-core/45MB/135W HPE BL660c Gen9 Intel® Xeon® E5-4627v4 (2.6GHz/10-core/25MB/135W **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:** 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 2 or 4 processors. Mixing different processor models is not supported. **NOTE:** For the Intel® C610 Chipset E5-4600 v3 or v4 Series, the letter preceding the model number indicates the Product Line (E3, E5, E7); 4600x, 4 = number of CPUs in a Node, 6 is socket/segment designation, 00 = Processor SKU, and x = L for low power SKUs. **NOTE:** All processors within the server must be identical. **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. **NOTE:** Intel® Hyper Threading is supported on all processors except E5-4627v3 and E5-4627v4
Cache Memory One of the following depending on Model	55MB (1x55MB) L3 cache **NOTE:** E5-4669v4 processors 45MB (1x45MB) L3 cache **NOTE:** E5-4669v3 and E5-4667v4 processors 35MB (1x35MB) L3 cache **NOTE:** E5-4660v3 and E5-4650v4 processors

Standard Features

30MB (1x30MB) L3 cache
NOTE: E5-4640v3, E5-4650v3, E5-4655v3, E5-4640v4, and E5-4655v4 processors

25MB (1x25MB) L3 cache
NOTE: E5-4627v3, E5-4610v3, E5-4620v3, E5-4610v4, E5-4620v4, and E5-4627v4 processors

Chipset

Intel® C610 Series Chipset

Intel® E5-4600v3 and v4 Processor Families

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

Upgradeability

Upgradeable to four (4) processors

On System Management Chipset

HPE iLO (Firmware HPE iLO4 2.0), 4GB NAND with 1GB USB user space configurable via UEFI and accessible via iLO. Read and learn more in the **iLO QuickSpecs.**

NOTE: For more information, visit: **https://www.hpe.com/us/en/servers/integrated-lights-out-ilo.html**

Memory Protection

Advanced ECC

Memory Online Spare Mode (Rank Spare Mode)

Memory
One of the following depending on Model

Type	HPE SmartMemory DDR4 Load Reduced (LRDIMM), or Registered (RDIMM)
Standard (Pre-configured Models)	128GB (4 x 32GB) DDR4 2400MT/s LRDIMMs at 1.2V 64GB (4 x 16GB) DDR4 2400MT/s RDIMMs at 1.2V
Maximum (LRDIMM)	4TB (32 x 128GB) up to 2400MT/s at 1.2V
Maximum (RDIMM)	512GB (32 x 16GB) up to 2400MT/s at 1.2V

NOTE: HPE memory from previous generation servers (DDR3) is not compatible with this server. HPE SmartMemory is required to realize the memory performance improvements and enhanced functionality listed in this document for Gen9. For additional information, please see the HPE SmartMemory QuickSpecs at: **https://www.hpe.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 2400MT/s, 2133 MT/s, 1866 MT/s, or 1600 MT/s. Please see Memory Population Table or the Online Memory Configuration Tool.

Network Controller
One of the following depending on Model

One (1) or two (2) 20Gb 2-port FlexFabric FLB, 10Gb 2-port HPE 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 HPE BladeSystem c-Class interconnect components. Both ports will operate at the same speed.
NOTE: FlexFabric capabilities require the use of an HPE Virtual Connect FlexFabric or Flex10/10D module module.

Standard Features

Fibre Channel over Ethernet (FCoE) is supported with HPE interconnects. Learn more at: **https://www.hpe.com/us/en/integrated-systems/bladesystem.html**

One (1) HPE FlexFabric 10Gb 2-port 536FLB FlexibleLOM
One (1) HPE Ethernet 10Gb 2-port 560FLB FlexibleLOM
One (1) HPE 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 HPE iLO 4 to Onboard Administrator link. The Onboard Administrator (with 10/100/1000 Mbps) to BladeSystem link is 1Gbps

Expansion Slots

Three (3) 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 slots 2 and 3).
  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 (or interconnect module bays 5 and 6 for mezz slot 3). 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: Four processors must be installed to have access to the second expansion slot (expansion slot 2).

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

HPE Server ROM

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

The HPE 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 HPE ROM-Based Setup Utility (RBSU).

NOTE: For further information, please refer to the HPE RBSU (ROM based setup utility) user guide: **https://www.hpe.com/us/en/support.html**

Standard Features

HPE Server UEFI /Legacy ROM

Unified Extensible Firmware Interface (UEFI) is an industry standard that provides better manageability and more secured configuration while interacting with your server at boot time. HPE ProLiant Gen9 platform defaults to UEFI and can be factory or field configured for Legacy BIOS Boot Mode.
NOTE: The UEFI System Utilities function is analogous to the HPE ROM-Based Setup Utility (RBSU) of legacy BIOS. For more information, please visit **https://www.hpe.com/us/en/product-catalog/detail/pip.6935826.html**

UEFI enables numerous new capabilities specific to HPE ProLiant servers such as:

- Secure Boot
- Operating system specific functionality
- Support for > 2.2 TB (using GPT) boot drives
- USB 3.0 Stack
- Embedded UEFI Shell
- Mass Configuration Deployment Tool using HPE RESTful API
- PXE boot support for IPv6 networks
- Boot support for option cards that only support a UEFI option ROM

NOTE: For more information please visit **https://www.hpe.com/us/en/product-catalog/detail/pip.6935826.html**
NOTE: For UEFI Boot Mode, boot environment and OS image installations should be configured properly to support UEFI.
NOTE: HPE UEFI FIO Setting (758959-B22) can be selected to configure the system in Legacy mode in the factory.

Storage Controller

All BTO Models

One (1) HPE Smart Array P246br Controller with 1GB Flash-Backed Write Cache (FBWC) supporting RAID 0, 1, and 5.
NOTE: The HPE Smart Array P246br and the HPE B140i (chipset SATA). Support four (4) small form factor (SFF) hot plug drive bays.

Maximum Internal Storage
One of the following depending on Model

Hot Plug SFF SAS HDD	4.8TB	4 x 2.4TB
Hot Plug SFF SATA HDD	8.0TB	4 x 2.0TB
Hot Plug SFF SAS SSD	61.2TB	4 x 15.3TB
Hot Plug SFF SATA SSD	15.36TB	4 x 3.84TB
Hot Plug SFF NVMe SSD	4.0TB	2 x 2.0TB

NOTE: The ProLiant BL660c Gen9 server includes the HPE hot plug small form factor (SFF) SmartDrive carrier for enhanced management and reduced maintenance errors. HPE drives from previous generation servers (prior to Gen8) are not compatible with the ProLiant BL660c Gen9 drive bays.
NOTE: A maximum of two (2) NVMe drives are supported on the BL660c Gen9. When using these drives, the other two drive bays must remain unused.

Interfaces

Micro SDHC Slot	One (1) internal Micro Secure Digital High Capacity (Micro SDHC) card slot
USB 3.0 Port	Two (2) internal USB 3.0 connectors 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

Standard Features

TPM 1.2 Support
IEEE (specific IEEE standards depending on Ethernet adapter card(s) installed)
Advanced Encryption Standard (AES)
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 A3
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)
VMware

NOTE: For more information on the HPE 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.hpe.com/info/ossupport** and our driver download page: **http://www.hpe.com/support/BL660cGen9**

Enclosures

Hewlett Packard Enterprise offers two different c-Class server blade enclosures to meet your individual needs:

- The HPE BladeSystem c7000 rack enclosure is 10U high and holds up to eight (8) ProLiant BL660c Gen9 servers plugged vertically.
- The HPE BladeSystem c3000 rack enclosure is 6U high and holds up to four (4) HPE ProLiant BL660c Gen9 servers plugged horizontally.

Server 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: **https://www.hpe.com/us/en/integrated-systems/bladesystem.html#portfolio**

Graphics

Integrated Matrox G200eh video controller

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

HPE 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

HPE ProLiant BL660c Gen9 is a full-height server blade that plugs into the HPE BladeSystem c3000 and c7000 enclosures.

