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

HPE Synergy 480 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 480 Gen10 Compute Module delivers superior capacity, efficiency, and flexibility in a two-socket, half-height form factor to support demanding workloads. Powered by the latest Intel® Xeon® Scalable processors, HPE DDR4 Smart Memory supporting up to 3TB, flexible storage controller options, three I/O connectors, and designed to create a pool of flexible compute capacity within a composable infrastructure the HPE Synergy 480 Gen10 Compute Module is the ideal platform for general-purpose enterprise workload performance now and in the future.

Get the right balance of performance, flexibility, and density for your traditional or new style of business applications. The HPE Synergy 480 Gen10 Compute Module delivers even more choice of performance, capacity and flexibility to meet your workload needs. Powered with newest Intel® Xeon® Scalable processors, HPE Smart Memory, more storage solutions and capacity, unique Smart Arrays and new GPU options the Synergy 480 Gen10 Compute is ideal to fit any workload you have, now and in the future

HPE Synergy offers additional compute module options (that have individual QuickSpecs) including:

- HPE Synergy 660 Gen10
- HPE Synergy 480 Gen10 Plus Compute Module
- HPE Synergy 480 Gen11 Compute Module

This QuickSpecs document focuses on the HPE Synergy 480 Gen10 Compute Module.

Notes: The HPE Synergy Gen10 compute modules installation involves a minimum upgrade requirement for component compatibility purposes. To ensure proper system functionality, you must update your system to Release Set Version 3.00.20170707 (or later) before installing and operating your compute module. Go to **http://www.hpe.com/downloads/synergy.**

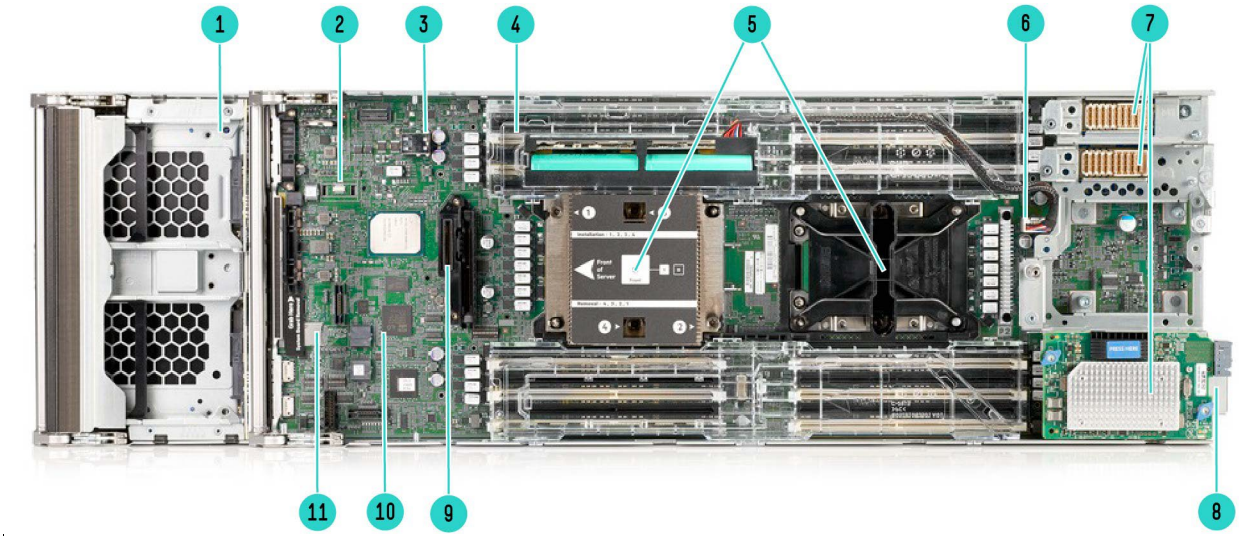
Overview



Front View – HPE Synergy 480 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. Compute Module handle release latch
7. Removable drive cage with two hot-plug drive bays
8. External USB 3.0 connector & iLO USB connection (behind serial label pull tab)

Overview



Synergy 480 Gen10 Compute Module
(Drive Cage removed)

1. Removable drive cage with two hot-plug drive bays and connection point for M.2 Drive Adaptor Kit
2. TPM connector (under drive cage)
3. USB 3.0 (boot port under drive cage – see notes regarding VMware changes to boot disks)
4. Twenty-four (24) DDR4 DIMM memory slots (12 per processor)
5. Up to two (2) Intel® Xeon® Scalable Family processors
6. Smart Array Battery connection
7. Mezzanine connectors (3 x16 PCIe 3.0)
8. Compute Module Power and Management connector
9. M.2 Storage Adapter connection (under cage)
10. iLO chipset (under drive cage)
11. MicroSD Slot (under drive cage)

ErP Lot9 Quick Summary

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

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

Standard Features

Processors

Notes: Up to 2 of the following depending on model.

With the extension 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 selecting the right processor are provided in the Configuring Your System section below.

Notes:

- This table covers the public HPE Synergy Gen10 offering only.
- The 2nd digit of the processor model number "x1xx" and "x2xx" is used to denote the processor generation (i.e. 1=1st generation and 2=2nd generation)
- Intel Xeon M or L labeled processors support extended memory capacities as show 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.
- For more information regarding Intel Xeon processors, please see the following **https://www.intel.com/content/www/us/en/products/details/processors/xeon.html**

Intel® Xeon® Scalable processor family - 2nd generation						
Intel Xeon Models	**CPU Frequency (GHz)**	**Cores**	**Power (WATTs)**	**DDR4 MT/s**	**Max Memory per socket (Terabytes)**	**Persistent Memory Support**
Platinum 8280L Processor	2.7	28	205	2933	4.5	Yes
Platinum 8280 Processor	2.7	28	205	2933	1	Yes
Platinum 8276L Processor	2.2	28	165	2933	4.5	Yes
Platinum 8276 Processor	2.2	28	165	2933	1	Yes
Platinum 8270 Processor	2.7	26	205	2933	1	Yes
Platinum 8268 Processor	2.9	24	205	2933	1	Yes
Platinum 8260Y Processor	2.4-2.5-2.8	24-20-16	165	2933	1	Yes
Platinum 8260L Processor	2.4	24	165	2933	4.5	Yes
Platinum 8260 Processor	2.4	24	165	2933	1	Yes
Platinum 8256 Processor	3.8	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 6258R Processor	2.7	28	205	2933	1	Yes
Gold 6254 Processor	3.1	18	200	2933	1	Yes
Gold 6252N Processor	2.3	24	150	2933	1	Yes
Gold 6252 Processor	2.1	24	150	2933	1	Yes
Gold 6248R Processor	3.0	24	205	2933	1	Yes
Gold 6248 Processor	2.5	20	150	2933	1	Yes
Gold 6246R Processor	3.4	16	205	2933	1	Yes
Gold 6246 Processor	3.3	12	165	2933	1	Yes
Gold 6244 Processor	3.6	8	150	2933	1	Yes
Gold 6242R Processor	3.1	20	205	2933	1	Yes
Gold 6242 Processor	2.8	16	150	2933	1	Yes
Gold 6240R Processor	2.4	24	165	2933	1	Yes
Gold 6240Y Processor	2.6-2.8-3.1	18-14-8	150	2933	1	Yes
Gold 6240L Processor	2.6	18	150	2933	4.5	Yes
Gold 6240 Processor	2.6	18	150	2933	1	Yes
Gold 6238R Processor	2.2	28	165	2933	1	Yes
Gold 6238L Processor	2.1	22	140	2933	4.5	Yes

