**RETIRED:** This document has been officially retired, and the base products listed herein are now considered obsolete and are no longer available for sale. Consequently, the information contained within may no longer be current. This document is provided exclusively for reference and informational purposes.



## Overview

The U.S. version of QuickSpecs is no longer being updated, please reference the Worldwide QuickSpecs for latest information.

## 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 SmartMemory 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.

**NOTE:** 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.

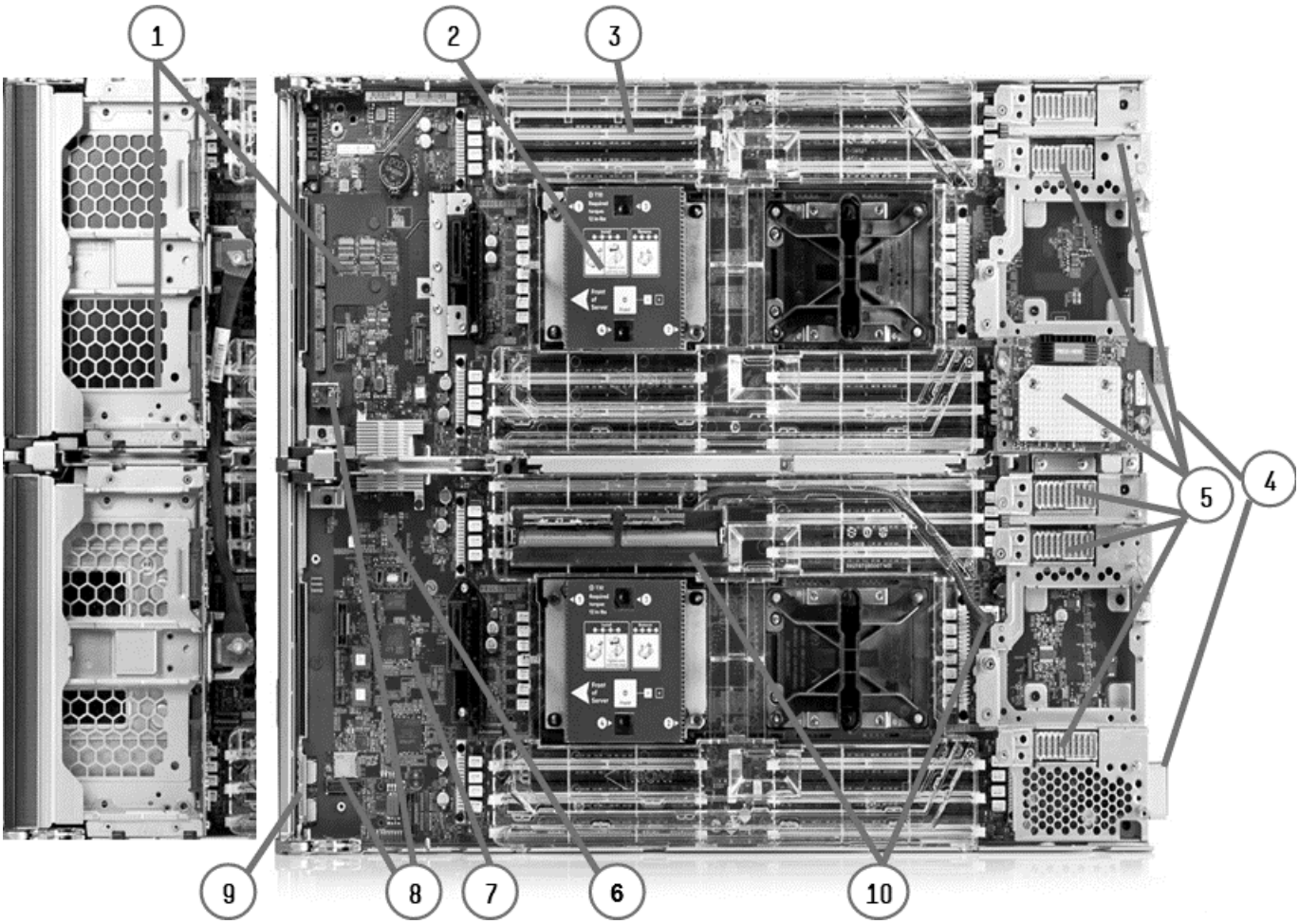
## Overview




**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 Handle Release Latch
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. Power/management combo connector
5. 6 x 16 PCIe 3.0 Mezzanine Slots
6. TPM connector (under drive cage)
7. iLO5
8. Internal MicroSD & USB 3.0 (boot port under drive cage)
9. USB 3.0/iLO Connections
10. Connector and JPE Smart Storage Battery

### What's New

- Next Generation of Intel Scalable Family Processors
- New 2933MT/s memory for next Generation Intel Scalable Family Processors
- New HPE Persistent Memory optimized for data-intensive workloads featuring Intel® Optane™ DC persistent memory
- Additionals Drive systems and replacements

## Optional 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.
**NOTE:** 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 8280M Processor | 2.7 | 28 | 205 | 2933 | 2 | Yes |
| Platinum 8280 Processor | 2.7 | 28 | 205 | 2933 | 1 | Yes |
| Platinum 8276L Processor | 2.2 | 28 | 165 | 2933 | 4.5 | Yes |
| Platinum 8276M Processor | 2.2 | 28 | 165 | 2933 | 2 | 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 8260M Processor | 2.4 | 24 | 165 | 2933 | 2 | 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 6240M Processor | 2.6 | 18 | 150 | 2933 | 2 | Yes |
| Gold 6240 Processor | 2.6 | 18 | 150 | 2933 | 1 | Yes |
| Gold 6238L Processor | 2.1 | 22 | 140 | 2933 | 4.5 | Yes |
| Gold 6238M Processor | 2.1 | 22 | 140 | 2933 | 2 | 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 |

## Optional Features

| | | | | | | |
|---|---|---|---|---|---|---|
| Gold 5218 Processor | 2.3 | 16 | 125 | 2666 | 1 | Yes |
| 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 |

**NOTE:** 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.

**NOTE:** 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.

**NOTE***: 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.

**NOTE:** 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 8180M Processor | 2.5 GHz | 28 | 205W | 10.4 | 2666 | 1.5TB |
| 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 8160M Processor | 2.1 GHz | 24 | 150W | 10.4 | 2666 | 1.5 TB |
| 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 6142M Processor | 2.6 GHz | 16 | 150W | 10.4 | 2666 | 1.5 TB |
| 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 |
| 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 |

## Optional Features

**NOTE:** 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.
**NOTE:** 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.
**NOTE:** 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
**NOTE:** 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
**NOTE:** Read and learn more about **OneView**.

**On Compute Management Chipset**
HPE iLO 5 ASIC
**NOTE:** 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 Memory Kit
- HPE 16GB (1x16GB) Single Rank x4 DDR4-2933 CAS-21-21-21 Registered Memory Kit
- HPE 16GB (1x16GB) Dual Rank x8 DDR4-2933 CAS-21-21-21 Registered Memory Kit
- HPE 32GB (1x32GB) Dual Rank x4 DDR4-2933 CAS-21-21-21 Registered Memory Kit
- HPE 64GB (1x64GB) Dual Rank x4 DDR4-2933 CAS-21-21-21 RDIMM Memory Kit
- HPE 64GB (1x64GB) Quad Rank x4 DDR4-2933 CAS-21-21-21 LRDIMM Memory Kit
- HPE 128GB (1x128GB) Octal Rank x4 DDR4-2933 CAS-24-21-21 LRDIMM Memory Kit

| **Type** | HPE DDR4 SmartMemory, 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)** | 3 TB | 48 x 64 GB RDIMM @ 2666 MT/s |

**NOTE:** The 128 GB LRDIMM may not be mixed with other DIMM capacities/types.
**NOTE:** LRDIMM and RDIMM are distinct memory technologies and cannot be mixed within a compute module.
**NOTE:** HPE memory from previous generation servers (DDR3) is not compatible with this compute module. HPE DDR4 SmartMemory 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 SmartMemory QuickSpecs at:
**https://www.hpe.com/h20195/v2/GetHTML.aspx?docname=c04355083**

The following memory supports Intel® Xeon® Scalable processor family 1st generation:

## Optional Features

- HPE 8GB (1x8GB) Single Rank x8 DDR4-2666 CAS-19-19-19 Registered Memory Kit
- HPE 16GB (1x16GB) Single Rank x4 DDR4-2666 CAS-19-19-19 Registered Memory Kit
- HPE 16GB (1x16GB) Dual Rank x8 DDR4-2666 CAS-19-19-19 Registered Memory Kit
- HPE 32GB (1x32GB) Dual Rank x4 DDR4-2666 CAS-19-19-19 Registered Memory Kit
- HPE 64GB (1x64GB) Quad Rank x4 DDR4-2666 CAS-19-19-19 LRDIMM Memory Kit
- HPE 128GB (1x128GB) Octal Rank x4 DDR4-2666 CAS-22-19-19 LRDIMM Memory Kit

| | | |
|---|---|---|
| **Type** | HPE DDR4 SmartMemory, 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 x 16 GB NVDIMM @ 2666 MT/s |

**NOTE:** The 128 GB LRDIMM may not be mixed with other DIMM capacities/types.
**NOTE:** LRDIMM and RDIMM are distinct memory technologies and cannot be mixed within a compute module.
**NOTE:** HPE memory from previous generation servers (DDR3) is not compatible with this compute module. HPE DDR4 SmartMemory 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 SmartMemory QuickSpecs at:
**https://www.hpe.com/h20195/v2/GetHTML.aspx?docname=c04355083**

HPE Persistent Memory featuring Intel Optane DC Persistent Memory
**NOTE:** 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) |

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

**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

**NOTE:** 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

## Optional Features

**NOTE:** This mezzanine connector supports dual-port mezzanine cards:. one port is routed to interconnect module bay 2 and the other to bay 5.
**NOTE:** 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.

