QuickSpecs

HP ProLiant XL190r Gen9 Server

Overview

HP ProLiant XL190r Gen9 Server

The ProLiant XL190r Gen9 Server is a 2U half-width, 2 processor server with the same configuration options as the XL170r for CPU and memory, but has additional PCIe slots in multiple configurations providing support for additional expansion cards and future support for two (2) integrated accelerators per server (GPUs or Coprocessors).
This server leverages Intel's latest Xeon E5-2600 v3 series processors increasing performance up to 30-40%, and DDR4 HP SmartMemory, at speeds of up to 2133 MHz and 512GB maximum which boosts bandwidth and efficiency up to 50% over previous generation servers.

The dense and flexible HP Apollo 2000 Chassis can accommodates up to two 2U hot-swap server trays to meet workload needs while lowering TCO.

Rack scale power efficiency is fueled by the optional Advanced Power Management for rack, chassis, server and component level management
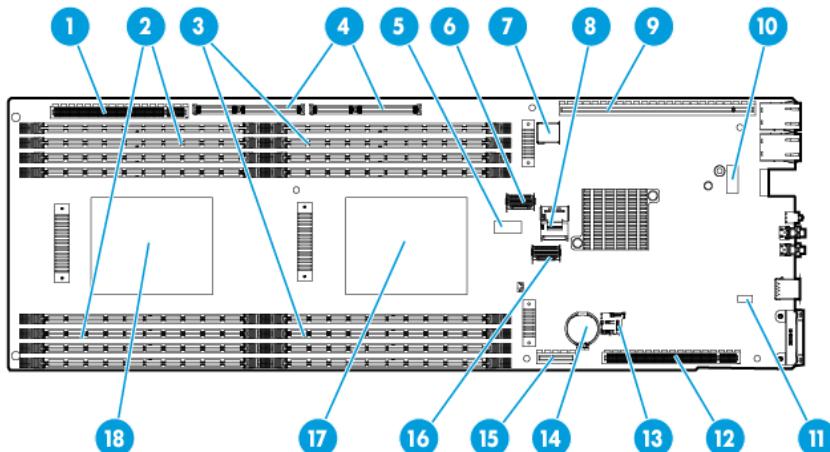
	Front View Item Description	
Item	Description	
1	Bayonet board slot	
2	DIMMs for processor 2	
3	DIMMs for processor 1	
4	PCIe x40 riser board connector*	
5	System maintenance switch	
6	Mini-SAS connector 1 (SATA x4)	
7	Internal USB 3.0 connector	
8	Mini-SAS connector 2 (SATA x4)	
9	PCIe x24 riser board connector*	
10	Dedicated iLO port connector	
11	NMI header	
12	PCIe x16 riser board connector*	
13	microSD slot	
14	System battery	
15	M.2 SSD riser connector	
16	TPM connector	
17	Processor 1	
18	Processor 2	

Overview

2U Node Rear Panel Components
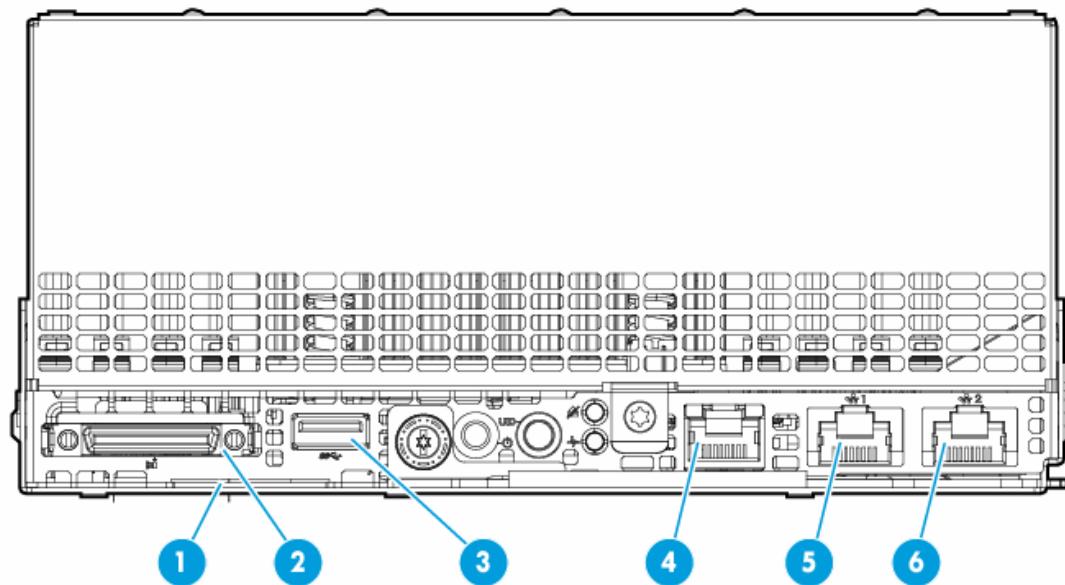
Item	Description
1	Node serial number and iLO label pull tab
2	SUV connector
3	USB 3.0 connector
4	Dedicated iLO port (optional)
5	NIC connector 1
6	NIC connector 2

Overview

Single-Slot 2U Node PCI Riser Cage Assembly
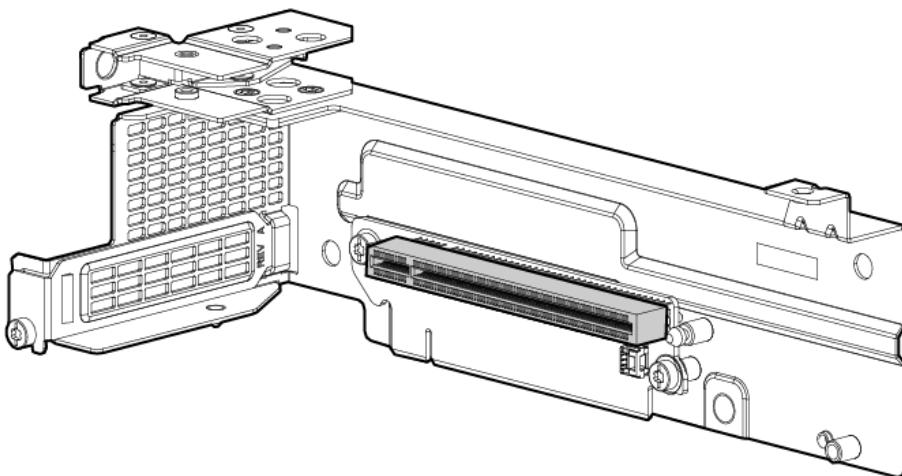
Item	Form factor	Slot number	Slot description
1	Low-profile PCIe card	1	PCIe3 x16 (16, 8, 4, 1) for Processor 1

FlexibleLOM 2U node riser cage assembly

• Three-slot PCI riser cage assembly
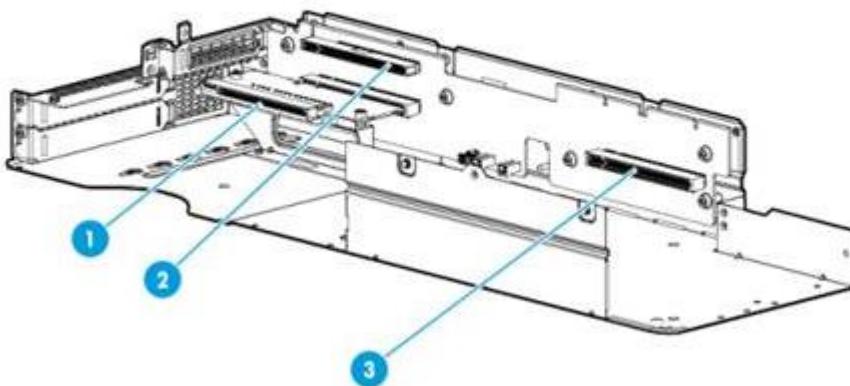
Item	Form factor	Slot number	Slot description
1	Storage controller or graphic card	3	PCIe3 x16 (16, 8, 4, 1) for Processor 1
2	Low-profile PCIe NIC card	2	PCIe3 x16 (16, 8, 4, 1) for Processor 2
3	Graphic card	4	PCIe3 x16 (16, 8, 4, 1) for Processor 2