Standard Features

Intel Xeon Models	CPU Frequency (GHz)	Cores	Power (WATTs)	DDR4 MT/s	Max Memory per socket (Terabytes)	Persistent Memory Support
Gold 6234 Processor	3.3	8	130	2933	1	Yes
Gold 6230R Processor	2.1	26	150	2933	1	Yes
Gold 6230N Processor	2.3	20	125	2933	1	Yes
Gold 6230 Processor	2.1	20	125	2933	1	Yes
Gold 6226R Processor	2.9	16	150	2933	1	Yes
Gold 6226 Processor	2.7	12	125	2400	1	Yes
Gold 6222V Processor	1.8	20	115	2400	1	Yes
Gold 5222 Processor	3.8	4	105	2933	1	Yes
Gold 5220R Processor	2.2	24	150	2666	1	Yes
Gold 5220S Processor	2.6	18	125	2666	1	Yes
Gold 5220 Processor	2.2	18	125	2666	1	Yes
Gold 5218R Processor	2.1	20	125	2666	1	Yes
Gold 5218N Processor	2.3	16	105	2666	1	Yes
Gold 5218B Processor	2.3	16	125	2666	1	Yes
Gold 5218 Processor	2.3	16	125	2666	1	Yes
Gold 5217 Processor	3	8	125	2666	1	Yes
Gold 5215L Processor	2.6	10	85	2666	4.5	Yes
Gold 5215 Processor	2.6	10	85	2666	1	Yes
Silver 4216 Processor	2.1	16	85	2400	1	No
Silver 4215R Processor	3.2	8	130	2400	1	Yes
Silver 4215 Processor	2.5	8	85	2400	1	Yes
Silver 4214R Processor	2.4	12	100	2400	1	No
Silver 4214Y Processor*	2.2-2.3-2.4	12-10-8	85	2400	1	No
Silver 4214 Processor	2.2	12	85	2400	1	No
Silver 4210R Processor	2.4	10	100	2400	1	No
Silver 4210 Processor	2.2	10	85	2400	1	No
Silver 4208 Processor	2.1	8	85	2400	1	No
Bronze 3206R Processor	1.9	8	85	2133	1	No
Bronze 3204 Processor	1.9	6	85	2133	1	No

Processor Suffix Description Offering (generation 2 Processors)

R Latest Intel Refresh SKU offerings

L Large memory tier Up to 4.5 TB addressable memory per socket

N NFV Optimized Targeted at Network Function Virtualization (NFV) workloads. IntelR SST-BF improves performance by directing base frequency to high priority/bottleneck cores. Other workloads may see throttling.

S Search Optimized base frequency to address 'search' workloads. Other workloads may see throttling.

V VM Optimized Fosters enhanced VM density, allowing to support more/larger virtual machines per host.

Y Speed Select IntelR SST-PP increases base frequency when less cores are enabled. Allows greater flexibility, deployment options and platform longevity.

Notes:

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

Standard Features

- 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 @ 2933/2666MT/S 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.
- Silver – 4200 Series - Supports 2 socket (Synergy 480 Gen10) compute module only, 2 Socket supports 2UPI, 6-Channel DDR4 @ 2400 MT/S providing up to 1, 2, or 4.5TB depending on processor selected. Intel Turbo Boost Technology, Intel Hyper-Threading Technology, Intel AVX-512(1x 512-bit FMA), 48 lanes PCIe 3.0, standard RAS supported.
- Bronze – 3200 Series - Supports 2 socket (Synergy 480 Gen10) compute module only, 2 Socket supports 2UPI, supports 6-Channel DDR4 @ 2133MT/S depending on processor and memory selected, providing up to 1TB memory capacity. Intel AVX-512(1x 512-bit FMA), 48 lanes PCIe 3.0, standard RAS supported.

Chipset

Intel C621 Series Chipset

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

Synergy Management

HPE Composer powered by OneView

Notes: Read and learn more about **OneView**

On Compute Management Chipset

HPE iLO 5 ASIC

Notes: Read and learn more in the **iLO QuickSpecs**

Memory

One of the following depending on model

The following memory supports Intel® Xeon® Scalable Family processors 2nd generation (Models x2xx)

- HPE 8GB (1x8GB) Single Rank x8 DDR4-2933 CAS-21-21-21 Registered Smart Memory Kit
- HPE 16GB (1x16GB) Single Rank x4 DDR4-2933 CAS-21-21-21 Registered Smart Memory Kit
- HPE 16GB (1x16GB) Dual Rank x8 DDR4-2933 CAS-21-21-21 Registered Smart Memory Kit
- HPE Synergy 32GB (1x32GB) Dual Rank x4 DDR4-2933 CAS-21-21-21 Registered Smart Memory Kit
- HPE 32GB (1x32GB) Dual Rank x4 DDR4-2933 CAS-21-21-21 Registered Smart Memory Kit
- HPE 32GB 1Rx4 PC4-2933Y-R Smart Kit
- HPE Synergy 64GB (1x64GB) Dual Rank x4 DDR4-2933 CAS-21-21-21 Registered Smart Memory Kit
- HPE 64GB (1x64GB) Dual Rank x4 DDR4-2933 CAS-21-21-21 Registered Smart Memory Kit
- HPE 128GB (1x128GB) Quad Rank x4 DDR4-2933 CAS-21-21-21 Load Reduced Smart Memory Kit

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

Standard Features

Type:	HPE DDR4 Smart Memory, Registered (RDIMM), Load Reduced (LRDIMM)	
DIMM Slots Available	24	12 DIMM slots per processor, 6 channels per processor, 2 DIMMs per channel
Maximum capacity (LRDIMM)	3 TB	24 x 128 GB LRDIMM
Maximum capacity (RDIMM)	1.5 TB	24 x 64 GB RDIMM

Notes:

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

- HPE Non-Volatile Memory DIMMs (NVDIMMs)

Notes: Available/compatible on Intel Xeon Scalable Family Generation 1 Only.

- HPE 16GB NVDIMM Single Rank x4 DDR4-2666 Module Kit

Notes:

- HPE memory from previous generation servers (DDR3) is not compatible with this compute module. HPE Smart Memory is required to realize the memory performance improvements and enhanced functionality listed in this document for Gen10.
- For additional information, please see the **HPE Smart Memory QuickSpecs**.
- LRDIMM and RDIMM are distinct memory technologies and cannot be mixed within a compute module.
- For the latest information on **Memory Speed**.
- If you want to know more about the memory, reference the **RAS feature whitepaper**.

HPE Persistent Memory featuring Intel Optane DC Persistent Memory

- 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

Notes: Supported on select HPE Synergy Gen10 servers with Intel Xeon Scalable Generation 2 processors (SY480 and SY660).

Memory Protection

- **Advanced ECC**
  Advanced ECC uses single device data correction to detect and correct single and all multibit error that occurs within a single DRAM chip.
- **Online Spare**
  Memory online spare mode detects a rank that is degrading and switches operation to the spare rank.
- **Online Mode**
  Memory Online Spare Mode (Rank Spare Mode)

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

Standard Features

HPE Persistent Memory module-processor compatibility

HPE Persistent Memory modules are supported only in designated compute modules with second-generation Intel Xeon Scalable processors installed.