Embedded Management

HPE Integrated Lights Out

Monitor your servers for ongoing management, service alerting, reporting and remote management with iLO. Learn more at **https://www.hpe.com/us/en/servers/integrated-lights-out-ilo.html**

UEFI

Configure and boot your servers securely with industry standard Unified Extensible Firmware Interface (UEFI). Learn more at **https://www.hpe.com/us/en/product-**

Standard Features

		catalog/detail/pip.6935826.html.
	HPE RESTful API	RESTful API is an application programming interface. RESTful Web Service API served by iLO's web server. **https://www.hpe.com/us/en/servers/restful-api.html** .
	Intelligent Provisioning	Provision servers by discovering and deploying 1 to few servers with Intelligent Provisioning. Learn more at **https://www.hpe.com/us/en/product-catalog/detail/pip.5219984.html**.
Server Utilities	**HPE Smart Update**	Optimize firmware and driver updates with HPE Smart Update solutions. Learn more at **https://www.hpe.com/us/en/product-catalog/detail/pip.5182020.html**.
	HPE OneView Standard	HPE OneView Standard can inventory, monitor, alert, and report on your G6 thru Gen9 servers, with use of the REST API and HPE OneView user interface. Annual support is optionally available. Learn more at **https://www.hpe.com/us/en/integrated-systems/software.html**.
	HPE Systems Insight Manager (HPE SIM)	HPE SIM allows you to monitor the health of your HPE ProLiant Servers and HPE Integrity Servers, and also provides you with basic support for non-Hewlett Packard Enterprise servers. HPE SIM also integrates with HPE SUM to provide quick and seemless firmware updates. Learn more at **https://www.hpe.com/us/en/product-catalog/detail/pip.489496.html**.
	Scripting Tool Kit and Windows PowerShell	Provision 1 to many servers using your own scripts to discover and deploy them with HPE Scripting Tool Kit for Windows and Linux or HPE Scripting Tools for Windows PowerShell. Learn more at **https://www.hpe.com/us/en/product-catalog/detail/pip.5219389.html** or **http://www.hp.com/go/powershell**.
	HPE RESTful Interface Tool	HPE RESTful API tool is a scripting tool to provision servers using RESTful API Interface to discover and deploy servers at scale. Learn more at **https://www.hpe.com/us/en/servers/restful-api.html**.
	HPE 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: **https://www.hpe.com/us/en/servers/integrated-lights-out-ilo.html**.

Security

- Power-on password
- Administrator's password
- Keyboard password (QuickLock)
- HPE 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)

Standard Features

- FIPS 140-2 Level-2 certification pending

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 two (2) FlexibleLOMs, providing four (4) (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

- Four (4) Small Form Factor hot-plug SAS/SATA HDD or SSD drive bays.
- Choice of the HPE Smart Array P246br Controller with 1GB FBWC/HPE or the HPE B140i (chipset SATA). RAID 0 and 1 support for both 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 HPE 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.
- HPE 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. HPE 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 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.

Standard Features

Warranty

This product is covered by a global limited warranty and supported by HPE Services and a worldwide network of Hewlett Packard Enterprise 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 HPE Pointnext operational 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 Hewlett Packard Enterprise replace Optional CSR parts at no charge. Additional information regarding worldwide limited warranty and technical support is available at **http://h20564.www2.hpe.com/hpsc/wc/public/home**.

Optional Features

Fibre Channel Support		Up to three (3) optional Fibre Channel mezzanine HBAs are supported on the HPE ProLiant BL660c Gen9.
Compatible SAN		HPE ProLiant BL660c Gen9 server blades are optimized for HPE MSA, EVA, 3PAR and XP. HPE ProLiant BL660c Gen9 server blades are compatible with select 3rd party SANs. Please see blade storage page for more details at **https://www.hpe.com/us/en/integrated-systems/bladesystem.html#portfolio**.
HPE Virtual Connect		HPE Virtual Connect is an interconnect option for c-Class BladeSystem that simplifies server connectivity to data and storage networks, and reduces costs. Unique HPE 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). HPE OneView's software-defined approach to infrastructure management enables central console to administer network connections and workloads for thousands of servers, see **https://www.hpe.com/us/en/integrated-systems/software.html** For more information on Virtual Connect Ethernet, Fibre Channel, Converged Network and management options, see **https://www.hpe.com/us/en/integrated-systems/virtual-connect.html**.
Embedded Management	**iLO Advanced for BladeSystem**	HPE iLO Advanced for BladeSystem licenses offer smart remote functionality without compromise, for all HPE 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 HPE iLO Advanced at **https://www.hpe.com/us/en/servers/integrated-lights-out-ilo.html**
Server Management	**HPE Insight Control**	HPE Insight Control, lets you deploy, migrate, monitor, remote control, and optimize your IT infrastructure through a single, simple management console. For more information, see **https://www.hpe.com/us/en/servers/management.html**.
	HPE OneView Advanced	HPE OneView Advanced is converged management that reduces infrastructure complexity with automation simplicity. This modern architecture accelerates your IT operations across servers, storage, and network resources using software-defined approaches and automation. Learn more at **https://www.hpe.com/us/en/integrated-systems/software.html**.
	HPE Matrix Operating Environment	The HPE 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 HPE Matrix OE includes the automated provisioning, optimization, and recovery management capabilities for HPE CloudSystem Matrix, the ideal platform for private cloud and Infrastructure as a Service (IaaS).

Optional Features

		NOTE: For more information, visit: **https://h20564.www2.hpe.com/hpsc/doc/public/display?docId=emr_na-c04762113**
	HPE Insight Cluster Management Utility (CMU)	HPE 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 **https://www.hpe.com/us/en/product-catalog/detail/pip.3296361.html**.
High Performance Clusters	**HPE Cluster Platforms**	HPE 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. **https://www.hpe.com/us/en/solutions/hpc-high-performance-computing.html**
	HPE HPC Interconnects	High Performance Computing (HPC) interconnect technologies are available for this server as part of the HPE Cluster Platform portfolio. These high-speed InfiniBand and Gigabit interconnects are fully supported by Hewlett Packard Enterprise when integrated within an HPE cluster. Flexible, validated solutions can be defined with the help of configuration tools. **https://www.hpe.com/us/en/solutions/hpc-high-performance-computing.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 HPE 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, HPE data protection and recovery software will cost-effectively protect you against disaster and ensure business continuity.
- **Data Archive and Migration Software**
  The HPE 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)**
  The HPE 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**
  Hewlett Packard Enterprise 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 HPE storage and networking with software that enables hardware-specific configuration, performance tuning and connectivity management.
- **HPE StoreVirtual VSA**
  HPE 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 HPE StoreVirtual VSA software with 1TB of capacity.
  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: **https://www.hpe.com/us/en/product-**

Optional Features

catalog/storage/storage-software/pip.hpe-storevirtual-vsa-software.5306917.html

NOTE: For more information available Storage Software including QuickSpecs, please see: **https://www.hpe.com/us/en/product-catalog/storage/storage-software.hits-12.html**.

Expansion Blade Support	Supports one (1) optional D2220sb storage or PCI expansion blade **NOTE:** Expansion blade support requires the use of either the HPE Dynamic Smart Array B140i or the HPE Smart Array P246br controller.d **NOTE:** Expansion blade support requires server firmware versions from SPP 2015.04 or later
HPE Insight Online	HPE Insight Online is part of the HPE Support Center for one stop, secure access to product and HPE support information personalized to your IT environment. Insight Online can automatically display devices remotely monitored by HPE Remote Support tools. With Insight Online's easy navigation you can efficiently track your IT support contracts and device status from anywhere and at anytime. **https://www.hpe.com/us/en/servers/management.html**
Get connected to HPE	To get the most from your investment in Hewlett Packard Enterprise servers, get connected to Hewlett Packard Enterprise using our innovative remote support technology which provides system health monitoring, pre-failure alert notification and more. For details, visit **https://www.hpe.com/us/en/services/platform-consulting-services.html**
Factory Express Portfolio for Servers and Storage	HPE Factory Express offers configuration, customization, integration and deployment services for Hewlett Packard Enterprise 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. Hewlett Packard Enterprise products supported through Factory Express include a wide array of servers and storage: HPE Integrity, HPE ProLiant, HPE ProLiant Server Blades, HPE BladeSystem, HPE 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: **https://www.hpe.com/us/en/services/factory-express.html**
HPE 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 the HPE Customer Business Center or an Authorized Partner for assistance. **https://h22174.www2.hpe.com/SimplifiedConfig/Welcome**

Service and Support

Service and Support

HPE Technology Services for BladeSystem

HPE Technology Services delivers confidence, reduces risk and helps customers realize agility and stability. Connect to Hewlett Packard Enterprise 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 HPE Pointnext operational services

HPE Pointnext operational services enable you to order the right service level, length of coverage and response time as you purchase your new server, giving you full entitlement for the term you select.