Overview

- Three-slot GPU-direct PCI riser cage assembly
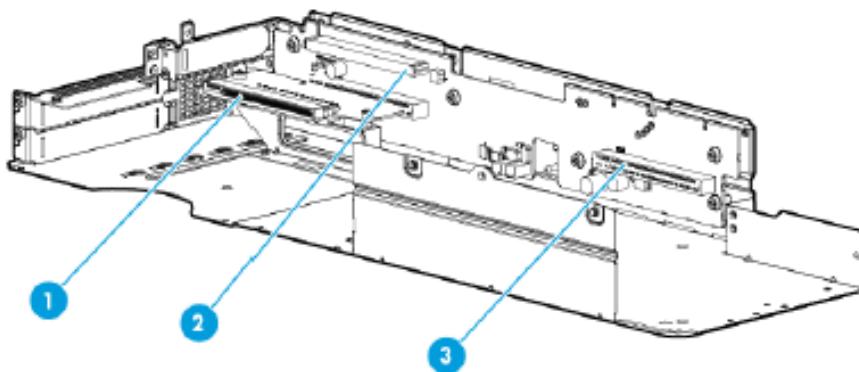
Item	Form factor	Slot number	Slot description
1	Storage controller or graphic card	3	PCIe3 x16 (16, 8, 4, 1) for Processor 2
2	Low-profile PCIe NIC card	2	PCIe3 x16 (16, 8, 4, 1) for Processor 2

Standard Features

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

Processor
One of the following depending on Model

E5-2600 v3 series Processors

Model	CPU frequency	Cores	L3 Cache	Power	QPI	DDR4 MHz
E5-2699v3	2.3GHz	18	45MB	145W	9.6GT/s	2133
E5-2698v3	2.3GHz	16	40MB	135W	9.6GT/s	2133
E5-2697v3	2.6GHz	14	35MB	145W	9.6GT/s	2133
E5-2690v3	2.6GHz	12	30MB	135W	9.6GT/s	2133
E5-2683v3	2.0GHz	14	35MB	120W	9.6GT/s	2133
E5-2680v3	2.5GHz	12	30MB	120W	9.6GT/s	2133
E5-2670v3	2.3GHz	12	30MB	120W	9.6GT/s	2133
E5-2667v3	3.2GHz	8	20MB	135W	9.6GT/s	2133
E5-2660v3	2.6GHz	10	25MB	105W	9.6GT/s	2133
E5-2650v3	2.3GHz	10	25MB	105W	9.6GT/s	2133
E5-2650Lv3	1.8GHz	12	25MB	65W	9.6GT/s	2133
E5-2643v3	3.4GHz	6	20MB	135W	9.6GT/s	2133
E5-2640v3	2.6GHz	8	20MB	90W	8.0GT/s	1866
E5-2637v3	3.5GHz	4	15MB	135W	9.6GT/s	2133
E5-2630v3	2.4Ghz	8	20MB	85W	8.0GT/s	1866
E5-2630Lv3	1.8GHz	8	25MB	55W	8.0GT/s	1866
E5-2620v3	2.4GHz	6	15MB	85W	8.0GT/s	1866
E5-2609v3	1.9GHz	6	15MB	85W	8.0GT/s	1600
E5-2603v3	1.6GHz	6	15MB	85W	6.4GT/s	1600

Chipset

Intel® C610 Series Chipset

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

On System Management Processor

HP iLO (Firmware: HP iLO 4)

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

Standard Features

Memory Protection	Advanced ECC (multi-bit error protection) Memory Online Spare Mode (Rank Spare Mode)	

Memory	Type	HP SmartMemory
		DDR4 Load Reduced (LRDIMM), or Registered (RDIMM)
	DIMM Slots Available	16 DIMM Slots available
	Maximum (LRDIMM) (per server tray)	512GB (16 x 32GB)

NOTE: HP memory from previous generation servers are not fully compatible with the HP ProLiant XL190r Gen9 Server.

NOTE: To realize the performance memory capabilities listed in this document, HP SmartMemory is required. For additional information, please see the HP SmartMemory QuickSpecs at: http://h18000.www1.hp.com/products/quickspecs/14225_na/14225_na.html.

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

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

Network Controller

Ethernet Options
HP Ethernet 1Gb 2P 332T Adptr
HP Ethernet 1Gb 4-port 331T Adapter
HP Ethernet 1Gb 2P 361T Adptr
HP Ethernet 10Gb 2P 530SFP+ Adptr
HP Ethernet 10Gb 2P 530T Adptr
HP Ethernet 10Gb 2P 560SFP+ Adptr
HP Ethernet 10Gb 2P 561T Adptr
HP Ethernet 10Gb 2P 561FLR-T Adptr
HP Ethernet 10G 2-port 546SFP+ Adptr
HP 1Gb Ethernet 4P 331FLR Adptr
HP Ethernet 1Gb 4-port 366FLR Adapter
HP Ethernet 10Gb 2P 560FLR-SFP+ Adptr
HP FlexFabric 10Gb 2P 534FLR-SFP+ Adptr
HP FlexFabric 10Gb 2P 533FLR-T Adptr
HP FlexFabric 10Gb 2P 556FLR-SFP+ Adptr
HP Ethernet 10Gb 2P 546FLR-SFP+ Adptr

InfiniBand Options
HP IB FDR/EN 40Gb 2P 544+FLR-QSFP Adptr
HP IB QDR/EN 10Gb 2P 544+FLR-QSFP Adptr
HP IB FDR/EN 40Gb 2P 544+QSFP Adptr
HP IB FDR 2P 545FLR-QSFP Adptr
HP IB FDR 2P 545QSFP Adptr
QLogic 4X QDR IB PCI-e G2 HCA

Riser Options to support FlexibleLOM cards
HP XL190r Gen9 LPx16 FLOMx8 R Riser Kit

NOTE: The HP XL190r Gen9 LPx16 FLOMx8 R Riser Kit (798184-B21) is required to order the FlexibleLOM options.

FHFLDW
FHFLDW
FHFLDW

Standard Features

<table>
<tr><td></td><td>FHFLDW
FHFLDW</td></tr>
</table>

| **HP Server ROM** | **NOTE**: indicates the number of physical electrical lanes running to the connector.
* FHFLDW allows for cards up to 10.5" in Length |

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

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

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

The HP ProLiant ROM is used to configure the following:

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

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

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

HP's ProLiant System BIOS is an EDK2 UEFI solution, and adheres to the latest revisions of UEFI Class 2 specifications which supports both legacy boot and UEFI boot operation. The HP ProLiant XL190r Gen9 defaults to UEFI boot operation and can be factory or field configured for Legacy boot operation.

NOTE: For UEFI boot operation, boot environment and OS image installations should be configured properly to support UEFI.
NOTE: For more information on HP's ProLiant System BIOS and UEFI, see the UEFI Information Library: http://www.hp.com/go/uefi/docs.
NOTE: HP Legacy FIO Mode Setting (758959-B22) can be selected to configure the system in UEFI mode in the factory.

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

UEFI enables numerous new capabilities, including both industry standard functionality and features specific to HP ProLiant servers. Following are some of the features that UEFI enables and that the HP ProLiant XL190r Gen9 can support when configured for UEFI boot operation:
- Secure Boot - A new feature in which the system firmware, option card firmware, operating systems, and software collaborate to greatly enhance platform security.
- Operating system specific functionality - Microsoft Windows 2012 supports several features only when installed in UEFI mode.
- Support for > 2.2 TB (using GPT) boot drives - Such drives could previously only be used for boot drives when using RAID solutions such as HP Smart Array.