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

System requirements

Notes: Hewlett Packard Enterprise recommends that you implement best practice configurations for high availability (HA) such as clustered configurations.

The following hardware components are required:

- HPE DDR4 Standard Memory RDIMMs or LRDIMMs
- HPE Persistent Memory modules
- Second-generation Intel Xeon Scalable processors

Supported firmware versions:

- System ROM version 2.10 or later
- Server Platform Services (SPS) Firmware version 04.01.04.296
- HPE iLO 5 Firmware version 1.43
- HPE Innovation Engine Firmware version 2.1.x or later

Download the required firmware and drivers from the Hewlett Packard Enterprise website
http://http://www.hpe.com/info/persistentmemory

Supported operating systems:

- Windows Server 2012 R2 with persistent memory drivers from Hewlett Packard Enterprise
- Windows Server 2016 with persistent memory drivers from Hewlett Packard Enterprise
- Windows Server 2019
- Red Hat Enterprise Linux 7.6
- Red Hat Enterprise Linux 8.0
- SUSE Linux Enterprise Server 12 SP4
- SUSE Linux Enterprise Server 15 with SUSE-SU-2019:0224-1 kernel update
- SUSE Linux Enterprise Server 15 SP1 with SUSE-SU-2019:1550-1 kernel update
- VMware vSphere 6.7 U2 + Express Patch 10 (ESXi670-201906002) or later (supports App Direct and Memory modes)
- VMware vSphere 6.5 U3 or later (supports Memory mode.

Hardware and licensing requirements for optional encryption of the HPE Persistent Memory modules:

- HPE TPM 2.0 (local key encryption)
- HPE iLO Advanced License (remote key encryption)
- Key management server (remote key encryption)

Standard Features

HPE Persistent Memory population information

DIMMs and HPE Persistent Memory modules are installed in specific configurations based on the workload requirements of the server. Supported configurations are optimized for persistent memory capacity, volatile memory capacity, and performance.

- Persistent memory capacity—the available capacity is equal to the HPE Persistent Memory module
- capacity.
- Volatile memory capacity:
- App Direct mode—the volatile capacity is equal to the DRAM capacity (the capacity of all the non-
- HPE Persistent Memory modules installed).
- Memory mode—the volatile capacity is some or all the HPE Persistent Memory module capacity.
- Memory tier capacity—the memory tier capacity is the total capacity of all installed memory (DRAM and HPE Persistent Memory modules).

  Notes: If the installed memory exceeds the processor capacity, the system will map out all but one DIMM channel and operate in App Direct mode. A message will be logged to the IML for exceeding capacity. To resolve the issue, remove the memory that exceeds the processor capacity.
- Performance:
  - Uses all channels to efficiently utilize processor resources.
  - Memory mode—more regular DIMMs provide a better cache ratio.

For more information, see Memory cache ratios on page 6 of this document.
https://support.hpe.com/hpsc/doc/public/display?docId=emr_na-a00074717en_us&docLocale=en_US

For specific population and configuration information, see **Server Memory and Persistent Memory Population rules for HPE Gen10 servers**.

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

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Memory Protection

Advanced ECC

Advanced ECC uses single device data correction to detect and correct single and all multibit errors that occur within a single DRAM chip.

Online Spare

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

Online Mode

Memory Online Spare Mode (Rank Spare Mode)

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

Standard Features

Mezzanine Connectors

Three (3) I/O expansion mezzanine connectors:

- x16 PCIe 3.0 Type D
  - Supports Type C and Type D mezzanine cards
  - Mezzanine connector 1

  Notes: This mezzanine connector supports dual-port mezzanine cards: one port is routed to interconnect module bay 1 and the other to bay 4.
- x16 PCIe 3.0 Type D
  - Supports Type C and Type D mezzanine cards
  - Mezzanine connector 2

  Notes:
  - This mezzanine connector supports dual-port mezzanine cards: one port is routed to interconnect module bay 2 and the other to bay 5.
  - A second processor must be installed (in processor slot 2) to have access to mezzanine connector 2.
- x16 PCIe 3.0 Type C
  - Supports Type C mezzanine cards
  - Mezzanine connector 3).

  Notes: This mezzanine connector supports dual-port mezzanine cards: one port is routed to interconnect module bay 3 and the other to bay 6.

Network & Storage Adapters or Mezzanine options include:

- HPE Synergy 4820C 10/20/25Gb Converged Network Adapter
- HPE Synergy 6820C 25/50Gb Converged Network Adapter
- HPE Synergy 6410C 25/50Gb Ethernet
- 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

Notes: Please refer to the Fabric/Network Options Quick Specs for more details.

HPE Compute Module ROM

HPE ROM (read only memory) is now digitally signed using the HPE Corporate Signing Service. As part of the Secure Start, 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).
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.

Standard Features

HPE Synergy Compute ROM is used to configure the following:

- Processor and chipset status registers
- System memory, memory map, and memory initialization
- System hardware configuration (integrated PCI devices and optional PCIe cards).
- Customer-specific BIOS configuration using the UEFI System Utilities.

Storage Controllers

One of the following depending on model

Software RAID

HPE Smart Array S100i SR Gen10 SW RAID

Notes:

- HPE Smart Array S100i SR Gen10 SW RAID is off by default and can be enabled RBSU.
- HPE Smart Array S100i SR Gen10 SW RAID is an HPE factory setting(784308-B21), will operate in UEFI mode only and requires HPE Synergy FIO Gen10 SATA Brd Kit (872955-B21) for enablement to Local Drives.
- HPE Synergy 480 Gen10 M.2 FIO Adptr Brd Kit(873165-B21) required for M.2 SATA Drives (Factory Integration Option only.
- HPE Synergy 480 Gen10 M.2 NGFF Adptr Brd Kit(P38437-B21) offered Factory Integration or field service/customer integration. (Replacement for 873165-B21)
- For legacy support select Legacy mode settings part, 758959-B22.

Essential RAID Controller

- HPE Smart Array E208i-c SR Gen10 12G SAS Modular Controller
  (8 internal lanes/no cache)

Performance RAID Controller

- HPE Smart Array P204i-c SR Gen10 12G SAS Modular Controller
  (4 internal lanes/1GB cache)
- HPE Smart Array P416ie-m SR Gen10 12G SAS Mezzanine Controller
  (8 internal 8 external lanes/2GB cache for use with with Synergy D3940 Storage Modules)

Premium Backplane CTO Compute Module

Premium Backplane Modules, CTO offers a Premium Backplane Compute Module for use with up to 2 NVMe drives in front drive cage. Or, supports P416ie-m with specific SAS cable connections allowing P416ie-m to manage 2x SATA or SAS drives in both front drive cage and drives on the Synergy D3940 Storage Module)

Notes: For more details on HPE Smart Array Controller solutions please see their **QuickSpecs**