**NOTE:** 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

**NOTE:** 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

**NOTE:** This mezzanine connector supports dual-port mezzanine cards:. one port is routed to interconnect module bay 2 and the other to bay 5.
**NOTE:** 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

**NOTE:** 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

**NOTE:** Supports full hardware offload of FCoE storage protocol processing for highest performance converged Ethernet data and storage networks

HPE Synergy 2820C 10GbE Converged Network Adapter

**NOTE:** Delivers flexibility to compose multiple network flows including Ethernet and FCoE or iSCSI within each connection.

HPE Synergy 4820C 10/20/25Gb CNA

HPE Synergy 4610C 10/25Gb Ethernet Adaptor

HPE Synergy 6410C 25/50Gb Ethernet 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

**NOTE:** Refer to the Memory Quickspecs for more details

**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

## Optional Features

- 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.

**NOTE:** For further information, please refer to the
**http://itdoc.hitachi.co.jp/manuals/ha8000v/hard/Gen10/UEFI/881334-004_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)

**NOTE:** 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.
**NOTE:** 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.

**Maximum Internal Storage**

| | 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 | d16.0 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 |

**NOTE:** 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

**NOTE:** 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

## Optional Features

### 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

**NOTE:** 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

### 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)

### 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

## Optional Features

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.
**NOTE:** 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 http://itdoc.hitachi.co.jp/manuals/ha8000v/hard/Gen10/UEFI/881334-004_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

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

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

## Optional Features

- 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 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.
**NOTE:** 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

## Optional Features

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**

**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 Advanced** 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 master/satellite architecture.

## Optional Features

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

The master 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.

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 Master/Satellite disaggregated architecture removes fixed of ratios of interconnects in every frame and allows extending networking resources pool for Virtual Connect to satellite frames.

**NOTE:** For more information on **Virtual Connect and converged network options**

---

**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

**Pointnext - Service and Support**

**Protect your business beyond warranty with HPE Support Services**

HPE Pointnext provides a comprehensive portfolio including Advisory and Transformational, Professional, and Operational Services to help accelerate your digital transformation. From the onset of your transformation journey, Advisory and Transformational Services focus on designing the transformation and creating a solution roadmap. Professional Services specializes in creative configurations with flawless and on-time implementation, and on-budget execution. Finally, operational services provides innovative new approaches like Flexible Capacity and Datacenter Care, to keep your business at peak performance. HPE is ready to bring together all the pieces of the puzzle for you, with an eye on the future, and make the complex simple.

**Connect your devices:**

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

Learn more about getting connected at **http://www.hpe.com/services/getconnected**

**Proactive Care Service Levels**

**HPE Proactive Care* with 24x7 coverage, three year Support Service**

HPE Proactive Care gives customers an enhanced call experience. When your products are connected to HPE, Proactive Care helps prevent problems and maintains IT stability by utilizing personalized proactive reports with recommendations and advice This Service combines three years proactive reporting and advice with our 24x7 coverage, four hour hardware response time when there is a problem. This service also includes collaborative software support for Independent Software Vendors (ISVs), (Red Hat, VMWare, Microsoft, etc.) running on your HPE servers.

**https://h20195.www2.hpe.com/v2/GetPDF.aspx/4AA3-8855ENW.pdf**

**HPE Proactive Care Advanced* - 24x7 coverage, three year Support Service**

This service helps achieve a higher return on your product investment with personalized support from a local assigned Account Support Manager who will share best practice advice and personalized recommendations designed to help improve availability and performance to increase stability and reduce unplanned downtime. Leverage your system's ability to connect to HPE for pre-failure alerts, automatic call logging and parts dispatch. For business critical incidents, this service offers critical event management to reduce mean time to resolution. This recommendation provides 24x7 coverage with four-hour response for hardware and collaborative support that offers two-hour callback for supported software issues. Collaborative software management is included with independent software vendors unless you have your software support from HPE where we own all cases from start through to resolution.

**https://h20195.www2.hpe.com/v2/GetPDF.aspx/4AA5-3259ENW.pdf**

**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**

## Service and Support

### 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 Datacenter Care service

**HPE Datacenter Care** helps improve IT stability and security, increase the value of IT, and enable agility and innovation. It is a structured framework of repeatable, tested, and globally available services "building blocks." You can deploy, operate, and evolve your datacenter wherever you are on your IT journey. With HPE Datacenter Care, you benefit from a personalized relationship with HPE via a single point of accountability for HPE and others' products. **http://www.hpe.com/services/datacentercare**

### 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**

### 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 HPE experts, access support resources or collaborate with peers. Learn more **http://www.hpe.com/support/hpesc**

HPE's 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.
**NOTE:** *HPE Support Center Mobile App is subject to local availability

For more information: **http://www.hpe.com/services**

### Parts and Materials

## Service and Support

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

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

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

**Parts and Materials**

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

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

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

## Configuration Information - Factory Integrated Models

**NOTE:** 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.
**NOTE:** Configure-to-order compute modules must start with a CTO Compute Module.
**NOTE:** FIO indicates that this option is only available as a factory installable option.
**NOTE:** All Factory Integrated Models will be populated with sufficient drive blanks based on the number of initial drives ordered with the server.
**NOTE:** 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 (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<br>4 Hot-plug SFF Bays | No Backplane<br>No Drive Carriage system<br>(optional 4x M.2) | Premium Backplane<br>4 Hot-plug SFF Bays<br>NVMe SSD and DAS Ready,<br>depending upon controller choice |
| **Storage Controller** | Optional<br>• HPE Smart Array S100i SR Gen10 Controller (HPE FIO Enable Smart Array SW RAID)<br>• HPE Smart Array E208i-c SR Gen10 Controller<br>• HPE Smart Array P408i-c SR Gen10 Controller<br>• HPE Smart Array P416ie-m SR Gen10 Controller<br>• HPE SAS Cable for P416ie-m SR G10 Controller | | |
| **Network Mezzanine Adapters** | Optional<br>• HPE Synergy 2820C 10Gb CNA<br>• HPE Synergy 3820C 10/20Gb CNA<br>• HPE Synergy 3530C 16G FC HBA<br>• HPE Synergy 3830C 16G FC HBA<br>• HPE Synergy 4820C 10/20/25Gb CNA<br>• HPE Synergy 6810C 25/50Gb Ethernet Adapter<br>• HPE Synergy 6410C 25/50Gb Ethernet Adapter | | |
| **I/O slots** | 6 x16 PCIe 3.0 | | |
| **Drives supported** | Optional<br>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 | | |

**NOTE:** This information applies to factory CTO configurations, Field upgrades may differ depending field configurations.
**NOTE:** BackPlane in the Compute Module description refers to the type of controller backplane in the Drive Cage modules.

## Configuration Information - Factory Integrated Models

**NOTE:** HPE Synergy 660 Gen10 Standard BackPlane Compute Module is designed for flexible use for most workloads. This model may use the SATA Board Option, or SmartArray options. This model may also use the Mezzanine P416ie-m for connection to the HPE D3940 Storage Module, but no links to local front drive.
**NOTE:** HPE Synergy 660 Gen10 without Drive Bays Compute Module is intended for stateless on SAN/NAS boot use cases and still supports mezzanine Smart Array for Synergy D3940 Storage Modules. Additionally, this model supports adding the M.2 Adapter for dual M.2 drive options. This model may also use the mezzanine P416ie-m for connection to the HPE D3940 Storage Module, but no links to local front drive.
**NOTE:** HPE Synergy 660 Gen10 Premium BackPlane Compute Module 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.
**NOTE:** [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.