Optimized Support recommendation

HPE 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 Hewlett Packard Enterprise 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 Hewlett Packard Enterprise where we own all cases through to resolution. Hewlett Packard Enterprise is a leading provider of support services for most operating systems used on HPE BladeSystem with long, successful partnerships with vendors such as Microsoft, Red Hat, VMware, SUSE and others. Purchasing software support from Hewlett Packard Enterprise simplifies troubleshooting and shortens time to resolution with one call for hardware or software questions.
https://www.hpe.com/h20195/V2/GetDocument.aspx?docname=4AA5-3259ENW&cc=us&lc=en

Standard Support recommendation

HPE 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 Hewlett Packard Enterprise. 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.hpe.com/v2/GetPDF.aspx/4AA3-8855ENW.pdf

Related Services

Data Center Platform Consulting Services

Choose HPE 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. Hewlett Packard Enterprise understands the needs of the data center of the future and will serve as your guide for the journey.
https://www.hpe.com/us/en/services/platform-consulting-services.html

Data Privacy Services

Protect your data through better media management. HPE 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.
https://www.hpe.com/us/en/services/platform-consulting-services.html

Service and Support

Factory Express for Servers and storage

HPE Factory Express offers configuration, customization, integration and deployment services for Hewlett Packard Enterprise servers and storage products. Choose how your factory solutions are built, tested, integrated, shipped and deployed.
https://www.hpe.com/us/en/services/factory-express.html

HPE ProLiant Blade Server Hardware Installation

This easy-to-buy, easy-to-use HPE Pointnext operational service helps ensure your new HPE BladeSystem hardware is installed smoothly, efficiently and with minimal disruption to your IT and business operations.
https://www.hpe.com/us/en/services/operational.html

Additional hardware Installation services for HPE BladeSystem

In addition to hardware installation of your Blade server, Hewlett Packard Enterprise offers installation and startup services for your BladeSystem and Network infrastructure.
https://www.hpe.com/us/en/services/operational.html

Connect your devices to HPE

Unlock all of the benefits of your technology investment by connecting your products to Hewlett Packard Enterprise. Achieve up to 77% reduction in down time, near 100% diagnostic accuracy and a single consolidated view of your environment. By connecting, you will receive 24x7monitoring, pre-failure alerts, automatic call logging, and automatic parts dispatch. HPE Proactive Care Service and HPE Datacenter Care Service customers will also benefit from proactive activities to help prevent issues and increase optimization. All of these benefits are already available to you with your server storage and networking products, securely connected to Hewlett Packard Enterprise support.

Parts and Materials

Hewlett Packard Enterprise will provide HPE-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 Hewlett Packard Enterprise due to malfunction.

Configuration Information - Factory Integrated Models

E5-4600 v4 series Processors

HPE ProLiant BL660c Gen9 E5-4650v4 2.2GHz 14-core 4-processor 128GB-L Server 844355-B21	**Processor(s)**	(4) Intel® Xeon® E5-4650 v4 (2.2GHz/14-core/35MB/9.6GT-s QPI/105W, DDR4-2400, HT, Turbo)
	Cache Memory	35MB (1x35MB) Level 3 cache
	Memory	128GB (4x 32GB) 2400-L (DDR4-2400) Load Reduced DIMMs at 1.2V) **NOTE:** Total of 32 DIMM slots.
	Network Controller	(2) HPE FlexFabric 20Gb 2-port 630FLB FlexibleLOM
	Storage Controller	HPE Smart Array P246br Controller with 1GB FBWC RAID 0,1,5
	Hard Drive	None ship standard Supports up to four (4) HPE hot-plug SFF SAS/SATA/SDD drives **NOTE:** NVMe SSDs are not supported on this model.
	Internal Storage	SAS: 8TB; SATA: 8TB; SAS SSD: 7.68TB; SATA SSD: 7.68TB
	Optical Drive Bay	None
	Expansion Slots	3 standard - Slot 1 supports Type A mezzanine Cards. Slots 2 and 3 support Type A and Type B mezzanine cards.
	Management	HPE iLO Management (standard) Optional: HPE OneView or HPE Insight Control
	Form Factor	Up to four (4) full-height blades supported in the HPE BladeSystem c3000 Enclosure Up to eight (8) full-height blades supported in HPE BladeSystem c7000 Enclosure
	Warranty	Server warranty includes 3-year Parts, 3-year Labor, 3-year on-site support.

HPE ProLiant BL660c Gen9 E5-4610v4 1.8GHz 10-core 2-processor 64GB-R Server 844356-B21	**Processor(s)**	(2) Intel® Xeon® E5-4610 v4 (1.8GHz/10-core/25MB/6.4GT-s QPI/105W, DDR4-1866, HT)
	Cache Memory	25MB (1x25MB) Level 3 cache
	Memory	64GB (4x 16GB) 2400-R (DDR4-2400) Registered DIMMs at 1.2V) **NOTE:** Total of 32 DIMM slots.
	Network Controller	(2) HPE FlexFabric 10Gb 2-port 536FLB FlexibleLOM
	Storage Controller	HPE Smart Array P246br Controller with 1GB FBWC RAID 0,1,5
	Hard Drive	None ship standard Supports up to four (4) HPE hot-plug SFF SAS/SATA/SDD drives **NOTE:** NVMe SSDs are not supported on this model.
	Internal Storage	SAS: 8TB; SATA: 8TB; SAS SSD: 7.68TB; SATA SSD: 7.68TB
	Optical Drive Bay	None
	Expansion Slots	3 standard - Slot 1 supports Type A mezzanine Cards. Slots 2 and 3 support Type A and Type B mezzanine cards.
	Management	HPE iLO Management (standard) Optional: HPE OneView or HPE Insight Control
	Fñorm Factor	Up to four (4) full-height blades supported in the HPE BladeSystem c3000 Enclosure Up to eight (8) full-height blades supported in HPE BladeSystem c7000 Enclosure
	Warranty	Server warranty includes 3-year Parts, 3-year Labor, 3-year on-site support.

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, Hewlett Packard Enterprise recommends the use of a Hewlett Packard

Configuration Information - Factory Integrated Models

Enterprise 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 Server Blade.
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	HPE ProLiant BL660c Gen9 E5-v4 10Gb/20Gb FlexibleLOM Configure-to-order Blade Server	844352-B21

Configurable Models ship with:

Two (2) FlexibleLOM connectors providing a choice for one or two of the supported 10Gb/20Gb FlexibleLOMs (see Step 2)
Four (4) HPE small form factor hot-plug SAS/SATA/ HDD or SSD hard drive bays
Three (3) x16 PCIe I/O expansion slots (one Type A, two Type A/B)
Two (2) integrated USB connector and one (1) MicroSDHC connector
One (1) TPM connector
HPE iLO Management (standard)

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

NOTE: All configure-to-order processor kits (i.e. xxxxxx-L21) contain two (2) processors.
NOTE: If four processors are desired, select one xxxxxx-L21 here in Step 2 and one xxxxxx-B21 in Step 4.
NOTE: The BL660c Gen9 supports two or four processors; one and three processor configurations are not supported

HPE Processors	**E5-4600 v4 series Processors**	
	HPE BL660c Gen9 Intel Xeon E5-4640v4 (2.1GHz/12-core/30MB/105W) FIO 2-processor Kit	844373-L21
	HPE BL660c Gen9 Intel Xeon E5-4620v4 (2.1/GHz/10-core/25MB/105W) FIO 2-processor Kit	844374-L21
	HPE BL660c Gen9 Intel Xeon E5-4610v4 (1.8GHz/10-core/25MB/105W) FIO 2-Processor Kit	844375-L21
	HPE BL660c Gen9 Intel Xeon E5-4669v4 (2.2GHz/22-core/55MB/135W) FIO 2-processor Kit	844376-L21
	HPE BL660c Gen9 Intel Xeon E5-4667v4 (2.2GHz/18-core/45MB/135W) FIO 2-processor Kit	844377-L21
	HPE BL660c Gen9 Intel Xeon E5-4627v4 (2.6GHz/10-core/25MB/135W) FIO 2-processor Kit	844378-L21
	HPE BL660c Gen9 Intel Xeon E5-4650v4 (2.2GHz/14-core/35MB/105W) FIO 2-processor Kit	844372-L21

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: Supports 2 or 4 processors. Mixing different processor models is not supported.
NOTE: For the Intel® C610 Chipset E5-6600 v3 Series, the letter preceding the model number indicates the Product Line (E3, E5, E7); 4600x, 4 = number of CPUs in a Node, 6 is socket/segment designation, 00 = Processor SKU, and x = L for low power SKUs.
NOTE: All processors within the server must be identical.

Configuration Information - Factory Integrated Models

NOTE: Intel® Hyper Threading is supported on all processors except E5-4627v3 and E5-4627v4

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

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

NOTE: 128GB DIMMs cannot be mixed with any other capacity of DIMM within the server.

