QuickSpecs

Overview

HPE Synergy 660 Gen10 Compute Module

HPE Synergy, the first platform built from the ground up for Composable Infrastructure, offers an experience that empowers IT to create and deliver new value instantly and continuously. It is a single infrastructure that reduces operational complexity for traditional workloads and increases operational velocity for the new breed of applications and services. Through a single interface, HPE Synergy composes physical and virtual compute, storage, and fabric pools into any configuration for any application. As an extensible platform, it easily enables a broad range of applications and operational models such as virtualization, hybrid cloud, and DevOps. With HPE Synergy, IT can become not just the internal service provider but the business partner to rapidly launch new applications that become the business.

HPE Synergy supports both two-socket and four-socket compute modules which provide the performance, scalability, density optimization, storage simplicity, and configuration flexibility to power a variety of workloads, including business processing, IT infrastructure, web infrastructure, collaborative, and high-performance computing.

The HPE Synergy 660 Gen10 Compute Module delivers agility, control and security in a four-socket, full-height form factor to support demanding workloads and virtualization density. Powered by 2 or 4 Intel® Xeon® Scalable family processors, 48 slots for HPE DDR4 Smart Memory supporting up to 6TB, flexible storage controller options with up to four SFF drives (8 uFF drives) and/or up to 4 internal M.2 drives, and six (6) I/O mezzanine slots. this compute module is designed to create a pool of flexible compute capacity within a composable infrastructure. This makes the HPE Synergy 660 Gen10 Compute Module the ideal platform for virtualization density, high availability, and scale-up enterprise workloads.

HPE Synergy offers additional compute module options (that have individual QuickSpecs) including:
- HPE Synergy 480 Gen10 (1 or 2-socket, general purpose)

This QuickSpecs document focuses on the HPE Synergy 660 Gen10 Compute Module.

Notes:
- The HPE Synergy Gen10 compute modules installation involves a minimum upgrade requirement for component compatibility purposes. To ensure proper system functionality, you must update your system to Release Set Version 3.00.20170707 (or later) before installing and operating your compute module.
- Go to **http://www.hpe.com/downloads/synergy** and see the HPE Synergy Firmware Update Overview guide at **http://www.hpe.com/info/synergy-firmware-update-overview-en** for specific details on updating compute module components.

Overview
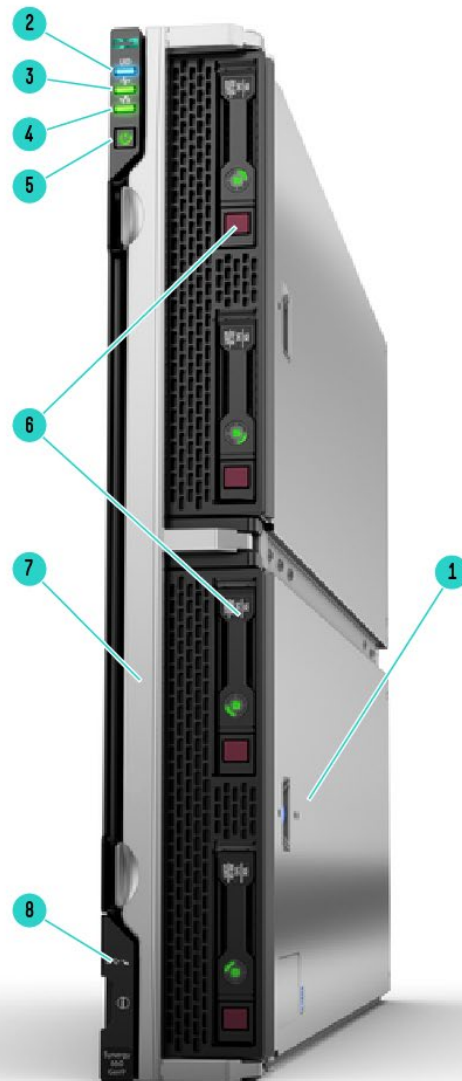
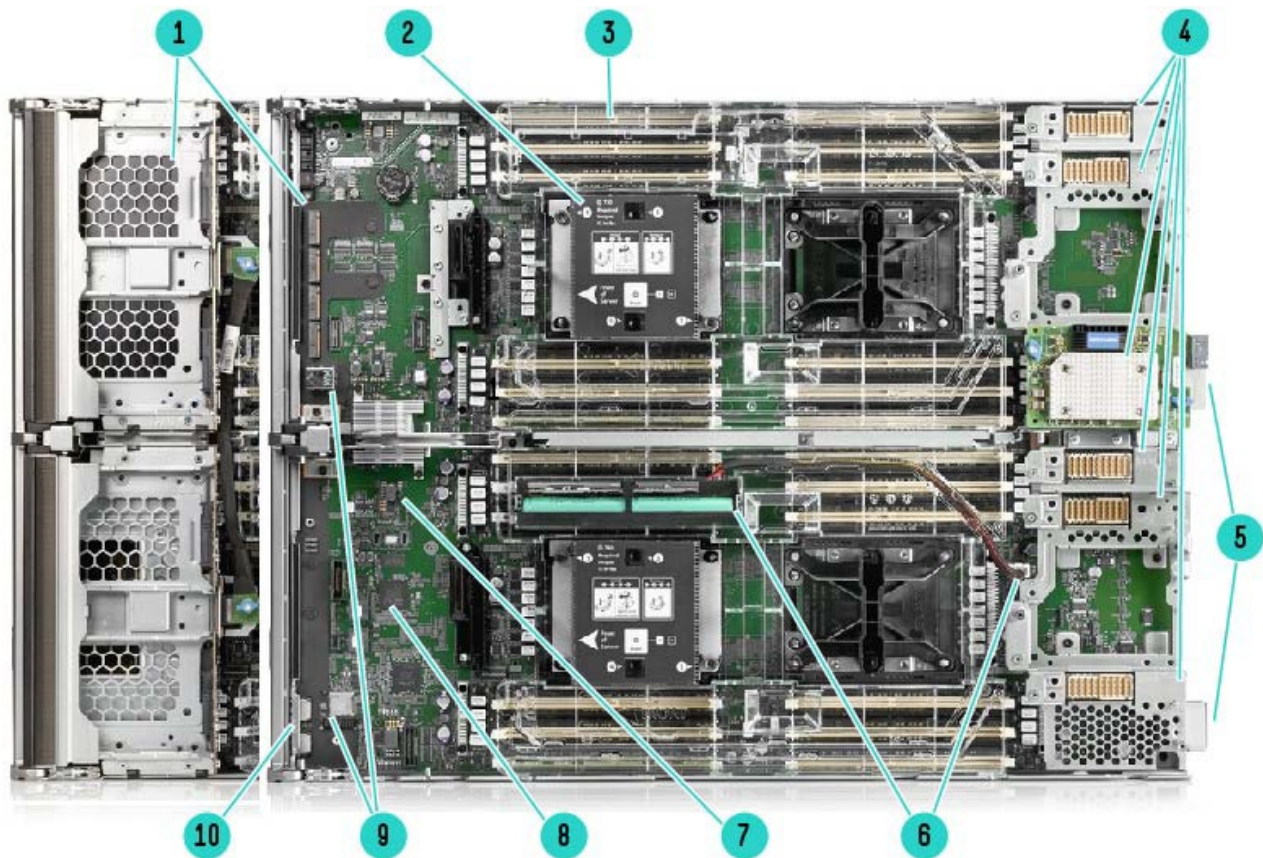**Front View – HPE Synergy 660 Gen10 Compute Module**

1. Quick Access Panel
2. UID LED
3. Health Status LED
4. Mezzanine NIC Status LED
5. Power On / Stand By Button and System Power LED
6. Zero (0) to Four (4) Hot-Plug Drive Bays (or up to 8 uFF with Smart Drive bay adapter)
7. Compute Module Release Handle
8. External USB Connector and iLO USB (behind serial label pull tab

Overview

Synergy 660 Gen10 Compute Module
(Drive Cage removed)

1. Removable drive cage with 4 hot-plug drive bays and 4 M.2 slots
2. 2 or 4 x Intel® Xeon® Scalable processors
3. 48 DDR4 DIMM memory slots (12 per processor)
4. 6 x 16 PCIe 3.0 Mezzanine Slots
5. Power/management combo connector
6. Connection for Smart Storage Battery
7. TPM connector (under drive cage)
8. iLO5
9. Internal MicroSD & USB 3.0 (boot port under drive cage)
10. External USB 3.0/iLO Connections

What's New

- Additionals Drive systems and replacements
- Replaced part numbers for 32GB and 64GB Smart Memory products to meet specification requirements.
- European Union (ErP Lot9) standards information

ErP Lot9 Quick Summary

The European Parliament (ErP) is responsible for setting the ecological standards for products that are imported into the EU. The European Parliament Commission Regulation 2019/424 (also known as the ErP Lot 9 regulation) are a new set of product standards that deal with servers and data storage devices and goes into effect on March 1, 2020. Products that are not compliant with Lot 9 requirements cannot be imported into the European Union after March 1, 2020. For details see Tech Specs section of this document. See Configure to Order section for details on configurable options.

For additional information, please visit: **https://www.hpe.com/us/en/about/environment/msds-specs-more.html**.
Documents provided by HPE: Lot 9 Declarations, White paper, and FAQ.

Standard Features

Processors

Two or four of the following depending on model.

With the extention of the lifecycle of Gen10 Compute, HPE introduces a new line up of Intel Xeon Scalable Family of processors or Gen2. HPE offers both Gen1 and Gen2 processors during the introduction of this life cycle. Below are the two generations and specifications. Further details on slecting the right process are provided in the Configuring you system section below.

Notes: Intel Xeon L or M labeled processors support extended memory capacities as show below up to 2 and 4.5TB per socket. However, maximum memory capacity for the server will be limited by maximum capacity DIMMs available and number of DIMM slots.

Intel® Xeon® Scalable processor family - 2nd generation						
Intel Xeon Models	CPU Frequency (GHz)	Cores	Power (WATTs)	DDR4 MT/s	Max Memory per socket (TeraBytes)	Persistent Memory Support
Platinum 8280L Processor	2.7	28	205	2933	4.5	Yes
Platinum 8280 Processor	2.7	28	205	2933	1	Yes
Platinum 8276L Processor	2.2	28	165	2933	4.5	Yes
Platinum 8276 Processor	2.2	28	165	2933	1	Yes
Platinum 8270 Processor	2.6	26	205	2933	1	Yes
Platinum 8268 Processor	2.9	24	205	2933	1	Yes
Platinum 8260Y Processor*	2.4-2.5-2.8	24-20-16	165	2933	1	Yes
Platinum 8260L Processor	2.4	24	165	2933	4.5	Yes
Platinum 8260 Processor	2.4	24	165	2933	1	Yes
Platinum 8256 Processor	3.4	4	105	2933	1	Yes
Platinum 8253 Processor	2.2	16	125	2933	1	Yes
Gold 6262V Processor	1.9	24	135	2933	1	Yes
Gold 6252N Processor	2.3	24	150	2933	1	Yes
Gold 6254 Processor	3.1	18	200	2933	1	Yes
Gold 6252 Processor	2.1	24	150	2933	1	Yes
Gold 6248 Processor	2.5	20	150	2933	1	Yes
Gold 6246 Processor	3.3	12	165	2933	1	Yes
Gold 6244 Processor	3.6	8	150	2933	1	Yes
Gold 6242 Processor	2.8	16	150	2933	1	Yes
Gold 6240Y Processor*	2.6-2.8-3.1	18-14-8	150	2933	1	Yes
Gold 6240L Processor	2.6	18	150	2933	4.5	Yes
Gold 6240 Processor	2.6	18	150	2933	1	Yes
Gold 6238L Processor	2.1	22	140	2933	4.5	Yes
Gold 6238 Processor	2.1	22	140	2933	1	Yes
Gold 6234 Processor	3.4	8	130	2933	1	Yes
Gold 6230N Processor	2.3	20	125	2933	1	Yes
Gold 6230 Processor	2.1	20	125	2933	1	Yes
Gold 6226 Processor	2.7	12	125	2933	1	Yes
Gold 6222V Processor	1.8	20	115	2933	1	Yes
Gold 5222 Processor	3.8	4	105	2933	1	Yes
Gold 5220S Processor	2.6	18	125	2666	1	Yes
Gold 5220 Processor	2.2	18	125	2666	1	Yes
Gold 5218N Processor	2.3	16	105	2666	1	Yes
Gold 5218B Processor	2.3	16	125	2666	1	Yes
Gold 5218 Processor	2.3	16	125	2666	1	Yes

Standard Features

Intel Xeon Models	CPU Frequency (GHz)	Cores	Power (WATTs)	DDR4 MT/s	Max Memory per socket (TeraBytes)	Persistent Memory Support
Gold 5217 Processor	3	8	125	2666	1	Yes
Gold 5215L Processor	2.6	10	85	2666	4.5	Yes
Gold 5215M Processor	2.6	10	85	2666	2	Yes
Gold 5215 Processor	2.6	10	85	2666	1	Yes

Notes:
- Platinum – 8200 Series – Supports 2 socket (Synergy 480 Gen10) or up to 4 socket (Synergy 660 Gen10) compute modules, 2 Socket supports 2UPI and 4 Socket supports 3UPI @ 10.4 GT/s, supports 6-Channel DDR4 @ 2933 MT/s providing up to 1TB on most and 2, 4.5TB on select processor skus. Intel Turbo Boost Technology, Intel Hyper-Threading Technology supported. Intel AVX-512 (2x 512-bit FMA), 48 lanes PCIe 3.0, advanced RAS.
- Gold – 5200, 6200 Series - Supports 2 socket (Synergy 480 Gen10) or up to 4 socket (Synergy 660 Gen10) compute modules, 2 Socket supports 2UPI and 4 Socket supports 3UPI @ 10.4 GT/s, supports 6-Channel DDR4 @ 2933/2666MHz providing up to 1, 2, or 4.5TB memory capacity depending on processor selected. Intel Turbo Boost Technology, Intel Hyper-Threading Technology, Intel AVX-512(1x 512-bit FMA) (SKU 5122 supports 2x 512 bit FMA), 48 lanes PCIe 3.0, advanced RAS supported.
- *These processors come with Intel Speed Select. The identifier for processor indicate Intel Speed Select Core processor. Processor provides capability to configure and operate at 3 distinct operating points. Core count selected sets frequency of operations.(Higher Core – Lower Frequency) Static Boot Time Configuration: BIOS discovers and prompts for setting at boot only.
- For more information regarding Intel Xeon processors, please see the following **http://www.intel.com/xeon**.