Standard Features

- UEFI Shell - Provides a pre-boot environment for running scripts and tools. The HP ProLiant UEFI Shell provides both standard capabilities as well as numerous enhancements.
- PXE boot support for IPv6 networks.
- PXE Multicast Boot allowing for faster PXE deployments for large numbers of servers.
- Boot support for option cards that only support a UEFI option ROM.

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

Storage Controller	**Smart Array Controller** HP Dynamic Smart Array B140i Controller HP Smart Array P440/4G Controller HP Smart Array P441/4G Controller HP Smart Array P840/4G Controller HP Smart Array P841/4G Controller **Host Bus Adapter** HP H240 Host Bus Adapter HP H241 Smart HBA **Storage Controller Cable Kits** HP XL190r B140i Cbl FIO Kit HP XL190r Gen9 Mini-SAS H240 Cbl Kit HP XL190r Gen9 Mini-SAS P440 Cbl Kit HP XL1x0r Gen9 Mini-SAS P840/440 Cbl Kit **Note:** The H240 controller and the embedded B140i will operate in UEFI mode only. For legacy support, AHCI mode is required.

Internal Storage Devices	Internal MicroSD slot

Maximum Internal Storage			
	Hot Plug LFF SAS 10k	24TB	x 6TB
	Hot Plug LFF SATA	4.0TB	6 x 1TB
	Hot Plug LFF SATA SSD	1.9 TB	6 x 480GB
	Hot Plug LFF SAS SSD	19.2TB	12 X 1.6TB
	Hot Plug SFF SAS 7.2k	12TB	12 X 1.0TB
	Hot Plug SFF SAS 10k	21.6TB	12X1.8TB
	Hot Plug SFF SAS 15k	7.2TB	12X600GB
	Hot Plug SFF SATA	12TB	12X1TB
	Hot Plug SFF SATA SSD	11.5TB	12X960GB
	Hot Plug SFF SAS SSD	19.2TB	12X1.6TB

Standard Features

Interfaces	FlexibleLOM	HP ProLiant Gen9 servers offer a new networking technology-Flexible Network Technology. The HP ProLiant Gen9 server offers the customer the choice of 1Gigabit, 10Gigabit, InfiniBand or FlexibleLOM solutions depending on workload. For further details on the choices, see FlexibleLOM in the Networking Section of this document.
	KVM	Serial USB Video Port (SUV)
	MicroSD	1 (internal)
	USB Ports	2 (external via SUV) 1 (USB 3.0 internal)
	HP iLO Remote Management Network Port	Aggregated via HP Apollo 2000 Chassis
	Health LED	1
	Power	1
	UID	1
	Do not remove LED	1
Industry Standard Compliance	ACPI 2.0b Compliant	
	PCIe 3.0 Compliant	
	WOL Support	
	Microsoft® Logo certifications	
	PXE Support	
	USB 1.1 and 2.0 Compliant	
	SMBIOS 2.6.1	

Power Ratings   To review typical system power ratings use the HP Power Advisor which is available via the online tool located at URL: http://www.hp.com/go/proliant-energy-efficient or http://www.hp.com/go/hppoweradvisor.

NOTE: Power Specification and Technical Content for supported power supplies can be found at: http://h18000.www1.hp.com/products/quickspecs/14209_na/14209_na.html

Operating Systems and Virtualization Software Support for ProLiant Servers
Microsoft Windows Server
Red Hat Enterprise Linux (RHEL)
SUSE Linux Enterprise Server (SLES)
Canonical Ubuntu
VMware
NOTE: Only 64-bit versions of these operating systems are supported.
NOTE: For more information on the HP Certified and Supported ProLiant Servers for OS and Virtualization Software and more OS support timeline such as Debian, CentOS, Fedora, OpenSUSE and Asianux, please visit our OS support site at http://www.hp.com/go/ossupport and our driver download page: http://www.hp.com/support.

Graphics   Integrated Matrox G200 video standard
- 1280 x 1024 (32 bpp)
- 1920 x 1200 (16 bpp)

HP iLO 4 On System Management Memory
- 16 MB Flash

Standard Features

- 256 MB DDR 3 with ECC (112 MB after ECC and video)

Form Factor		The ProLiant XL190r Gen9 Server is a single-slot 2U tray for the HP Apollo 2000 Chassis.
Embedded Management	**HP Integrated Lights Out**	Monitor your servers for ongoing management, service alerting, reporting and remote management with iLO. Learn more at http://www.hp.com/go/ilo.
	UEFI	Configure and boot your servers securely with industry standard Unified Extensible Firmware Interface (UEFI). Learn more at http://www.hp.com/go/ProLiant/uefi.
	HP RESTful API	RESTful API is an application programming interface. RESTful Web Service API served by iLO's web server.http://www.hp.com/go/restfulapi .
	Intelligent Provisioning	Provision servers by discovering and deploying 1 to few servers with Intelligent Provisioning. Learn more at http://www.hp.com/go/intelligentprovisioning.
Server Utilities	**HP Smart Update**	Optimize firmware and driver updates with HP Smart Update solutions. Learn more at http://www.hp.com/go/smartupdate.
	HP Systems Insight Manager (HP SIM)	HP SIM allows you to monitor the health of your HP ProLiant Servers and HP Integrity Servers, and also provides you with basic support for non-HP servers. HP SIM also integrates with HP SUM to provide quick and seamless firmware updates. Learn more at http://www.hp.com/go/sim
	Scripting Tool Kit and Windows PowerShell	Provision 1 to many servers using your own scripts to discover and deploy them with HP Scripting Tool Kit for Windows and Linux or HP Scripting Tools for Windows PowerShell. Learn more at http://www.hp.com/go/ProLiantSTK or http://www.hp.com/go/powershell.
	HP RESTful Interface Tool	HP RESTful API tool is a scripting tool to provision servers using RESTful API Interface to discover and deploy servers at scale. Learn more at http://www.hp.com/go/restfulapi
	HP iLO Mobile Application	Enables the ability to access, deploy, and manage your server anytime from anywhere from select smartphones and mobile devices. For additional information please visit: http://www.hp.com/go/ilo/mobileapp
	HP Insight Online	HP Insight Online, available at no additional cost as part of your HP warranty, Care Pack or contractual support agreement with HP, is a personalized dashboard for simplified tracking of IT operations and support information from anywhere, anytime. Learn more at http://www.hp.com/go/insightonline/info.
Embedded Management	**HP Integrated Lights Out**	Monitor your servers for ongoing management, service alerting, reporting and remote management with iLO. Learn more at http://www.hp.com/go/ilo.
HP Insight management software	**HP Service Pack for ProLiant (SPP)**	HP Service Pack for ProLiant (SPP) and HP Smart Update Manager (HP SUM) provide a comprehensive approach to firmware and system software maintenance. Together they provide better operating stability and ensure maximum uptime. The SPP will be updated at a predictable cadence, typically coinciding with new HP server hardware launches. By enabling firmware to be updated online and integrating firmware and system software updates in one operation, HP SUM and the SPP offer faster updates of individual servers and dramatically faster updates of entire HP Apollo 2000 Chassis. Further improving system uptime and stability is the fact that HP provides 12 months of support for each Service Pack for ProLiant release (may vary by region).

Standard Features

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

The Service Pack for ProLiant has been rigorously tested with specific attention for interaction between firmware, drivers and agents both within the server as well as in interaction with the HP Apollo 2000 chassis. This testing ensures the highest quality as well as providing the input for HP SUM to deploy updates taking into account all interdependencies, when determining the correct updates and order of update deployment.