NOTE: Depending on the memory configuration and processor model, the memory speed may run at 2400MT/s, 2133 MT/s, 1866 MT/s, or 1600 MT/s. Please see Memory Population Table or the Online Memory Configuration Tool at: **https://h22195.www2.hpe.com/ddr4memoryconfig/home/legal**

HPE Memory

HPE SmartMemory

Registered DIMMs (RDIMMs) - E5-4600 v4 series Processors

HPE 16GB (1x16GB) Single Rank x4 DDR4-2400 CAS-17-17-17 Registered Memory Kit	805349-B21
HPE 32GB (1x32GB) Dual Rank x4 DDR4-2400 CAS-17-17-17 Registered Memory Kit	805351-B21
HPE 8GB (1x8GB) Single Rank x8 DDR4-2400 CAS-17-17-17 Registered Memory Kit	805347-B21
HPE 16GB (1x16GB) Dual Rank x4 DDR4-2400 CAS-17-17-17 Registered Memory Kit	836220-B21

Load Reduced DIMMs (LRDIMMs) - E5-4600 v4 series Processors

HPE 64GB (1x64GB) Quad Rank x4 DDR4-2400 CAS-17-17-17 Load Reduced Memory Kit	805358-B21
HPE 32GB (1x32GB) Dual Rank x4 DDR4-2400 CAS-17-17-17 Load Reduced Memory Kit	805353-B21
HPE 128GB (1x128GB) Octal Rank x4 DDR4-2400 CAS-20-18-18 Load Reduced Memory Kit	809208-B21

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: **https://www.hpe.com/us/en/about/environment/eco-labels.html**

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.

NOTE: Up to two (2) FlexibleLOMs can be used with either two (2) or four (4) processors.

HPE 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.

20Gb FlexibleLOM Adapters

HPE FlexFabric 20Gb 2-port 630FLB Adapter	700065-B21
HPE FlexFabric 20Gb 2-port 650FLB Adapter	700763-B21

10Gb FlexibleLOM Adapters

HPE FlexFabric 10Gb 2-port 536FLB Adapter	766490-B21
HPE Ethernet 10Gb 2-port 560FLB Adapter	655639-B21

Configuration Information - Factory Integrated Models

NOTE: Please see the QuickSpecs for Technical Specifications and additional information: **https://www.hpe.com/us/en/product-catalog/servers/server-adapters.hits-12.html**

Step 3: Choose Additional Factory Integration Options

HPE Software	**HPE OneView Advanced with HPE iLO Advanced & with rights-to-use HPE Insight Control (Server hardware required on the same purchase order)**	
HPE OneView Software for Converged Mgmt	HPE OneView for Blade Server including 3yr 24x7 Support FIO Bundle Physical 1-server LTU	F6Q89A
HPE Storage Controllers	HPE Smart Array P246br/1GB FBWC 12Gb 4-ports Int FIO SAS Controller	749975-B21
	HPE FIO Enable Smart Array SW RAID	784308-B21
	HPE BL460c G9 Broadwell NVMe FIO Setting	825555-B21
	NOTE: The HPE Gen9 Broadwell NVMe FIO Setting (825555-B21) is required to support up to 2 SFF NVMe SSDs within the system. This option disables SFF bays 3 and 4 and is not compatible with the HPE Smart Array P246br. Hewlett Packard Enterprise recommends the use of a dual M.2 solid state drive kit for boot when using this option. **NOTE:** The HPE Smart Array B140i Controller (chipset SATA) comes standard with the HPE BL660c Gen9 10Gb/20Gb FLB CTO Blade. If the HPE Smart Array P246br controller is not chosen, SATA cables will be provided to support SATA devices for the four internal drives. If RAID is required when using the B140i, please choose 'HPE 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:

- HPE BladeSystem c3000 Enclosure QuickSpecs: **https://www.hpe.com/h20195/v2/GetDocument.aspx?docname=c04123379**
  NOTE: The c3000 HPE 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.
- HPE BladeSystem c7000 Enclosure QuickSpecs: **https://www.hpe.com/h20195/v2/GetDocument.aspx?docname=c04229580**
  NOTE: The c7000 HPE 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.
- HPE BladeSystem c-Class Interconnect and Mezzanine Components: **https://www.hpe.com/us/en/integrated-systems/bladesystem.html#portfolio** and **https://www.hpe.com/us/en/integrated-systems/bladesystem.html#portfolio**

Core Options

HPE 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 (HPE BladeSystem c7000 Enclosure) or bays 2-4 (HPE BladeSystem c3000 Enclosure).

20 Gigabit Ethernet Mezzanine Cards

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

NOTE: Please see QuickSpecs for technical specifications and additional information at **https://www.hpe.com/h20195/v2/GetDocument.aspx?docname=c04312720**

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

NOTE: Please see QuickSpecs for technical specifications and additional information at **https://www.hpe.com/h20195/v2/GetDocument.aspx?docname=c04347342**

10 Gigabit Ethernet Mezzanine Cards

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

NOTE: Please see QuickSpecs for technical specifications and additional information at: **https://www.hpe.com/h20195/v2/GetHTML.aspx?docname=c04111368**

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

NOTE: Please see QuickSpecs for technical specifications and additional information at: **https://www.hpe.com/h20195/v2/GetHTML.aspx?docname=c04111406.**

1 Gigabit Ethernet Mezzanine Cards

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

NOTE: Please see QuickSpecs for technical specifications and additional information at: **https://www.hpe.com/h20195/v2/GetHTML.aspx?docname=c04111456**

FlexibleLOM Adapters

NOTE: The server supports a maximum of two FlexibleLOMs that are installed in the FlexibleLOM connectors. Both can be used with either two (2) or four (4) processors.
NOTE: For a single FlexibleLOM Factory Integrated Model configuration, select the option here in the "Step 2" HPE Networking section.
NOTE: For a two FlexibleLOM Factory Integrated Model configuration, the second FlexibleLOM is a different part number. When two FlexibleLOMs are needed you must select the first FlexibleLOM in the "Step 2" HPE Networking section and the second FlexibleLOM from here in "Step 4" HPE Networking section.

20Gb FlexibleLOM Adapters

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

NOTE: Please see QuickSpecs for technical specifications and additional information at **https://www.hpe.com/h20195/v2/GetDocument.aspx?docname=c04312719**

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

NOTE: Please see QuickSpecs for technical specifications and additional information at **https://www.hpe.com/h20195/v2/GetDocument.aspx?docname=c04347341**

10Gb FlexibleLOM Adapters

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

NOTE: Please see QuickSpecs for technical specifications and additional information at **https://www.hpe.com/h20195/v2/GetDocument.aspx?docname=c04347246**

Core Options

	HPE Ethernet 10Gb 2-port 560FLB Adapter	655639-B21
	NOTE: Please see QuickSpecs for technical specifications and additional information at **https://www.hpe.com/h20195/v2/GetHTML.aspx?docname=c04111516**	
	HPE 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.	
	NOTE: InfiniBand QDR and FDR speeds are only supported on the HPE BladeSystem c7000 Enclosure. For additional information, please see the HPE BladeSystem c7000 Enclosure and InfiniBand QuickSpecs at: **https://www.hpe.com/h20195/v2/GetHTML.aspx?docname=c04126044** **https://www.hpe.com/h20195/v2/GetHTML.aspx?docname=c04154440**	
	HPE 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.	
	HPE InfiniBand FDR 2-port 545M Adapter	702213-B21
HPE Fibre Channel	HPE LPe1605 16Gb Fibre Channel HBA for BladeSystem c-Class	718203-B21
	HPE QMH2672 16Gb Fibre Channel Host Bus Adapter	710608-B21
	NOTE: Please see QuickSpecs for technical specifications and additional information at **https://www.hpe.com/h20195/v2/GetDocument.aspx?docname=c04126962**	
	HPE LPe1205A 8Gb Fibre Channel Host Bus Adapter for BladeSystem c-Class	659818-B21
	NOTE: Please see QuickSpecs for technical specifications and additional information at **https://www.hpe.com/h20195/v2/GetDocument.aspx?docname=c04163733**	
HPE Processors	**NOTE:** All configure-to-order processor kits (i.e. xxxxxx-L21) contain two (2) processors. **NOTE:** If four processors are desired, select one xxxxxx-L21 here in Step 2 and one xxxxxx-B21 in Step 4. **NOTE:** The BL660c Gen9 supports two or four processors; one and three processor configurations are not supported.	
	E5-4600 v4 series Processors	
	HPE BL660c Gen9 Intel Xeon E5-4650v4 (2.2GHz/14-core/35MB/105W) 2-processor Kit	844372-B21
	HPE BL660c Gen9 Intel Xeon E5-4640v4 (2.1GHz/12-core/30MB/105W) 2-processor Kit	844373-B21
	HPE BL660c Gen9 Intel Xeon E5-4620v4 (2.1GHz/10-core/25MB/105W) 2-Processor Kit	844374-B21
	HPE BL660c Gen9 Intel Xeon E5-4610v4 (1.8GHz/10-core/25MB/105W) 2-Processor Kit	844375-B21
	HPE BL660c Gen9 Intel Xeon E5-4669v4 (2.2GHz/22-core/55MB/135W) 2-processor Kit	844376-B21
	HPE BL660c Gen9 Intel Xeon E5-4667v4 (2.2GHz/18-core/45MB/135W) 2-processor Kit	844377-B21
	HPE BL660c Gen9 Intel Xeon E5-4627v4 (2.6GHz/10-core/25MB/135W) 2-processor Kit	844378-B21
	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:** Supports 2 or 4 processors. Mixing different processor models is not supported. **NOTE:** For the Intel® C610 Chipset E5-4600 v3 Series, the letter preceding the model number indicates the Product Line (E3, E5, E7); 4600x, 4 = number of CPUs in a Node, 6 is socket/segment designation, 00 = Processor SKU, and x = L for low power SKUs. **NOTE:** All processors within the server must be identical.	