Intel Xeon Models	CPU Frequency	Cores	Power	UPI	DDR4 MT/s	Memory per socket
Platinum 8180 Processor	2.5 GHz	28	205W	10.4	2666	768GB
Platinum 8176 Processor	2.1 GHz	28	165W	10.4	2666	768GB
Platinum 8170 Processor	2.1 GHz	26	165W	10.4	2666	768GB
Platinum 8168 Processor	2.7 GHz	24	205W	10.4	2666	768GB
Platinum 8165 Processor	2.3 GHz	24	205W	10.4	2666	768GB
Platinum 8164 Processor	2.0 GHz	26	150W	10.4	2666	768GB
Platinum 8160 Processor	2.1 GHz	24	150W	10.4	2666	768 GB
Platinum 8158 Processor	3.0 GHz	12	150W	10.4	2666	768 GB
Platinum 8156 Processor	3.6 GHz	4	105W	10.4	2666	768 GB
Platinum 8153 Processor	2.0 GHz	16	125W	10.4	2666	768 GB
Gold 6154 Processor	3.0 GHz	18	200W	10.4	2666	768 GB
Gold 6152 Processor	2.1 GHz	22	140W	10.4	2666	768 GB
Gold 6150 Processor	2.7 GHz	18	165W	10.4	2666	768 GB
Gold 6148 Processor	2.4 GHz	20	150W	10.4	2666	768 GB
Gold 6146 Processor	3.2 GHz	12	165W	10.4	2666	768 GB
Gold 6144 Processor	3.5 GHz	8	150W	10.4	2666	768 GB
Gold 6143 Processor	2.8 GHz	16	205W	10.4	2666	768 GB
Gold 6142 Processor	2.6 GHz	16	150W	10.4	2666	768 GB
Gold 6140 Processor	2.3 GHz	18	140W	10.4	2666	768 GB
Gold 6138 Processor	2.0 GHz	20	125W	10.4	2666	768 GB
Gold 6136 Processor	3.0 GHz	12	150W	10.4	2666	768 GB
Gold 6134 Processor	3.2 GHz	8	130W	10.4	2666	768 GB
Gold 6132 Processor	2.6 GHz	14	140W	10.4	2666	768 GB
Gold 6130 Processor	2.1 GHz	16	125W	10.4	2666	768 GB

Standard Features

Intel Xeon Models	CPU Frequency	Cores	Power	UPI	DDR4 MT/s	Memory per socket
Gold 6128 Processor	3.4 GHz	6	115W	10.4	2666	768GB
Gold 6126 Processor	2.6 GHz	12	125W	10.4	2666	768 GB
Gold 5122 Processor	3.6 GHz	4	105W	10.4	2666	768 GB
Gold 5120 Processor	2.2 GHz	14	105W	10.4	2400	768 GB
Gold 5118 Processor	2.3 GHz	12	105W	10.4	2400	768 GB
Gold 5115 Processor	2.4 GHz	10	85W	10.4	2400	768 GB

Notes:

− Platinum – 8100 Series – Supports 2 socket (Synergy 480 Gen10) or up to 4 socket (Synergy 660 Gen10) compute modules, 2 Socket supports 2UPI and 4 Socket supports 3UPI @ 10.4 GT/s, supports 6-Channel DDR4 @ 2666 MT/s providing up to 768GB memory capacity (1.5 TB on select processor skus). Intel Turbo Boost Technology, Intel Hyper-Threading Technology supported. Intel AVX-512 (2x 512-bit FMA), 48 lanes PCIe 3.0, advanced RAS.

− Gold – 5100, 6100 Series - Supports 2 socket (Synergy 480 Gen10) or up to 4 socket (Synergy 660 Gen10) compute modules, 2 Socket supports 2UPI and 4 Socket supports 3UPI @ 10.4 GT/s, supports 6-Channel DDR4 @ 2400 MHz (SKU 5122=supports 2666) providing up to 768GB memory capacity (1.5 TB on select skus). Intel Turbo Boost Technology, Intel Hyper-Threading Technology, Intel AVX-512(1x 512-bit FMA) (SKU 5122 supports 2x 512 bit FMA), 48 lanes PCIe 3.0, advanced RAS supported.

− The Intel Xeon Gold 6143 and Intel Xeon Platinum 8165 processors enable HPE Core Boosting technology. Please refer to the section on Intelligent System Tuning for more details: **https://www.hpe.com/us/en/servers/management/tuning.html**

Chipset
Intel C621 Series Chipset
Notes: For more information regarding Intel® chipsets, please see the following URL:
http://www.intel.com/products/server/chipsets/

Synergy Management
HPE Composer powered by OneView
Notes: Read and learn more about **OneView**.

On Compute Management Chipset
HPE iLO 5 ASIC
Notes: Read and learn more in the **iLO QuickSpecs**.

Memory

HPE RDIMMS and LRDIMMs
Two to forty-eight (48) of the following depending on model.

The following memory supports Intel® Xeon® Scalable processor family 2nd generation:
- HPE 8GB (1x8GB) Single Rank x8 DDR4-2933 CAS-21-21-21 Registered Smart Memory Kit
- HPE 16GB (1x16GB) Single Rank x4 DDR4-2933 CAS-21-21-21 Registered Smart Memory Kit
- HPE 16GB (1x16GB) Dual Rank x8 DDR4-2933 CAS-21-21-21 Registered Smart Memory Kit
- HPE Synergy 32GB (1x32GB) Dual Rank x4 DDR4-2933 CAS-21-21-21 Registered Smart Memory Kit
- HPE 32GB (1x32GB) Dual Rank x4 DDR4-2933 CAS-21-21-21 Registered Smart Memory Kit
- HPE 32GB 1Rx4 PC4-2933Y-R Smart Kit
- HPE Synergy 64GB (1x64GB) Dual Rank x4 DDR4-2933 CAS-21-21-21 Registered Smart Memory Kit
- HPE 64GB (1x64GB) Dual Rank x4 DDR4-2933 CAS-21-21-21 Registered Smart Memory Kit
- HPE 128GB (1x128GB) Quad Rank x4 DDR4-2933 CAS-21-21-21 Load Reduced Smart Memory Kit

Standard Features

Modes of Operation

New class of memory which can be configured as either large server memory or fast storage
- Flexibility to deploy as dense memory or fast storage
- Single technology used as memory or storage reducing datacenter complexity.

HPE DDR4 Smart Memory, Registered (RDIMM), Load Reduced (LRDIMM)	
DIMM Slots Available	48 12 DIMM slots per processor, 6 channels per processor, 2 DIMMs per channel
Maximum capacity (LRDIMM)	6 TB 48 x 128 GB LRDIMM @ 2666 MT/s (check on availability of 128 GB DIMMs before ordering)
Maximum capacity (RDIMM)	1.5 TB 48 x 32 GB RDIMM @ 2666 MT/s
Maximum capacity (NVDIMM)	192 GB 12 16 GB NVDIMM @ 2666 MT/s

Notes:
- The 128 GB LRDIMM may not be mixed with other DIMM capacities/types.
- LRDIMM and RDIMM are distinct memory technologies and cannot be mixed within a compute module.
- HPE memory from previous generation servers (DDR3) is not compatible with this compute module. HPE DDR4 Smart Memory is required to realize the memory performance improvements and enhanced functionality listed in this document for Gen10. Please see Memory Speed Tables for memory speed changes based on processors selected. For additional information, please see the HPE DDR4 Smart Memory QuickSpecs at:
  https://www.hpe.com/h20195/v2/GetHTML.aspx?docname=c04355083

HPE Persistent Memory featuring Intel Optane DC Persistent Memory
Notes: Supported on select HPE Synergy Gen10 servers with Intel Xeon Scalable Generation 2 processors (SY480 and SY660).
- HPE 128GB 2666 Persistent Memory Kit featuring Intel Optane DC Persistent Memory
- HPE 256GB 2666 Persistent Memory Kit featuring Intel Optane DC Persistent Memory
- HPE 512GB 2666 Persistent Memory Kit featuring Intel Optane DC Persistent Memory

For information regarding HPE Persistent Memory visit: **http://www.hpe.com/info/persistentmemory**

Modes of Operation

New class of memory which can be configured as either large server memory or fast storage
- Flexibility to deploy as dense memory or fast storage
- Single technology used as memory or storage reducing datacenter complexity

Memory Protection
- **Advanced ECC**

  Advanced ECC uses single device data correction to detect and correct single and all multibit error that occurs within a single DRAM chip.
- **Online Spare**

  Memory online spare mode detects a rank that is degrading and switches operation to the spare rank.
- **Online Mode**

  Memory Online Spare Mode (Rank Spare Mode)

Notes: For details on the HPE Server Memory Options RAS feature, visit: **http://www.hpe.com/docs/memory-ras-feature.**

Standard Features

Mezzanine Connectors

Six (6) I/O expansion mezzanine connectors:

- Mezzanine connector 1 is x16 PCIe 3.0 Type D (supports Type C and Type D mezzanine cards) for fabric 1
  Notes: This mezzanine connector supports dual-port mezzanine cards: one port is routed to interconnect module bay 1 and the other to bay 4.
- Mezzanine connector 2 is x16 PCIe 3.0 Type D (supports Type C and Type D mezzanine cards) for fabric 2
  Notes:
  - This mezzanine connector supports dual-port mezzanine cards:. one port is routed to interconnect module bay 2 and the other to bay 5.
  - The HPE Synergy 660 Gen10 supports 2 or 4 processors. Mezzanine 2 and 5 are only supported when 4 processors are installed.
- Mezzanine connector 3 is x16 PCIe 3.0 Type C (supports Type C mezzanine cards) for fabric 3.
  Notes: This mezzanine connector supports dual-port mezzanine cards: one port is routed to interconnect module bay 3 and the other to bay 6.
- Mezzanine connector 4 is x16 PCIe 3.0 Type D (supports Type C and Type D mezzanine cards) for fabric 1
  Notes: This mezzanine connector supports dual-port mezzanine cards: one port is routed to interconnect module bay 1 and the other to bay 4.
- Mezzanine connector 5 is x16 PCIe 3.0 Type D (supports Type C and Type D mezzanine cards for fabric 2
  Notes:
  - This mezzanine connector supports dual-port mezzanine cards:. one port is routed to interconnect module bay 2 and the other to bay 5.
  - The HPE Synergy 660 Gen10 supports 2 or 4 processors. Mezzanine 2 and 5 are only supported when 4 processors are installed.
- Mezzanine connector 6 is x16 PCIe 3.0 Type C (supports Type C mezzanine cards) for fabric 3
  Notes: This mezzanine connector supports dual-port mezzanine cards: one port is routed to interconnect module bay 3 and the other to bay 6.

Network Adapters or Mezzanine options include:

- HPE Synergy 3820C 10/20GbE Converged Network Adapter
- HPE Synergy 2820C 10GbE Converged Network Adapter
- HPE Synergy 4820C 10/20/25Gb CNA
- HPE Synergy 4610C 10/25Gb Ethernet Adaptor
- HPE Synergy 6410C 25/50Gb Ethernet Adapter
- HPE Synergy 6820C 25/50Gb Converged Network Adapter
- HPE Synergy 5330C 32G Fibre Channel Host Bus Adapters
- HPE Synergy 5830C 32G Fibre Channel Host Bus Adapters
- HPE Synergy 3530C 16G Fibre Channel Host Bus Network Adapter
- HPE Synergy 3830C 16G Fibre Channel Host Bus Network Adapter

Standard Features

HPE Compute Module 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.

HPE Synergy Compute 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 UEFI System Utilities.

Notes: For further information, please refer to the
https://itpfdoc.hitachi.co.jp/manuals/ha8000v/hard/Gen10/UEFI/881334-401_en.pdf

Storage Controllers
Zero (0) to three (3) of the following depending on model:

Software RAID (embedded)
HPE Smart Array S100i Sofware RAID Gen10 (HPE FIO Enable Smart Array SW RAID)
Notes:
- HPE Smart Array S100i SR Gen10 SW RAID will operate in UEFI mode only. For legacy support an additional controller will be needed, and for CTO orders please also select the Legacy mode settings part, 758959-B22.
- HPE Smart Array S100i SR Gen10 SW RAID is off by default and must be enabled. The enablement SKU is 784308-B21

Essential RAID Controllers
HPE Smart Array E208i-c SR Gen10 12G SAS Modular Controller

Performance RAID Controllers
HPE Smart Array P408i-c SR Gen10 12G SAS Modular Controller
HPE Smart Array P416ie-m SR Gen10 12G SAS Mezzanine Controller (Mezzanine Hybrid Smart Array Controller for use with Synergy D3940 Storage Modules; up to 4 storage modules per frame with the HPE Synergy 660 Gen10 compute modules)

Premium Backplane CTO Compute Module
Premium Backplane Compute Module option for use with up to 4 NVMe drives in front drive cage. Also, supports P416ie-m with specific SAS cable connections allowing P416ie-m to manage SATA/SAS drives in both front drive cage and HPE SY D3940 DAS Storage Module.

Standard Features

Maximum Internal Storage		
Type	Capacity	Configuration
Hot Plug SFF SAS SSD	61.2 TB	4 x 15.3 TB
Hot Plug SFF SATA SSD	15.36 TB	4 x 3.84 TB
Hot Plug SFF SAS HDD	9.6 TB	4 x 2.4 TB
Hot Plug SFF SATA HDD	8.0 TB	4 x 2.0 TB
Hot Plug SFF NVMe SSD	16.0 TB	4 x 4.0 TB
Hot Plug uFF SATA SSD	2.72 TB	8 x 340 GB
Hot Plug internal M.2	7.68 TB	4 x 1.92 TB

Notes: The Synergy 660 Gen10 compute module 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 Synergy 660 Gen9 or Gen10 drive bays.