**Step 2a: Choose Required Options - 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**

| | |
|---|---|
| HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8280L (2.7GHz/28-core/205W) FIO Processor Kit | P07363-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8280M (2.7GHz/28-core/205W) FIO Processor Kit | P07362-L21 |
| HPE Synergy 480/660 Gen10 Intel® Xeon-Platinum 8280 (2.7GHz/28-core/205W) FIO Processor Kit | P07361_B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8276L (2.2GHz/28-core/165W) FIO Processor Kit | P07360-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8276M (2.2GHz/28-core/165W) FIO Processor Kit | P07359-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8276 (2.2GHz/28-core/165W) FIO Processor Kit | P07358-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8270 (2.7GHz/26-core/205W) FIO Processor Kit | P07357-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8268 (2.9GHz/24-core/205W) FIO Processor Kit | P07356-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8260Y (2.4GHz/24-20-16-core/165W) FIO Processor Kit | P07355-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8260L (2.4GHz/24-core/165W) FIO Processor Kit | P07354-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8260M (2.4GHz/24-core/165W) FIO Processor Kit | P07353-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8260 (2.4GHz/24-core/165W) FIO Processor Kit | P07352-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8256 (3.8GHz/4-core/105W) FIO Processor Kit | P07340-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8253 (2.2GHz/16-core/125W) FIO Processor Kit | P07338-L21 |

**Intel Xeon-Gold Processors**

| | |
|---|---|
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6262V (1.9GHz/24-core/135W) FIO Processor Kit | P11881-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6254 (3.1GHz/18-core/200W) FIO Processor Kit | P07351-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6252 (2.1GHz/24-core/150W) FIO Processor Kit | P07350-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6248 (2.5GHz/20-core/150W) FIO Processor Kit | P07349-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6246 (3.3GHz/12-core/165W) FIO Processor Kit | P16385-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6244 (3.6GHz/8-core/150W) FIO Processor Kit | P07348-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6242 (2.8GHz/16-core/150W) FIO Processor Kit | P07347-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6240Y (2.6GHz/18-14-8-core/150W) FIO Processor Kit | P07346-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6240L (2.6GHz/18-core/150W) FIO Processor Kit | P11886-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6240M (2.6GHz/18-core/150W) FIO Processor Kit | P11884-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6240 (2.6GHz/18-core/150W) FIO Processor Kit | P07345-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6238L (2.1GHz/22-core/140W) FIO Processor Kit | P11885-L21 |

## Configuration Information - Factory Integrated Models

| | |
|---|---|
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6238M (2.1GHz/22-core/140W) FIO Processor Kit | P11883-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6238 (2.1GHz/22-core/140W) Processor Kit | P07337-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6234 (3.3GHz/8-core/130W) FIO Processor Kit | P11694-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6230 (2.1GHz/20-core/125W) FIO Processor Kit | P07344-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6226 (2.7GHz/12-core/125W) FIO Processor Kit | P12767-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6222V (1.8GHz/20-core/115W) FIO Processor Kit | P11880-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5222 (3.8GHz/4-core/105W) FIO Processor Kit | P08679-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5220S (2.7GHz/18-core/125W) FIO Processor Kit | P11882-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5220 (2.2GHz/18-core/125W) FIO Processor Kit | P07343-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5218B (2.3GHz/16-core/125W) FIO Processor Kit | P12572-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5218N (2.3GHz/16-core/105W) FIO Processor Kit | P07341-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5218 (2.3GHz/16-core/125W) FIO Processor Kit | P07342-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5217 (3.0GHz/8-core/115W) FIO Processor Kit | P07339-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5215M (2.5GHz/10-core/85W) FIO Processor Kit | P12142-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5215L (2.5GHz/10-core/85W) FIO Processor Kit | P12143-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5215 (2.5GHz/10-core/85W) FIO Processor Kit | P07336-L21 |

**NOTE:** All processors within any single compute module must be identical.
**NOTE:** HT indicates that the processor model supports Intel® Hyper-Threading Technology.
**NOTE:** Turbo indicates the maximum potential frequency when using Intel® Turbo Boost Technology. The frequency boost increment is dependent on the processor SKU and the number of active cores. In general, a higher boost increment is obtained when fewer cores are active.
**NOTE:** DDR4 speed is the maximum memory speed of the processor. Actual memory speed may depend on the quantity and type of DIMMs installed.
**NOTE:** Supports 1 or 2 processors. Mixing different processor models is not supported.
**NOTE:** For the Intel® 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)
**NOTE:** 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.
**NOTE:** The processor model as well as the memory configuration determines the maximum speed memory can operate. Please see the see the "Memory" section later in this document.
**NOTE:** 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.
**NOTE:** 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.
**NOTE:** See indivual Specs for more details

**Intel Xeon Scalable Family Gen 1 - Processor Option Kits**

**Intel Xeon-Platinum Processors**

| | |
|---|---|
| HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8180M (2.5GHz/28-core/205W) FIO Processor Kit | 872131-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8180 (2.5GHz/28-core/205W) FIO Processor Kit | 872119-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8176 (2.1GHz/28-core/165W) FIO Processor Kit | 872120-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8170 (2.1GHz/26-core/165W) FIO Processor Kit | 872121-L21 |

## Configuration Information - Factory Integrated Models

| | |
|---|---|
| HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8168 (2.7GHz/24-core/205W) FIO Processor Kit | 872122-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8165 (2.3GHz/24-core/205W) FIO Processor Kit | 881653-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8164 (2.0GHz/26-core/150W) FIO Processor Kit | 872123-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8160M (2.1GHz/24-core/150W) FIO Processor Kit | 872130-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8160 (2.1GHz/24-core/150W) FIO Processor Kit | 872129-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8158 (3.0GHz/12-core/150W) FIO Processor Kit | 873385-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8156 (3.6GHz/4-core/105W) FIO Processor Kit | 873382-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8153 (2.0GHz/16-core/125W) FIO Processor Kit | 873389-L21 |

**Intel Xeon-Gold Processors**

| | |
|---|---|
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6154 (3.0GHz/18-core/200W) FIO Processor Kit | 872132-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6152 (2.1GHz/22-core/140W) FIO Processor Kit | 872133-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6150 (2.7GHz/18-core/165W) FIO Processor Kit | 872134-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6148 (2.4GHz/20-core/150W) FIO Processor Kit | 872135-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6146 (3.2GHz/12-core/165W)FIO Processor Kit | 872136-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6144 (3.5GHz/8-core/150W) FIO Processor Kit | 872137-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6143 (2.8GHz/16-core/205W) FIO Processor Kit | 881652-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6142M (2.6GHz/16-core/150W) FIO Processor Kit | 872117-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6142 (2.6GHz/16-core/150W) FIO Processor Kit | 872138-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6140M (2.3GHz/18-core/140W) FIO Processor Kit | 872116-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6140 (2.3GHz/18-core/140W) FIO Processor Kit | 872139-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6138 (2.0GHz/20-core/125W) FIO Processor Kit | 873376-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6136 (3.0GHz/12-core/150W) FIO Processor Kit | 873378-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6134 (3.2GHz/8-core/130W) FIO Processor Kit | 873379-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6132 (2.6GHz/14-core/140W) FIO Processor Kit | 873380-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6130 (2.1GHz/16-core/125W) FIO Processor Kit | 873381-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6128 (3.4GHz/6-core/115W) FIO Processor Kit | 873383-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6126 (2.6GHz/12-core/125W) FIO Processor Kit | 873384-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5122 (3.6GHz/4-core/105W) FIO Processor Kit | 873386-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5120 (2.2GHz/14-core/105W) FIO Processor Kit | 873388-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5118 (2.3GHz/12-core/105W) FIO Processor Kit | 873387-L21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5115 (2.4GHz/10-core/85W) FIO Processor Kit | 873390-L21 |

**NOTE:** All processors within any single compute module must be identical.
**NOTE:** HT indicates that the processor model supports Intel® Hyper-Threading Technology.
**NOTE:** Turbo indicates the maximum potential frequency when using Intel® Turbo Boost Technology. The frequency boost increment is dependent on the processor SKU and the number of active cores. In general, a higher boost increment is obtained when fewer cores are active.
**NOTE:** DDR4 speed is the maximum memory speed of the processor. Actual memory speed may depend on the quantity and type of DIMMs installed.
**NOTE:** Supports 2 or 4 processors. Mixing different processor models is not supported.
**NOTE:** 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)
**NOTE:** The processor model as well as the memory configuration determines the maximum speed memory can operate. Please see the see the "Memory" section later in this document.
**NOTE:** 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

## Configuration Information - Factory Integrated Models

Intel AVX-512 (2x 512-bit FMA), 48 lanes PCIe 3.0, advanced RAS.
**NOTE:** 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.
**NOTE:** 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**

## Step 2b: Choose Memory Options

Select memory associated with the processors selected in previous section.

**HPE SmartMemory**

**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 64GB (1x64GB) Quad Rank x4 DDR4-2933 CAS-21-21-21 Load Reduced Smart Memory Kit | P00926-B21 |
| HPE 128GB (1x128GB) Octal Rank x4 DDR4-2933 CAS-24-21-21 Load Reduced 3DS Smart Memory Kit | P00928-B21 |

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

| | |
|---|---|
| HPE 8GB (1x8GB) Single Rank x8 DDR4-2666 CAS-19-19-19 Registered Smart Memory Kit | 815097-B21 |
| HPE 16GB (1x16GB) Single Rank x4 DDR4-2666 CAS-19-19-19 Registered Smart Memory Kit | 815098-B21 |
| HPE 16GB (1x16GB) Dual Rank x8 DDR4-2666 CAS-19-19-19 Registered Smart Memory Kit | 835955-B21 |
| HPE 32GB (1x32GB) Dual Rank x4 DDR4-2666 CAS-19-19-19 Registered Smart Memory Kit | 815100-B21 |
| HPE 64GB (1x64GB) Quad Rank x4 DDR4-2666 CAS-19-19-19 Load Reduced Smart Memory Kit | 815101-B21 |
| HPE 128GB (1x128GB) Octal Rank x4 DDR4-2666 CAS-22-19-19 3DS Load Reduced Memory Kit | 815102-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**

| | |
|---|---|
| HPE 128GB 2666 DC Persistent Memory Kit with Intel Optane Technology | 835804-B21 |
| HPE 256GB 2666 DC Persistent Memory Kit with Intel Optane Technology | 835807-B21 |
| HPE 512GB 2666 DC Persistent Memory Kit with Intel Optane Technology | 835810-B21 |