NOTE: The Service Pack for ProLiant (which includes HP SUM) can be downloaded from http://www.hp.com/go/spp/download. More information can be found: http://www.hp.com/go/SmartUpdate, http://www.hp.com/go/spp and http://www.hp.com/go/hpsum

Security	Power-on password
	Keyboard password
	Serial interface control
	Administrator's password
	iLO 4 (Integrated Lights-Out 4) has 12 customizable user accounts and SSL encryption
	iLO 4 can be disabled via a Global Setting
	iLO Advanced supports directory services integration
	TPM (Trusted Platform Module) 1.2 option

Warranty

This product is covered by a global limited warranty and supported by HP Services and a worldwide network of HP Authorized Channel Partners (may vary by region). Hardware diagnostic support and repair is available for one year from date of purchase. Support for software and initial setup is available for 90 days from date of purchase. Enhancements to warranty services are available through HP Care Pack services or customized service agreements. Hard drives have either a one year or three year warranty.
NOTE: Server Warranty includes 1 year Parts, 1 year Labor, 1-year on-site support with next business day response. Warranty repairs may be accomplished through the use of Customer Self Repair (CSR) parts. These parts fall into two categories: 1) Mandatory CSR parts are designed for easy replacement. A travel and labor charge will result when customers decline to replace a Mandatory CSR part; 2) Optional CSR parts are also designed for easy replacement but may involve added complexity. Customers may choose to have HP replace Optional CSR parts at no charge. Additional information regarding worldwide limited warranty and technical support is available at: http://h18004.www1.hp.com/products/servers/platforms/warranty/index.html.
NOTE: In Asia Pacific, Japan and China, Server Warranty includes 3 years Parts, 3 year Labor, 3-year Onsite support with next business day response.

Optional Features

HP Insight management software	HP Insight Control	HP Insight Control, a product option, delivers essential infrastructure management that can help save time and money by making it easy to deploy, migrate, monitor, remote control, and optimize your IT infrastructure through a single, simple management console. For more information, see: http://www.hp.com/go/insightcontrol.
		HP Insight Control includes one year of 24 x 7 HP Software Technical Support and Update Service ensuring rapid access to HP support staff and proactive delivery of software updates. For more information about this service, see: http://www.hp.com/services/insight.
	HP iLO Advanced	HP Integrated Lights-Out Advanced License a product option, providing smart remote server management without compromise. iLO Advanced unlocks the full set of remote administration functionality for all HP ProLiant servers by activating the full Virtual Keyboard Video and Mouse remote console, multi-user collaboration, console record and replay, GUI-based and scripted virtual media and virtual folders, and enhanced security and power management functionality. For more information, see: http://www.hp.com/go/iloadvance.
	HP iLO Scale-Out	The HP iLO Scale-Out license ideal for web/hosting/cloud service providers and High Performance Computing environments. This license is a specific subset of iLO Advanced functionality, provides fast remote access through Text Console via SSH, lower operational cost with Dynamic power capping, and faster time to resolution through Email-based Alerting and proactive notifications. With this newly designed HP iLO Scale-Out license HPC customers now have a server management package solely design and priced for their massive data environments. HP iLO Scale-Out is available on all HP ProLiant Gen9 servers. For more information, see: http://www.hp.com/go/iLO/scale-out.
	HP Matrix Operating Environment	The HP Matrix Operating Environment (Matrix OE) for ProLiant and Integrity servers is an integrated command center that helps you instantly adjust to dynamic business demands. This advanced infrastructure management software lets you reduce the cost of common data center tasks by up to 40 percent while keeping pace with your changing business.
		The HP Matrix OE includes the automated provisioning, optimization, and recovery management capabilities for HP CloudSystem Matrix, the ideal platform for private cloud and Infrastructure as a Service (IaaS).
		NOTE: For more information, visit: http://www.hp.com/go/matrixoe.
High Performance Clusters	HP Cluster Platforms	HP Cluster Platforms are specifically engineered, factory-integrated large-scale ProLiant clusters optimized for High Performance Computing, with a choice of servers, networks and software. Operating system options include specially priced offerings for Red Hat Enterprise Linux and SUSE Linux Enterprise Server, as well as Microsoft Windows HPC Server. A Cluster Platform Configurator simplifies ordering. http://www.hp.com/go/clusters
	HP HPC Interconnects	High Performance Computing (HPC) interconnect technologies are available for this server as part of the HP Cluster Platform portfolio. These high-speed InfiniBand and Gigabit interconnects are fully supported by HP when integrated within an HP cluster. Flexible, validated solutions can be defined with the help of configuration tools. http://www.hp.com/techservers/clusters/ucp/index.html

Optional Features

	HP Insight Cluster Management Utility	HP Insight Cluster Management Utility (CMU) is an HP-licensed and HP-supported suite of tools that are used for lifecycle management of hyperscale clusters of Linux ProLiant systems. CMU includes software for the centralized provisioning, management and monitoring of nodes. CMU makes the administration of clusters user friendly, efficient, and effective. http://www.hp.com/go/cmu
HP Insight Online		HP Insight Online is a new addition to the HP Support Center for one stop, secure access to product and HP support information personalized to your IT environment. Insight Online can automatically display devices remotely monitored by HP Insight Remote Support. With Insight Online's easy navigation you can efficiently track your IT support contracts and device status from anywhere and at any time. http://www.hp.com/go/insightonline

Service and Support

Service and Support	**The support Care Packs chosen for the chassis are applied to this server node at no additional cost.** **HP Technology Services for HP Apollo 2000** HP Technology Services delivers confidence, reduces risk and helps customers realize agility and stability. Connect to HP to help prevent problems and solve issues faster. Our support technology lets you to tap into the knowledge of millions of devices and thousands of experts to stay informed and in control, anywhere, any time. **Support for the HP Apollo 2000, APM and chassis are all covered by support purchased at the chassis level.** This simplifies your support experience and can reduce total cost of ownership over support purchased per server. **What HP Technology Services can do for you** We can help you design, deploy, test, integrate, support, and manage IT and infrastructure solutions. Our services solutions include more than just uplift of base warranty; we help deliver high levels of application availability through proactive service management and advanced technical response. Protect your business beyond warranty with HP Care Pack Services that provide total support expertise to meet your IT and business needs. We have made it simple to select among 3 levels of recommended services; optimized, standard, or basic.
For more information	To learn more on HP ProLiant servers, please contact your HP sales representative or HP Authorized Channel Partner. Or visit: http://www.hp.com/services/proliant To find the full list of Care Pack SKUs for the HP Apollo family of products, go to: http://hp.com/go/lookuptool and in step 2 select HP ProLiant, then select HP Apollo family.

Configuration Information – Factory Integrated Models

NOTE: This section lists some of the steps required to configure a Factory Integrated Model. To ensure only valid configurations are ordered, HP recommends the use of an HP approved configurator. Contact your local sales representative for information on configurable product offerings and requirements.
NOTE: FIO indicates that this option is only available as a factory installable option.
NOTE: HP Apollo 2000 Chassis is required to support the server. Refer to their QuickSpecs for additional information.
HP Apollo 2000Chassis

Step 1: Base Configuration (Choose one of the CTO Models below)