Interfaces
- Micro SDHC slot

  One (1) internal Micro Secure Digital High Capacity (Micro SDHC) card slot
- USB 3.0 port

  One (1) internal USB 3.0 connector for USB flash media drive keys

  Notes: The above options are intended for integrated hypervisor virtualization environments.
- USB 3.0 port

  One (1) external USB 3.0 connector for USB flash media drive keys
- iLO USB 2.0 port

  One (1) external USB 2.0 connector for iLO 5

Operating Systems and Virtualization Software Support
- Microsoft Windows Server
- Microsoft Hyper-V Server
- Red Hat Enterprise Linux
- SUSE Linux Enterprise Server (includes XEN & KVM)
- VMware ESXi
- VMware vSphere

Notes: Operating System support may change. To get the most updated information, please go to the HPE OS Support Matrix at **http://www.hpe.com/info/ossupport**

Form Factor
HPE Synergy 660 Gen10 is a 10U full-height, single-wide, compute module that plugs into the HPE Synergy Frame 12000.

Frames
HPE Synergy 12000 Frame, is the base for all Synergy products and supports full redundancy in a single Frame, while allowing for scalability and redundancy out to many Frames(up to 21 frames supported per single Composer/OneView)
- Up to 12 half-height, 6 full-height single-wide, or 3 full-height double-wide Compute Modules (mixing allowed)
- Up to 5 half-height double-wide HPE Synergy D3940 Storage Modules (mixing with compute modules in any to any ratio allowed.
- One HPE Synergy 12000 Frame will support up to six (6) HPE Synergy 660 Gen10 Compute Modules

Standard Features

Industry Standard Compliance
- Microsoft® Logo certifications
- USB 3.0 Compliant; iLO USB is 2.0 compliant
- WOL enabled on specific adapters
- PXE support enabled
- TPM 2.0 Support (RBSU support of TPM 1.2)
- 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
- UEFI (Unified Extensible Firmware Interface Forum)
- ErP Lot9 (see Technical Specifications see **HPE Environmental Declarations website** for HPE Lot9 Declarations, a White Paper, FAQs and products list of verified products.
  Notes: See requirements at end of this document or in OCA for valid configurations to meet Erp Lot9 requirements.

Graphics(I/O)
Integrated Matrox G200eH2 video standard with 16 MB of Video RAM
- 1280 x 1024 (32 bpp)
- 1920 x 1200 (16 bpp)

HPE iLO 5 on system management memory
- 32 MB Flash
- 512 MB with ECC (224 MB after ECC and video)

HPE Server UEFI/Legacy ROM
Unified Extensible Firmware Interface (UEFI) is an industry standard that provides better manageability and more secured configuration than the legacy ROM while interacting with your server at boot time. HPE Gen10 servers have a UEFI Class 2 implementation and support both UEFI Mode (default) and Legacy BIOS Mode.
Notes: The UEFI System Utilities tool is analogous to the HPE ROM-Based Setup Utility (RBSU) of legacy BIOS. For more information, please visit **https://support.hpe.com/hpsc/doc/public/display?docId=c04398276**
https://itpfdoc.hitachi.co.jp/manuals/ha8000v/hard/Gen10/UEFI/881334-401_en.pdf

UEFI enables numerous new capabilities specific to HPE Synergy Compute Modules such as:
- Secure Boot and Secure Start enable for enhanced security
- 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 iLO RESTful API that is Redfish API Conformant.
- PXE boot support for IPv6 networks
- Workload Profiles for simple performance optimization

Standard Features

UEFI Boot Mode only:
- TPM 2.0 Support
- NVMe Boot Support
- Platform Trust Technology (PTT) can be enabled.
- iSCSI Software Initiator Support.
- HTTP/HTTPs Boot support as a PXE alternative.
- Boot support for option cards that only support a UEFI option ROM

Notes:
- For UEFI Boot Mode, boot environment and OS image installations should be configured properly to support UEFI.
- UEFI FIO Setting (758959-B22) can be selected to configure the system in Legacy mode in the factory for your HPE Synergy Gen10 Server.

Embedded Management

HPE Synergy Composer with HPE OneView
HPE Synergy integrates HPE OneView to deliver 'composable infrastructure' with a view of resources. This **flexible and scalable solution** provides IT managers with the architecture to implement their software-defined data center (SDDC) -- and to address the changing business needs and the challenges of today's enterprise data centers.

HPE Integrated Lights-Out (HPE iLO)
Monitor your servers for ongoing management, service alerting, reporting and remote management with HPE iLO. Learn more at **http://www.hpe.com/info/ilo.**

UEFI
Configure and boot your servers securely with industry standard Unified Extensible Firmware Interface (UEFI). Learn more at **http://www.hpe.com/servers/uefi.**

Intelligent Provisioning
Hassle free server and OS provisioning for 1 or more servers with Intelligent Provisioning. Learn more at **http://www.hpe.com/servers/intelligentprovisioning.**

iLO RESTful API
iLO RESTful API is Redfish API conformance and offers simplified server management automation such as configuration and maintenance tasks based on modern industry standards. Learn more at **http://www.hpe.com/info/restfulapi.**

Security Features
Newest forms of security based on iLO 5 features.
Secure Start, with hardware root of trust.
- HPE hardware designed logic in iLO chip validates iLO firmware burned in chip
- iLO then validates system/compute ROM firmware for digital signature
- iLO completes the chain of trust.
- ROM validates option ROMs and OS Bootloader via UEFI Secure Boot

Standard Features

Standard security features
- 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 or 2.0 option
- Advanced Encryption Standard (AES)
- Intel® Advanced Encryption Standard-New Instructions (AES-NI).

About Trusted Platform Module
Trusted Platform Module (TPM) is a separate processor that monitors the system state. TPM is a passive component needing to be updated and not able to lock down any component in the system except access to its own memory. It also provides some cryptographic operations - among them: creating RSA keypairs, and working with them.

The first verification of signatures happens by code on the CPU, which can be intercepted and replaced. Emulating a "properly" booted system is possible by sending the right values to the TPM.

The bootblock, the part of the firmware that contains the first instructions executed by the CPU, comes first and anchors the root of trust. But if you can't trust the bootblock to send a truthful state into the TPM, this is a vulnerability.

About HPE Silicon Root of Trust
As soon as the server is powered on and the iLO firmware comes alive, it looks into the silicon for the immutable fingerprint that verifies all the firmware code is valid and uncompromised. Over a million lines of firmware code run before the operating system starts, making it vital to confirm that all server essential firmware is free from malware or compromised code.
During operation of the server, HPE has a new technology that conducts run-time firmware validation that checks the firmware stored in the server. At any point, if compromised code or malware is inserted in any of the critical firmware, an iLO audit log alert is created to notify the customer that a compromised has occurred. It is achieved by storing iLO 5 and UEFI firmware in non-volatile Flash memory which is thoroughly scanned at regular user determined intervals. The contents of the firmware stored in memory must be exactly right, down to the individual bit, or else it is flagged as compromised. See the iLO 5 Quickspecs for recovery processes.

Warranty
This product is covered by a global limited warranty and supported by HPE Services and a worldwide network of HPE Authorized Channel Partners resellers. Hardware diagnostic support and repair is available for three years from date of purchase. Support for software and initial setup is available for 90 days from date of purchase. Enhancements to warranty services are available through HPE Pointnext operational services or customized service agreements. Hard drives have either a one year or three year warranty; refer to the specific hard drive QuickSpecs for details.
Notes: Server Warranty includes 3-Year Parts, 3-Year Labor, 3-Year Onsite 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 Hewlett Packard Enterprise replace Optional CSR parts at no charge.
Additional information regarding worldwide limited warranty and technical support

Standard Features

Server Management

HPE OneView Advanced
HPE OneView brings a new level of automation to infrastructure management by taking a template driven approach to provisioning, updating, and integrating compute, storage, and networking infrastructure. It provides full-featured licenses which can be purchased for managing Gen8 Gen9 and Gen10 servers
.

HPE iLO Advanced (standard with Synergy Compute)
HPE iLO licenses offer smart remote functionality without compromise. 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

HPE iLO Advanced Premium Security Edition for iLO 5 includes iLO Advanced License plus high-end security modes, unique security capabilities, like Automatic FW recovery; Runtime FW verification, and Secure erase.

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.

HPE Insight Control
HPE Insight Control is recommended for current implementation on HPE Servers to deploy, migrate, monitor, remote control, and optimize your IT infrastructure through a single, simple management console.

Fibre Channel Support
Optional Fibre Channel mezzanine HBAs are supported on the HPE Synergy 660 Gen10.

Up to two (2) optional Fibre Channel mezzanine HBAs are supported on the HPE Synergy 480 Gen10.
- HPE Synergy 3530C 16G Fibre Channel Host Bus Adapters
- HPE Synergy 3830C 16G Fibre Channel Host Bus Adapters
- HPE Synergy 5330C 32G Fibre Channel Host Bus Adapters
- HPE Synergy 5830C 32G Fibre Channel Host Bus Adapters

Compatible SAN
HPE Synergy 660 Gen10 Compute Modules are optimized for HPE MSA, EVA, 3PAR, XP, and LeftHand.

HPE Virtual Connect
HPE Synergy composable fabric delivers high performance and composability for the delivery of applications and services. The composable fabric is based on primary/satellite architecture.

The HPE Virtual Connect SE 40Gb F8 Module, primary module, based on composable fabric is designed for Composable Infrastructure. Its disaggregated, rack-scale design uses a primary/satellite architecture to consolidate data center network connections, reduce hardware and scales network bandwidth across multiple HPE Synergy Frames.

The primary module contains intelligent networking capabilities that extend connectivity to satellite frames through Interconnect Link Modules. This eliminates top of rack switch need and substantially reduces cost. The reduction in components also simplifies fabric management at scale while consuming fewer ports at the data center aggregation layer.

Standard Features

The HPE VC SE 40 Gb F8 modules eliminate up to 95% of network sprawl at the compute module edge with one device that converges traffic inside frames and directly connects to external LANs. Each redundant pair of Virtual Connect modules provide eight adjustable downlink connections (six Ethernet and two Fibre Channel, or eight Ethernet) to dual-port 10 Gb and in case of 20 Gb Converged Network Adapters 16 adjustable downlinks connections 14 Ethernet and two Fibre Channel) on each compute module. Up to six uplinks using QSFP+ interfaces are available for connection to upstream Ethernet switches. Including splitter cables up to 24 uplinks are available for connection to upstream Ethernet and Fibre Channel. The HPE VC SE 40 Gb F8 modules avoid the confusion of traditional and other converged network solutions by eliminating the need for multiple Ethernet and Fibre Channel switches, extension modules, cables and software licenses. Also, Virtual Connect wire-once connection management is built-in enabling compute modules adds, moves and replacement in minutes instead of days or weeks. The Primary/Satellite disaggregated architecture removes fixed of ratios of interconnects in every frame and allows extending networking resources pool for Virtual Connect to satellite frames.

One Config Simple (SCE)
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 Hewlett Packard Enterprise Customer Business Center or an Authorized Partner for assistance.

Service and Support

HPE Pointnext - Service and Support

Get the most from your HPE Products. Get the expertise you need at every step of your IT journey with **HPE Pointnext Services**. We help you lower your risks and overall costs using automation and methodologies that have been tested and refined by HPE experts through thousands of deployments globally. HPE Pointnext **Advisory Services**, focus on your business outcomes and goals, partnering with you to design your transformation and build a roadmap tuned to your unique challenges. Our **Professional** and **Operational Services** can be leveraged to speed up time-to-production, boost performance and accelerate your business. HPE Pointnext specializes in flawless and on-time implementation, on-budget execution, and creative configurations that get the most out of software and hardware alike.

Consume IT on your terms

HPE GreenLake brings the cloud experience directly to your apps and data wherever they are—the edge, colocations, or your data center. It delivers cloud services for on-premises IT infrastructure specifically tailored to your most demanding workloads. With a pay-per-use, scalable, point-and-click self-service experience that is managed for you, HPE GreenLake accelerates digital transformation in a distributed, edge-to-cloud world..

- Get faster time to market
- Save on TCO, align costs to business
- Scale quickly, meet unpredictable demand
- Simplify IT operations across your data centers and clouds

Managed services to run your IT operations

HPE GreenLake Management Services provides services that monitor, operate, and optimize your infrastructure and applications, delivered consistently and globally to give you unified control and let you focus on innovation.

Free up resources with Operational Services from HPE Pointnext Services

HPE delivers services for IT by using proven best practices as well as automation and methodologies that have been tested and refined by HPE experts and artificial intelligence through thousands of deployments globally. Choose from the recommended services for customers purchasing from Hewlett Packard Enterprise or an authorized reseller. Services are quoted using Hewlett Packard Enterprise order configuration tools.

HPE Pointnext Tech Care

HPE Pointnext Tech Care is the new operational service experience for HPE products. Tech Care goes beyond traditional support by providing access to product specific experts, an AI driven digital experience, and general technical guidance to not only reduce risk but constantly search for ways to do things better. HPE Pointnext Tech Care has been reimagined from the ground up to support a customer-centric, AI driven, and digitally enabled customer experience to move your business forward. HPE Pointnext Tech Care is available in three response levels. Basic, which provides 9x5 business hour availability and a 2 hour response time. Essential which provides a 15 minute response time 24x7 for most enterprise level customers, and Critical which includes a 6 hour repair commitment where available and outage management response for severity 1 incidents.

https://www.hpe.com/services/techcare

HPE Pointnext Complete Care

HPE Pointnext Complete Care is a modular, edge-to-cloud IT environment service that provides a holistic approach to optimizing your entire IT environment and achieving agreed upon IT outcomes and business goals through a personalized and customer-centric experience. All delivered by an assigned team of HPE Pointnext Services experts. HPE Pointnext Complete Care provides:

- A complete coverage approach -- edge to cloud
- An assigned HPE team
- Modular and fully personalized engagement
- Enhanced Incident Management experience with priority access
- Digitally enabled and AI driven customer experience

https://www.hpe.com/services/completecare

Service and Support

Other Related Services

HPE Server Hardware Installation
Provides for the basic hardware installation of HPE branded servers, storage devices and networking options to assist you in bringing your new hardware into operation in a timely and professional manner.

HPE Synergy First Frame Installation and Startup
Provides for hardware installation (HPE Synergy compute modules, Storage Modules, Virtual Connect modules, Interconnect Link Modules, Frame Link Modules, and HPE Synergy D3940 Storage Modules) and software startup for the first frame of your HPE Synergy deployment. Additional frames can be added using the HPE Synergy Additional Frame Installation and Startup Service.
https://h20195.www2.hpe.com/v2/GetPDF.aspx/4AA6-5014ENN.pdf

HPE Synergy Additional Frame Installation and Startup Service
Add additional frames to your HPE Synergy First Frame Startup service or expand your existing HPE Synergy Infrastructure.