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

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

## Step 2c: Choose Networking Adapters

| | |
|---|---|
| HPE Synergy 2820C 10Gb Converged Network Adapter | 794538-B21 |
| HPE Synergy 3820C 10/20Gb Converged Network Adapter | 777430-B21 |
| HPE Synergy 4610C 10/25Gb Ethernet Adapter | 813890-B21 |
| 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 |

**NOTE:** 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.

## Configuration Information - Factory Integrated Models

**NOTE:** 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 2d: Choose Required Storage Controller

**NOTE:** HPE Synergy 660 Gen10 Standard Backplane Configure-to-order Compute Module (871929-B21/B22) requires selection of one of the below Storage Controllers.

| | |
|---|---|
| HPE Smart Array E208i-c SR Gen10 (8 Internal Lanes/No Cache) 12G SAS Modular Controller | 823852-B21 |
| HPE Smart Array P408i-c SR Gen10 (8 Internal Lanes/2GB Cache) 12G SAS Modular Controller | 823856-B21 |

### 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 Legacy Mode FIO Setting | 758959-B22 |

**HPE Security**

| | |
|---|---|
| HPE Gen10 TPM 1.2 FIO Setting | 872108-B21 |

### 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** and **https://www.hpe.com/h20195/v2/GetHtml.aspx?docname=c04815110**

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

### Step 5: Choose HPE Synergy Services

**HPE Synergy Proactive Care Services**

| | |
|---|---|
| HPE 3 Year Proactive Care 24x7 Synergy SY660 Gen10 Service | H7ML8E |
| HPE 3 Year Proactive Care 24x7 with DMR Synergy SY660 Gen10 Service | H7ML9E |
| HPE 3 Year Proactive Care 24x7 with DMR Synergy SY660 Gen10 Service | H7ML9E |
| HPE 3 Year Proactive Care Advanced 24x7 with DMR Synergy SY660 Gen10 Service | H7MM2E |

## Additional Options

**NOTE:** 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

**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**

| | |
|---|---|
| HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8280L (2.7GHz/28-core/205W) Processor Kit | P07363-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8280M (2.7GHz/28-core/205W) Processor Kit | P07362-B21 |
| HPE Synergy 480/660 Gen10 Intel® Xeon-Platinum 8280 (2.7GHz/28-core/205W) Processor Kit | P07361_B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8276L (2.2GHz/28-core/165W) Processor Kit | P07360-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8276M (2.2GHz/28-core/165W) Processor Kit | P07359-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8276 (2.2GHz/28-core/165W) Processor Kit | P07358-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8270 (2.7GHz/26-core/205W) Processor Kit | P07357-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8268 (2.9GHz/24-core/205W) Processor Kit | P07356-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8260Y (2.4GHz/24-20-16-core/165W) Processor Kit | P07355-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8260L (2.4GHz/24-core/165W) Processor Kit | P07354-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8260M (2.4GHz/24-core/165W) Processor Kit | P07353-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8260 (2.4GHz/24-core/165W) Processor Kit | P07352-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8256 (3.8GHz/4-core/105W) Processor Kit | P07340-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8253 (2.2GHz/16-core/125W) Processor Kit | P07338-B21 |

**Intel Xeon-Gold Processors**

| | |
|---|---|
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6262V (1.9GHz/24-core/135W) Processor Kit | P11881-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6254 (3.1GHz/18-core/200W) Processor Kit | P07351-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6252 (2.1GHz/24-core/150W) Processor Kit | P07350-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6248 (2.5GHz/20-core/150W) Processor Kit | P07349-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6246 (3.3GHz/12-core/165W) Processor Kit | P16385-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6244 (3.6GHz/8-core/150W) Processor Kit | P07348-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6242 (2.8GHz/16-core/150W) Processor Kit | P07347-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6240Y (2.6GHz/18-14-8-core/150W) Processor Kit | P07346-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6240L (2.6GHz/18-core/150W) Processor Kit | P11886-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6240M (2.6GHz/18-core/150W) Processor Kit | P11884-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6240 (2.6GHz/18-core/150W) Processor Kit | P07345-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6238L (2.1GHz/22-core/140W) Processor Kit | P11885-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6238M (2.1GHz/22-core/140W) Processor Kit | P11883-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6238 (2.1GHz/22-core/140W) FIO Processor Kit | P07337-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6234 (3.3GHz/8-core/130W) Processor Kit | P11694-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6230 (2.1GHz/20-core/125W) Processor Kit | P07344-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6226 (2.7GHz/12-core/125W) Processor Kit | P12767-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6222V (1.8GHz/20-core/115W) Processor Kit | P11880-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5222 (3.8GHz/4-core/105W) Processor Kit | P08679-B21 |

## Additional Options

| | |
|---|---|
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5220S (2.7GHz/18-core/125W) Processor Kit | P11882-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5220 (2.2GHz/18-core/125W) Processor Kit | P07343-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5218N (2.3GHz/16-core/110W) Processor Kit | P07341-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5218B (2.3GHz/16-core/125W) Processor Kit | P12572-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5218 (2.3GHz/16-core/125W) Processor Kit | P07342-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5217 (3.0GHz/8-core/115W) Processor Kit | P07339-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5215M (2.5GHz/10-core/85W) Processor Kit | P12142-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5215L (2.5GHz/10-core/85W) Processor Kit | P12143-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5215 (2.5GHz/10-core/85W) Processor Kit | P07336-B21 |

**NOTE:** All processors within any single compute module must be identical.
**NOTE:** HT indicates that the processor model supports Intel® Hyper-Threading Technology.
**NOTE:** Turbo indicates the maximum potential frequency when using Intel® Turbo Boost Technology. The frequency boost increment is dependent on the processor SKU and the number of active cores. In general, a higher boost increment is obtained when fewer cores are active.
**NOTE:** DDR4 speed is the maximum memory speed of the processor. Actual memory speed may depend on the quantity and type of DIMMs installed.
**NOTE:** Supports 2 or 4 processors. Mixing different processor models is not supported.
**NOTE:** 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)
**NOTE:** 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.
**NOTE:** The processor model as well as the memory configuration determines the maximum speed memory can operate. Please see the see the "Memory" section later in this document.

**NOTE:** 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.
**NOTE:** 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.
**NOTE:** See indivual Specs for more details

**Intel Xeon Scalable Family Gen 1 - Processor Option Kits**

**Intel Xeon-Platinum Processors**

(2 or 4 total are required)

**Intel Xeon-Platinum Processors**

| | |
|---|---|
| HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8180 (2.5GHz/28-core/205W) Processor Kit | 872119-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8176 (2.1GHz/28-core/165W) Processor Kit | 872120-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8170 (2.1GHz/26-core/165W) Processor Kit | 872121-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8168 (2.7GHz/24-core/205W) Processor Kit | 872122-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8164 (2.0GHz/26-core/150W) Processor Kit | 872123-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8160 (2.1GHz/24-core/150W) Processor Kit | 872129-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8158 (3.0GHz/12-core/150W) Processor Kit | 873385-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8156 (3.6GHz/4-core/105W) Processor Kit | 873382-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8153 (2.0GHz/16-core/125W) Processor Kit | 873389-B21 |

## Additional Options

| | |
|---|---|
| **Intel Xeon-Platinum Processors** | |
| HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8165 (2.3GHz/24-core/205W) Processor Kit | 881653-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8160M (2.1GHz/24-core/150W) Processor Kit | 872130-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8180M (2.5GHz/28-core/205W) Processor Kit | 872131-B21 |
| **Intel Xeon-Gold Processors** | |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6154 (3.0GHz/18-core/200W) Processor Kit | 872132-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6152 (2.1GHz/22-core/140W) Processor Kit | 872133-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6150 (2.7GHz/18-core/165W) Processor Kit | 872134-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6148 (2.4GHz/20-core/150W) Processor Kit | 872135-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6146 (3.2GHz/12-core/165W) Processor Kit | 872136-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6144 (3.5GHz/8-core/150W) Processor Kit | 872137-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6142 (2.6GHz/16-core/150W) Processor Kit | 872138-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6140 (2.3GHz/18-core/140W) Processor Kit | 872139-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6138 (2.0GHz/20-core/125W) Processor Kit | 873376-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6136 (3.0GHz/12-core/150W) Processor Kit | 873378-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6134 (3.2GHz/8-core/130W) Processor Kit | 873379-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6132 (2.6GHz/14-core/140W) Processor Kit | 873380-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6130 (2.1GHz/16-core/125W) Processor Kit | 873381-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6128 (3.4GHz/6-core/115W) Processor Kit | 873383-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6126 (2.6GHz/12-core/125W) Processor Kit | 873384-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5122 (3.6GHz/4-core/105W) Processor Kit | 873386-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5120 (2.2GHz/14-core/105W) Processor Kit | 873388-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5118 (2.3GHz/12-core/105W) Processor Kit | 873387-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5115 (2.4GHz/10-core/85W) Processor Kit | 873390-B21 |
| **Intel Xeon-Gold Processors** | |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6143 (2.8GHz/16-core/205W) Processor Kit | 881652-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6142M (2.6GHz/16-core/150W) Processor Kit | 872117-B21 |
| HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6140M (2.3GHz/18-core/140W) Processor Kit | 872116-B21 |