Maximum Internal Storage		
Drive	**Capacity**	**Configuration**
Hot Plug SFF SAS SSD	30.6 TB	2 x 15.3 TB (with standard front SFF drive cage)
Hot Plug SFF SATA SSD	15.36 TB	2 x 7.68 TB (with standard front SFF drive cage)
Hot Plug SFF NVMe SSD	15.6 TB	2 x 7.8 TB (with Premium front SFF drive cage)
M.2 SATA SSD Option Drives	1.9 TB	2 x 960GBATA M.2 Drives (internal w/ adaptor)

Standard Features

Interfaces

- Micro SDHC Slot (Not intended for VMware Boot solutions)
  One (1) internal Micro Secure Digital High Capacity (Micro SDHC) card slot
- USB 3.0 Port
  One (1) internal USB 3.0 connector for USB flash media drive keys
  Notes: The above options are intended for integrated hypervisor virtualization environments of VMware 7.0 U2 and prior. Neither USB or SD devices will be supported beyond 7.0 U2 and other storage devices are recommended..
- USB 3.0 Port (Not intended for VMware Boot solutions)
  One (1) external USB 3.0 connector for USB flash media drive keys. (Not intended for VMware Boot solutions)
- iLO Port
- One (1) external USB port for direct iLO access to compute. (Not intended for VMware Boot solutions)

Operating Systems and Virtualization Software Support

- Microsoft Windows Server
- Microsoft Hyper-V Server
- Red Hat Enterprise Linux
- SUSE Linux Enterprise Server
- VMware ESXi
- VMware vSphere

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

Client OS

- With GPU Options Only
- Windows & Enterprise Client OS
- Red Hat Enterprise Linux Desktop/Workstation
- SLES Desktop (64 bit - includes KVM)

Notes: For Operating Systems tested with the NVIDIA and AMD GPU options, please see the Graphics Adapter Quick Specs for details **https://h20195.www2.hpe.com/v2/getdocument.aspx?docname=a00016718enw**

Frames

HPE Synergy 12000 Frame, is the base for all Synergy products and supports:

- 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 twelve (12) HPE Synergy 480 Gen10 Compute Modules

Standard Features

Industry Standard Compliance

- Microsoft® Logo certifications
- WOL enabled on some adaptors
- PXE support enabled
- USB 3.0 Compliant; iLO USB 2.0 Compliant
- TPM 2.0 Support (RBSU support for TPM 1.2)
- IEEE (specific IEEE standards depending on Ethernet adapter card(s) installed)
- Advanced Encryption Standard (AES)
- Triple Data Encryption Standard (3DES)
- SNMP v3
- SSL 2.0
- DMTF Systems Management Architecture for Server Hardware Command Line Protocol (SMASH CLP)
- Active Directory v1.0
- PCIe 3.0 Compliant
- UEFI (Unified Extensible Firmware Interface Forum)
- Redfish API (iLO5)
- ErP Lot9 (see Technical Specifications see **HPE Environmental Declarations website** for HPE Lot9 Declarations, a White Paper, FAQs and products list of verified products.
  Notes: See requirements at end of this document or in OCA for valid configurations to meet Erp Lot9 requirements.

Graphics (iIO)

Integrated Matrox G200eH2 video standard with 16 MB of Video RAM

- 1280 x 1024 (32 bpp)
- 1920 x 1200 (16 bpp)

HPE iLO 5 on system management memory

- 32 MB Flash
- 512 MB with ECC (224 MB after ECC and video)

HPE Server UEFI/Legacy ROM

Unified Extensible Firmware Interface (UEFI) is an industry standard that provides better manageability and more secured configuration than the legacy ROM while interacting with your server at boot time. HPE ProLiant Gen10 servers have a UEFI Class 2 implementation and support both UEFI Mode (default) and Legacy BIOS Mode.

Notes: The UEFI System Utilities tool is analogous to the HPE ROM-Based Setup Utility (RBSU) of legacy BIOS. For more information, please visit **http://www.hpe.com/servers/uefi**

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.

Standard Features

- 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

Notes:

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

Embedded Management

HPE Synergy Composer powered by 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)

Silicon Root of Trust. Protect, detect, recover with 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

Newest forms of security based on iLO 5 features.

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

Standard Features

Standard security features

- Power-on password
- Administrator's password
- Keyboard password (QuickLock)
- HPE iLO Management On System Management Chipset with SSL encryption, Secure Shell version 2, Advanced Encryption Standard (AES) and Triple Data Encryption Standard (3DES) on browser, CLP and XML scripting interface, AES and RC4 encryption of video
- External USB port enable/disable
- Network server mode
- Serial interface control
- TPM (Trusted Platform Module) 1.2 or 2.0 option
- Advanced Encryption Standard (AES)
- Intel® Advanced Encryption Standard-New Instructions (AES-NI)

About Trusted Platform Module

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

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

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

About HPE Silicon Root of Trust

As soon as the server is powered on and the iLO firmware comes alive, it looks into the silicon for the immutable fingerprint that verifies all the firmware code is valid and uncompromised. Over a million lines of firmware code run before the operating system starts, making it vital to confirm that all server essential firmware is free from malware or compromised code.

During operation of the server, HPE has a new technology that conducts run-time firmware validation that checks the firmware stored in the server. At any point, if compromised code or malware is inserted in any of the critical firmware, an iLO audit log alert is created to notify the customer that a compromised has occurred. It is achieved by storing iLO 5 and UEFI firmware in non-volatile Flash memory which is thoroughly scanned at regular user determined intervals. The contents of the firmware stored in memory must be exactly right, down to the individual bit, or else it is flagged as compromised. See the iLO 5 QuickSpecs for recovery processes.

Warranty

This product is covered by a global limited warranty and supported by HPE Services and a worldwide network of HPE Authorized Channel Partners resellers. Hardware diagnostic support and repair is available for three years from date of purchase. Support for software and initial setup is available for 90 days from date of purchase. Enhancements to warranty services are available through HPE Services operational services or customized service agreements. Hard drives have either a one year or three year warranty; refer to the specific hard drive QuickSpecs for details.

Notes: Server Warranty includes 3-Year Parts, 3-Year Labor, 3-Year Onsite support with next business day response. Warranty repairs may be accomplished through the use of Customer Self Repair (CSR) parts. These parts fall into two categories: 1) Mandatory CSR parts are designed for easy replacement. A travel and labor charge will result when customers decline to replace a Mandatory CSR part; 2) Optional CSR parts are also designed for easy replacement but may involve added complexity. Customers may choose to have Hewlett Packard Enterprise replace Optional CSR parts at no charge. Additional information regarding worldwide limited warranty and technical support is available at:
http://www.hpe.com/services/support.

Optional Features

Server Management

HPE OneView Advanced

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

HPE iLO Advanced (standard with Synergy Compute)

HPE iLO 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 (optional)

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 Graphics Accelerators and Expansion

Standard PCIe Expansion Module GPU Options

- NVIDIA A2 16GB PCIe Non-CEC Accelerator for HPE
- NVIDIA A40 48GB PCIe Non-CEC Accelerator for HPE

Notes:

– For more details on Graphic Acceleration Options please see the **Graphics Accelerator QuickSpecs.**

Optional Features

Fibre Channel Support

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 480 Gen10 Compute Modules are optimized for HPE MSA, EVA, 3PAR, Primera, Alletra, XP, and StoreVirtual VSA.