HPE Factory Express Initial Frame Service for Synergy
Factory Express allows a customers' configurations to be pre-configured in the HPE Integration center with an implementation project manager to manage the deployment end to end. The project manager will act as a single point of contact to coordinate the build, delivery and onsite installation and commissioning of the solution. In addition to the configuration and deployment activities, your HPE Synergy configuration goes through comprehensive testing and a detailed documentation package on the configuration and settings of the delivered solution will be provided

HPE Factory Express Synergy Additional Frame Service for Synergy
Add additional frames to your HPE Synergy Factory Express service or expand your existing HPE Synergy Infrastructure.

HPE Greenlake Flexibly Capacity
With Flexible Capacity, you get the speed, scalability, and economics of the public cloud in the privacy of your data center. Gain the advantages of the public cloud—consumption-based payment, rapid scalability without worrying about capacity constraints. Reduce the "heavy lifting" needed to operate a data center. And retain the advantages that IT provides the business (i.e., control, security). Deliver the right user experience, choose the right technology for the business, manage privacy and compliance, and manage the cost of IT. And, you have the option to use the public cloud when needed.

HPE Service Credits
HPE Technology Services Support Credits offer flexible services and technical skills to meet your changing IT demands. With a menu of service that is tailored to suit your needs, you get additional resources and specialist skills to help you maintain peak performance of your IT. Offered as annual credits, you can plan your budgets while proactively responding to your dynamic business.

HPE Education Services
Keep your IT staff trained making sure they have the right skills to deliver on your business outcomes. Book on a class today and learn how to get the most from your technology investment. **http://www.hpe.com/ww/learn**

Service and Support

HPE Support Center

The HPE Support Center is a personalized online support portal with access to information, tools and experts to support HPE business products. Submit support cases online, chat with Hewlett Packard Enterprise experts, access support resources or collaborate with peers. Learn more **http://www.hpe.com/support/hpesc**

The HPE Support Center Mobile App* allows you to resolve issues yourself or quickly connect to an agent for live support. Now, you can get access to personalized IT support anywhere, anytime.

HPE Insight Remote Support and HPE Support Center are available at no additional cost with a HPE warranty, HPE Support Service or HPE contractual support agreement.

For more information: **http://www.hpe.com/services**
Notes: *HPE Support Center Mobile App is subject to local availability

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 QuickSpecs, 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.

For more information

- **www.hpe.com/services**
- **https://www.hpe.com/us/en/services/operational.html**

To learn more on HPE Storage Services, please contact your Hewlett Packard Enterprise sales representative or Hewlett Packard Enterprise Authorized Channel Partner. Contact information for a representative in your area can be found at "Contact HPE"
https://www.hpe.com/us/en/contact-hpe.html

HPE Support Services are sold by HPE and Hewlett Packard Enterprise Authorized Service Partners:
- Services for customers purchasing from HPE or an enterprise reseller are quoted using HPE order configuration tools.
- Customers purchasing from a commercial reseller can find HPE Support Services at
  https://ssc.hpe.com/portal/site/ssc/

Configuration Information

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

Notes:

− Not all models are available in all regions. Check with your local country Hewlett Packard Enterprise offices for availability.

− Configure-to-order compute modules must start with a CTO Compute Module.

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

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

− The Factory integrated w/o drive bay model ships with a grill blank in place of the drive cage and drive backplane.

Step 1: Customizable Configuration (CTO)

Choose one of the following configurable models			
CTO Model Name	**HPE Synergy 660 Gen10 Configure-to-order Compute Module**	**HPE Synergy 660 Gen10 without Drive Bays Configure-to-order Compute Module**	**HPE Synergy 660 Gen10 Configure-to-order Premium Backplane Compute Module**
SKU Number	871929-B21	871930-B21	871931-B21
[1]TAA SKU	871929-B22	871930-B22	871931-B22
Processor	2 or 4 selectable		
DIMM Slots	48 total DIMM slots		
Backplane	Standard Backplane 4 Hot-plug SFF Bays	No Backplane No Drive Carriage system (optional 4x M.2)	Premium Backplane 4 Hot-plug SFF Bays NVMe SSD and SAS Ready, depending upon controller choice
Storage Controller	Optional - HPE Smart Array S100i SR Gen10 Controller (HPE FIO Enable Smart Array SW RAID) - HPE Smart Array E208i-c SR Gen10 Controller - HPE Smart Array P408i-c SR Gen10 Controller - HPE Smart Array P416ie-m SR Gen10 Controller - HPE SAS Cable for P416ie-m SR G10 Controller		
Network Mezzanine Adapters	Optional - HPE Synergy 2820C 10Gb CNA - HPE Synergy 3820C 10/20Gb CNA - HPE Synergy 3530C 16G FC HBA - HPE Synergy 3830C 16G FC HBA - HPE Synergy 4820C 10/20/25Gb CNA - HPE Synergy 6810C 25/50Gb Ethernet Adapter - HPE Synergy 6410C 25/50Gb Ethernet Adapter		
I/O slots	6 x16 PCIe 3.0		
Drives supported	Optional 0 to 4 SFF SAS/SATA/NVMe SSDs OR up to 8 uFF Flash AND/OR up to 4 internal M.2 drives		
Security	TPM 2.0 optional; iLO5		
USB and MicroSD	1 internal USB, 1 internal uSD, 1 external USB, 1 external USB iLO port		
Management	HPE OneView and iLO 5 Advanced included with all Synergy solutions		

Configuration Information

Notes:

− CTO SKUs are designed for specific use case fits.
− This information applies to factory CTO configurations, Field upgrades may differ depending field configurations.
− BackPlane in the chassis description refers to the type of controller backplane in the Drive Cage modules.
− Standard BackPlane CTO chassis is designed for flexible use of the Compute Module for most workloads. This SKU may use the SATA Board Option, or SmartArray options. This SKU may also use the Mezzanine P416ie-m for connection to the HPE D3940 Storage Module, but no links to local front drive.
− The Drive-Less CTO option is intended for stateless on SAN/NAS boot use cases and still supports messanine Smart Array for Synergy D3940 Storage Modules. Additionally, this model supports adding the M.2 Adapter for dual M.2 drive options. This SKU may also use the Mezzanine P416ie-m for connection to the HPE D3940 Storage Module, but no links to local front drive.
− The Premium BackPlane CTO option supports NVMe drives directly in the Front Drive cage. SATA/SAS drives may optionally be supported in the Front Drive Cage in combination with the D3940 Storage Module with a mezzanine Smart Array P416ie-m and addition SAS Cables that connect the mezzanine card directly to the Premium Backplane on the Local Drive Cage.
− [1]HPE offers multiple Trade Agreement Act (TAA) compliant configurations to meet the needs of US Federal Government customers. These products are either manufactured or substantially transformed in a designated country.

ErP LOT 9 (Commission Regulation (EU) 2019/424)

The ErP Lot 9 directive is associated with the EU circular economy initiative and will have an impact on energy and disclosure requirements for servers and storage products. The intent of the ErP Lot 9 initiative is to reduce the environmental footprint of server and storage products by reducing energy usage and allowing server and storage systems to be more efficiently reused and recycled. Energy requirements include power supply efficiency, idle power limits, and active power efficiency. The ErP Lot 9 regulations will go into effect for all products placed on the market in the EU member countries after March 1, 2020. EU countries include Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and United Kingdom(status TBD).

A summary of the HPE Synergy 480 Gen10 requirements are listed here. Configuration rules for compliant products are included in the HPE order entry system. HPE Factory order has rules set internal to avoid mis-configuration of any system intended for Lot9 country

HPE SY660 Gen10

● There are no Compute, memory, drive or power supply restrictions for this product..

Step 2: Choose Required Options

Step 2a: Choose Processors (made – only L21 SKUs appear here)

HPE SY660 Gen10 Compute may be configured with either Intel® Xeon® Scalable Family of Generation 1 or Generation 2 Processors(Mixing not allowed)

Intel Xeon Scalable Family Gen 2 - Processor Option Kits

Intel Xeon-Platinum Processors

Intel Xeon-Platinum 8280L (2.7GHz/28-core/205W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P07363-L21
Intel® Xeon-Platinum 8280 (2.7GHz/28-core/205W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P07361_B21
Intel Xeon-Platinum 8276L (2.2GHz/28-core/165W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P07360-L21
Intel Xeon-Platinum 8276 (2.2GHz/28-core/165W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P07358-L21
Intel Xeon-Platinum 8270 (2.7GHz/26-core/205W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P07357-L21

Configuration Information

Intel Xeon-Platinum 8268 (2.9GHz/24-core/205W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P07356-L21
Intel Xeon-Platinum 8260Y (2.4GHz/24-core/165W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P07355-L21
Intel Xeon-Platinum 8260L (2.4GHz/24-core/165W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P07354-L21
Intel Xeon-Platinum 8260 (2.4GHz/24-core/165W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P07352-L21
Intel Xeon-Platinum 8253 (2.2GHz/16-core/125W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P07338-L21

Intel Xeon-Gold Processors

Intel Xeon-Gold 6230N (2.3GHz/20-core/125W) Processor Kit for HPE Synergy 480/660 Gen10	P08919-B21
Intel Xeon-Gold 6230N (2.3GHz/20-core/125W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P08919-L21
Intel Xeon-Gold 6262V (1.9GHz/24-core/135W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P11881-L21
Intel Xeon-Gold 6254 (3.1GHz/18-core/200W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P07351-L21
Intel Xeon-Gold 6252 (2.1GHz/24-core/150W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P07350-L21
Intel Xeon-Gold 6248 (2.5GHz/20-core/150W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P07349-L21
Intel Xeon-Gold 6246 (3.3GHz/12-core/165W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P16385-L21
Intel Xeon-Gold 6244 (3.6GHz/8-core/150W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P07348-L21
Intel Xeon-Gold 6242 (2.8GHz/16-core/150W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P07347-L21
Intel Xeon-Gold 6240Y (2.6GHz/18-14-8-core/150W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P07346-L21
Intel Xeon-Gold 6240L (2.6GHz/18-core/150W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P11886-L21
Intel Xeon-Gold 6240 (2.6GHz/18-core/150W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P07345-L21
Intel Xeon-Gold 6238L (2.1GHz/22-core/140W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P11885-L21
Intel Xeon-Gold 6234 (3.3GHz/8-core/130W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P11694-L21
Intel Xeon-Gold 6230 (2.1GHz/20-core/125W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P07344-L21
Intel Xeon-Gold 6226 (2.7GHz/12-core/125W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P12767-L21
Intel Xeon-Gold 6222V (1.8GHz/20-core/115W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P11880-L21
Intel Xeon-Gold 5222 (3.8GHz/4-core/105W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P08679-L21
Intel Xeon-Gold 5220S (2.7GHz/18-core/125W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P11882-L21
Intel Xeon-Gold 5218B (2.3GHz/16-core/125W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P12572-L21
Intel Xeon-Gold 5218 (2.3GHz/16-core/125W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P07342-L21
Intel Xeon-Gold 5217 (3.0GHz/8-core/115W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P07339-L21
Intel Xeon-Gold 5215L (2.5GHz/10-core/85W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P12142-L21
Intel Xeon-Gold 5215 (2.5GHz/10-core/85W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P07336-L21

Notes:

− All processors within any single compute module must be identical.
− HT indicates that the processor model supports Intel® Hyper-Threading Technology.
− 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.

− DDR4 speed is the maximum memory speed of the processor. Actual memory speed may depend on the quantity and type of DIMMs installed.
− Supports 2 or 4 processors. Mixing different processor models is not supported.
− For the Intel® C621 Chipset Scalable Family Processors come with model numbers to indicate SKU level, processor generation, SKU model, integrations-optimizations or memory capacity. (ie. HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6136; 6 is the SKU Level, 1 is the processor generation, 34 is the SKU model, m indicates memory sku)

Configuration Information

- The HPE Synergy 660 Gen10 Compute Module includes six I/O mezzanine connectors. A processor must be installed in processor socket 1 and 2 for access to mezzanine connectors 1,3,4 and 6). A processor must be installed in processor sockets 3 and 4for access to the mezzanine connector 2 and 5.
- 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.
- Platinum – 8200 Series – Supports 2 socket (Synergy 480 Gen10) or up to 4 socket (Synergy 660 Gen10) compute modules, 2 Socket supports 2UPI and 4 Socket supports 3UPI @ 10.4 GT/s, supports 6-Channel DDR4 @ 2933 MT/s providing up to 1TB on most and 2, 4.5TB on select processor skus. Intel Turbo Boost Technology, Intel Hyper-Threading Technology supported. Intel AVX-512 (2x 512-bit FMA), 48 lanes PCIe 3.0, advanced RAS.
- Gold – 5200, 6200 Series - Supports 2 socket (Synergy 480 Gen10) or up to 4 socket (Synergy 660 Gen10) compute modules, 2 Socket supports 2UPI and 4 Socket supports 3UPI @ 10.4 GT/s, supports 6-Channel DDR4 @ 2933/2666MHz providing up to 1, 2, or 4.5TB memory capacity depending on processor selected. Intel Turbo Boost Technology, Intel Hyper-Threading Technology, Intel AVX-512(1x 512-bit FMA) (SKU 5122 supports 2x 512 bit FMA), 48 lanes PCIe 3.0, advanced RAS supported.

Step 2b: Choose Memory Options

Select memory associated with the processors selected in previous section.