**NOTE:** All processors within the compute module must be identical.
**NOTE:** HT indicates that the processor model supports Intel® Hyper-Threading Technology.
**NOTE:** Turbo indicates the maximum potential frequency when using Intel® Turbo Boost Technology. The frequency boost increment is dependent on the processor SKU and the number of active cores. In general, a higher boost increment is obtained when fewer cores are active.
**NOTE:** DDR4 speed is the maximum memory speed of the processor. Actual memory speed may depend on the quantity and type of DIMMs installed.
**NOTE:** Supports 2 or 4 processors. Mixing different processor models is not supported.
**NOTE:** 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)
**NOTE:** The HPE Synergy 660 Gen9 Compute Module includes six I/O mezzanine connectors.
**NOTE:** The processor model as well as the memory configuration determines the maximum speed memory can operate. Please see the see the "Memory" section later in this document.
**NOTE:** 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.
**NOTE:** 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

## Additional Options

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.
**NOTE:** 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**

**HPE SmartMemory**

**The following memory supports Intel® Xeon® Scalable Family processors – 2nd generation:**

**Registered DIMMs (RDIMMs)**

| | |
|---|---|
| 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 |

**Load Reduced DIMMs (LRDIMMs)**

| | |
|---|---|
| HPE 64GB (1x64GB) Quad Rank x4 DDR4-2933 CAS-21-21-21 Load Reduced Smart Memory Kit | P00926-B21 |
| HPE 128GB (1x128GB) Octal Rank x4 DDR4-2933 CAS-24-21-21 Load Reduced 3DS Smart Memory Kit | P00928-B21 |

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

**Registered DIMMs (RDIMMs)**

| | |
|---|---|
| HPE 8GB (1x8GB) Single Rank x8 DDR4-2666 CAS-19-19-19 Registered Smart Memory Kit | 815097-B21 |
| HPE 16GB (1x16GB) Single Rank x4 DDR4-2666 CAS-19-19-19 Registered Smart Memory Kit | 815098-B21 |
| HPE 16GB (1x16GB) Dual Rank x8 DDR4-2666 CAS-19-19-19 Registered Smart Memory Kit | 835955-B21 |
| HPE 32GB (1x32GB) Dual Rank x4 DDR4-2666 CAS-19-19-19 Registered Smart Memory Kit | 815100-B21 |

**Load Reduced DIMMs (LRDIMMs)**

| | |
|---|---|
| HPE 64GB (1x64GB) Quad Rank x4 DDR4-2666 CAS-19-19-19 Load Reduced Smart Memory Kit | 815101-B21 |
| HPE 128GB (1x128GB) Octal Rank x4 DDR4-2666 CAS-22-19-19 3DS Load Reduced Memory Kit | 815102-B21 |

**NOTE:** HPE memory from previous generation servers (DDR3) is not compatible with this compute module. HPE SmartMemory 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 SmartMemory QuickSpecs**
**NOTE:** LRDIMM and RDIMM are distinct memory technologies and cannot be mixed within a compute module.
**NOTE:** For more information refer to the **Memory Speed Tables**
**NOTE:** 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

| | |
|---|---|
| HPE 128GB 2666 Persistent Memory Kit featuring Intel Optane DC Persistent Memory | 835804-B21 |
| HPE 256GB 2666 Persistent Memory Kit featuring Intel Optane DC Persistent Memory | 835807-B21 |
| HPE 512GB 2666 Persistent Memory Kit featuring Intel Optane DC Persistent Memory | 835810-B21 |

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

**HPE Drives**

**NOTE:** 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 480 Gen10 drive bays.
**NOTE:** 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.

## Additional Options

**NOTE:** 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
**NOTE:** 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.

**Enterprise - 12G SAS - SFF Drives**

| | |
|---|---|
| HPE 300GB SAS 12G Enterprise 10K SFF (2.5in) SC 3yr Wty Digitally Signed Firmware HDD | 872475-B21 |
| HPE 300GB SAS 12G Enterprise 15K SFF (2.5in) SC 3yr Wty Digitally Signed Firmware HDD | 870753-B21 |
| HPE 600GB SAS 12G Enterprise 15K SFF (2.5in) SC 3yr Wty Digitally Signed Firmware HDD | 870757-B21 |
| HPE 600GB SAS 12G Enterprise 10K SFF (2.5in) SC 3yr Wty Digitally Signed Firmware HDD | 872477-B21 |
| HPE 900GB SAS 12G Enterprise 15K SFF (2.5in) SC 3yr Wty Digitally Signed Firmware HDD | 870759-B21 |
| HPE 1.2TB SAS 12G Enterprise 10K SFF (2.5in) SC 3yr Wty Digitally Signed Firmware HDD | 872479-B21 |
| HPE 1.8TB SAS 12G Enterprise 10K SFF (2.5in) SC 3yr Wty 512e Digitally Signed Firmware HDD | 872481-B21 |
| HPE 2.4TB SAS 12G Enterprise 10K SFF (2.5in) SC 3yr Wty 512e Digitally Signed Firmware HDD | 881457-B21 |

**Midline - 12G SAS - SFF Drives**

| | |
|---|---|
| HPE 1TB SAS 12G Midline 7.2K SFF (2.5in) SC 1yr Wty Digitally Signed Firmware HDD | 832514-B21 |
| HPE 2TB SAS 12G Midline 7.2K SFF (2.5in) SC 1yr Wty 512e HDD | 765466-B21 |
| HPE 1TB SATA 6G Midline 7.2K SFF (2.5in) SC 1yr Wty Digitally Signed Firmware HDD | 655710-B21 |
| HPE 2TB SATA 6G Midline 7.2K SFF (2.5in) SC 1yr Wty 512e Digitally Signed Firmware HDD | 765455-B21 |
| HPE 1TB SAS 12G Midline 7.2K SFF (2.5in) SC 1yr Wty 512e Digitally Signed Firmware HDD | 765464-B21 |

**Write Intensive - NVMe- SFF - Solid State Drives**

| | |
|---|---|
| HPE 375GB NVMe x4 Lanes Write Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD | 878014-B21 |

**Read Intensive - SATA - SFF Drives**

| | |
|---|---|
| HPE 480GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P06194-B21 |
| HPE 960GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P06196-B21 |
| HPE 1.92TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P06198-B21 |
| HPE 240GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P04556-B21 |
| HPE 480GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P04560-B21 |
| HPE 960GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P04564-B21 |
| HPE 1.92TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P04566-B21 |
| HPE 240GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | 875503-B21 |
| HPE 3.84TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P04570-B21 |
| HPE 3.84TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P06200-B21 |
| HPE 480GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P04474-B21 |
| HPE 960GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P04476-B21 |
| HPE 1.92TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P04478-B21 |
| HPE 3.84TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P04480-B21 |
| HPE 7.68TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P04482-B21 |
| HPE 1.92TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P05938-B21 |
| HPE 3.84TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P05946-B21 |
| HPE 240GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P05924-B21 |
| HPE 480GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P05928-B21 |
| HPE 960GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P05932-B21 |

**Mixed Use SATA SSD Drives**

| | |
|---|---|
| HPE 480GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P05976-B21 |
| HPE 960GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P05980-B21 |

## Additional Options

| | |
|---|---|
| **Micro Form Factor uFF Dual SATA Drives** | |
| HPE Dual 240GB SATA 6G Mixed Use M.2 - UFF to SFF SCM 3yr Wty Digitally Signed Firmware SSD | P06607-B21 |
| HPE Dual 480GB SATA 6G Read Intensive M.2 - UFF to SFF SCM 3yr Wty Digitally Signed Firmware SSD | P06609-B21 |
| **Standard – M.2 Solid State Drives** | |
| **NOTE:** M.2's require adapter kit for Synergy 480 Gen10 | |
| HPE Synergy 480 Gen10 M.2 NGFF FIO Adapter Board Kit | 873165-B21 |
| HPE 480GB SATA 6G Read Intensive M.2 2280 3yr Wty Digitally Signed Firmware SSD | 875498-B21 |
| HPE 240GB SATA 6G Mixed Use M.2 2280 3yr Wty Digitally Signed Firmware SSD | 875488-B21 |
| HPE 480GB SATA 6G Mixed Use M.2 2280 3yr Wty Digitally Signed Firmware SSD | 875490-B21 |
| HPE 960GB SATA 6G Mixed Use M.2 2280 3yr Wty Digitally Signed Firmware SSD | 875492-B21 |
| HPE 960GB SATA 6G Read Intensive M.2 2280 3yr Wty Digitally Signed Firmware SSD | 875500-B21 |
| **Read Intensive – SAS SFF - Solid State Drives** | |
| HPE 960GB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P06584-B21 |
| HPE 1.92TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P06586-B21 |
| HPE 3.84TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P06588-B21 |
| HPE 7.68TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P06590-B21 |
| HPE 15.3TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P06592-B21 |
| HPE 960GB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P04517-B21 |
| HPE 1.92TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P04519-B21 |
| HPE 3.84TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P04521-B21 |
| HPE 7.68TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P04523-B21 |
| HPE 960GB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD | P10440-B21 |
| HPE 1.92TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD | P10442-B21 |
| HPE 3.84TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD | P10444-B21 |
| HPE 7.68TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD | P10446-B21 |
| **Write Intensive – SAS SFF - Solid State Drives** | |
| HPE 400GB SAS 12G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P04541-B21 |
| HPE 400GB SAS 12G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P09098-B21 |
| HPE 800GB SAS 12G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P04543-B21 |
| HPE 800GB SAS 12G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P09100-B21 |
| HPE 1.6TB SAS 12G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P04545-B21 |
| HPE 1.6TB SAS 12G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P09102-B21 |
| HPE 3.2TB SAS 12G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P04547-B21 |
| **Mixed Use – SFF - Solid State Drives** | |
| HPE 3.84TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P00896-B21 |
| HPE 400GB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P04525-B21 |
| HPE 800GB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P04527-B21 |
| HPE 1.6TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P04533-B21 |
| HPE 3.2TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P04537-B21 |
| HPE 6.4TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P04539-B21 |
| HPE 960GB SAS 12G Mixed Use SC 3yr Wty Value SAS Digitally Signed Firmware SSD | P10448-B21 |
| HPE 1.92TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD | P10454-B21 |
| HPE 3.84TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD | P10460-B21 |
| **Mixed Use - SATA - SFF - Solid State Drives** | |
| HPE 480GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P09712-B21 |