HPE Virtual Connect

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

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

The primary module contains intelligent networking capabilities that extend connectivity to satellite frames through Interconnect Link Modules. This eliminates the need for a top of rack switch 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 cable up to 24 uplinks are available for connection to upstream Ethernet and Fibre Channel. The HPE VC SE 40 Gb F8 modules avoid the confusion of traditional and other converged network solutions by eliminating the need for multiple Ethernet and Fibre Channel switches, extension modules, cables and software licenses. Also, Virtual Connect wire-once connection management is built-in enabling compute modules adds, moves and replacement in minutes instead of days or weeks. The Primary/Satellite disaggregated architecture removes fixed ratios of interconnects in every frame and allows extending networking resources pool for Virtual Connect to satellite frames.

For more information on Virtual Connect and converged network options, see
https://www.hpe.com/psnow/doc/c04815258.pdf?jumpid=in_lit-psnow-getpdf

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.

Service and Support

HPE Services

No matter where you are in your digital transformation journey, you can count on HPE Services to deliver the expertise you need when, where and how you need it. From planning to deployment, ongoing operations and beyond, our experts can help you realize your digital ambitions.

https://www.hpe.com/services

Consulting Services

No matter where you are in your journey to hybrid cloud, experts can help you map out your next steps. From determining what workloads should live where, to handling governance and compliance, to managing costs, our experts can help you optimize your operations.

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

HPE Managed Services

HPE runs your IT operations, providing services that monitor, operate, and optimize your infrastructure and applications, delivered consistently and globally to give you unified control and let you focus on innovation.

HPE Managed Services | HPE

Operational services

Optimize your entire IT environment and drive innovation. Manage day-to-day IT operational tasks while freeing up valuable time and resources. Meet service-level targets and business objectives with features designed to drive better business outcomes.

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

HPE Complete Care Service

HPE Complete Care Service is a modular, edge-to-cloud IT environment service designed to help optimize your entire IT environment and achieve agreed upon IT outcomes and business goals through a personalized experience. All delivered by an assigned team of HPE Services experts. HPE Complete Care Service provides:

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

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

HPE Tech Care Service

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

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

Service and Support

HPE Lifecycle Services

HPE Lifecycle Services provide a variety of options to help maintain your HPE systems and solutions at all stages of the product lifecycle. A few popular examples include:

- Lifecycle Install and Startup Services: Various levels for physical installation and power on, remote access setup, installation and startup, and enhanced installation services with the operating system.
- HPE Firmware Update Analysis Service: Recommendations for firmware revision levels for selected HPE products, taking into account the relevant revision dependencies within your IT environment.
- HPE Firmware Update Implementation Service: Implementation of firmware updates for selected HPE server, storage, and solution products, taking into account the relevant revision dependencies within your IT environment.
- Implementation assistance services: Highly trained technical service specialists to assist you with a variety of activities, ranging from design, implementation, and platform deployment to consolidation, migration, project management, and onsite technical forums.
- HPE Service Credits: Access to prepaid services for flexibility to choose from a variety of specialized service activities, including assessments, performance maintenance reviews, firmware management, professional services, and operational best practices.

Notes: To review the list of Lifecycle Services available for your product go to:
https://www.hpe.com/services/lifecycle

For a list of the most frequently purchased services using service credits, see the **HPE Service Credits Menu**

Other Related Services from HPE Services:

HPE Education Services

Training and certification designed for IT and business professionals across all industries. Broad catalogue of course offerings to expand skills and proficiencies in topics ranging from cloud and cybersecurity to AI and DevOps. Create learning paths to expand proficiency in a specific subject. Schedule training in a way that works best for your business with flexible continuous learning options.
https://www.hpe.com/services/training

Defective Media Retention

An option available with HPE Complete Care Service and HPE Tech Care Service and applies only to Disk or eligible SSD/Flash Drives replaced by HPE due to malfunction.

Consult your HPE Sales Representative or Authorized Channel Partner of choice for any additional questions and services options.

Parts and Materials

HPE 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.

How to Purchase Services

Services are sold by Hewlett Packard Enterprise and Hewlett Packard Enterprise Authorized Service Partners:

- Services for customers purchasing from HPE or an enterprise reseller are quoted using HPE order configuration tools.
- Customers purchasing from a commercial reseller can find services at **https://ssc.hpe.com/portal/site/ssc/**

Service and Support

AI Powered and Digitally Enabled Support Experience

Achieve faster time to resolution with access to product-specific resources and expertise through a digital and data driven customer experience

Sign into the HPE Support Center experience, featuring streamlined self-serve case creation and management capabilities with inline knowledge recommendations. You will also find personalized task alerts and powerful troubleshooting support through an intelligent virtual agent with seamless transition when needed to a live support agent.
https://support.hpe.com/hpesc/public/home/signin

Consume IT On Your Terms

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

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

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

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

Configuration Information

Factory Integrated Models

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

Notes:

- Not all models are available in all regions. Check with your local country Hewlett Packard Enterprise offices for availability.
- Configure-to-order compute modules must start with a CTO Compute Module.
- FIO indicates that this option is only available as a factory installable option.
- All Factory Integrated Models will be populated with sufficient drive blanks based on the number of initial drives ordered with the server.
- The Factory integrated w/o drive bay model ships with a grill blank in place of the drive cage and drive backplane.

Step 1: Base Configuration

Choose one of the following configurable models

CTO Compute Module	HPE Synergy 480 Gen10 CTO Standard Backplane Compute Module	HPE Synergy 480 Gen10 CTO w/o Drives Compute Module	HPE Synergy 480 Gen10 CTO Premium Backplane Compute Module
SKU Number	871940-B21	871941-B21	871942-B21
TAA SKU [1]	871940-B22	871941-B22	871942-B22
Processor	Up to 2 Selectable Intel Xeon Scalable Family Processors		
DIMM Slots	Up to 24 DIMM slots (12 per processor-6DPC)		
Storage Backplane	Standard backplane 2 Hot-plug SFF Bays	No backplane, No Drive Carriage system	Premium backplane, 2 Hot-plug SFF
Storage Controllers	Front Drive Cage Controller Options: Software RAID - S100i Chipset SATA, Essential RAID - E208i-c, Performance RAID– P204i-c and P416ie-m SATA/SAS Mezzanine option for D3940 Storage Module	Front Drive Cage Blank, Optional: P416ie-m SATA/SAS Mezzanine option for D3940 Storage Module	Premium Backplane supports NVMe drive in front drive cage (no S100i, E208i-c or P204i-c controllers supported Optional: P416ie-m SATA/SAS Mezzanine (with optional SAS cables allow additional access to SATA/SAS drives in Front Drive Cage as well as for D3940 Storage Modules)
Drives supported	Optional: 2x SAS/SATA/SSD, 4x uFF or 2x Internal M.2 SATA drives or SATA/SAS in D3940 Storage Modules	Optional: 2x Internal M.2 SATA drives	Optional: 2x NVMe Drives or 2x Internal M.2 SATA drives, SATA/SAS in D3940 Storage Modules
IO Expansion/ Mezzanine slots	3x 16 PCIe 3.0 Slots for Mezzanine Options		
Network	Optional: (HPE Synergy 2820C 10Gb CNA, HPE Synergy 3820C 10/20Gb CNA, HPE Synergy 4820c 10/20/25 CNA, HPE Synergy 6810C 25/50Gb Ethernet Adapter, HPE Synergy 6410C 25/50Gb Ethernet Adapter, HPE Synergy 3530C 16G FC HBA, HPE Synergy 3830C 16G FC HBA) , HPE Synergy 5330C 32G Fibre Channel Host Bus Adapters, HPE Synergy 5830C 32G Fibre Channel Host Bus Adapters		
Graphic Processing Units	Optional MXM Mezzanine and PCI Module solutions		
Security	iLO 5		
USB and MicroSD	1 Internal USB 3.0, 1 Internal microSD Warning – USB/SD internal Boot options not recommended for VMware 7.0 U2 and beyond.		
Management	OneView 3.1 and iLO 5 Advanced (standard)		