Core Options

NOTE: Intel® Hyper Threading is supported on all processors except E5-4627v3 and E5-4627v4

HPE Memory

NOTE: HPE memory from previous generation servers (DDR3) is not compatible with this server. HPE SmartMemory is required to realize the memory performance improvements and enhanced functionality listed in this document for Gen9. For additional information, please see the HPE SmartMemory QuickSpecs at:
https://www.hpe.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 2400MT/s, 2133 MT/s, 1866 MT/s, or 1600 MT/s. Please see Memory Population Table or the Online Memory Configuration Tool at: **https://h22195.www2.hpe.com/ddr4memoryconfig/home/legal**

HPE SmartMemory

Registered DIMMs (RDIMMs) - E5-4600 v4 series Processors

HPE 16GB (1x16GB) Single Rank x4 DDR4-2400 CAS-17-17-17 Registered Memory Kit	805349-B21
HPE 32GB (1x32GB) Dual Rank x4 DDR4-2400 CAS-17-17-17 Registered Memory Kit	805351-B21
HPE 8GB (1x8GB) Single Rank x8 DDR4-2400 CAS-17-17-17 Registered Memory Kit	805347-B21
HPE 16GB (1x16GB) Dual Rank x4 DDR4-2400 CAS-17-17-17 Registered Memory Kit	836220-B21

Load Reduced DIMMs (LRDIMMs) - E5-4600 v4 series Processors

HPE 64GB (1x64GB) Quad Rank x4 DDR4-2400 CAS-17-17-17 Load Reduced Memory Kit	805358-B21
HPE 32GB (1x32GB) Dual Rank x4 DDR4-2400 CAS-17-17-17 Load Reduced Memory Kit	805353-B21
HPE 128GB (1x128GB) Octal Rank x4 DDR4-2400 CAS-20-18-18 Load Reduced Memory Kit	809208-B21

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: **https://www.hpe.com/us/en/about/environment/eco-labels.html**

HPE Hard Drives

NOTE: The standard ProLiant BL660c Gen9 server includes the HPE hot-plug small form factor (SFF) SmartDrive carrier for enhanced management and reduced maintenance errors. HPE drives from generation G7 servers and before are not compatible with the BL660c 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: HPE hard drives have either a one year or three year warranty; refer to the specific hard drive QuickSpecs for details.
NOTE: The hard drive options are not required when configuring a drive-less model.
NOTE: The HPE Gen9 Broadwell NVMe FIO Setting (825555-B21) is required to support up to 2 SFF NVMe SSDs within the system. This option disables SFF bays 3 and 4 and is not compatible with the HPE Smart Array P246br. Hewlett Packard Enterprise recommends the use of a dual M.2 solid state drive kit for boot when using this option.
NOTE: Hewlett Packard Enterprise has qualified the NVMe drive portfolio using the Operating System inbox drivers, full detail on the Solid State Drive QuickSpecs:

HPE NVMe PCIe Read Intensive SFF (2.5-inch) Solid State Drives

HPE 2TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	877986-B21

Core Options

HPE 480GB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	875587-B21
HPE 960GB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	875589-B21
HPE 1.92TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	875591-B21
HPE 1TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	877984-B21
HPE 4TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	877988-B21
HPE NVMe PCIe Mixed Use SFF (2.5-inch) Solid State Drives	
HPE 400GB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	875593-B21
HPE 800GB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	875595-B21
HPE 1.6TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	875597-B21
HPE 1TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	877984-B21
HPE 4TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	877988-B21
HPE NVMe PCIe Write Intensive SFF (2.5-inch) SCN Drives	
HPE 375GB NVMe x4 Lanes Write Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	878014-B21
SATA Hot Plug SmartDrive SFF (2.5-inch) SSD Drives	
HPE 240GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P04556-B21
HPE 480GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P04560-B21
HPE 960GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P04564-B21
HPE 1.92TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P04566-B21
HPE 3.84TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P00896-B21
HPE 3.84TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P04570-B21
HPE 240GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	877740-B21
HPE 480GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	877746-B21
HPE 960GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	877752-B21
HPE 1.92TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	877758-B21
HPE 3.84TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	877764-B21
HPE 480GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	877776-B21
HPE 960GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	877782-B21
HPE 1.92TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	877788-B21
HPE 240GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	880295-B21
SAS Hot Plug with SmartDrive SFF (2.5-inch) Enterprise Drives	
HPE 300GB SAS 12G Enterprise 15K SFF (2.5in) SC 3yr Wty Digitally Signed Firmware HDD	870753-B21
HPE 600GB SAS 12G Enterprise 15K SFF (2.5in) SC 3yr Wty Digitally Signed Firmware HDD	870757-B21
HPE 900GB SAS 12G Enterprise 15K SFF (2.5in) SC 3yr Wty Digitally Signed Firmware HDD	870759-B21
HPE 1TB SAS 12G Midline 7.2K SFF (2.5in) SC 1yr Wty 512e Digitally Signed Firmware HDD	765464-B21
HPE 2TB SAS 12G Midline 7.2K SFF (2.5in) SC 1yr Wty 512e HDD	765466-B21

Core Options

HPE 2.4TB SAS 12G Enterprise 10K SFF (2.5in) SC 3yr Wty 512e Digitally Signed Firmware HDD	881457-B21
HPE 1TB SAS 7.2K SFF SC 3yr Wty Digitally Signed Firmware HDD	832514-B2
HPE 900GB SAS 12G Enterprise 15K SFF (2.5in) SC 3yr Wty 512e Digitally Signed Firmware HDD	870765-B21
SATA (2.5-inch) Hard Drives	
HPE 1TB SATA 6G Midline 7.2K SFF (2.5in) SC 1yr Wty Digitally Signed Firmware HDD	655710-B21
HPE 2TB SATA 6G Midline 7.2K SFF (2.5in) SC 1yr Wty 512e Digitally Signed Firmware HDD	765455-B21
12G SAS Write Intensive SFF (2.5-inch) SC DS SSD	
HPE 400GB SAS 12G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	873351-B21
HPE 800GB SAS 12G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	873355-B21
HPE 1.6TB SAS 12G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	873357-B21
12G SAS Read Intensive SFF (2.5-inch) SC SSD	
HPE 1.92TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	875326-B21
HPE 960GB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	875313-B21
HPE 480GB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	875311-B21
HPE 960GB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	872390-B21
HPE 1.92TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	872392-B21
HPE 3.84TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	872394-B21
HPE 3.84TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	875330-B21
HPE 7.68TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	870144-B21
HPE 15.3TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	870148-B21
12G SAS Mixed Use SFF (2.5-inch) SC SSD	
HPE 400GB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	873359-B21
HPE 800GB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	873363-B21
HPE 1.6TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	873365-B21
HPE 3.2TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	873367-B21
HPE 400GB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	872374-B21
HPE 800GB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	872376-B21
HPE 1.6TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	872382-B21
HPE 3.2TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	872386-B21
6G SAS Mixed Use SFF (2.5-inch) SC Solid State Drive	
HPE 1.92TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	875478-B21
HPE 960GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	875474-B21
HPE 480GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	875470-B21
HPE 240GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	875483-B21
12G SAS SFF (2.5-inch) SC 3yr Wty H2 Drive	
HPE 1.8TB SAS 12G Enterprise 10K SFF (2.5in) SC 3yr Wty 512e Digitally Signed Firmware HDD	872481-B21
HPE 1.2TB SAS 12G Enterprise 10K SFF (2.5in) SC 3yr Wty Digitally Signed Firmware HDD	872479-B21
HPE 600GB SAS 12G Enterprise 10K SFF (2.5in) SC 3yr Wty Digitally Signed Firmware HDD	872477-B21
HPE 300GB SAS 12G Enterprise 10K SFF (2.5in) SC 3yr Wty Digitally Signed Firmware HDD	872475-B21
12G SATA 2.5in RI-3 SFF SC SSD	

Core Options

HPE 3.84TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	P00896-B21
HPE 1.92TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	875513-B21
HPE 960GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	875511-B21
HPE 480GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	875509-B21
HPE 240GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	875503-B21

NOTE: Please see the QuickSpecs for technical specifications and information at **https://www.hpe.com/h20195/v2/GetHTML.aspx?docname=c04154378**