## Additional Options

| | |
|---|---|
| HPE 960GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P09716-B21 |
| HPE 1.92TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P09722-B21 |
| HPE 3.84TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P00896-B21 |
| **Mixed Use - SATA - SFF - Solid State Drives** | |
| HPE 480GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P07922-B21 |
| HPE 960GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P07926-B21 |
| HPE 1.92TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P07930-B21 |
| HPE 1.92TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P05986-B21 |
| HPE 3.84TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P05994-B21 |
| **NVMe - SFF Drives** | |
| HPE 1.6TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD | P13699-B21 |
| HPE 3.2TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD | P13701-B21 |
| HPE 6.4TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD | P13703-B21 |
| HPE 800GB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD | P07179-B21 |
| HPE 1.6TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD | P07181-B21 |
| HPE 1.6TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD | P10222-B21 |
| HPE 3.2TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD | P07183-B21 |
| HPE 6.4TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD | P07185-B21 |
| HPE 3.2TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD | P10224-B21 |
| HPE 6.4TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD | P10226-B21 |
| HPE 2TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD | P13695-B21 |
| HPE 4TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD | P13697-B21 |
| HPE 800GB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD | P10220-B21 |
| HPE 960GB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD | P10208-B21 |
| HPE 960GB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD | P07190-B21 |
| HPE 1.92TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD | P07192-B21 |
| HPE 1.92TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD | P10210-B21 |
| HPE 3.84TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD | P07194-B21 |
| HPE 3.84TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD | P10212-B21 |
| HPE 7.68TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD | P07196-B21 |
| HPE 15.36TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD | P07198-B21 |
| HPE 1.92TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD | P10214-B21 |
| HPE 3.84TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD | P10216-B21 |
| HPE 7.68TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD | P10218-B21 |
| HPE 750GB NVMe x4 Lanes Write Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD | P06952-B21 |
| **Mixed Use – SAS SFF - Solid State Drives** | |
| HPE 400GB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P09088-B21 |
| HPE 800GB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P09090-B21 |
| HPE 1.6TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P09092-B21 |
| HPE 3.2TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P09094-B21 |
| HPE 6.4TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD | P09096-B21 |

**Drive Qualification Exceptions:**

**NOTE:** At this time there are no exceptions to list.

**HPE Compute Security**

| | |
|---|---|
| HPE Trusted Platform Module 2.0 Gen10 Option | 864279-B21 |

## Additional Options

**NOTE:** The TPM (Trusted Platform Module) is a microcontroller chip that can securely store artifacts used to authenticate the server platform. These artifacts can include passwords, certificates and encryption keys. Windows® BitLocker™ Drive Encryption (BitLocker) is a data protection feature available in Windows Server® 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.
**NOTE:** For more information about **Trusted Platform Module**
**NOTE:** HPE Synergy OS pre-installed units will come with the partition required for TPM deployment.
**NOTE:** The TPM key is unique to every TPM deployed server and must be retained. Misplacing or losing the key could result in data loss.

**HPE Networking**

**Ethernet Mezzanine Adapters**

| | |
|---|---|
| HPE Synergy 2820C 10Gb Converged Network Adapter | 794538-B21 |
| HPE Synergy 3820C 10/20Gb Converged Network Adapter | 777430-B21 |
| HPE Synergy 4610C 10/25Gb Ethernet Adapter | 813890-B21 |
| HPE Synergy 4820C 10/20/25Gb Converged Network Adapter | 876449-B21 |
| HPE Synergy 6410C 25/50Gb Ethernet Adapter | 868779-B21 |

**HPE Fibre Channel**

| | |
|---|---|
| HPE Synergy 3530C 16Gb Fibre Channel Host Bus Adapter | 777454-B21 |
| HPE Synergy 3830C 16Gb Fibre Channel Host Bus Adapter | 777452-B21 |
| 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 |
| 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 |

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

| | |
|---|---|
| HPE Smart Storage Hybrid Capacitor with 260mm Cable Kit | P02381-B21 |
| HPE 96W Smart Storage Battery (up to 20 Devices) with 260mm Cable Kit | P01367-B21 |

**NOTE:** For use with premium modules/front drives.

**NOTE:** HPE Smart Array S100i SR Gen10 SW RAID is off by default and can be enabled RBSU.
**NOTE:** 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
**NOTE:** HPE Smart Array S100i SR Gen10 SW RAID is an HPE factory setting (784308-B21), will operate in UEFI mode only.
**NOTE:** HPE Synergy 480 Gen10 M.2 FIO Adapter Board Kit (873165-B21) required for enablement of optional internal M.2 SATA Drives.
**NOTE:** For legacy support select Legacy mode settings part, 758959-B22.
**NOTE:** 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 8GB microSD Flash Memory Card | 726116-B21 |

## Additional Options

| | |
|---|---|
| HPE 32GB microSD Flash Memory Card | 700139-B21 |
| HPE 8GB Dual microSD Flash USB Drive | 741279-B21 |
| HPE 8GB microSD Flash Memory Card | 726116-B21 |

**NOTE:** 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 Proactive Care Services**

| | |
|---|---|
| HPE 3 Year Proactive Care 24x7 Synergy SY660 Gen10 Service | H7ML8E |
| HPE 3 Year Proactive Care 24x7 with DMR Synergy SY660 Gen10 Service | H7ML9E |
| HPE 3 Year Proactive Care Advanced 24x7 Synergy SY660 Gen10 Service | H7MM1E |
| HPE 3 Year Proactive Care Advanced 24x7 with DMR Synergy SY660 Gen10 Service | H7MM2E |

**NOTE:** 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 |

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

**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 |

**NOTE:** 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 |

**NOTE:** 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

**NOTE:** 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 SmartMemory is required. For additional information, please see the **HPE DDR4 SmartMemory QuickSpecs**

## Synergy 660 Gen10 Compute Module

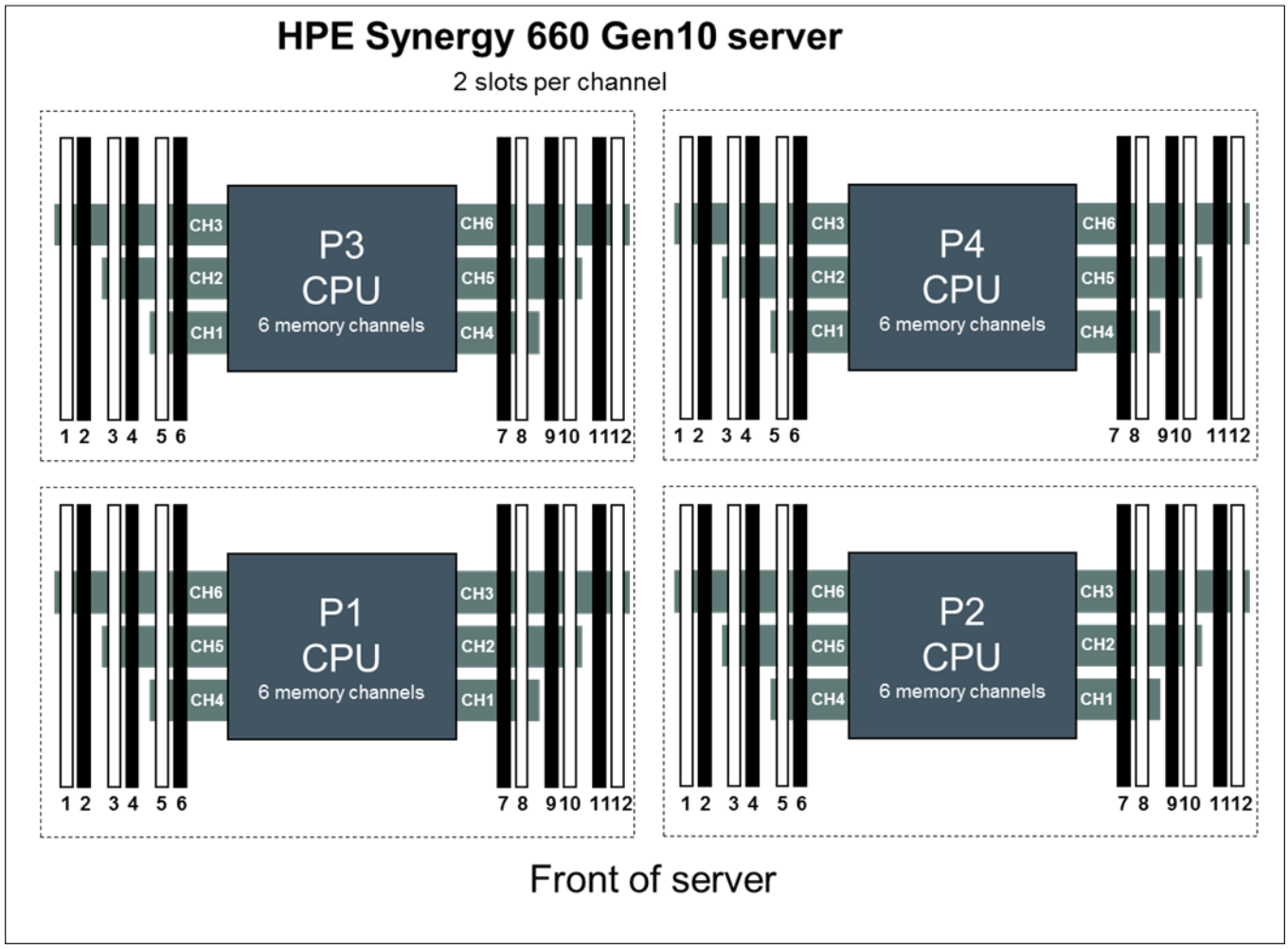
**Memory Speed Table for Memory used with Intel Scalable Family Gen2 Processors**