Configuration Information

Notes:

- Boot Devices Advisory for USB/SD with VMware 7.0 U2 and beyond:
  - Background:
    - VMware; at 7.0 U1, made changes in the Boot/Store format to better manage IO growth. The format change of the ESX-OSDATA boot data partition was from FAT to VMFS-L. The new format allows for faster IO to the scratch partition, allowing an overwhelming level of IO traffic to flow and some Hosts may become unresponsive or boot bank not found on boot devices like USB/SD cards.
  - Issue:
    - The host (USB/SD with ESXi) goes into an unresponsive mode due to "Bootbank cannot be found in the path" and the boot device is in an APD (All Paths Down) state. In some cases, the Host goes to non-responsive state and shows disconnected from VCenter.
  - Options for HPE Customers @ Next Update:
    - When the customer decides to upgrade to VMware Next or beyond ESXi 7.0 U2c Update Release, VMware will deprecate any USB/SD drive and already recommends the customer use alternative High Endurance SSD's for "Boot & Store partitions.
  - HPE Synergy recommends that customer move to alternative Boot & Store solutions as well, examples below:
    - With any SY480 Gen10 move from USB/SD Boot & Store devices to HPE 2x Drive Cage solution(P36675-B21), with HPE Smart Array P204i-c SR Gen10 12G SAS Modular Controller(804424-B21) Smart Array or HPE Smart Array E208i-c SR Gen10 Ctrlr (823852-B21) and additional Drives.
    - With SY480 Gen10 Plus servers you have the options to move from USB/SD Boot & Store devices to an HPE NS204i-d SY Gen10 Plus NVMe PCIe3 M.2 OS Boot Device (w/ 2x M.2 NVMe 480GB Drives) and/or
    - HPE 2x Drive Cage solution (P36675-B21), with HPE Smart Array P204i-c SR Gen10 12G SAS Modular Controller (804424-B21) Smart Array and additional SSD Drives. Options for Gen10 Plus and Gen10.
- CTO SKUs are designed for specific use case fits.
- This information applies to factory CTO configurations, Field upgrades may differ depending on field configurations.
- Backplane in the chassis description refers to the type of controller backplane in the Drive Cage modules.
- Standard Backplane CTO Chassis is designed for flexible use of the Compute Module for most workloads. This SKU may use the SATA Board Option, or Smart Array options. This SKU may also use the Mezzanine P416ie-m for connection to the HPE D3940 Storage Module, but no links to local front drive.
- The Drive-Less CTO option is intended for stateless on SAN/NAS boot use cases and still supports mezzanine Smart Array for Synergy D3940 Storage Modules. Additionally, this model supports adding the M.2 Adapter for dual M.2 drive options. This SKU may also use the Mezzanine P416ie-m for connection to the HPE D3940 Storage Module.
- The Premium Backplane CTO option supports NVMe drives directly in the Front Drive cage. SATA/SAS drives may optionally be supported in the Front Drive Cage in combination with the D3940 Storage Module with a mezzanine Smart Array P416ie-m and addition SAS Cables that connect the mezzanine card directly to the Premium Backplane on the Local Drive Cage
- [1]HPE offers multiple Trade Agreement Act (TAA) compliant configurations to meet the needs of US Federal Government customers. These products are either manufactured or substantially transformed in a designated country.

Configuration Information

ErP LOT 9 (Commission Regulation (EU) 2019/424): An Overview

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

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

HPE SY480 Gen10

- For ErP Lot9 all 2 processor configurations are fully compliant.
- For any 1 Processor configuration 8GB memory solution will be removed from HPE Order System so that all other configurations meet compliance.
- There are no additional memory, drive, or power supply restrictions for this product.

Step 2: Choose Required Options

Step 2a: Choose Processors Options

Processor Option Kits

HPE SY480 Gen10 Compute may be configured with either Intel Xeon Scalable Family of Generation 1 or Generation 2 Processors (Mixing not allowed)

Intel Xeon Scalable Family Gen 2 - Processor Option Kits

Intel Xeon-Platinum Processors

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

Intel Xeon-Gold Processors

Intel Xeon-Gold 6262V (1.9GHz/24-core/135W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P11881-L21
Intel Xeon-Gold 6258R (2.7GHz/28-core/205W) FIO Processor Kit for HPE Synergy 480 Gen10	P23596-L21
Intel Xeon-Gold 6254 (3.1GHz/18-core/200W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P07351-L21
Intel Xeon-Gold 6252N (2.3GHz/24-core/150W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P08920-L21
Intel Xeon-Gold 6252 (2.1GHz/24-core/150W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P07350-L21

Configuration Information

Intel Xeon-Gold 6248R (3.0GHz/24-core/205W) FIO Processor Kit for HPE Synergy 480 Gen10	P23593-L21
Intel Xeon-Gold 6248 (2.5GHz/20-core/150W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P07349-L21
Intel Xeon-Gold 6246R (3.4GHz/16-core/205W) FIO Processor Kit for HPE Synergy 480 Gen10	P23592-L21
Intel Xeon-Gold 6246 (3.3GHz/12-core/165W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P16385-L21
Intel Xeon-Gold 6244 (3.6GHz/8-core/150W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P07348-L21
Intel Xeon-Gold 6242R (3.1GHz/20-core/205W) FIO Processor Kit for HPE Synergy 480 Gen10	P23591-L21
Intel Xeon-Gold 6242 (2.8GHz/16-core/150W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P07347-L21
Intel Xeon-Gold 6240R (2.4GHz/24-core/165W) FIO Processor Kit for HPE Synergy 480 Gen10	P23590-L21
Intel Xeon-Gold 6240Y (2.6GHz/18-14-8-core/150W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P07346-L21
Intel Xeon-Gold 6240L (2.6GHz/18-core/150W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P11886-L21
Intel Xeon-Gold 6240 (2.6GHz/18-core/150W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P07345-L21
Intel Xeon-Gold 6238R (2.2GHz/28-core/165W) FIO Processor Kit for HPE Synergy 480 Gen10	P23589-L21
Intel Xeon-Gold 6238L (2.1GHz/22-core/140W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P11885-L21
Intel Xeon-Gold 6234 (3.3GHz/8-core/130W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P11694-L21
Intel Xeon-Gold 6230R (2.1GHz/26-core/150W) FIO Processor Kit for HPE Synergy 480 Gen10	P23588-L21
Intel Xeon-Gold 6230 (2.1GHz/20-core/125W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P07344-L21
Intel Xeon-Gold 6226R (2.9GHz/16-core/150W) FIO Processor Kit for HPE Synergy 480 Gen10	P23587-L21
Intel Xeon-Gold 6226 (2.7GHz/12-core/125W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P12767-L21
Intel Xeon-Gold 6222V (1.8GHz/20-core/115W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P11880-L21
Intel Xeon-Gold 5222 (3.8GHz/4-core/105W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P08679-L21
Intel Xeon-Gold 5220S (2.7GHz/18-core/125W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P11882-L21
Intel Xeon-Gold 5218R (2.1GHz/20-core/125W) FIO Processor Kit for HPE Synergy 480 Gen10	P18506-L21
Intel Xeon-Gold 5218B (2.3GHz/16-core/125W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P12572-L21
Intel Xeon-Gold 5218 (2.3GHz/16-core/125W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P07342-L21
Intel Xeon-Gold 5217 (3.0GHz/8-core/115W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P07339-L21
Intel Xeon-Gold 5215 (2.5GHz/10-core/85W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P07336-L21