HP CTO Model	HP ProLiant XL190r Gen9 Compute Tray	789917-B21

Step 2: Choose Required Options (only one from each category unless otherwise noted) Please compare with product offering to update below table		
HP Processors	HP XL1x0r Gen9 Intel Xeon E5-2603v3 (1.6GHz/6-core/15MB/85W) Processor Kit	793012-B21
	HP XL1x0r Gen9 Intel Xeon E5-2603v3 (1.6GHz/6-core/15MB/85W) FIO Processor Kit	793012-L21
	HP XL1x0r Gen9 Intel Xeon E5-2609v3 (1.9GHz/6-core/15MB/85W) Processor Kit	793014-B21
	HP XL1x0r Gen9 Intel Xeon E5-2609v3 (1.9GHz/6-core/15MB/85W) FIO Processor Kit	793014-L21
	HP XL1x0r Gen9 Intel Xeon E5-2630v3 (2.4GHz/8-core/20MB/85W) Processor Kit	793018-B21
	HP XL1x0r Gen9 Intel Xeon E5-2630v3 (2.4GHz/8-core/20MB/85W) FIO Processor Kit	793018-L21
	HP XL1x0r Gen9 Intel Xeon E5-2630Lv3 (1.8GHz/8-core/25MB/55W) Processor Kit	793040-B21
	HP XL1x0r Gen9 Intel Xeon E5-2630Lv3 (1.8GHz/8-core/25MB/55W) FIO Processor Kit	793040-L21
	HP XL1x0r Gen9 Intel Xeon E5-2640v3 (2.6GHz/8-core/20MB/90W) Processor Kit	793020-B21
	HP XL1x0r Gen9 Intel Xeon E5-2640v3 (2.6GHz/8-core/20MB/90W) FIO Processor Kit	793020-L21
	HP XL1x0r Gen9 Intel Xeon E5-2650v3 (2.3GHz/10-core/25MB/105W) Processor Kit	793022-B21
	HP XL1x0r Gen9 Intel Xeon E5-2650v3 (2.3GHz/10-core/25MB/105W) FIO Processor Kit	793022-L21
	HP XL1x0r Gen9 Intel Xeon E5-2660v3 (2.6GHz/10-core/25MB/105W) Processor Kit	793024-B21
	HP XL1x0r Gen9 Intel Xeon E5-2660v3 (2.6GHz/10-core/25MB/105W) FIO Processor Kit	793024-L21
	HP XL1x0r Gen9 Intel Xeon E5-2670v3 (2.3GHz/12-core/30MB/120W) Processor Kit	793026-B21
	HP XL1x0r Gen9 Intel Xeon E5-2670v3 (2.3GHz/12-core/30MB/120W) FIO Processor Kit	793026-L21
	HP XL1x0r Gen9 Intel Xeon E5-2680v3 (2.5GHz/12-core/30MB/120W) Processor Kit	793028-B21
	HP XL1x0r Gen9 Intel Xeon E5-2680v3 (2.5GHz/12-core/30MB/120W) FIO Processor Kit	793028-L21
	HP XL1x0r Gen9 Intel Xeon E5-2690v3 (2.6GHz/12-core/30MB/135W) Processor Kit	793030-B21
	HP XL1x0r Gen9 Intel Xeon E5-2690v3 (2.6GHz/12-core/30MB/135W) FIO Processor Kit	793030-L21
	HP XL1x0r Gen9 Intel Xeon E5-2697v3 (2.6GHz/14-core/35MB/145W) Processor Kit	793032-B21
	HP XL1x0r Gen9 Intel Xeon E5-2697v3 (2.6GHz/14-core/35MB/145W) FIO Processor Kit	793032-L21
	HP XL1x0r Gen9 Intel Xeon E5-2637v3 (3.5GHz/4-core/15MB/135W) Processor Kit	793034-B21
	HP XL1x0r Gen9 Intel Xeon E5-2637v3 (3.5GHz/4-core/15MB/135W) FIO Processor Kit	793034-L21
	HP XL1x0r Gen9 Intel Xeon E5-2643v3 (3.4GHz/6-core/20MB/135W) Processor Kit	793036-B21
	HP XL1x0r Gen9 Intel Xeon E5-2643v3 (3.4GHz/6-core/20MB/135W) FIO Processor Kit	793036-L21
	HP XL1x0r Gen9 Intel Xeon E5-2667v3 (3.2GHz/8-core/20MB/135W) Processor Kit	793038-B21

Configuration Information – Factory Integrated Models

	HP XL1x0r Gen9 Intel Xeon E5-2667v3 (3.2GHz/8-core/20MB/135W) FIO Processor Kit	793038-L21
	HP XL1x0r Gen9 Intel Xeon E5-2683v3 (2GHz/14-core/35MB/120W) Processor Kit	793046-B21
	HP XL1x0r Gen9 Intel Xeon E5-2683v3 (2GHz/14-core/35MB/120W) FIO Processor Kit	793046-L21
	HP XL1x0r Gen9 Intel Xeon E5-2650Lv3 (1.8GHz/12-core/30MB/65W) Processor Kit	793050-B21
	HP XL1x0r Gen9 Intel Xeon E5-2650Lv3 (1.8GHz/12-core/30MB/65W) FIO Processor Kit	793050-L21
	HP XL1x0r Gen9 Intel Xeon E5-2698v3 (2.3GHz/16-core/40MB/135W) Processor Kit	793054-B21
	HP XL1x0r Gen9 Intel Xeon E5-2698v3 (2.3GHz/16-core/40MB/135W) FIO Processor Kit	793054-L21
	HP XL1x0r Gen9 Intel Xeon E5-2699v3 (2.3GHz/18-core/45MB/145W) Processor Kit	793056-B21
	HP XL1x0r Gen9 Intel Xeon E5-2699v3 (2.3GHz/18-core/45MB/145W) FIO Processor Kit	793056-L21
	NOTE: Select one xxxxxx-L21 processor and one corresponding xxxxxx-B21. A minimum of two processors are required. Mixing of processor speeds and types is not supported. **NOTE:** For the maximum supported memory speeds for each processor listed above, please reference the 'Memory Speed by Processor Model' table in the Memory section of the QuickSpecs. **NOTE:** HT indicates that the processor model supports Intel® Hyper-Threading Technology. **NOTE:** Turbo indicates the maximum potential frequency when using Intel® Turbo Boost Technology. The frequency boost increment is dependent on the processor SKU and the number of active cores. In general, a higher boost increment is obtained when fewer cores are active. **NOTE:** DDR4 speed is the maximum memory speed of the processor. Actual memory speed may depend on the quantity and type of DIMMs installed. **NOTE:** Mixing different processor models is not supported. **NOTE:** For the Intel® C610 Chipset E5-2600 v3 Series, the letter preceding the model number indicates the Product Line (E3, E5, E7); 2600x, 2 = number of CPUs in a Node, 6 is socket/segment designation, 00 = Processor SKU, and x = L for low power SKUs. **NOTE:** All processors within the server must be identical. **NOTE:** All processors support Intel® Hyper-Threading and Intel® Turbo Boost Technologies except the E5-2603 v3 and E5-2609 v3. **NOTE:** The letter "L" following the model number denotes lower wattage. **NOTE:** The processor model as well as the memory configuration determines the maximum speed memory can operate. Please see the see the "Memory" section later in this document.	
HP Memory	**NOTE:** Minimum 2 DIMMs are required. **NOTE:** HP memory from previous generation servers (DDR3) is not compatible with this server. HP SmartMemory is required to realize the memory performance improvements and enhanced functionality listed in this document for Gen9. For additional information, please see the HP SmartMemory QuickSpecs at: http://www8.hp.com/h20195/v2/GetHTML.aspx?docname=c04111535 **NOTE:** LRDIMM and RDIMM are distinct memory technologies and cannot be mixed within a server. **NOTE:** Depending on the memory configuration and processor model, the memory speed may run at 2133MHz, 1866MHz, or 1600MHz. Please see Memory Population Table or the Online Memory Configuration Tool at: http://h22195.www2.hp.com/MemoryTool/Home/Legal	
	Registered DIMMs (RDIMMs) - E5-2600 v3 series Processors	
	HP 4GB 1Rx8 PC4-2133P-R Kit	726717-B21
	HP 8GB (1x8GB) Single Rank x4 DDR4-2133 CAS-15-15-15 Registered Memory Kit	726718-B21
	HP 8GB (1x8GB) Dual Rank x8 DDR4-2133 CAS-15-15-15 Registered Memory Kit	759934-B21
	HP 16GB (1x16GB) Dual Rank x4 DDR4-2133 CAS-15-15-15 Registered Memory Kit	726719-B21
	HP 32GB (1x32GB) Dual Rank x4 PC4-2133P-R (DDR4-2133) Registered	728629-B21
	HP 8GB 1Rx4 PC4-2133P-R MIC Kit	803664-B21
	HP 16GB 2Rx4 PC4-2133P-R MIC Kit	803666-B21
	Load Reduced DIMMs (LRDIMMs) - E5-2600 v3 series Processors	
	HP 16GB 2Rx4 PC4-2133P-L Kit	726722-B21
	HP 32GB 4Rx4 PC4-2133P-L Kit	726720-B21