HPE Smart Memory

Notes: The following memory supports Intel® Xeon® Scalable Family processors - 2nd generation

HPE 8GB (1x8GB) Single Rank x8 DDR4-2933 CAS-21-21-21 Registered Smart Memory Kit	P00918-B21
HPE 16GB (1x16GB) Single Rank x4 DDR4-2933 CAS-21-21-21 Registered Smart Memory Kit	P00920-B21
HPE 16GB (1x16GB) Dual Rank x8 DDR4-2933 CAS-21-21-21 Registered Smart Memory Kit	P00922-B21
HPE 32GB (1x32GB) Dual Rank x4 DDR4-2933 CAS-21-21-21 Registered Smart Memory Kit	P00924-b21
HPE 64GB (1x64GB) Dual Rank x4 DDR4-2933 CAS-21-21-21 Registered Smart Memory Kit	P00930-B21
HPE 128GB (1x128GB) Quad Rank x4 DDR4-2933 CAS-21-21-21 Load Reduced Smart Memory Kit	P11040-B21

HPE Persistent Memory Kit featuring Intel Optane DC Persistent Memory

The following memory is for use with specific Intel Xeon Scalable Family Gen 2 processors

Intel Optane 128GB persistent memory 100 Series for HPE	835804-B21
Intel Optane 256GB persistent memory 100 Series for HPE	835807-B21
Intel Optane 512GB persistent memory 100 Series for HPE	835810-B21

Notes:

- Supported on select HPE Synergy Gen10 servers with second generation Intel Xeon Scalable Gen2 processors (SY480 and SY660)
- For information regarding HPE Persistent Memory visit: **http://www.hpe.com/info/persistentmemory**

Step 2c: Choose Networking Adapters

HPE Synergy 4820C 10/20/25Gb Converged Network Adapter	876449-B21
HPE Synergy 6410C 25/50Gb Ethernet Adapter	868779-B21
HPE Synergy 6810C 25/50Gb Ethernet Adapter	867322-B21
HPE Synergy 6820C 25/50Gb Converged Network Adapter	P02054-B21

Configuration Information

Notes:
– Networking adapters must have matched Interconnect Modules or Interconnect Links matched in the corresponding ICM slot on the rear of the Synergy 12000 Frame. See Specifications Section below for Mezzanine to ICM Best Practices and matching requirements.
– Networking adapters must have matched Interconnect Modules or Interconnect Links matched in the corresponding ICM slot on the rear of the Synergy 12000 Frame. See Specifications Section below for Mezzanine to ICM Best Practices and matching requirements.

Step 3: Choose Additional Factory Integratable Options

HPE Storage Controllers

HPE FIO Enable Smart Array SW RAID	784308-B21
HPE Synergy Compute Chipset SATA FIO Board Kit	872955-B21
HPE Smart Array E208i-c SR Gen10 (8 Internal Lanes/No Cache) 12G SAS Modular Controller	823852-B21

Notes: HPE Smart Array E208i-c SR Gen10 Controller (823852-B21) or HPE Smart Array P480i-c SR Gen10 Controller (832856-B21) is required with HPE Synergy 660 Gen10 Configure-to-order Compute Module (871929-B21/B22).

HPE Smart Array P408i-c SR Gen10 (8 Internal Lanes/2GB Cache) 12G SAS Modular Controller	823856-B21
HPE 96W Smart Storage Lithium-ion Battery with 260mm Cable Kit	P01367-B21

Notes: Available beginning December 2017.

HPE Smart Array P416ie-m SR Gen10 (8 Int 8 Ext Lanes/2GB Cache) 12G SAS Mezzanine Controller	804428-B21
HPE Smart Array P416ie-m SR Gen10 SAS Cable Kit	871573-B21

Notes: For SATA/SAS drive use with premium compute modules/front local drives.

HPE I/O Expansion Options

HPE Synergy 6810C 25/50Gb Ethernet Adapter	867322-B21
HPE Synergy 6410C 25/50Gb Ethernet Adapter	868779-B21
HPE Synergy 6820C 25/50Gb Converged Network Adapter	P02054-B21
HPE Synergy 4820C 10/20/25Gb Converged Network Adapter	876449-B21
HPE Synergy 5330C 32Gb Fibre Channel Host Bus Adapter	870828-B21
HPE Synergy 5830C 32Gb Fibre Channel Host Bus Adapter 777456-B21	

Notes:
– See Specfications sections below for Best Practices and requirements for options placement in correct mezzanine slots that match with Interconnect model slotting for correct operations.
– Networking adapters must have matched Interconnect Modules or Interconnect Links matched in the corresponding ICM slot on the rear of the Synergy 12000 Frame. See Specifications Section below for Mezzanine to ICM Best Practices and matching requirements.
– Networking adapters must have matched Interconnect Modules or Interconnect Links matched in the corresponding ICM slot on the rear of the Synergy 12000 Frame. See Specifications Section below for Mezzanine to ICM Best Practices and matching requirements.

Step 4: Choose additional options for Factory Integration from Additional Options sections below or the following:

- HPE Synergy 12000 Frame QuickSpecs: **https://www.hpe.com/h20195/v2/GetHtml.aspx?docname=c04815113**
- HPE Synergy Interconnect and Mezzanine Components QuickSpecs: **https://www.hpe.com/h20195/v2/GetHtml.aspx?docname=c04815110**

Configuration Information

- HPE Synergy D3940 Storage Module QuickSpecs:
  https://www.hpe.com/h20195/v2/GetHtml.aspx?docname=c04815141

Step 5: Choose HPE Synergy Services
HPE Synergy Tech Care Services
HPE 5Y Tech Care Essential Service	HU4A6A5
HPE 5Y Tech Care Essential with Defective Media Retention Service	HU4A7A5

Optional Items as Required – 2ⁿᵈ Processors
HPE SY660 Gen10 Compute may be configured with either Intel Xeon Scalable Family of Generation 1 or Generation 2 Processors (Mixing not allowed)

HPE Processors (2 or 4 total are required)
Intel Xeon Scalable Family Gen 2 - Processor Option Kits
Intel Xeon-Platinum Processors

Intel Xeon-Platinum 8280L (2.7GHz/28-core/205W) Processor Kit for HPE Synergy 480/660 Gen10	P07363-B21
Intel® Xeon-Platinum 8280 (2.7GHz/28-core/205W) Processor Kit for HPE Synergy 480/660 Gen10	P07361_B21
Intel Xeon-Platinum 8276L (2.2GHz/28-core/165W) Processor Kit for HPE Synergy 480/660 Gen10	P07360-B21
Intel Xeon-Platinum 8276 (2.2GHz/28-core/165W) Processor Kit for HPE Synergy 480/660 Gen10	P07358-B21
Intel Xeon-Platinum 8270 (2.7GHz/26-core/205W) Processor Kit for HPE Synergy 480/660 Gen10	P07357-B21
Intel Xeon-Platinum 8268 (2.9GHz/24-core/205W) Processor Kit for HPE Synergy 480/660 Gen10	P07356-B21
Intel Xeon-Platinum 8260Y (2.4GHz/24-20-16-core/165W) Processor Kit for HPE Synergy 480/660 Gen10	P07355-B21
Intel Xeon-Platinum 8260L (2.4GHz/24-core/165W) Processor Kit for HPE Synergy 480/660 Gen10	P07354-B21
Intel Xeon-Platinum 8260 (2.4GHz/24-core/165W) Processor Kit for HPE Synergy 480/660 Gen10	P07352-B21
Intel Xeon-Platinum 8253 (2.2GHz/16-core/125W) Processor Kit for HPE Synergy 480/660 Gen10	P07338-B21

Intel Xeon-Gold Processors

Intel Xeon-Gold 6262V (1.9GHz/24-core/135W) Processor Kit for HPE Synergy 480/660 Gen10	P11881-B21
Intel Xeon-Gold 6254 (3.1GHz/18-core/200W) Processor Kit for HPE Synergy 480/660 Gen10	P07351-B21
Intel Xeon-Gold 6252 (2.1GHz/24-core/150W) Processor Kit for HPE Synergy 480/660 Gen10	P07350-B21
Intel Xeon-Gold 6248 (2.5GHz/20-core/150W) Processor Kit for HPE Synergy 480/660 Gen10	P07349-B21
Intel Xeon-Gold 6246 (3.3GHz/12-core/165W) Processor Kit for HPE Synergy 480/660 Gen10	P16385-B21
Intel Xeon-Gold 6244 (3.6GHz/8-core/150W) Processor Kit for HPE Synergy 480/660 Gen10	P07348-B21
Intel Xeon-Gold 6242 (2.8GHz/16-core/150W) Processor Kit for HPE Synergy 480/660 Gen10	P07347-B21
Intel Xeon-Gold 6240Y (2.6GHz/18-14-8-core/150W) Processor Kit for HPE Synergy 480/660 Gen10	P07346-B21
Intel Xeon-Gold 6240L (2.6GHz/18-core/150W) Processor Kit for HPE Synergy 480/660 Gen10	P11886-B21
Intel Xeon-Gold 6240 (2.6GHz/18-core/150W) Processor Kit for HPE Synergy 480/660 Gen10	P07345-B21
Intel Xeon-Gold 6238L (2.1GHz/22-core/140W) Processor Kit for HPE Synergy 480/660 Gen10	P11885-B21
Intel Xeon-Gold 6234 (3.3GHz/8-core/130W) Processor Kit for HPE Synergy 480/660 Gen10	P11694-B21
Intel Xeon-Gold 6230 (2.1GHz/20-core/125W) Processor Kit for HPE Synergy 480/660 Gen10	P07344-B21
Intel Xeon-Gold 6226 (2.7GHz/12-core/125W) Processor Kit for HPE Synergy 480/660 Gen10	P12767-B21
Intel Xeon-Gold 6222V (1.8GHz/20-core/115W) Processor Kit for HPE Synergy 480/660 Gen10	P11880-B21
Intel Xeon-Gold 5222 (3.8GHz/4-core/105W) Processor Kit for HPE Synergy 480/660 Gen10	P08679-B21
Intel Xeon-Gold 5220S (2.7GHz/18-core/125W) Processor Kit for HPE Synergy 480/660 Gen10	P11882-B21
Intel Xeon-Gold 5218B (2.3GHz/16-core/125W) Processor Kit for HPE Synergy 480/660 Gen10	P12572-B21
Intel Xeon-Gold 5218 (2.3GHz/16-core/125W) Processor Kit for HPE Synergy 480/660 Gen10	P07342-B21
Intel Xeon-Gold 5217 (3.0GHz/8-core/115W) Processor Kit for HPE Synergy 480/660 Gen10	P07339-B21

Configuration Information

Intel Xeon-Gold 5215L (2.5GHz/10-core/85W) Processor Kit for HPE Synergy 480/660 Gen10   P12142-B21
Intel Xeon-Gold 5215 (2.5GHz/10-core/85W) Processor Kit for HPE Synergy 480/660 Gen10   P07336-B21

Notes:

— All processors within any single compute module must be identical.

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

— 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.

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

— Supports 2 or 4 processors. Mixing different processor models is not supported.

— For the Intel® C621 Chipset Scalable Family Processors come with model numbers to indicate SKU level, processor generation, SKU model, integrations-optimizations or memory capacity. (ie. HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6234; 6 is the SKU Level, 2 is the processor generation, 34 is the SKU model, m indicates memory sku)

— The HPE Synergy 660 Gen10 Compute Module includes up to 6 I/O mezzanine connectors. A processor must be installed in processor sockets 1 and 2for access to mezzanine connectors 1,3,4 and 6). Processors must be installed in processor Socket 3 and 4 for access to the mezzanine connectors 2 and 5.

— 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.

— Platinum – 8200 Series – Supports 2 socket (Synergy 480 Gen10) or up to 4 socket (Synergy 660 Gen10) compute modules, 2 Socket supports 2UPI and 4 Socket supports 3UPI @ 10.4 GT/s, supports 6-Channel DDR4 @ 2933 MT/s providing up to 1TB on most and 2, 4.5TB on select processor skus. Intel Turbo Boost Technology, Intel Hyper-Threading Technology supported. Intel AVX-512 (2x 512-bit FMA), 48 lanes PCIe 3.0, advanced RAS.

— Gold – 5200, 6200 Series - Supports 2 socket (Synergy 480 Gen10) or up to 4 socket (Synergy 660 Gen10) compute modules, 2 Socket supports 2UPI and 4 Socket supports 3UPI @ 10.4 GT/s, supports 6-Channel DDR4 @ 2933/2666MHz providing up to 1, 2, or 4.5TB memory capacity depending on processor selected. Intel Turbo Boost Technology, Intel Hyper-Threading Technology, Intel AVX-512(1x 512-bit FMA) (SKU 5122 supports 2x 512 bit FMA), 48 lanes PCIe 3.0, advanced RAS supported.

— See indivual Specs for more details

Additional Options

Some options may not be integrated at the factory. To ensure only valid configurations are ordered, Hewlett Packard Enterprise recommends the use of an HPE approved configurator. Contact your local sales representative for additional information

Intel Xeon Scalable Family Gen 1 - Processor Option Kits
Intel Xeon-Platinum Processors (2 or 4 total are required)
Intel Xeon-Gold Processors
Notes:
- All processors within the compute module must be identical.
- HT indicates that the processor model supports Intel® Hyper-Threading Technology.
- 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.
- DDR4 speed is the maximum memory speed of the processor. Actual memory speed may depend on the quantity and type of DIMMs installed.
- Supports 2 or 4 processors. Mixing different processor models is not supported.
- For the Intel® C621 Chipset Scalable Family Processors come with model numbers to indicate SKU level, processor generation, SKU model, integrations-optimizations or memory capacity. (ie. HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6134M; 6 is the SKU Level, 1 is the processor generation, 34 is the SKU model, m indicates memory sku)
- The HPE Synergy 660 Gen9 Compute Module includes six I/O mezzanine connectors.
- 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.
- Platinum – 8100 Series - 2 and 4 socket capable, 2S - 2UPI, 4S - 3UPI @ 10.4 GT/s, 6-Channel DDR4 @ 2666 MT/s, 768 GB memory capacity (1.5 TB on select skus), Intel Turbo Boost Technology, Intel Hyper-Threading Technology Intel AVX-512 (2x 512-bit FMA), 48 lanes PCIe 3.0, advanced RAS.
- Gold – 5100, 6100 Series - 2 and 4 socket capable, 2S - 2UPI, 4S - 3UPI @ 10.4 GT/s, 6-Channel DDR4 @ 2400 MHz (SKU 5122=supports 2666), 768 GB memory capacity (1.5 TB on select skus), Intel Turbo Boost Technology, Intel Hyper-Threading Technology, Intel AVX-512(1x 512-bit FMA) (SKU 5122 supports 2x 512 bit FMA), 48 lanes PCIe 3.0, advanced RAS.
- The Intel Xeon Gold 6143 and Intel Xeon Platinum 8165 processors enable HPE Core Boosting technology. Please refer to the section on Intelligent System Tuning for more details.
  https://www.hpe.com/us/en/servers/management/tuning.html

Memory
The following memory supports Intel® Xeon® Scalable Family processors - 2nd generation:

HPE Smart Memory
HPE 8GB (1x8GB) Single Rank x8 DDR4-2933 CAS-21-21-21 Registered Smart Memory Kit	P00918-B21
HPE 16GB (1x16GB) Single Rank x4 DDR4-2933 CAS-21-21-21 Registered Smart Memory Kit	P00920-B21
HPE 16GB (1x16GB) Dual Rank x8 DDR4-2933 CAS-21-21-21 Registered Smart Memory Kit	P00922-B21
HPE 32GB (1x32GB) Dual Rank x4 DDR4-2933 CAS-21-21-21 Registered Smart Memory Kit	P00924-b21
HPE 64GB (1x64GB) Dual Rank x4 DDR4-2933 CAS-21-21-21 Registered Smart Memory Kit	P00930-B21
HPE 128GB (1x128GB) Quad Rank x4 DDR4-2933 CAS-21-21-21 Load Reduced Smart Memory Kit	P11040-B21

The following memory supports Intel® Xeon® Scalable Family Processors - 1st generation:

Additional Options

Registered DIMMs (RDIMMs)

HPE 16GB (1x16GB) Dual Rank x8 DDR4-2666 CAS-19-19-19 Registered Smart Memory Kit   835955-B21

Notes:

− HPE memory from previous generation servers (DDR3) is not compatible with this compute module. HPE Smart Memory is required to realize the memory performance improvements and enhanced functionality listed in this document for Gen10. For additional information, please see the **HPE DDR4 Smart Memory QuickSpecs**

− LRDIMM and RDIMM are distinct memory technologies and cannot be mixed within a compute module.