Additional Options

HPE iLO Advanced License	**HPE Integrated Lights-Out (iLO) Advanced for ProLiant BladeSystem Remote Management**	
	HPE iLO Advanced for BladeSystem Electronic License with 3yr Support on iLO Licensed Features	E6U63ABE
	HPE iLO Advanced for BladeSystem 1-server License with 3yr Support on iLO Licensed Features	BD502A
	HPE iLO Advanced for BladeSystem Electronic License with 1yr Support on iLO Licensed Features	E6U60ABE
	HPE iLO Advanced for BladeSystem 1-server License with 1yr Support on iLO Licensed Features	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 HPE 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 HPE Software Technical Support Service. **NOTE:** For additional license kits, please see the QuickSpecs at: **https://www.hpe.com/h20195/v2/GetHTML.aspx?docname=c04154343**	
HPE OneView Software for Converged Mgmt	**HPE OneView Advanced (with HPE iLO Advanced and with rights-to-use HPE Insight Control)**	
	HPE OneView including 3yr 24x7 Support Physical 1-server LTU	E5Y34A
	HPE OneView including 3yr 24x7 Support Flexible Quantity E-LTU	E5Y35AAE
	HPE OneView Physical Media Kit LTU	E5Y37A
	HPE OneView w/o iLO including 3yr 24x7 Support 1-server LTU	P8B24A
	HPE OneView w/o iLO including 3yr 24x7 Support Flexible Quantity E-LTU	P8B26AAE
	HPE OneView w/o iLO including 3yr 24x7 Support 1-server FIO LTU	P8B31A
	NOTE: For additional license kits please see the QuickSpecs at **https://www.hpe.com/h20195/v2/GetHTML.aspx?docname=c04154343** **NOTE:** Full licenses of HPE OneView Advanced also provide the right-to-use HPE Insight Control without additional charge. **NOTE:** Server provisioning (via 'HPE Insight Control server provisioning') is licensed as part of HPE OneView Advanced and provides multi-server OS and driver provisioning. Media kit #BD883A can be ordered for a physical copy of this software (USB flash drive). **NOTE:** Licenses ship without media. The HPE OneView Media Kit can be ordered separately, or can be downloaded at: **https://www.hpe.com/us/en/integrated-systems/software.html** **NOTE:** Electronic and Flexible-Quantity licenses can be used to purchase multiple licenses with a single activation key. **NOTE:** For additional license kits please see the QuickSpecs at **https://www.hpe.com/h20195/v2/GetHTML.aspx?docname=c04111367**.	
High Performance Clusters	**HPE Cluster Management Utility**	
	HPE Insight Cluster Management Utility 1yr 24x7 Flexible LTU	QL803B
	HPE Insight Cluster Management Utility 3yr 24x7 Flexible LTU	BD476A

Core Options

	NOTE: These part numbers can be used to purchase one certificate for multiple licenses and support with a single activation key. Each license is for one node (server). Customer will receive a printed end user license agreement and license entitlement certificate via physical shipment. The license entitlement certificate must be redeemed online in order to obtain a license key. Customer also will receive a support agreement.	
	HPE Insight Cluster Management Utility Media	BD477A
HPE Security	HPE Trusted Platform Module Option	488069-B21
	HPE Trusted Platform Module 2.0 Kit	745823-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 R2. 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 R2 has not been tampered with while the system was offline. **NOTE:** For more information about TPM, including a white paper, go to **https://www.hpe.com/h20195/v2/GetPDF.aspx/c04939549.pdf**. **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.	
HPE Storage Controllers	HPE Smart Array P246br/1GB FBWC 12Gb 4-ports Int SAS Controller	726793-B21
	HPE BL460c G9 Broadwell NVMe FIO Setting	825555-B21
	NOTE: The HPE Gen9 Broadwell NVMe FIO Setting (825555-B21) is required to support up to 2 SFF NVMe SSDs within the system. This option disables SFF bays 3 and 4 and is not compatible with the HPE Smart Array P246br. Hewlett Packard Enterprise recommends the use of a dual M.2 solid state drive kit for boot when using this option. **NOTE:** The HPE Smart Array B140i Controller (chipset SATA) comes standard with the HPE BL660c Gen9 10Gb/20Gb FLB CTO Blade. If the HPE Smart Array P246br controller is not chosen, SATA cables will be provided to support SATA devices for the four internal drives. If RAID is required when using the B140i, please choose 'HPE FIO B140i RAID Enable Kit – BIOS Setting' (784308-B21).	
HPE 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 any other mezzanine slot, both ports are active.	
	NOTE: InfiniBand QDR and FDR speeds are only supported on the HPE BladeSystem c7000 Enclosure. For additional information, please see the HPE BladeSystem c7000 Enclosure and InfiniBand QuickSpecs at: **https://www.hpe.com/h20195/v2/GetHTML.aspx?docname=c04126044** **https://www.hpe.com/h20195/v2/GetHTML.aspx?docname=c04154440**	
	HPE 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 any mezzanine slot if operated in any other mode.	
	HPE InfiniBand FDR 2-port 545M Adapter	702213-B21
	HPE Flash Media Kits for USB Drives	
	HPE Enterprise Mainstream Flash Media Kits for Memory Cards	

Core Options

HPE Flash Media Kits for USB Drives	HPE 8GB microSD Flash USB Drive	737953-B21
	HPE 8GB microSD Flash Memory Card	726116-B21
	HPE 32GB microSD Flash Memory Card	700139-B21
	HPE 8GB Dual microSD Flash USB Drive	741279-B21
	NOTE: Please see the QuickSpecs for Technical Specifications and additional information: **https://www.hpe.com/h20195/v2/GetHTML.aspx?docname=c04123175**	
HPE Pointnext operational Services	**Proactive Care Services**	
	HPE 3 year Proactive Care 24x7 BL4xxc Gen9 Service	U7BN8E
	HPE 3 year Proactive Care 24x7 with DMR BL4xxc Gen9 Service	U7BN9E
	HPE 3 year Proactive Care Advanced 24x7 BL4xxc Gen9 Service	U7BT6E
	HPE 3 year Proactive Care Advanced 24x7 with DMR BL4xxc Gen9 Service	U7CF8E
	HPE 3 year Proactive Care 24x7 BL660c Gen9 Service	U8LQ2E
	HPE 3 year Proactive Care 24x7 with DMR BL660c Gen9 Service	U8LQ3E
	HPE 3 year Proactive Care Advanced 24x7 BL660c Gen9 Service	U8LQ5E
	HPE 3 year Proactive Care Advanced 24x7 with DMR BL660c Gen9 Service	U8LQ6E
	Installation Services	
	HPE Install c-Class Server Blade Service	UE493E
	NOTE: Additional HPE Pointnext operational services can be found at: **http://h20565.www2.hpe.com/portal/site/hpsc/**	

Memory

For detailed memory configuration rules and guidelines, please use the Online DDR4 Memory Configuration Tool:
https://h22195.www2.hpe.com/ddr4memoryconfig/home/legal

Memory Subsystem Architecture
Each Intel® Xeon® E5-4600 v4 family or Intel® Xeon® E5-4600 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 thirty two DIMMs for the server. Up to 64GB capacity DIMMs are supported for 2TB of memory (32 DIMM slots x 64GB 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 two processors are installed in a four 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.
- HPE memory from previous generation servers is not compatible with the BL660c Gen9 Server Blade.
- To realize the performance memory capabilities listed in this document, HPE SmartMemory is required. For additional information, please see the HPE SmartMemory QuickSpecs at: **https://www.hpe.com/h20195/v2/GetHTML.aspx?docname=c04111535**
- For memory population rules and additional memory guidelines, please see the BL660c Gen9 user guide at **https://www.hpe.com/us/en/support.html**.