Configuration Information – Factory Integrated Models

	HP 32GB 4Rx4 PC4-2133P-L MIC Kit	803668-B21
HP Storage Cables	HP XL190r B140i Cbl FIO Kit **NOTE**: This cable is required to support the embedded B140i controller on the 2U node	800061-B21
	HP XL190r Gen9 Mini-SAS H240 Cbl Kit	806525-B21
	HP XL190r Gen9 Mini-SAS P440 Cbl Kit	806527-B21
	HP XL170r/190r Mini-SAS P840/P440 Cbl Kit **NOTE**: Must select for P840 on 2U, 2 cable kits per card	798205-B21
	HP XL170r/190r Mini-SAS H240 Cbl Kit	798207-B21
Riser Option	HP XL170r/190r LP PCIex16 L Riser Kit **NOTE**: This is supported only with 11OS R Riser Kit (798186-B21) and GD R riser Kit (798188-B21)	798178-B21
	HP XL190r x16x16x16 11OS R Riser Kit **NOTE**: This riser includes two PCIe3.0x16 double width card slots, one Low-profile PCIe3.0 x8 card slot. This riser is supported only when HP L Riser Kit (798178-B21) is selected.	798186-B21
	HP XL190r LP PCIex16 L Riser Kit **NOTE**: This is supported only with HP XL190r x16x8 R Riser Kit (798184-B21)	800293-B21
	HP XL190r x16x16x16 GD R Riser Kit **NOTE**: This riser includes two PCIe3.0x16 double width card slots, one Low-profile card slot. This riser is supported only with HP XL170r/190r LP PCIex16 L Riser Kit (798178-B21).	798188-B21
	HP XL190r PCIE x16 FLOM x8 R Riser Kit **NOTE**: This riser includes one PCIe3.0x16 double width card slots, one Low-profile PCIe3.0 x8 card slot. This riser is supported only with HP XL190r LP PCIex16 L Riser Kit (800293-B21).	798184-B21
HP Networking:	HP Ethernet 1Gb 2P 332T Adptr	615732-B21
	HP Ethernet 1Gb 4-port 331T Adapter	647594-B21
	HP Ethernet 1Gb 2P 361T Adptr	652497-B21
	HP Ethernet 10Gb 2P 530SFP+ Adptr	652503-B21
	HP Ethernet 10Gb 2P 530T Adptr	656596-B21
	HP Ethernet 10Gb 2P 560SFP+ Adptr	665249-B21
	HP Ethernet 10Gb 2P 561T Adptr	716591-B21
	HP Ethernet 10G 2-port 546SFP+ Adptr	779793-B21
	HP XL170r/190r Dedicated NIC IM Board Ki	798192-B21
	HP Ethernet 1Gb 2P 332T Adptr	615732-B21
	HP Ethernet 1Gb 4-port 331T Adapter	647594-B21
	HP Ethernet 1Gb 2P 361T Adptr	652497-B21
	NOTE: For 2U, total Slots available for PCIe is 4, total Slots available for FlexLOM is 1.This is a total selection from anything in the following categories: Infiniband, Networking, Controllers	

Step 3: Choose Additional Factory Integrated Options (only one from each category unless otherwise noted)

BIOS Mode	HP Legacy FIO Mode Setting **NOTE**: If B140i is the only primary controller, then this option cannot be selected. When this option is selected, then BIOS need to be switched from default UEFI Mode to Legacy Mode.	758959-B22
HP Storage Controllers	HP Smart Array P440/4G Controller **NOTE**: Device Count - This controller can support up to 8 internal SAS/SATA devices H240/P440/P840 can't be selected in the same time per node max=1	726821-B21
	HP Smart Array P441/4G Controller **NOTE**: Device Count - This controller supports 0 Internal SAS/SATA devices	726825-B21

Configuration Information – Factory Integrated Models

	max=2	
	HP H240 Smart HBA	726907-B21
	NOTE: Device Count - This controller can support up to 8 internal SAS/SATA devices max=1; H240/P440/P840 can't be selected in the same time per node	
	HP H241 Smart HBA	726911-B21
	NOTE: Device Count - This controller supports 0 Internal SAS/SATA devices max=2	
	HP Smart Array P840/4G Controller	726897-B21
	NOTE: Device Count - This controller can support up to 16 internal SAS/SATA devices max=1; Only support XL190r 2U node; H240/P440/P840 can't be selected in the same time per node	
	HP Smart Array P841/4G Controller	726903-B21
	NOTE: Device Count - This controller supports 0 Internal SAS/SATA devices max=2; Only support XL190r 2U node	
HP Networking	Ethernet Options	
	FlexibleLOM Adapters	
	HP 1Gb Ethernet 4P 331FLR Adptr	629135-B22
	HP Ethernet 1Gb 4-port 366FLR Adapter	665240-B21
	HP Ethernet 10Gb 2P 560FLR-SFP+ Adptr	665243-B21
	HP FlexFabric 10Gb 2P 534FLR-SFP+ Adptr	700751-B21
	HP FlexFabric 10Gb 2P 533FLR-T Adptr	700759-B21
	HP FlexFabric 10Gb 2P 556FLR-SFP+ Adptr	727060-B21
	HP Ethernet 10Gb 2P 546FLR-SFP+ Adptr	779799-B21
	InfiniBand Options	
	QLogic 4X QDR IB PCI-e G2 HCA	583211-B21
	HP IB FDR 2P 545QSFP Adptr	702211-B21
	HP IB FDR/EN 40Gb 2P 544+QSFP Adptr	764284-B21
	HP IB FDR 2P 545FLR-QSFP Adptr	702212-B21
	HP IB FDR/EN 40Gb 2P 544+FLR-QSFP Adptr	764285-B21
	HP IB QDR/EN 10Gb 2P 544+FLR-QSFP Adptr	764286-B21
	HP XL170r/190r LP PCIex16 L Riser Kit	798178-B21
	HP XL190r LP PCIex16 L Riser Kit	800293-B21
Riser Options:	HP XL190r LP x16 FLOM x8 R Riser Kit	798184-B21
	NOTE Must select XL190r Gen9 Single GPU Adapter Kit max=1	
	NOTE: When the riser card of LPx16 FLOMx8 is selected, graphic card max=1 When the riser card of 11OS is selected, max=2 for graphic cards When the riser card of GD R Riser is selected, max=2 for graphic cards can be 2.	
Graphic Card Option	HP XL190r Intel GPU Enablement Cable Kit	800809-B21
	HP XL190r K40 Enablement Cable Kit	800807-B21
Controller State	HP Mfg FIO Enable HBA Mode Setting	792962-B21
	If H240 is the primary controller and if HP Mfg FIO Enable HBA Mode Setting is selected, then RAID is not allowed. Can only be selected with HBA card The Legacy Mode Setting and Enable HBA Mode Setting CANNOT be selected together	
	HP AHCI-Enable FIO Setting	801845-B21

Configuration Information – Factory Integrated Models

If B140i is the primary controller and if HP AHCI-Enable FIO Setting is selected, then RAID is not allowed.

Step 4: Choose Additional Options for Factory Integration

NOTE: for additional options, please refer to "Core Options" and "Additional Options" section below.
NOTE: Some options may not be integrated at the factory. To ensure only valid configurations are ordered, HP recommends the use of an HP approved configurator. Contact your local sales representative for additional information.