Intel Xeon-Silver Processors

Intel Xeon-Silver 4216 (2.1GHz/16-core/100W) FIO Processor Kit for HPE Synergy 480 Gen10	P11692-L21
Intel Xeon-Silver 4215R (3.2GHz/8-core/130W) FIO Processor Kit for HPE Synergy 480 Gen10	P23586-L21
Intel Xeon-Silver 4215 (2.5GHz/8-core/85W) FIO Processor Kit for HPE Synergy 480 Gen10	P08680-L21
Intel Xeon-Silver 4214R (2.4GHz/12-core/100W) FIO Processor Kit for HPE Synergy 480 Gen10	P18503-L21
Intel Xeon-Silver 4214Y (2.2GHz/12-10-8-core/85W) FIO Processor Kit for HPE Synergy 480 Gen10	P07334-L21
Intel Xeon-Silver 4214 (2.2GHz/12-core/85W) FIO Processor Kit for HPE Synergy 480 Gen10	P11693-L21
Intel Xeon-Silver 4210R (2.4GHz/10-core/100W) FIO Processor Kit for HPE Synergy 480 Gen10	P18502-L21
Intel Xeon-Silver 4210 (2.2GHz/10-core/85W) FIO Processor Kit for HPE Synergy 480 Gen10	P07333-L21
Intel Xeon-Silver 4208 (2.1GHz/8-core/85W) FIO Processor Kit for HPE Synergy 480 Gen10	P08678-L21



Configuration Information

Intel Xeon-Bronze Processors

Notes:

- All processors within any single compute module must be identical.
- HT indicates that the processor model supports Intel® Hyper-Threading Technology.
- Turbo indicates the maximum potential frequency when using Intel® Turbo Boost Technology. The frequency boost increment is dependent on the processor SKU and the number of active cores. In general, a higher boost increment is obtained when fewer cores are active.
- DDR4 speed is the maximum memory speed of the processor. Actual memory speed may depend on the quantity and type of DIMMs installed.
- Supports 1 or 2 processors. Mixing different processor models is not supported.
- For the Intel® C621 Chipset Scalable Family Processors come with model numbers to indicate SKU level, processor generation, SKU model, integrations-optimizations or memory capacity. (i.e.. HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6136; 6 is the SKU Level, 1 or 2 is the processor generation, 34 is the SKU model, m indicates memory SKU)
- The HPE Synergy 480 Gen10 Compute Module includes three I/O mezzanine connectors. A processor must be installed in processor slot 1 for access to mezzanine connectors one and three (mezzanine connectors 1 and 3). A processor must be installed in processor slot 2 for access to the mezzanine connector two (mezzanine connector 2).
- 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.
- Bronze – 3200 Series - Supports 2 socket (Synergy 480 Gen10) compute module only, 2 Socket supports 2UPI, supports 6-Channel DDR4 @ 2133MT/S depending on processor and memory selected, providing up to 1TB memory capacity. Intel AVX-512(1x 512-bit FMA), 48 lanes PCIe 3.0, standard RAS supported.
- See individual Specs for more details

Intel® Xeon®-Bronze Processors

Notes:

- All processors within any single compute module must be identical.
- HT indicates that the processor model supports Intel® Hyper-Threading Technology.
- Turbo indicates the maximum potential frequency when using Intel® Turbo Boost Technology. The frequency boost increment is dependent on the processor SKU and the number of active cores. In general, a higher boost increment is obtained when fewer cores are active.
- DDR4 speed is the maximum memory speed of the processor. Actual memory speed may depend on the quantity and type of DIMMs installed.
- Supports 1 or 2 processors. Mixing different processor models is not supported.
- For the Intel® C621 Chipset Scalable Family Processors come with model numbers to indicate SKU level, processor generation, SKU model, integrations-optimizations or memory capacity. (i.e. 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)
- The HPE Synergy 480 Gen10 Compute Module includes three I/O mezzanine connectors. A processor must be installed in processor slot 1 for access to mezzanine connectors one and three (mezzanine connectors 1 and 3). A processor must be installed in processor slot 2 for access to the mezzanine connector two (mezzanine connector 2).
- The processor model as well as the memory configuration determines the maximum speed memory can operate. Please see the see the "Memory" section later in this document.
- Platinum – 8100 Series - 2 and 4 socket capable, 2S - 2UPI, 4S - 3UPI @ 10.4 GT/s, 6-Channel DDR4 @ 2666 MT/s, 768 GB memory capacity (1.5 TB on select SKUs), Intel Turbo Boost Technology, Intel Hyper-Threading Technology Intel AVX-512 (2x 512-bit FMA), 48 lanes PCIe 3.0, advanced RAS.

Configuration Information

- Gold – 5100, 6100 Series - 2 and 4 socket capable, 2S - 2UPI, 4S - 3UPI @ 10.4 GT/s, 6-Channel DDR4 @ 2400 MT/S (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.
- Silver and Bronze processors are primarily designed for 2 Socket servers and will appear as Synergy 480 Gen10 only processors.
- Silver – 4100 Series - 2 socket capable, 2S - 2UPI @ 9.6 GT/s, 6-Channel DDR4 @ 2400 MT/S, 768 GB memory capacity, Intel Turbo Boost Technology, Intel Hyper-Threading Technology, Intel AVX-512(1x 512-bit FMA), 48 lanes PCIe 3.0, standard RAS.
- Bronze – 3100 Series - 2 socket capable, 2S - 2UPI @ 9.6 GT/s, 6-Channel DDR4 @ 2133 MT/S, 768 GB memory capacity, Intel AVX-512(1x 512-bit FMA), 48 lanes PCIe 3.0, standard RAS

Step 2b: Choose Memory Options

Only one of the following from each list unless otherwise noted.

Select memory associated with the processors selected in previous section.

HPE Smart Memory

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

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

Notes:

- HPE memory from previous generation servers (DDR3) is not compatible with this compute module. HPE Smart Memory is required to realize the memory performance improvements and enhanced functionality listed in this document for Gen10.
- For additional information, please see the **HPE Smart Memory QuickSpecs.**
- LRDIMM and RDIMM are distinct memory technologies and cannot be mixed within a compute module.
- For the latest information on **Memory Speed.**
- If you want to know more about the memory, reference the **RAS feature whitepaper.**

HPE Persistent Memory Kit featuring Intel Optane DC Persistent Memory

The following memory is for use with specific Intel Xeon Scalable Family Generation 2 processors only.