| 6DPC | Register DIMM (RDIMM) | | | | |
|---|---|---|---|---|---|
| HPE SKU P/N | **P00918-B21** | **P00920-B21** | **P00922-B21** | **P00924-B21** | **P00930-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 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 |
| 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 |

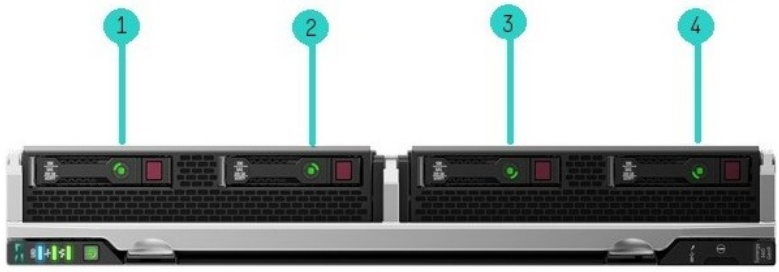
## Memory

| **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 |
| **Load Reduced (LRDIMM)** | | | | | |
| HPE SKU P/N | P00926-B21 | P00928-B21 | P11040-B21 | | |
| SKU Description | HPE 64GB 4Rx4 PC4-2933Y-L Smart Kit | HPE 128GB 8Rx4 PC4-2933Y-L 3DS Smart Kit | HPE 128GB 4Rx4 PC4-2933Y-L Smart Kit | | |
| DIMM Rank -> | Quad Rank (4R) | Octal Rank (8R) | Quad rank (4R) | | |
| DIMM Capacity -> | **64GB** | **128GB** | **128 GB** | | |
| Voltage | 1.2V | 1.2V | 1.2V | | |
| DRAM depth [bit] | 2G | 2G | 2G | | |
| DRAM Width [bit] | x4 | x4 | x4 | | |
| DRAM Density | 8Gb | 8Gb | 16Gb | | |
| CAS Latency | 21-21-21 | 24-21-21 | 21-21-21 | | |
| DIMM Native Speed (MT/s) | 2933 | 2933 | 2933 | | |
| **Intel Xeon®Platinum/Gold 82xx/ 62xx Processors Officially Supported Memory Speed (MT/s)** | | | | | |
| 1 DIMM Per Channel | 2933 | 2933 | 2933 | | |
| 2 DIMM Per Channel | 2933 | 2933 | 2933 | | |
| **Intel Xeon®Gold 52xx Processors Officially Supported Memory Speed (MT/s)** | | | | | |
| 1 DIMM Per Channel | 2666 | 2666 | 2666 | | |
| 2 DIMM Per Channel | 2666 | 2666 | 2666 | | |
| **Intel Xeon®Silver 42xx Processors Officially Supported Memory Speed (MT/s)** | | | | | |
| 1 DIMM Per Channel | 2400 | 2400 | 2400 | | |
| 2 DIMM Per Channel | 2400 | 2400 | | | |
| **Intel Xeon®Bronze 32xx Processors Officially Supported Memory Speed (MT/s)** | | | | | |
| 1 DIMM Per Channel | 2133 | 2133 | 2133 | | |
| 2 DIMM Per Channel | 2133 | 2133 | 2133 | | |
| * The maximum memory speed is a function of the memory type, memory configuration, and processor model. | | | | | |
| The information contained herein is subject to change without notice. HPE Confidential. Not for customer viewing. Do not distribute. | | | | | |

## Memory

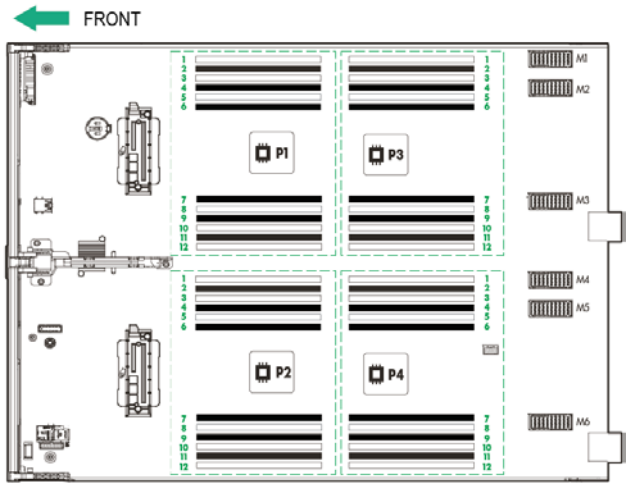



**Front Local Storage**

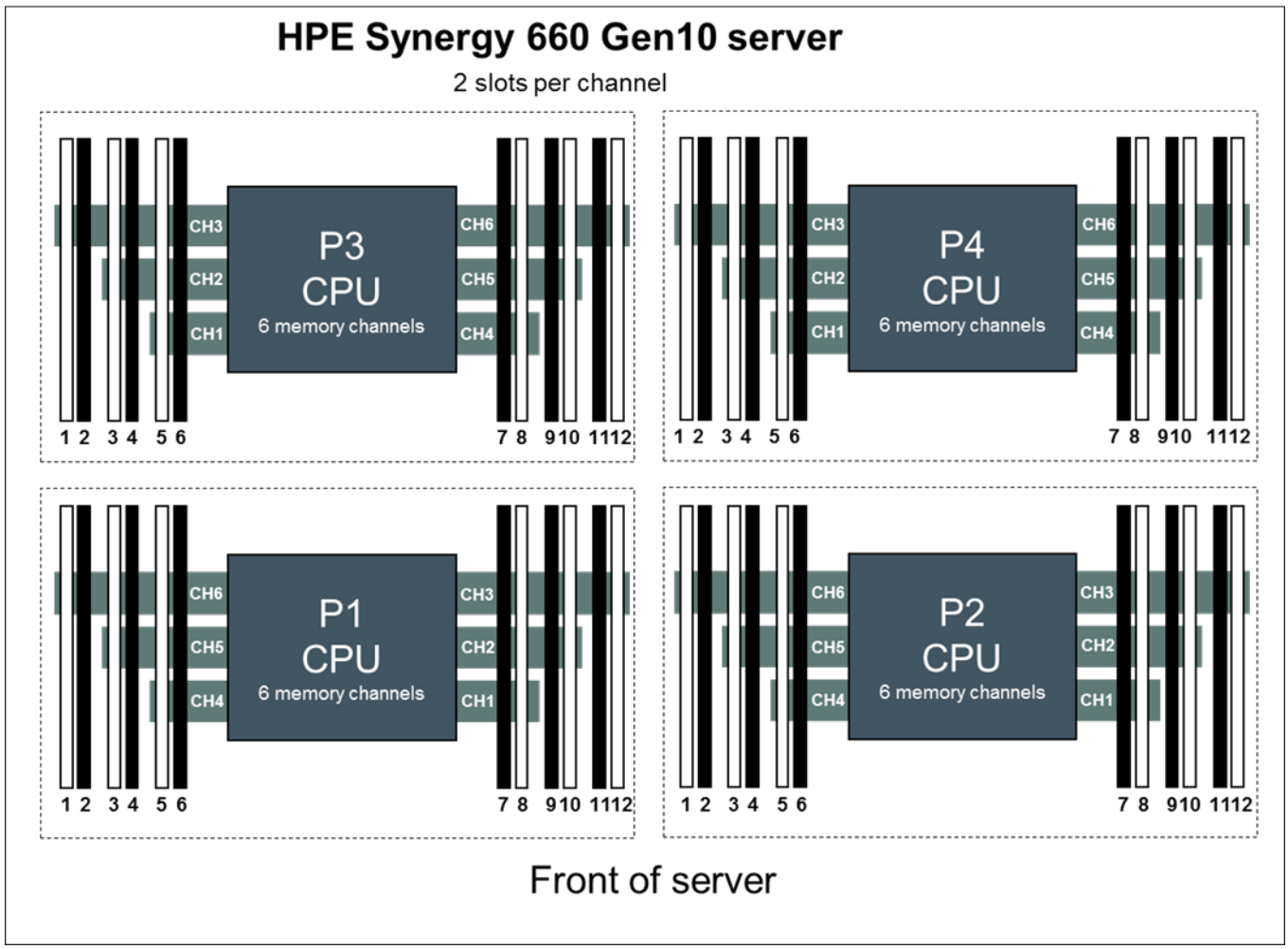



0-4 4 x SFF hot-plug drive bays for SAS, SATA, SAS SDD, SATA SSD, NVMe PCIe SSD, or up to 8 uFF with Smart Drive Carrier adapter Not shown: 4 internal M.2 drives, USB or uSD drives