HP Hard Drives

Hot Plug SFF Drives
NOTE: "User may select any combination of SAS or SATA Hard Drives.
However, if RAID is selected and both SAS and SATA Hard Drives have been selected, then only the SAS Drives will be used in the RAID set.
NOTE: If B140i is the primary controller, user can only select SATA drives.
NOTE: Can't select HDD when customers oder standalone XL1x0 node without r2x00 enclosure

HP 1.6TB 12G SAS VE 2.5in SC EV SSD	762263-B21
HP 1.2TB 6G SAS 10K 2.5in DP ENT SC HDD	759210-B21
HP 800GB 12G SAS VE 2.5in SC EV SSD	762261-B21
HP 600GB 12G SAS 15K 2.5in SC ENT HDD	759212-B21
HP 450GB 12G SAS 15K 2.5in SC ENT HDD	759210-B21
HP 300GB 12G SAS 15K 2.5in SC ENT HDD	759208-B21
HP 1.2TB 6G SAS 10K 2.5in DP ENT SC HDD	718162-B21
HP 400GB 6G SAS LE 2.5in SC EL SSD	767904-B21
HP 960GB 6G SATA LE 2.5in SC EL G1 SSD	756601-B21
HP 480GB 6G SATA VE 2.5in SC EV G1 SSD	756657-B21
HP 240GB 6G SATA VE 2.5in SC EV G1 SSD	756636-B21
HP 120GB 6G SATA VE 2.5in SC EV G1 SSD	756621-B21
HP 1TB 6G SAS 7.2K 2.5in SC MDL HDD	652749-B21
HP 1TB 6G SATA 7.2k 2.5in SC MDL HDD	655710-B21
HP 900GB 6G SAS 10K 2.5in SC ENT HDD	652589-B21
HP 600GB 6G SAS 10K 2.5in SC ENT HDD	652583-B21
HP 500GB 6G SAS 7.2K 2.5in SC MDL HDD	652745-B21
HP 500GB 6G SATA 7.2k 2.5in SC MDL HDD	655708-B21
HP 450GB 6G SAS 10K 2.5in SC ENT HDD	652572-B21
HP 300GB 6G SAS 10K 2.5in SC ENT HDD	652564-B21
HP 146GB 6G SAS 15K 2.5in SC ENT HDD	652605-B21

Hot Plug LFF

NOTE: User may select any combination of SAS or SATA Hard Drives.
However, if RAID is selected and both SAS and SATA Hard Drives have been selected, then only the SAS Drives will be used in the RAID set.
NOTE: If B140i is the primary controller, user can only select SATA drives.
NOTE :Can't select HDD when customers oder standalone XL1x0 node without r2x00 enclosure

HP 1.6TB 12G SAS VE 3.5in LP EV SSD	797301-B21
HP 800GB 12G SAS ME 3.5in LP EM SSD	797291-B21
HP 800GB 12G SAS VE 3.5in LP EV SSD	797299-B21
HP 400GB 12G SAS ME 3.5in LP EM SSD	797289-B21

Configuration Information – Factory Integrated Models

HP 600GB 12G SAS 15K 3.5in LPc ENT HDD	797283-B21
HP 450GB 12G SAS 15K 3.5in LPc ENT HDD	797287-B21
HP 300GB 12G SAS 15K 3.5in LPc ENT HDD	797285-B21
HP 960GB 6G SATA LE 3.5in LP EL SSD	797305-B21
HP 480GB 6G SATA VE 3.5in LP EV SSD	797303-B21
HP 6TB 6G SAS 7.2K 3.5in MDL LP HDD	797263-B21
HP 4TB 6G SAS 7.2K 3.5in DP MDL LP HDD	797267-B21
HP 3TB 6G SAS 7.2K 3.5in MDL LP HDD	797277-B21
HP 2TB 6G SAS 7.2K 3.5in MDL LP HDD	797279-B21
HP 1TB 6G SAS 7.2K 3.5in MDL LP HDD	797281-B21
HP 6TB 6G SATA 7.2K 3.5in LP LP MDL HDD	797269-B21
HP 4TB 6G SATA 7.2k 3.5in MDL LP HDD	797265-B21
HP 3TB 6G SATA 7.2k 3.5in MDL LP HDD	797271-B21
HP 2TB 6G SATA 7.2k 3.5in MDL LP HDD	797273-B21
HP 1TB 6G SATA 7.2k 3.5in MDL LP HDD	797275-B21

Memory

HP Rack Options	**HP USB BFR with PVC Free Keyboard/Mouse Kit**
	HP USB BFR with PVC Free US Keyboard/Mouse Kit

631341-B21

NOTE: Please see the QuickSpecs for Technical Specifications and additional information:
http://h18000.www1.hp.com/products/quickspecs/13972_na/13972_na.html

HP Memory

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

Memory Subsystem Architecture

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

Memory Population Rules and Guidelines:

- White DIMM slots denote the first slot of a channel. For 1 DPC (DIMM per channel) populate white slots only.
- Install DIMMs only if the corresponding processor is installed.
- There are two channels per processor with two DIMM slots per channel.
- Memory channel A consists of the two (2) DIMMs that are closest to the processor.
- Memory channel B consists of the two (2) DIMMs that are furthest from the processor.
- Populate DIMMs from heaviest load (quad-rank) to lightest load (single-rank) within a channel
- Heaviest load (DIMM with most ranks) within a channel goes furthest from the processor
- No support for RDIMMs; Non-ECC UDIMMs
- 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.
- To realize the performance memory capabilities listed in this document, HP SmartMemory is required. For additional information, please see the HP SmartMemory QuickSpecs at:
  http://h18000.www1.hp.com/products/quickspecs/14225_na/14225_na.html.
- For memory population rules and additional memory guidelines, please see the HP ProLiant XL230 Gen9 user guide at http://www.hp.com/support.

Security Hardware	**Trusted Platform Module.**
	HP TPM Module Kit

488069-B21

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

Memory

HP Insight Software	**Integrated Lights-Out (iLO)**	
	HP iLO Scale Out	
	HP iLO Adv incl 1yr TS U E-LTU	E6U59ABE
	HP iLO Adv incl 3yr TS U E-LTU	E6U64ABE
	HP iLO Scale-Out incl 3yr TSU Flex E-LTU	BD776AAE
	HP iLO Scale-Out incl 3yr TSU Track Lic	BD777A
	HP iLO Scale-Out incl 3yr TSU Track Lic	BD777A
	HP iLO Scale-Out incl 1yr TSU Flex Lic	BD778A
	HP Integrated Lights-Out (iLO) Advanced for ProLiant	
	HP iLO Scale-Out incl 1yr TSU Flex E-LTU	BD778AAE
	HP iLO Scale-Out incl 1yr TSU Track Lic	BD779A
	HP iLO Adv incl 3yr TS U 1-Svr Lic	BD505A
	HP iLO Adv incl 3yr TS U Flex Lic	BD506A
	HP iLO Adv incl 3yr TS U E-LTU	BD506AAE
	HP iLO Adv incl 3yr TS U Track Lic	BD507A
	HP iLO Adv incl 1yr TS U 1-Svr Lic	512485-B21
	HP iLO Adv incl 1yr TS U Flex Lic	512486-B21
	HP iLO Adv incl 1yr TS U Track Lic	512487-B21
	HP iLO Advanced including 1yr 24x7 Technical Support and Updates Electronic License	TA850AAE

NOTE: For additional license options please see the QuickSpecs at:
http://h18004.www1.hp.com/products/quickspecs/14276_na/14276_na.html
NOTE: For more information, visit: http://www.hp.com/go/ilo

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

Memory Speed by E5-2600 v3 Series Processor Model

| Processor Models (please based on processor model Mission Bay offer to update below SKUs)	Supported Memory Speeds
E5-2690 v3, E5-2695 v3, E5-2697 v3, E5-2698 v3, E5-2699 v3, E5-2687W v3, E5-2683 v3, E5-2680	2133MHz