− For more information refer to the **Memory Speed Tables**

− For memory **RAS feature whitepaper** if users want to know more about the memory RAS features.

HPE Persistent Memory Kit featuring Intel Optane DC Persistent Memory

The following memory is for use with specific Intel Xeon Scalable Family Gen 2 processors

Intel Optane 128GB persistent memory 100 Series for HPE   835804-B21
Intel Optane 256GB persistent memory 100 Series for HPE   835807-B21
Intel Optane 512GB persistent memory 100 Series for HPE   835810-B21

Notes:

− Supported on select HPE Synergy Gen10 servers with second generation Intel Xeon Scalable Gen2 processors (SY480 and SY660)

− For information regarding HPE Persistent Memory visit: **http://www.hpe.com/info/persistentmemory**

HPE Drives

Notes:

− The HPE Synergy 660 Gen10 Compute Module supports 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 HPE Synergy 660 Gen10 drive bays.

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

− HPE drives have either a one year or three year warranty; refer to the specific drive QuickSpecs for details. **HPE Hard Disk Drives** or **HPE Solid State Drives**

− The drive options are not required when configuring a drive-less model.

− HPE Synergy 660 Gen10 Compute Module support all small form factor (SFF) SAS and SATA HDDs and SSDs currently certified in HPE Smart Carriers. Any exceptions to this qualification will be listed on this page by drive description and part number.

SATA Drives (listed by capacity)

HPE Dual 480GB SATA 6G Read Intensive M.2 to SFF SCM Multi Vendor SSD   P47819-B21
HPE 240GB SATA 6G Read Intensive SFF SC Multi Vendor SSD   P18420-B21
HPE 480GB SATA 6G Read Intensive SFF SC Multi Vendor SSD   P18422-B21
HPE 480GB SATA 6G Read Intensive SFF SC PM893 SSD   P47810-B21
HPE 7.68TB SATA 6G Read Intensive SFF SC Multi Vendor SSD   P18430-B21
HPE 960GB SATA 6G Read Intensive SFF SC Multi Vendor SSD   P18424-B21
HPE 960GB SATA 6G Read Intensive SFF SC PM893 SSD   P47811-B21
HPE 1.92TB SATA 6G Read Intensive SFF SC Multi Vendor SSD   P18426-B21
HPE 1.9TB SATA 6G Read Intensive SFF SC PM893 SSD   P47812-B21
HPE 3.84TB SATA 6G Read Intensive SFF SC Multi Vendor SSD   P18428-B21
HPE 3.84TB SATA 6G Read Intensive SFF SC PM893 SSD   P47813-B21
HPE 480GB SATA 6G Mixed Use SFF SC Multi Vendor SSD   P18432-B21

Additional Options

HPE 480GB SATA 6G Mixed Use SFF SC PM897 SSD	P47814-B21
HPE 960GB SATA 6G Mixed Use SFF SC Multi Vendor SSD	P18434-B21
HPE 960GB SATA 6G Mixed Use SFF SC PM897 SSD	P47815-B21
HPE 1.92TB SATA 6G Mixed Use SFF SC Multi Vendor SSD	P18436-B21
HPE 1.92TB SATA 6G Mixed Use SFF SC PM897 SSD	P47816-B21
HPE 3.84TB SATA 6G Mixed Use SFF SC Multi Vendor SSD	P18438-B21

SAS Drives (listed by Capacity)

HPE 1.92TB SAS 12G Read Intensive SFF SC Multi Vendor SSD	P49030-B21
HPE 1.92TB SAS 12G Read Intensive SFF SC Value SAS Multi Vendor SSD	P36999-B21
HPE 15.36TB SAS 12G Read Intensive SFF SC Multi Vendor SSD	P49044-B21
HPE 3.84TB SAS 12G Read Intensive SFF SC Multi Vendor SSD	P49034-B21
HPE 3.84TB SAS 12G Read Intensive SFF SC Value SAS Multi Vendor SSD	P37001-B21
HPE 7.68TB SAS 12G Read Intensive SFF SC Multi Vendor SSD	P49039-B21
HPE 7.68TB SAS 12G Read Intensive SFF SC Value SAS Multi Vendor SSD	P37003-B21
HPE 960GB SAS 12G Read Intensive SFF SC Multi Vendor SSD	P49028-B21
HPE 960GB SAS 12G Read Intensive SFF SC Value SAS Multi Vendor SSD	P36997-B21
HPE 1.92TB SAS 12G Mixed Use SFF SC Value SAS Multi Vendor SSD	P37011-B21
HPE 960GB SAS 12G Mixed Use SFF SC Value SAS Multi Vendor SSD	P37005-B21
HPE 800GB SAS 12G Mixed Use SFF SC Multi Vendor SSD	P49046-B21
HPE 6.4TB SAS 12G Mixed Use SFF SC Multi Vendor SSD	P49056-B21
HPE 3.2TB SAS 12G Mixed Use SFF SC Multi Vendor SSD	P49052-B21
HPE 3.84TB SAS 12G Mixed Use SFF SC Value SAS Multi Vendor SSD	P37017-B21
HPE 1.6TB SAS 12G Mixed Use SFF SC Multi Vendor SSD	P49048-B21
HPE 1.6TB SAS 12G Write Intensive SFF SC PM6 SSD	P26376-B21

NVMe Drives (listed by Capacity)

HPE 1.92TB NVMe Gen4 High Performance Read Intensive SFF SCN Self-encrypting FIPS U.3 CM6 SSD	P44572-B21
HPE 1.92TB NVMe Gen4 High Performance Read Intensive SFF SCN U.2 P5520 SSD	P51452-B21
HPE 1.92TB NVMe Gen4 High Performance Read Intensive SFF SCN U.3 PM1733 SSD	P22276-B21
HPE 1.92TB NVMe Gen4 Mainstream Performance Read Intensive SFF SCN U.2 Multi Vendor SSD	P47823-B21
HPE 1.92TB NVMe Gen4 Mainstream Performance Read Intensive SFF SCN U.2 V2 Multi Vendor SSD	P64874-B21
HPE 1.92TB NVMe Gen4 High Performance Read Intensive SFF SCN U.3 PM1733a SSD	P50214-B21
HPE 3.84TB NVMe Gen4 High Performance Read Intensive SFF SCN Self-encrypting FIPS U.3 CM6 SSD	P44580-B21
HPE 3.84TB NVMe Gen4 High Performance Read Intensive SFF SCN U.2 P5520 SSD	P51454-B21
HPE 3.84TB NVMe Gen4 High Performance Read Intensive SFF SCN U.3 PM1733 SSD	P22278-B21
HPE 3.84TB NVMe Gen4 Mainstream Performance Read Intensive SFF SCN U.2 Multi Vendor SSD	P47824-B21
HPE 3.84TB NVMe Gen4 Mainstream Performance Read Intensive SFF SCN U.2 V2 Multi Vendor SSD	P64882-B21
HPE 3.84TB NVMe Gen4 High Performance Read Intensive SFF SCN U.3 PM1733a SSD	P50217-B21
HPE 7.68TB NVMe Gen4 High Performance Read Intensive SFF SCN U.2 P5520 SSD	P51456-B21
HPE 7.68TB NVMe Gen4 High Performance Read Intensive SFF SCN U.3 PM1733 SSD	P22280-B21
HPE 7.68TB NVMe Gen4 Mainstream Performance Read Intensive SFF SCN U.2 Multi Vendor SSD	P47825-B21
HPE 7.68TB NVMe Gen4 Mainstream Performance Read Intensive SFF SCN U.2 V2 Multi Vendor SSD	P64890-B21
HPE 7.68TB NVMe Gen4 High Performance Read Intensive SFF SCN U.3 PM1733a SSD	P50220-B21
HPE 15.36TB NVMe Gen4 High Performance Read Intensive SFF SCN U.3 PM1733 SSD	P22282-B21
HPE 1.6TB NVMe Gen4 High Performance Mixed Use SFF SCN Self-encrypting FIPS U.3 CM6 SSD	P44588-B21
HPE 1.6TB NVMe Gen4 High Performance Mixed Use SFF SCN U.3 PM1735 SSD	P22268-B21
HPE 1.6TB NVMe Gen4 Mainstream Performance Mixed Use SFF SCN U.2 Multi Vendor SSD	P47820-B21
HPE 1.6TB NVMe Gen4 Mainstream Performance Mixed Use SFF SCN U.2 V2 Multi Vendor SSD	P64870-B21

Additional Options

HPE 1.6TB NVMe Gen4 High Performance Mixed Use SFF SCN U.2 P5620 SSD	P51458-B21
HPE 1.6TB NVMe Gen4 High Performance Mixed Use SFF SCN U.3 PM1735a SSD	P50225-B21
HPE 3.2TB NVMe Gen4 High Performance Mixed Use SFF SCN Self-encrypting FIPS U.3 CM6 SSD	P44596-B21
HPE 3.2TB NVMe Gen4 High Performance Mixed Use SFF SCN U.3 PM1735 SSD	P22270-B21
HPE 3.2TB NVMe Gen4 Mainstream Performance Mixed Use SFF SCN U.2 Multi Vendor SSD	P47821-B21
HPE 3.2TB NVMe Gen4 Mainstream Performance Mixed Use SFF SCN U.2 V2 Multi Vendor SSD	P64878-B21
HPE 3.2TB NVMe Gen4 High Performance Mixed Use SFF SCN U.2 P5620 SSD	P51460-B21
HPE 3.2TB NVMe Gen4 High Performance Mixed Use SFF SCN U.3 PM1735a SSD	P50228-B21
HPE 6.4TB NVMe Gen4 High Performance Mixed Use SFF SCN U.3 PM1735 SSD	P22272-B21
HPE 6.4TB NVMe Gen4 Mainstream Performance Mixed Use SFF SCN U.2 Multi Vendor SSD	P47822-B21
HPE 6.4TB NVMe Gen4 Mainstream Performance Mixed Use SFF SCN U.2 V2 Multi Vendor SSD	P64886-B21
HPE 6.4TB NVMe Gen4 High Performance Mixed Use SFF SCN U.2 P5620 SSD	P51462-B21
HPE 6.4TB NVMe Gen4 High Performance Mixed Use SFF SCN U.3 PM1735a SSD	P50231-B21
HPE 12.8TB NVMe Gen4 High Performance Mixed Use SFF SCN U.3 PM1735 SSD	P22274-B21
HPE 375GB NVMe Gen3 High Performance Low Latency Write Intensive SFF SCN U.2 P4800X SSD	878014-B21
HPE 750GB NVMe Gen3 High Performance Low Latency Write Intensive SFF SCN U.2 P4800X SSD	P06952-B21

Enterprise - 12G SAS - SFF Drives
HPE 1.6TB NVMe Gen4 High Performance Mixed Use SFF SCN U.3 PM1735 SSD	P22268-B21
HPE 750GB NVMe Gen3 High Performance Low Latency Write Intensive SFF SCN U.2 P4800X SSD	P06952-B21

M.2 Drive Options
HPE Synergy 480 Gen10 M2 NGFF Adapter Kit	P38437-B21

Drive Qualification Exceptions:

Notes: At this time there are no exceptions to list.

HPE Compute Security

HPE Trusted Platform Module 2.0 Gen10 Option	864279-B21
HPE iLO Common Password FIO Setting	P08040-B21

Notes:

– 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® 2012. 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 2012 has not been tampered with while the system was offline.

– For more information about **Trusted Platform Module**

– HPE Synergy OS pre-installed units will come with the partition required for TPM deployment.

– 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 Networking

Ethernet Mezzanine Adapters

HPE Synergy 4820C 10/20/25Gb Converged Network Adapter	876449-B21
HPE Synergy 6410C 25/50Gb Ethernet Adapter	868779-B21
HPE Synergy 6810C 25/50Gb Ethernet Adapter	867322-B21
HPE Synergy 6820C 25/50Gb Converged Network Adapter	P02054-B21

Additional Options

HPE Fibre Channel

HPE Synergy 5330C 32Gb Fibre Channel Host Bus Adapter	870828-B21
HPE Synergy 5830C 32Gb Fibre Channel Host Bus Adapter	777456-B21

HPE Storage Controllers

HPE Synergy Compute Chipset SATA FIO Board Kit	872955-B21

Notes: Two (2) are required only when HPE Smart Array S100i is enabled

HPE FIO Enable Smart Array SW RAID

HPE Smart Array P408i-c SR Gen10 (8 Internal Lanes/2GB Cache) 12G SAS Modular Controller	823856-B21
HPE Smart Array P416ie-m SR Gen10 (8 Int 8 Ext Lanes/2GB Cache) 12G SAS Mezzanine Controller	804428-B21
HPE FIO Enable Smart Array SW RAID	784308-B21
HPE Smart Array E208i-c SR Gen10 (8 Internal Lanes/No Cache) 12G SAS Modular Controller	823852-B21
HPE Smart Storage Hybrid Capacitor with 260mm Cable Kit	P02381-B21
HPE 96W Smart Storage Lithium-ion Battery with 260mm Cable Kit	P01367-B21
HPE 32GB microSD RAID 1 USB Boot Drive	P21868-B21

Notes: For use with premium modules/front drives.