Supported Memory Bandwidth on Intel® Xeon® E5-4600 v4 series Processors

DIMM Rank	Registered DIMMs (RDIMMs)				Load Reduced (LRDIMM)		
	Single Rank (1R)		Dual Rank (2R)		Dual Rank (2R)	Quad Rank (4R)	Octal Rank (8R)
SKU PN	805347-B21	805349-B21	836220-B21	805351-B21	805353-B21	805358-B21	809208-B21
DIMM Capacity	8GB	16GB	16GB	32GB	32GB	64GB	128GB
Voltage	Std Voltage 1.2V	Std Voltage 1.2V	Std Voltage 1.2V	Std Voltage 1.2V	Std Voltage 1.2V	Std Voltage 1.2V	Std Voltage 1.2V
	SLOTS THAT CAN BE POPULATED						
2P Server	16	16	16	16	16	16	16
4P Server	32	32	32	32	32	32	32
	MAXIMUM CAPACITY (GB)						
2P Server	128	256	256	512	512	1024	1024
4P Server	256	512	512	1024	1024	2048	2048
	POPULATED DIMM SPEED (MT/s)						
1 DIMM per Channel	2400	2400	2400	2400	2400	2400	2400
2 DIMM per	2133	2133	2133	2133	2400	2400	2400

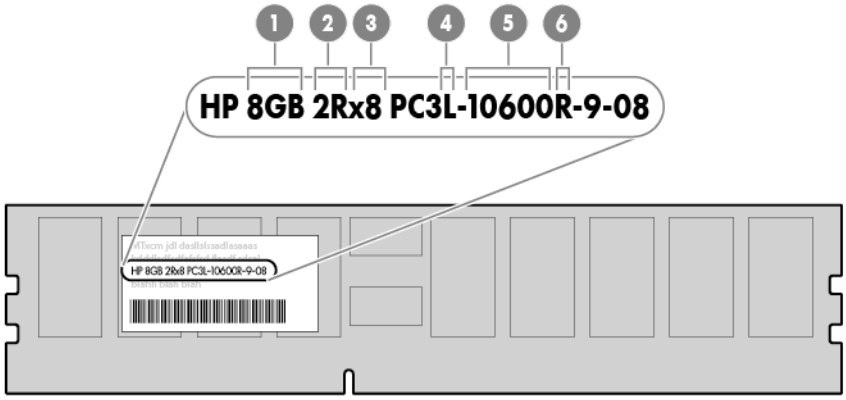
Memory

Channel							

Memory Speed by E5-4600 v4 Series Processor Model

Processor Models	Supported Memory Speeds
E5-4627 v4, , E5-4650 v4, E5-4667 v4, E5-4669 v4	2400MT/s
E5-4620 v4, E5-4640 v4	2133MT/s
E5-4610 v4	1866MT/s

Memory options part number decoder



Item	Description	Definition
1	Capacity	8 GByte 16 GByte 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 Hewlett Packard Enterprise:

HPE Memory

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

Memory

may run at 2400MT/s, 2133 MT/s, 1866 MT/s, or 1600 MT/s. Please see Memory Population Table or the Online Memory Configuration Tool at: **https://h22195.www2.hpe.com/ddr4memoryconfig/home/legal**

HPE SmartMemory

Registered DIMMs (RDIMMs) - E5-4600 v4 series Processors

HPE 16GB (1x16GB) Single Rank x4 DDR4-2400 CAS-17-17-17 Registered Memory Kit	805349-B21
HPE 32GB (1x32GB) Dual Rank x4 DDR4-2400 CAS-17-17-17 Registered Memory Kit	805351-B21
HPE 8GB (1x8GB) Single Rank x8 DDR4-2400 CAS-17-17-17 Registered Memory Kit	805347-B21
HPE 16GB (1x16GB) Dual Rank x4 DDR4-2400 CAS-17-17-17 Registered Memory Kit	836220-B21
HPE 64GB (1x64GB) Quad Rank x4 DDR4-2400 CAS-17-17-17 Load Reduced Memory Kit	805358-B21

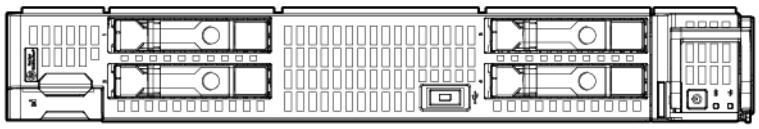
Load Reduced DIMMs (LRDIMMs) - E5-4600 v4 series Processors

HPE 32GB (1x32GB) Dual Rank x4 DDR4-2400 CAS-17-17-17 Load Reduced Memory Kit	805353-B21
HPE 128GB (1x128GB) Octal Rank x4 DDR4-2400 CAS-20-18-18 Load Reduced Memory Kit	809208-B21

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: **https://www.hpe.com/us/en/about/environment/eco-labels.html**

Storage



Technical Specifications

System Unit	**Dimensions** (H x W x D) (with bezel)	366.27mm (14.42") x 56.54mm (2.23") x 516.67mm (20.34")	
	Weight (approximate)	Maximum: 4 processors, 2 FlexibleLOMs, 32 DIMMs, 4 hard drives, 3 mezzanine cards, and 1 flash cache batteries installed	14.00 lb (6.33 kg)
		Minimum: 2 processors, 1 FlexibleLOM, and 2 DIMMs installed	10.50 lb (4.75 kg)

Power Specifications

For power specifications including input requirements, BTU rating, and power supply output, please see the:

- HPE BladeSystem c3000 Enclosure QuickSpecs at **https://www.hpe.com/h20195/v2/GetDocument.aspx?docname=c04123379**
- HPE BladeSystem c7000 Enclosure QuickSpecs at **https://www.hpe.com/h20195/v2/GetHTML.aspx?docname=c04229580**

To review typical system power ratings use the HPE Power Advisor which is available via the online tool located at **https://paonline56.itcs.hpe.com/?Page=Index.**

NOTE: For optimal cooling and system performance the BL660c Gen9 Server Blade requires the c7000 enclosure to be configured with 10 fans and the c3000 enclosure to be configured with 6 fans.

System Inlet Temperature	Operating	10° to 35°C (50° to 95°F) at sea level with an altitude derating of 1.0°C per every 305 m (1.8°F per every 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).

Extended Ambient Operating Support

For Approved hardware configurations, the supported system inlet range is extended to be:
5° to 10°C (41° to 50°F) and 35° to 40°C (95° to 104°F) at sea level with an altitude derating of 1.0°C per every 175 m (1.8°F per every 574 ft) above 900 m (2953 ft) to a maximum of 3050 m (10,000 ft)

NOTE: Qualifications for extended ambient configurations are detailed at: **http://www.hpe.com/servers/ashrae**

	Operating	10 to 90% relative humidity (Rh), 28°C (82.4°F) maximum wet bulb temperature, non-condensing.

Technical Specifications

	Relative Humidity (non-condensing)	Non-operating	5 to 95% relative humidity (Rh), 38.7°C (101.7°F) maximum wet bulb temperature, non-condensing.
	Altitude	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).
	Acoustic Noise	For acoustic noise specifications, please see the HPE BladeSystem c-Class Enclosures QuickSpecs located at: • HPE BladeSystem c3000 Enclosure QuickSpecs: **http://h18000.www1.hp.com/products/QuickSpecs/12790_div/12790_div.html** • HPE BladeSystem c7000 Enclosure QuickSpecs: **http://h18000.www1.hp.com/products/QuickSpecs/12810_div/12810_div.html**	

HPE Smart Array P246br Controller	**Disk Drive Interface**	12Gb/s SAS (Serial Attached SCSI) 6Gb/s SATA (Serial ATA)
	Server Interface	x8 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 5, RAID 10
	Other	Upgradeable firmware with recovery ROM Online drive flash (with SAS drives)

HPE Dynamic Smart Array B140i Controller	**Disk Drive Interface**	6Gb/s SATA (Serial ATA)
	Server Interface	Embedded x4 PCIe 2.0
	SAS Connectors **Cache Memory**	4 internal SATA ports None
	SAS Speed **Logical Drives Supported**	6Gb/s SATA links Up to 10 logical volumes (4 physical drives)
	Host Memory Addressing	64-bit, supporting greater than 4GB server memory space
	Hot Plug Support **RAID Support**	Yes RAID 1 (Mirroring) RAID 0 (Striping) RAID 5
	Other	Upgradeable firmware with recovery ROM

Technical Specifications

HPE 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 autosencing 1Gb/10Gb Ethernet capability)
	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 HPE 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 the HPE Flex-10 blade interconnect technology User configurable bandwidth settings when combined with the 10Gb Flex-10 Virtual Connect module. From 100Mb/s to10Gb/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)
HPE FlexFabric 20Gb 2-port 650FLB FlexibleLOM	**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 autosencing 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)

Technical Specifications

		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 the HPE Flex-20 blade interconnect 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 to10Gb/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 Enterprise offers end-of-life Hewlett Packard Enterprise product return, trade-in, and recycling programs in many geographic areas. For trade-in information, please go to: **http://www.hpe.com/info/recycle**.To recycle your product, please go to: **http://www.hpe.com/info/recycle** or contact your nearest Hewlett Packard Enterprise sales office. Products returned to Hewlett Packard Enterprise 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 Enterprise web site at: **http://www.hpe.com/info/recycle**. These instructions may be used by recyclers and other WEEE treatment facilities as well as Hewlett Packard Enterprise OEM customers who integrate and re-sell Hewlett Packard Enterprise equipment.