Memory

v3, E5-2670 v3, E5-2667 v3 , E5-2660 v3, E5-2650 v3, E5-2650L, E5-2643 v3, E5-2637 v3	
E5-2640 v3, E5-2630 v3, E5-2630L v3, E5-2623 v3, E5-2620 v3	1866MHz
E5-2609 v3, E5-2603 v3	1600MHz

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

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

Memory options part number decoder

HP 8GB 2Rx8 PC3L-10600R-9-08
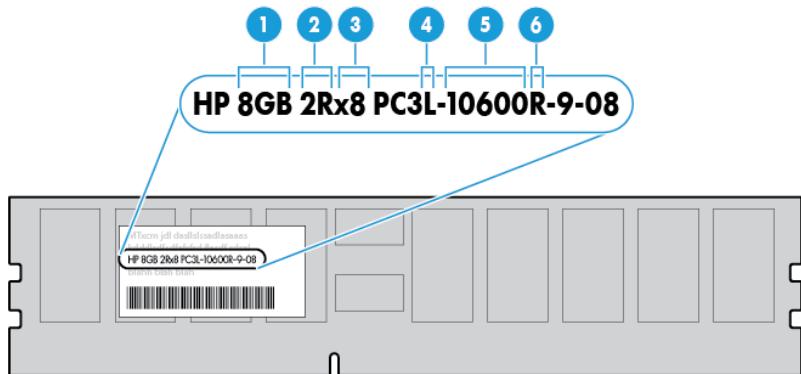
Item	Description	Definition
1	Capacity	8 GByte / 16 GByte / 32 GByte
2	Rank	1R=Single-rank / 2R = Dual-rank / 4R Quad-rank
3	Data Width	x4 = 4-bit / x8 =-bit
4	Memory Generation	DDR4
5	Max. Memory Speed	2133MT/s
6	CasLatency	P=15
6	DIMM type	R= RDIMM (registered) L= LRDIMM (registered)

Technical Specifications

System Unit			
	Server Dimensions (L x W x D)	1.63 x 7.07 x 25.26 in (4.13 x 17.95 x 64.15 cm)	
	Weight (approximate)	Maximum (four hard drives and two processors installed)	14.27 lb (6.47 kg)
	System Inlet Temperature	Standard Operating Support	System performance during standard operating support may be reduced if operating with a fan fault or above 30°C (86°F). 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)
		Extended Ambient Operating Support	to a maximum of 3050 m (10,000 ft). The approved hardware configurations for this system are listed at the URL: http://www.hp.com/servers/ASHRAE For approved hardware configurations, the supported system inlet range is extended to be: 40° to 45°C (104° to 113°F) at sea level with an altitude derating of 1.0°C per every 125 m (1.8°F per every 410 ft) above 900 m (2953 ft) to a maximum of 3050 m (10,000 ft). The approved hardware configurations for this system are listed at the URL: http://www.hp.com/servers/ASHRAE System performance may be reduced if operating in the extended ambient operating range or with a fan fault.
		Non-operating	-30° to 60°C (-22° to 140°F). Maximum rate of change is 20°C/hr (36°F/hr).
	Relative Humidity (non-condensing)	Operating	Minimum to be the higher (more moisture) of -12°C (10.4°F) dew point or 8% relative humidity. Maximum to be the lower (less moisture) of 24°C (75.2°F) dew point or 90% relative humidity.
		Non-operating	5 to 95% relative humidity (Rh), 38.7°C (101.7°F) maximum wet bulb temperature, non-condensing.
	Altitude	Operating	3050 m (10,000 ft). This value may be limited by the type and number of options installed. Maximum allowable altitude change rate is 457 m/min (1500 ft/min).
	Acoustic Noise	Listed are the declared A-Weighted sound power levels (LWAd) and measured average bystander position A-Weighted sound pressure levels (LpAm) when the product is operating in a 23°C ambient environment. Noise emissions were measured in accordance with ISO 7779 (ECMA 74) and declared in accordance with ISO 9296 (ECMA 109). The listed sound levels apply to standard shipping configurations. Additional options may result in increased sound levels.	
	Emissions Classification (EMC)	FCC Rating	Class A
		Normative Standards	CISPR 22; EN55022; EN55024; FCC CFR 47, Pt 15; ICES-003; CNS13438; GB9254; K22;K24; EN 61000-3-2; EN 61000-3-3; EN 60950-1; IEC 60950-1
		NOTE: Product conformance to cited product specifications is based on	

QuickSpecs

Technical Specifications

sample (type) testing, evaluation, or assessment. This product or family of products is eligible to bear the appropriate compliance logos and statements.

Acoustic Noise

Configuration	Entry	Typical	Performance	Others
CPU type and qty	HP XL1x0r Gen9 ZE5-2630v3 Kit x 1	HP XL1x0r Gen9 ZE5-2630v3 Kit x1	HP XL1x0r Gen9 ZE5-2630v3 Kit x2	NA
DIMM type, capacity and qty	HP Z16GB 2Rx4 PC4-2133P-R Kit x2	HP Z16GB 2Rx4 PC4-2133P-R Kit x2	HP Z16GB 2Rx4 PC4-2133P-R Kit x4	NA
HDD type and qty	500GB 6G SATA 7.2K SFF HDD x2	HP 450GB 12G SAS 15K 2.5in x2	HP 450GB 12G SAS 15K 2.5in x2	NA
HDD Backplane	24SFF W/O Expander	24SFF W/ Expander	24SFF W/ Expander	NA
HD Controller for flexible storage options	B140i onboard SATA	HP Smart Array P440/4GB 12Gb Controller	HP Smart Array P440/4GB 12Gb Controller	NA
LOM for flexibility for multiple ALOM/BLOM	NA	NA	NA	NA
Fan type and count	8038mm x4	8038mm x4	8038mm x4	NA
I/O and Others (Mezz, GPGPU, NIC and etc.)	NA	NA	NA	NA
Cooling Mode Setting (Optimal, increased cooling or max cooling mode)	Optimal Cooling	Optimal Cooling	Optimal Cooling	NA
Acoustics Performance				
Sound Power Level in Bels LWAd	Idle:6.6Bel OP: 6.6Bel	Idle:6.9 Bel OP: 6.9Bel	Idle:6.9;Bel OP: 7.1Bel	NA
Sound Pressure Level LpAm	Idle:47 dBA OP:47 dBA	Idle:50 dBA OP:50 dBA	Idle:50 dBA OP: 51 dBA	NA
Note	The product is operating in a 23°C ambient environment. Noise emissions were measured in accordance with ISO 7779 and declared in accordance with ISO 9296. The listed sound levels apply to listed configurations. Additional options may result in increased sound levels. Please have your HP Rep refer to EMESC Website for further technical details regarding the configurations listed above.			

FCC Rating – Class A
Normative Standards - CISPR 22; EN55022; EN55024; FCC CFR 47, Pt 15; ICES-003; CNS13438;

Technical Specifications

GB9254; K22;K24; EN 61000-3-2; EN 61000-3-3; EN 60950-1; IEC 60950-1
NOTE: Product conformance to cited product specifications is based on sample (type) testing, evaluation, or assessment. This product or family of products is eligible to bear the appropriate compliance logos and statements.

Environment-friendly Products and Approach

Hewlett-Packard offers end-of-life HP product return, trade-in, and recycling programs in many geographic areas. For trade-in information, please go to: http://www.hp.com/go/green. To recycle your product, please go to: http://www.hp.com/go/green or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.

The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: http://www.hp.com/go/green. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.

Summary of Changes

Date	Version History	Action	Description of Change:
30-May-2015	Version 2	Modified	Modified Riser card and updates throughout the QuickSpecs
30-Mar-2015	Version 1	Created	Crete QuickSpecs for HP ProLiant XL190r Gen9 Server