Notes:

- HPE Smart Array S100i SR Gen10 SW RAID is off by default and can be enabled RBSU.
- HPE Smart Array S100i SR Gen10 SW RAID is an HPE factory setting(784308-B21), will operate in UEFI mode only and requires HPE Synergy FIO Gen10 SATA Brd Kit (872955-B21) for enablement to Local Drives
- HPE Smart Array S100i SR Gen10 SW RAID is an HPE factory setting(784308-B21), will operate in UEFI mode only.
- For legacy support select Legacy mode settings part, 758959-B22.
- Premium Backplane Modules, CTO offers a Premium Backplane Compute Module for use with NVMe drives in front drive cage. Also, supports P416ie-m with specific SAS cable(871573-B21) connections allowing P416ie-m to manage SATA/SAS drives in both front drive cage and D3940.

HPE Flash Media Kits

HPE Enterprise Mainstream Flash Media Kits for Memory Cards

HPE 32GB microSD Flash Memory Card	700139-B21

Notes: Please see the QuickSpecs for Technical Specifications and additional information:
https://www.hpe.com/h20195/v2/GetDocument.aspx?docname=c04123175

HPE Synergy Services

HPE Synergy Tech Care Services

HPE 5Y Tech Care Essential Service	HU4A6A5
HPE 5Y Tech Care Essential with Defective Media Retention Service	HU4A7A5

Notes: DMR – Defective Media Retention

Deployment/Installation & Start-up Services

HPE Factory Express Synergy Initial Frame Package 4 Service	HA454A1-300
HPE Factory Express Synergy Add-on Frame Package 4 Service	HA454A1-301
HPE Synergy First Frame Startup Service	U8JM3E
HPE Synergy Additional Frame Startup Service	U8JM4E

Notes: See HPE Support Services Central for additional services at **http://ssc.hpe.com/portal/site/ssc/**

Additional Options

Third Party Solutions
Orumco Cloud Solution(Service Provider)
Ormuco is a turnkey, white label private and/or public cloud solution powered by HPE Rack and/or Synergy infrastructure. The solution is installed and operated by Ormuco in the enterprise or service provider data center and offers fully-featured Openstack/Docker based cloud with value add services in IaaS/PaaS. It offers a multilingual, sophisticated hybrid management end-user and administration portal.

Solution – see **http://www.Ormuco.com**

HPE internal Sales/Presales material can be found on the WW Service Provider Sales Portal SKUs.

Ormuco Installation	Description
ORM-INS-ENT	Enterprise Customer Site
ORM-INS-SP	Service Provider Customer Site

Notes: HPE should be entitled to a 15% discount on list

Ormuco Software License and Support	List price per server / month
ORM-SW-SP	$2,200.00 USD
ORM-SW-ENT	$1,400.00 USD

Notes: To request a quotation or place an order for the Ormuco SKUs send an email to HILS@hpe.com for WW engagement.

Memory

Memory Subsystem Architecture

Notes: Each processor socket contains six memory channels that support two DIMMs each for a total of 12 (twelve) DIMMs per installed processor or up to forty-eight (48) DIMMs for the compute module.

Memory Population Rules and Guidelines

- A minimum of one DIMM is required per processor.
- Install DIMMs only if the corresponding processor is installed.
- If only one processor is installed in a two processor system, only half of the DIMM slots are available.
- DIMM sizes can be mixed in channel. To maximize performance, it is recommended to balance the total memory capacity between all installed processors and to load the channels similarly whenever possible.
- LRDIMM and RDIMMs are all distinct memory technologies and cannot be mixed within a compute module.
- DIMMs of different speeds may be mixed in any order; the compute module 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 HPE Synergy 480 Gen10 Compute Module.

To realize the performance memory capabilities listed in this document, HPE Smart Memory is required. For additional information, please see the **HPE DDR4 Smart Memory QuickSpecs**

Memory Speed Table for Memory used with Intel Scalable Family Gen2 Processors					
6DPC	**Register DIMM (RDIMM)**				
HPE SKU P/N	P00918-B21	P00920-B21	P00922-B21	P28225-B21	P28217-B21
SKU Description	HPE 8GB (1x8GB) Single Rank x8 DDR4-2933 CAS-21-21-21 Registered Smart Memory Kit	HPE 16GB (1x16GB) Single Rank x4 DDR4-2933 CAS-21-21-21 Registered Smart Memory Kit	HPE 16GB (1x16GB) Dual Rank x8 DDR4-2933 CAS-21-21-21 Registered Smart Memory Kit	HPE Synergy 32GB (1x32GB) Dual Rank x4 DDR4-2933 CAS-21-21-21 Registered Smart Memory Kit	HPE Synergy 64GB (1x64GB) Dual Rank x4 DDR4-2933 CAS-21-21-21 Registered Smart Memory Kit
DIMM Rank ->	Single Rank (1R)	Single Rank (1R)	Dual Rank (2R)	Dual Rank (2R)	Dual Rank (2R)
DIMM Capacity ->	8GB	16GB	16GB	32GB	64GB
Voltage	1.2V	1.2V	1.2V	1.2V	1.2V
DRAM depth [bit]	1G	2G	1G	2G	4G
DRAM Width [bit]	x8	x4	x8	x4	x4
DRAM Density	8Gb	8Gb	8Gb	8Gb	16Gb
CAS Latency	21-21-21	21-21-21	21-21-21	21-21-21	21-21-21
DIMM Native Speed (MT/s)	2933	2933	2933	2933	2933
Intel Xeon®Platinum/Gold 82xx/ 62xx Processors Officially Supported Memory Speed (MT/s)					
1 DIMM Per Channel	2933	2933	2933	2933	2933
2 DIMM Per Channel	2933	2933	2933	2933	2933
Intel Xeon®Gold 52xx Processors Officially Supported Memory Speed (MT/s)					
1 DIMM Per Channel	2666	2666	2666	2666	2666
2 DIMM Per Channel	2666	2666	2666	2666	2666
Intel Xeon®Silver 42xx Processors Officially Supported Memory Speed (MT/s)					
1 DIMM Per Channel	2400	2400	2400	2400	2400
2 DIMM Per Channel	2400	2400	2400	2400	2400
Intel Xeon®Bronze 32xx Processors Officially Supported Memory Speed (MT/s)					
1 DIMM Per Channel	2133	2133	2133	2133	2133
2 DIMM Per Channel	2133	2133	2133	2133	2133

Memory

Memory Speed Table for Memory used with Intel Scalable Family Gen2 Processors			
	Register DIMM (RDIMM)		
HPE SKU P/N	P00924-B21	P00930-B21	P11040-B21
SKU Description	HPE 32GB (1x32GB) Dual Rank x4 DDR4-2933 CAS-21-21-21 Registered Smart Memory Kit	HPE 64GB (1x64GB) Dual Rank x4 DDR4-2933 CAS-21-21-21 Registered Smart Memory Kit	HPE 128GB 4Rx4 PC4-2933Y-L Smart Kit
DIMM Rank ->	Dual Rank	Dual Rank	Quad rank (4R)
DIMM Capacity ->	**32GB**	**64GB**	**128 GB**
Voltage	1.2V	1.2V	1.2V
DRAM depth [bit]	2G	4G	2G
DRAM Width [bit]	x4	x4	x4
DRAM Density	8Gb	16Gb	16Gb
CAS Latency	21-21-21	21-21-21	21-21-21
DIMM Native Speed (MT/s)	2933	2933	2933
HPE Server Memory speed (MT/s): Intel Xeon Platinum/Gold 82xx/62xx processors*			
1 DIMM Per Channel	2933	2933	2933
2 DIMM Per Channel			
HPE Server Memory speed (MT/s): Intel Xeon Gold 52xx processors*			
1 DIMM Per Channel	2666	2666	2666
2 DIMM Per Channel			
HPE Server Memory speed (MT/s): Intel Xeon Silver 42xx processors			
1 DIMM Per Channel	2400	2400	2400
24002 DIMM Per Channel			
HPE Server Memory speed (MT/s): Intel Xeon Bronze 32xx processors			
1 DIMM Per Channel	2133	2133	2133
2 DIMM Per Channel			

Notes:

– The information contained herein is subject to change without notice. HPE Confidential. Not for customer viewing. Do not distribute.

– For more information refer to: **http://www.hpe.com/docs/memory-speed-table**
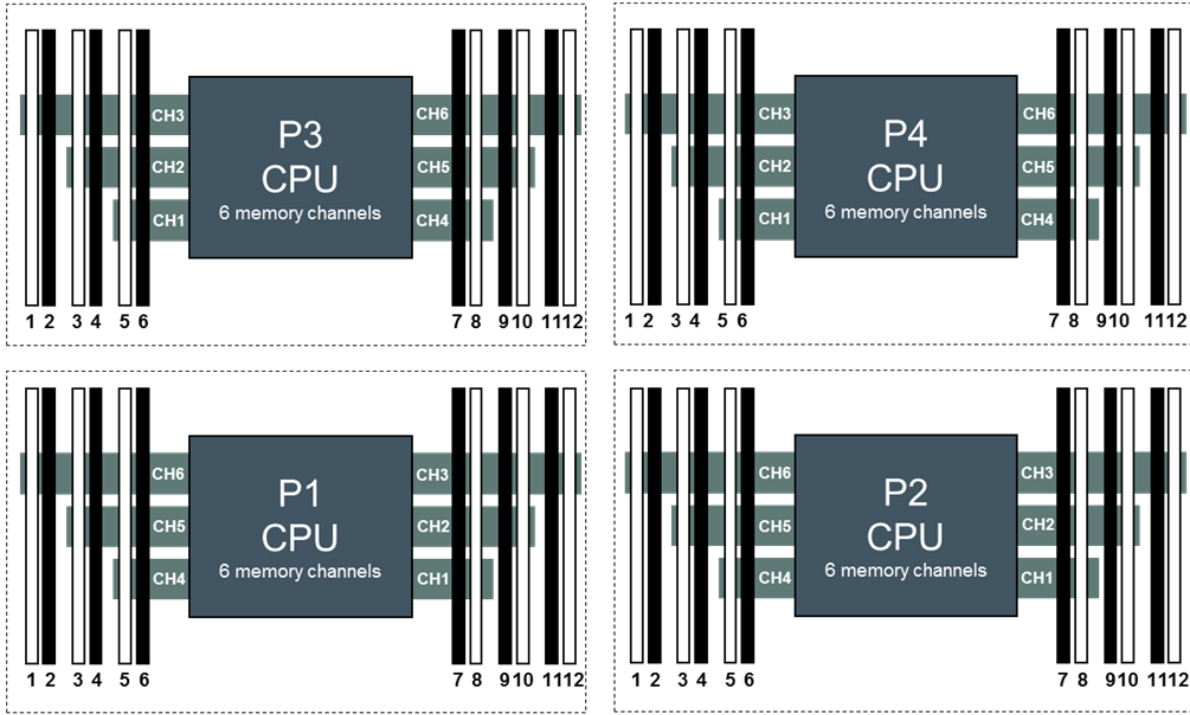
Memory Layout
Drawing showing SY660 system board layout for processors, memory and mezzanine slots.

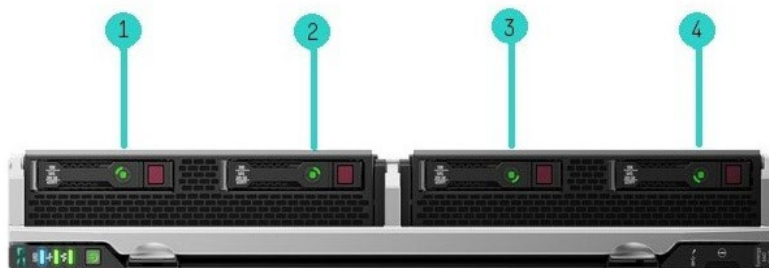## Storage

HPE Synergy 660 Gen10 server

2 slots per channel

Front of Server
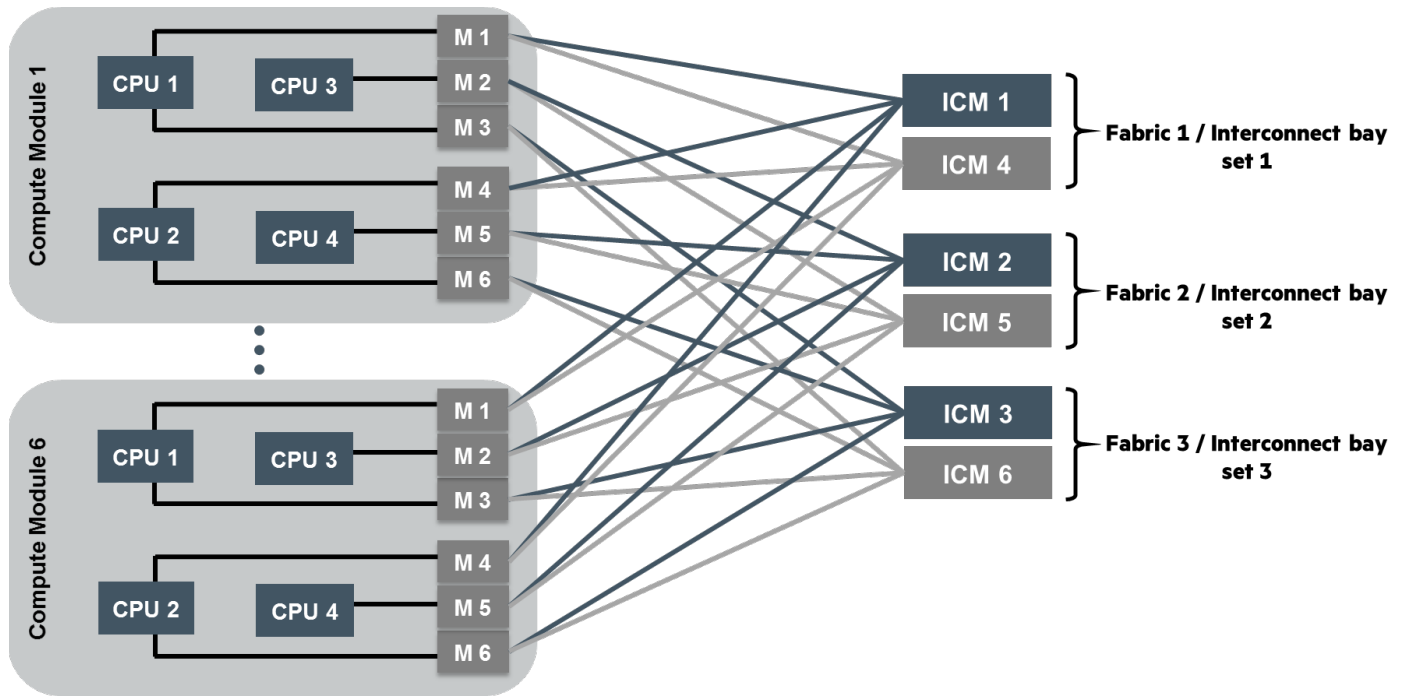**Front Local Storage**

1-4   4 x SFF hot-plug drive bays for SAS, SATA, SAS SDD, SATA SSD, NVMe PCIe SSD, or up to 8 uFF with Smart
             Drive Carrier adapter Not shown: 4 internal M.2 drives, USB or uSD drives