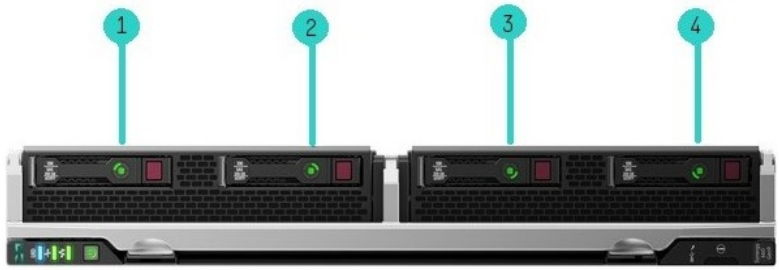
## Memory



## Storage

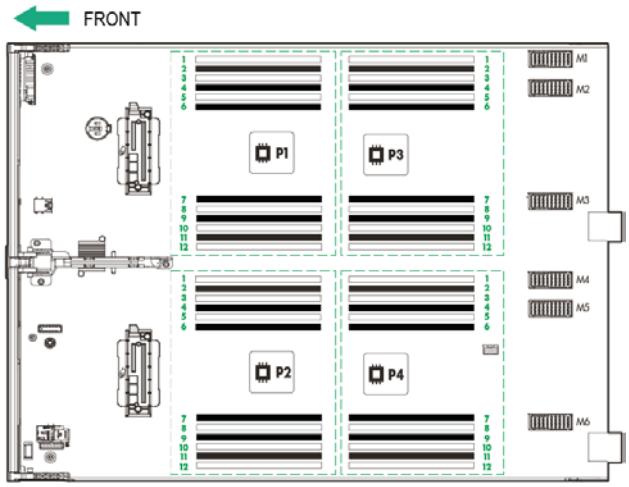



**Front Local Storage**



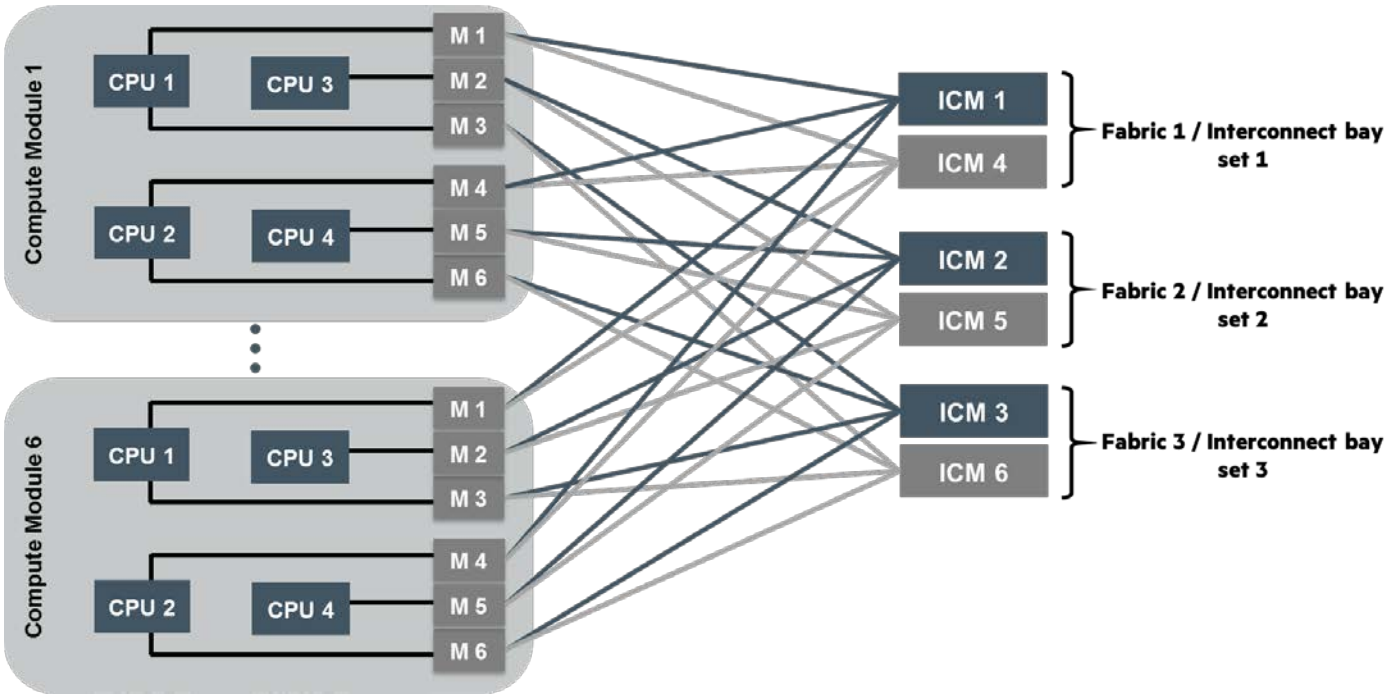

0-4 4 x SFF hot-plug drive bays for SAS, SATA, SAS SDD, SATA SSD, NVMe PCIe SSD, or up to 8 uFF with Smart Drive Carrier adapter Not shown: 4 internal M.2 drives, USB or uSD drives

## Memory



## Technical Specifications

### HPE Synergy 660 Gen10 Compute Module – Fabric Routing




**System Unit**

| | | |
|---|---|---|
| **Dimensions (H x W x D) (with bezel)** | 6.35 x 43.03 x 59.92 cm<br>2.50 x 16.94 x 23.59 in | |
| **Weight (approximate)** | 13.75 kg<br>30.31 lbs | Minimum: two processor and 1 DIMM / processor installed |
| | 17.41 kg<br>38.38 lbs | 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.<br><br>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.<br>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.<br>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). |

## Technical Specifications

| | | |
|---|---|---|
| **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).<br>**NOTE:** 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. |
| **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**.

| | |
|---|---|
| **Environment-friendly Products and Approach - End-of-life Management and Recycling** | Hewlett Packard Enterprise offers **End-of-life product return, Trade-in, and Recycling 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.<br><br>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 |
|---|---|---|---|
| 03-Jun-2019 | Version 10 | Changed | Overview, Configuration Information - Factory Integrated Models, Optional Features, Additional Options, Memory, and Storage sections were updated. The U.S. version of QuickSpecs is no longer being updated, please reference the Worldwide QuickSpecs for latest information. |
| | | Added | 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. |
| 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. |
| | | Added | 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. |
| | | Removed | SKUs deleted: 845264-B21, 867322-B21, 868779-B21, 876449-B21, 777430-B21, 794538-B21, 777452-B21, HOUT1E, HOUT2E, HOUT4E, HOUT5E.<br>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 |
| 03-Dec-2018 | Version 8 | Changed | Overview, Standard Features, Configuration Information - Factory Integrated Models, and Additional Options |
| | | Added | 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. |
| | | Removed | 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. |

## Summary of Changes

| | | | |
|---|---|---|---|
| | | Added | 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. |
| | | Added | SKUs added in Configuration Information - Factory Integrated Models and Additional Options sections: 876449-B21, P06194-B21, P06196-B21, P06198-B21, P06200-B21. |
| | | Removed | Obsolete SKUS were deleted: 765453-B21. |
| 04-Jun-2018 | Version 5 | Changed | Standard Features, Optional Features, Configuration Information - Factory Integrated Models, and Additional Options sections were updated. |
| | | Added | SKUs added: 876871-B21, 873377-B21, 815097-B21, 815098-B21, 835955-B21, 815100-B21, 815101-B21, 815102-B21, 845264-B21. |
| | | Removed | 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 |

**Sign up for updates**

© Copyright 2019 Hewlett Packard Enterprise Development LP. The information contained herein is subject to change without notice. The only warranties for Hewlett Packard Enterprise products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. Hewlett Packard Enterprise shall not be liable for technical or editorial errors or omissions contained herein.

Intel® and Xeon® are registered trademarks of Intel Corporation in the U.S. and other countries.

Microsoft®, Windows®, and Windows Server® are U.S. registered trademarks of the Microsoft group of companies.

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

a00008522enus - 15942 – North America - V10 - 03-June-2019