Summary of Changes

Date	Version History	Action	Description of Change
01-Oct-2018	Version 21	Changed	Configuration Information – Factory Integrated Models, Core Options, Additional Options and Memory were updated.
06-Aug-2018	Version 20	Changed	Configuration Information - Factory Integrated Models, Additional Options, and Memory sections were updated.
04-Jun-2018	Version 19	Changed	Standard Features, Confirgurations Information - Factory Integrated Models, Additional Options, and Memory sections were updated.
		Added	SKUs were added: 700065-B21, 700763-B21, 766490-B21, 655639-B21, 749975-B21, 726782-B21, 878014-B21, P04556-B21, P04560-B21, P04564-B21, P04566-B21, P04570-B21, 873351-B21, 873355-B21, 873357-B21, P00896-B21, 809208-B21.
		Removed	SKUs were deleted: 844371-L21, 844379-L21, 700066-B21, 700064-B21, 766491-B21, 684214-B21, 749975-B21, 844371-B21, 844379-B21, 880875-B21, 880877-B21, C6N27A.
02-Apr-2018	Version 18	Changed	Configuration Information - Factory Integrated Models, Additional Options, and Technical Specifications sections were updated
		Added	SKUs were added: P8B24A, P8B26AAE, P8B31A.
		Removed	Obsolete SKUs were deleted: 728378-L21, 728376-L21, 728374-L21, 728372-L21, 728370-L21, 728380-L21, 728382-L21, 728384-L21, 792028-L21, 759934-B21, 726718-B21, 726719-B21, 728629-B21, 726722-B21, 726720-B21, 726724-B21, 764282-B21, 728378-B21, 728376-B21, 728374-B21, 728372-B21, 728370-B21, 728380-B21, 728382-B21, 728384-B21, 792028-B21, 764908-B21, 764906-B21, 764904-B21, 765044-B21, 765038-B21, 765036-B21, 765034-B21, 764892-B21, 736939-B21, 736936-B21, 652605-B21, 816576-B21, 822567-B21, 822563-B21, 822555-B21, 764927-B21, 804631-B21, 832414-B21, 804605-B21, 869386-B21, 869384-B21, 804593-B21, 869378-B21, 804587-B21, 869376-B21, 869374-B21, 804575-B21, 871770-B21, 871768-B21, 872855-B21, 872853-B21, 872363-B21, 791034-B21, 781518-B21, 785069-B21, 781516-B21, 785067-B21, 802891-B21, 802586-B21, 802578-B21, 748387-B21, 870763-B21, 779164-B21, 779168-B21, 779172-B21, 779176-B21, 762261-B21, 759208-B21, 759210-B21, 759212-B21, P9J18AAE.
23-Oct-2017	Version 17	Changed	Care Pack naming and Service and Support- Parts and Materials updated.
25-Sep-2017	Version 16	Changed	QuickSpecs was updated.
07-Aug-2017	Version 15	Added	New SKUs added in Core Options section: 875470-B21, 875474-B21, 875478-B21, 875483-B21, 870144-B21, 875311-B21, 875313-B21, 875326-B21, 875330-B21, 875503-B21, 875509-B21, 875511-B21, 875513-B21.
		Removed	Obsolete SKUs were deleted: 792278-B21, 846497-B21, 846495-B21, 846434-B21, 875503-B21, C6N31A.
12-Jun-2017	Version 14	Added	New SKUs added in Core Options section: 875593-B21, 875595-B21, 875597-B21, 875587-B21, 875589-B21, 875591-B21.
		Changed	Obsolete SKUs were deleted: C6N28ABE, C6N36ABE, 652572-B21, 804599-B21, 804581-B21, 838404-B21, 838406-B21, 838408-B21, 838410-B21, 838412-B21, 816929-B21. 785233-B21, 804677-B21, 804671-B21, 804665-B21, 804639-B21, 804625-B21, 804613-B21, 802582-B21, 762263-B21.

Summary of Changes

27-Mar-2017	Version 13	Changed	Overview and Configuration Information – Factory Integrated sections were updated.
		Removed	Obsolete SKUs were deleted: 718162-B21, 652589-B21, 652583-B21, 652564-B21, 652611-B21, 764923-B21, 764925-B21, 764929-B21, 817011-B21, 816995-B21, 816985-B21, 816909-B21.
13-Feb-2017	Version 12	Changed	Information in QuickSpecs was updated.
		Added	SKUs were added: 872355-B21, 872359-B21, 872363-B21, 870753-B21, 870757-B21, 870759-B22, 870763-B21, 870765-B21, 872475-B21, 872477-B21, 872479-B21, 872481-B21,. 872344-B21, 872348-B21, 872352-B21, 869374-B21, 869376-B21, 869378-B21, 869384-B21, 869386-B21.
		Removed	Obsolete SKUs were deleted: 652749-B21.
28-Nov-2016	Version 11	Changed	Sections in QuickSpecs were updated
		Added	SKUs added: 868830-B21, 868826-B21, 871770-B21, 868822-B21, 871768-B21, 868818-B21, 872855-B21, 868814-B21, 872853-B21, 809208-B21.
		Removed	Turn-off SKUs were deleted: 816562-B21, 816568-B21, 816572-B21, 816879-B21, 816883-B21, 816889-B21, 816893-B21, 816899-B21, 816903-B21, 816913-B21, 816919-B21, 816923-B21, 816965-B21, 816969-B21, 816975-B21, 816979-B21, 817015-B21, 822559-B21, 822563-B21. Obsolete SKUs were deleted: 651281-B21, 655708-B21, 652745-B21, 757339-B21, 789145-B21, BD883A,
20-Jun-2016	Version 10	Changed	Error corrected in Overview section.
20-Jun-2016	Version 9	Changed	Overview, Standard Features, Configuration Information - Factory Integrated, Core Options, Additional Options, and Memory sections were updated.
		Added	SKUs added in Configuration Information, Core Options, Additional Options, and Memory section: 844352-B21, 844371-L21, 844372-L21, 844373-L21, 844374-L21, 844375-L21, 844376-L21, 844377-L21, 844378-L21, 844379-L21, 805347-B21, 805349-B21, 836220-B21, 805351-B21, 805353-B21, 805358-B21, 684214-B21, 825555-B21, 665246-B21, 844371-B21, 844372-B21, 844373-B21, 844374-B21, 844375-B21, 844376-B21, 844377-B21, 844378-B21, 844379-B21, 775588-B21, 785233-B21, 846497-B21, 846495-B21, 764908-B21, 764906-B21, 764904-B21, 765044-B21, 765038-B21, 765036-B21, 765034-B21, 764892-B21, 736939-B21, 736936-B21.
31-Mar-2016	Version 8	Changed	Overview, Standard Features, Confirguration Information - Factory Integrated Models, and Additional Options sections were updated.
		Added	SKUs added in Core Options and Additional Options sections: 846430-B21, 846432-B21, 846434-B21, 846436-B21, 838404-B21, 838406-B21, 838408-B21, 838410-B21, 838412-B21, P9J18AAE.
		Removed	Obsolete SKU deleted: 756601-B21
16-Feb-2016	Version 7	Changed	Standard View and Core Options sections were updated.
		Added	SKUs added in Core Options section: 846495-B21, 846497-B21, 832514-B21.
		Removed	Obsolete SKU was deleted: 789135-B21
11-Dec-2015	Version 6	Changed	Pre-Configured Models, Configuration Information - Factory Integrated Models, Core Options, Additional Options, and Memory sections were updated.

Summary of Changes

		Added	SKUs added: 816562-B21, 816568-B21, 816572-B21, 816576-B21, 822555-B21, 822559-B21, 822563-B21, 822567-B21.
		Removed	Obsolete SKUs were deleted: 789155-B21, D8S85AAE, D8S84A
28-Sep-2015	Version 5	Added	SKU added:726724-B21, 745823-B21
		Changed	HPE Hard Drives updated
28-Aug-2015	Version 4	Changed	Information in Core Options section was updated
10-Jul-2015	Version 3	Changed	Standard Features and Optional Features sections were updated.
		Removed	SKUs removed from Core Options section: 741155-B21, 741151-B21, 741146-B21, 717965-B21, 734360-B21, 717973-B21, 739898-B21, 717971-B21, 739888-B21, 717969-B21, 691868-B21, 691868-B21, 691866-B21, 691862-B21, 756636-B21, 756621-B21, 748387-B21, 791034-B21, 781518-B21, 785069-B21, 781516-B21, 785067-B21, 684214-B21, 665246-B21,665639-B21, 684214-B21
		Added	SKU added in Core Options Section. 779176-B21
19-Jun-2015	Version 2	Changed	Information in Additional Options and Configuration information - Factory Integrated Models section were updated.
		Removed	Obsolete SKU removed: 741146-B21
		Added	SKUs were added in Additional Options Section: U8LQ2E, U8LQ3E, U8LQ5E, U8LQ6E, 659818-B21, 651281-B21
01-Jun-2015	Version 1	Created	New QuickSpecs

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