Storage

HPE Synergy 660 Gen10 Compute Module – Fabric Routing

Technical Specifications

System Unit

Dimensions (H x W x D) (with bezel)

- 6.35 x 43.03 x 59.92 cm
- 2.50 x 16.94 x 23.59 in

Weight (approximate)

- 13.75 kg
- 30.31 lbs

    Notes: Minimum: two processor and 1 DIMM / processor installed

- 17.41 kg
- 38.38 lbs

    Notes: Maximum: all processors, 48 DIMMs, drives, mezzanine cards, and one flash cache battery installed

Power Specifications

For power specifications including input requirements, BTU rating, and power supply output, please see the HPE Synergy Frame TechSpecs.

To review typical system power ratings use the HPE Power Advisor which is available via the online tool located at **http://www.hpe.com/info/hppoweradvisor**

System Inlet Temperature

- **Operating**
    - 10° to 35°C (50° to 95°F) at sea level with an altitude derating of 1.0°C per every 305 m (1.8°F per every 1000 ft) above sea level to a maximum of 3050 m (10,000 ft), no direct sustained sunlight.
    - Maximum rate of change is 20°C/hr (36°F/hr). The upper limit and rate of change may be limited by the type and number of options installed.
    - System performance during standard operating support 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).

Notes: Qualifications for extended ambient configurations are detailed at:
https://www.hpe.com/servers/ASHRAE

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.

Technical Specifications

Altitude
- **Operating**

  3050 m (10,000 ft). This value may be limited by the type and number of options installed. Maximum allowable altitude change rate is 457 m/min (1500 ft/min).

- **Non-operating**

  9144 m (30,000 ft). Maximum allowable altitude change rate is 457 m/min (1500 ft/min).

Acoustic Noise
For acoustic noise specifications, please see the **HPE Synergy 12000 Frame Specifications.**

Network Options QuickSpecs:
- Detail or information on the HPE Synergy 3820C 10/20Gb CNA please refer to their **QuickSpecs**.
- For information on the HPE Synergy 6810C 25/50 Gb Ethernet adapter please refer to their **QuickSpecs.**
- For information on the HPE Synergy 6410C 25/50 Gb Ethernet adapter please refer to their **QuickSpecs.**
- For information on the HPE Synergy 4820C 10/20/25Gb Ethernet adapter please refer to their **QuickSpecs.**
- For information on the HPE Synergy 2820C 10Gb CNA please refer to their **QuickSpecs**.
- For information on the HPE Smart Array S100i SR Gen10 Controller please refer to their **QuickSpecs.**
- For information on the HPE Smart Array E208i-c SR Gen10 Controller please refer to their **QuickSpecs**.
- For information on the HPE Smart Array P204i-c SR Gen10 Controller please refer to their **QuickSpecs**.
- For information on the HPE Smart Array P416ie-m SR Gen10 Controller please refer to their **QuickSpecs**.

ErP Lot9
The European Parliament (ErP) is responsible for setting the ecological standards for products that are imported into the EU. The European Parliament Commission Regulation 2019/424 (also known as the ErP Lot 9 regulation) are a new set of product standards that deal with servers and data storage devices and goes into effect on March 1, 2020. Products that are not compliant with Lot 9 requirements cannot be imported into the European Union after March 1, 2020. For details see Tech Specs section of this document. See Configure to Order section for details on configurable options.

For additional information, please visit: **https://www.hpe.com/us/en/about/environment/msds-specs-more.html .**
Documents provided by HPE: Lot 9 Declarations, White paper, and FAQ.

Environment-friendly Products and Approach - End-of-life Management and Recycling
Hewlett Packard Enterprise offers **End-of-life product return, Trade-in, and Rrecycling programs**, in many geographic areas, for our products. 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. 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
05-Sep-2023	Version 26	Changed	Overview, Configuration Information, and Additional Options sections were updated.
01-Aug-2022	Version 25	Changed	Standard Features, Configuration Information, Addtitional Options and Memory sections were updated. Obsolete SKUs were removed
01-Nov-2021	Version 24	Changed	Service and Support Pointnext Tech Care and Complete Care information updated Obsolete SKUs were removed
07-Sep-2021	Version 23	Changed	Configuration Information and Additional Options sections were updated Services and Support Pointnext Tech Care information added SKUs Removed – All Drive SKUs planned for 31-Aug-2021 OBS SKU Added: HPE 1.6TB NVMe MU SCN FIPS U.3 CM6 SSD - P44588-B21 HPE 3.2TB NVMe MU SCN FIPS U.3 CM6 SSD - P44596-B21 HPE 1.92TB NVMe RI SCN FIPS U.3 CM6 SSD - P44572-B21 HPE 3.84TB NVMe RI SCN FIPS U.3 CM6 SSD - P44580-B21
02-Aug-2021	Version 22	Changed	Service and Support Pointnext information added. Obsolete SKUs were removed
01-Feb-2021	Version 21	Changed	New SKUs added and Obsolete SKUs were deleted in Additional Options sections.
07-Dec-2020	Version 20	Changed	Obsolete SKUs were deleted in Configuration Information, and Addtitional Options sections.
05-Oct-2020	Version 19	Changed	Standard Features, Configuration Information, and Addtitional Options sections were updated.
03-Aug-2020	Version 18	Changed	Configuration Information, Core Options, and Additional Options sections were updated.
22-Jun-2020	Version 17	Changed	Configuration Information and Additional Options sections were updated. Rebranding applied to QuickSpecs.
06-Apr-2020	Version 16	Changed	Overview, Standard Features, Service and Support, Configuration Information, Additional Options, Memory, and Technical Specifications sections were updated.
02-Mar-2020	Version 15	Changed	Overview, Optional Features, and Technical Specifications sections were updated.
03-Feb-2020	Version 14	Changed	Overview, Configuration Information and Additional Options sections were updated.
02-Dec-2019	Version 13	Changed	Overview, Configuration Information and Additional Options sections were updated.
07-Oct-2019	Version 12	Changed	QuickSpecs was updated and Sustaining SKUs were added.
05-Aug-2019	Version 11	Changed	QuickSpecs was updated.
03-Jun-2019	Version 10	Changed	Overview, Configuration Information - Factory Integrated Models, Optional Features, Additional Options, Memory, and Storage sections were updated. SKUs added: P11881-L21, P08920-L21, P16385-L21, P11886-L21, P11884-L21, P11885-L21, P11883-L21, P07337-L21, P11694-L21, P08919-L21, P12767-L21, P11880-L21, P11882-L21, P07341-L21, 835804-B21, 835807-B21, 835810-B21, P11881-B21, P08920-B21, P16385-B21, P11886-B21, P11884-B21, P11885-B21, P11883-B21, P07337-B21, P11694-B21, P08919-B21, P07344-B21, P12767-B21, P11880-B21, P11882-B21, P07341-B21.

Summary of Changes

Date	Version History	Action	Description of Change
05-Sep-2023	Version 26	Changed	
02-Apr-2019	Version 9	Changed	Overview, Optional Features, Service and Support, Memory, Configuration Information - Factory Integrated Models, Additional Options, Service and Support and Technical Specifications sections were updated. SKUs added: P07363-L21P0, 7362-L21 , P07361_B21, P07360-L21,, P07359-L21, P07358-L21, P07357-L21, P07356-L21, P07355-L21, P07354-L21, P07353-L21, P07352-L21, P07340-L21, P07338-L21, P07351-L21, P07350-L21, P07349-L21, P07348-L21, P07347-L21, , P07346-L21, P07345-L21, P07344-L21, P08679-L21, P07343-L21, P12572-L21, P07342-L21P07339-L21, P12142-L21, P12143-L21, P07336-L21, P00918-B21, P00920-B21, P00922-B21, P00924-B21, P00930-B21, P00926-B21, P00928-B21, 794538-B21, 813890-B21, 876449-B21, 867322-B21, 777430-B21, 868779-B21, 823852-B21, P02381-B21, P01367-B21, 777452-B21, 777454-B21, 870828-B21, 777456-B21, H7ML8E, H7ML9E, H7MM1E, H7MM2E. SKUs deleted: 845264-B21, 867322-B21, 868779-B21, 876449-B21, 777430-B21, 794538-B21, 777452-B21, HOUT1E, HOUT2E, HOUT4E, HOUT5E. Obsolete SKUs deleted: 765453-B21, 873355-B21, 873357-B21, 868818-B21, 875509-B21, 875511-B21, 875513-B21, 875311-B21, 875313-B21, 875326-B21, P04517-B21, P04519-B21, P04521-B21, P04523-B21, 872374-B21, 872376-B21, 872382-B21, 872386-B21, 875483-B21, 875470-B21, 875474-B21, 875478-B21, 872348-B21, 872352-B21, 880295-B21, 873359-B21, 873363-B21, 873365-B21, 873367-B21

Summary of Changes

Date	Version History	Action	Description of Change
03-Dec-2018	Version 8	Changed	Overview, Standard Features, Configuration Information - Factory Integrated Models, and Additional Options SKUs added: 868779-B21, 765453-B21, 868814-B21, 868818-B21, 868822-B21, 868826-B21, P06607-B21, P06609-B21, 875490-B21, 875492-B21, 875500-B21, P04517-B21, P04519-B21, P04521-B21, P04523-B21, P04541-B21, P09098-B21, P04543-B21, P09100-B21, P04545-B21, P09102-B21, P04547-B21, P04525-B21, P04527-B21, P04533-B21, P04537-B21, P04539-B21, 872344-B21, P09712-B21, 872348-B21, P09716-B21, 872352-B21, P09722-B21, P07922-B21, P07926-B21, P07930-B21, P10222-B21, 877994-B21, P10214-B21, 877986-B21, P10224-B21, 877998-B21, P10216-B21, P10226-B21, P10218-B21, P09088-B21, P09090-B21, P09092-B21, P09094-B21, P09096-B21. SKUs deleted: 877740-B21, 877746-B21, 877752-B21, 877758-B21, 877764-B21, 875587-B21, 875589-B21, 875591-B21, 875490-B21, 875492-B21, 877782-B21, 877788-B21, 877776-B21, 872382-B21.
01-Oct-2018	Version 7	Changed	Recommended/Extended updates were applied. SKUs added in Additional Options sections: P04474-B21, P04476-B21, P04478-B21, P04480-B21, P04482-B21, 875311-B21, 872390-B21, 872392-B21, 872394-B21, 875313-B21, 875326-B21, 875330-B21, 870144-B21, 870148-B21, P06584-B21, P06586-B21, P06588-B21, P06590-B21, P06592-B21.
06-Aug-2018	Version 6	Changed	Overview, Configuration Information - Factory Integrated Models, Additional Options, and Technical Specifications sections were updated. SKUs added in Configuration Information - Factory Integrated Models and Additional Options sections: 876449-B21, P06194-B21, P06196-B21, P06198-B21, P06200-B21. Obsolete SKUS were deleted: 765453-B21.

Summary of Changes

Date	Version History	Action	Description of Change
04-Jun-2018	Version 5	Changed	Standard Features, Optional Features, Configuration Information - Factory Integrated Models, and Additional Options sections were updated. SKUs added: 876871-B21, 873377-B21, 815097-B21, 815098-B21, 835955-B21, 815100-B21, 815101-B21, 815102-B21, 845264-B21. SKUs deleted: 876871-L21, 873377-L21, 872115-L21, 875242-B21, 870757-B21.
04-Dec-2017	Version 4	Changed	Overview, Standard Features, Optional Features, Service and Support, Configuration Information - Factory Integrated Models, Additional Options, Storage, and Technical Specifications were updated.
		Added	SKUs added in Configuration Information - Factory Integrated Models, and Additional Options sections: 881653-L21, 881652-L21, 845264-B21, 867322-B21, 777430-B21, 794538-B21, 777452-B21, 777454-B21, 815097-B21, 815098-B21, 835955-B21, 815100-B21, H0UT1E, H0UT2E, H0UT4E, H0UT5E, H7MC1E, H7MC2E, H7MC4E, H7MC5E.
		Removed	OBS SKUs were deleted: 764894-B21, 822594-B21, 822593-B21.
25-Sep-2017	Version 3	Changed	Overview, Standard Features, Configuration Information - Factory Integrated Models, and Additional Options sections were updated.
		Added	SKUs added in Configuration Information - Factory Integrated Models, and Additional Options sections: 872136-L21, 872137-L21, 815102-B21, 870144-B21.
14-Aug-2017	Version 2	Changed	Standard Features, Pre-Configured Models, Configuration Information - Factory Integrated Models, and Additional Options sections were updated.
		Added	SKUs were added in Configuration Information - Factory Integrated Models, and Additional Options sections: Configuration Information - Factory Integrated Models, and Additional Options sections.
		Removed	Obsolete SKUs were deleted: 777262-B21, 777264-B21, 875496-B21.
11 Jul-2017	Version 1	Created	New QuickSpecs

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