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

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

Notes:

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

Configuration Information

Step 2c: Choose Networking Adapters

Notes: Only one or more of the following from each list unless otherwise noted

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

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

Step 3: Choose Additional Factory Integrated Options

Notes: Only one or more of the following

HPE Storage Controllers

HPE FIO Enable Smart Array SW RAID	784308-B21
HPE Synergy Compute Chipset SATA FIO Board Kit	872955-B21

Notes:

- HPE Synergy Compute Chipset SATA FIO Board Kit cannot be used with M.2 Adapter Kit.
- M.2 Adapter Kit cannot be used with HPE Synergy Compute Chipset SATA FIO Board Kit
- M.2 Adapter Kit is key option available for 871941-B21/-B22 no drive Compute Modules)

HPE Synergy 480 Gen10 M2 NGFF Adapter Kit	P38437-B21

Notes: Replacement for 873165-B21

HPE Smart Array E208i-c SR Gen10 (8 Internal Lanes/No Cache) 12G SAS Modular Controller	823852-B21
HPE Smart Array P204i-c SR Gen10 (4 Internal Lanes/1GB Cache) 12G SAS Modular Controller	804424-B21
HPE 96W Smart Storage Lithium-ion Battery with 260mm Cable Kit	P01367-B21
HPE Smart Storage Hybrid Capacitor with 260mm Cable Kit	P02381-B21
HPE Smart Array P416ie-m SR Gen10 (8 Int 8 Ext Lanes/2GB Cache) 12G SAS Mezzanine Controller	804428-B21
HPE Smart Array P416ie-m SR Gen10 SAS Cable Kit	871573-B21

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

HPE I/O Expansion Options

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

Notes: See Specifications sections below for Best Practices and requirements for options placement in correct mezzanine slots that match with Interconnect model slotting for correct operations.

Configuration Information

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/psnow/doc/c04815113
- HPE Synergy Interconnect and Mezzanine Components QuickSpecs
  https://www.hpe.com/psnow/doc/c04815110
- HPE Synergy D3940 Storage Module QuickSpecs
  https://www.hpe.com/psnow/doc/c04815141

Step 5: Choose HPE Synergy Services

HPE Synergy Tech Care Services

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

HPE Synergy Complete Care Services

HPE 5Y Complete Care Addon Essential Service	HU4D5A5
HPE 5Y Complete Care Addon Essential with Defective Media Retention Service	HU4D6A5

Additional Options

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

HPE Graphics Accelerators and Expansion

Mezzanine GPU Options for Synergy 480 Compute Module

Standard PCIe Expansion Module GPU Options

HPE Synergy 480 Gen10 PCIe FIO Expansion Module	872628-B21
HPE Synergy 480 Gen10 PCIe x4 Expansion Module	P14255-B21
HPE Synergy 1x 8-port 2-pack GPU Cable	P25493-B21
HPE Synergy 1x 8-port/1x 6-port 2-pack PCIe GPU Cable	P25494-B21
NVIDIA A2 16GB PCIe Non-CEC Accelerator for HPE	R9H23C
NVIDIA A40 48GB PCIe Non-CEC Accelerator for HPE	R9S37C

Notes: Must be installed in Mezz 1. Due to heatsink size, no other card may be installed in Mezz 2 and the HPE Smart Array P416ie-m 12Gb Mezzanine SAS Controller, which provides connectivity to direct attach storage, cannot be in the same server due to size restraints.

HPE Processors

- 1 or 2 required
- Optional Items as Required – 2nd Processors

HPE SY480 Gen10 Compute may be configured with either Intel® Xeon® Scalable Family of Generation 1 or Generation 2 Processors (Mixing not allowed)

Intel® Xeon® Scalable Family Gen 2 - Processor Option Kits

Intel® Xeon®-Platinum Processors

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

Intel® Xeon®-Gold Processors

Intel Xeon-Gold 6262V (1.9GHz/24-core/135W) Processor Kit for HPE Synergy 480/660 Gen10	P11881-B21
Intel Xeon-Gold 6258R (2.7GHz/28-core/205W) Processor Kit for HPE Synergy 480 Gen10	P23596-B21
Intel Xeon-Gold 6254 (3.1GHz/18-core/200W) Processor Kit for HPE Synergy 480/660 Gen10	P07351-B21
Intel Xeon-Gold 6252 (2.1GHz/24-core/150W) Processor Kit for HPE Synergy 480/660 Gen10	P07350-B21
Intel Xeon-Gold 6252N (2.3GHz/24-core/150W) Processor Kit for HPE Synergy 480/660 Gen10	P08920-B21
Intel Xeon-Gold 6248R (3.0GHz/24-core/205W) Processor Kit for HPE Synergy 480 Gen10	P23593-B21
Intel Xeon-Gold 6248 (2.5GHz/20-core/150W) Processor Kit for HPE Synergy 480/660 Gen10	P07349-B21
Intel Xeon-Gold 6246R (3.4GHz/16-core/205W) Processor Kit for HPE Synergy 480 Gen10	P23592-B21
Intel Xeon-Gold 6246 (3.3GHz/12-core/165W) Processor Kit for HPE Synergy 480/660 Gen10	P16385-B21
Intel Xeon-Gold 6244 (3.6GHz/8-core/150W) Processor Kit for HPE Synergy 480/660 Gen10	P07348-B21
Intel Xeon-Gold 6242R (3.1GHz/20-core/205W) Processor Kit for HPE Synergy 480 Gen10	P23591-B21
Intel Xeon-Gold 6242 (2.8GHz/16-core/150W) Processor Kit for HPE Synergy 480/660 Gen10	P07347-B21
Intel Xeon-Gold 6240Y (2.6GHz/18-14-8-core/150W) Processor Kit for HPE Synergy 480/660 Gen10	P07346-B21

Additional Options

Intel Xeon-Gold 6240L (2.6GHz/18-core/150W) Processor Kit for HPE Synergy 480/660 Gen10	P11886-B21
Intel Xeon-Gold 6240R (2.4GHz/24-core/165W) Processor Kit for HPE Synergy 480 Gen10	P23590-B21
Intel Xeon-Gold 6240 (2.6GHz/18-core/150W) Processor Kit for HPE Synergy 480/660 Gen10	P07345-B21
Intel Xeon-Gold 6238L (2.1GHz/22-core/140W) Processor Kit for HPE Synergy 480/660 Gen10	P11885-B21
Intel Xeon-Gold 6238R (2.2GHz/28-core/165W) Processor Kit for HPE Synergy 480 Gen10	P23589-B21
Intel Xeon-Gold 6234 (3.3GHz/8-core/130W) Processor Kit for HPE Synergy 480/660 Gen10	P11694-B21
Intel Xeon-Gold 6230R (2.1GHz/26-core/150W) Processor Kit for HPE Synergy 480 Gen10	P23588-B21
Intel Xeon-Gold 6230 (2.1GHz/20-core/125W) Processor Kit for HPE Synergy 480/660 Gen10	P07344-B21
Intel Xeon-Gold 6230N (2.3GHz/20-core/125W) Processor Kit for HPE Synergy 480/660 Gen10	P08919-B21
Intel Xeon-Gold 6226R (2.9GHz/16-core/150W) Processor Kit for HPE Synergy 480 Gen10	P23587-B21
Intel Xeon-Gold 6226 (2.7GHz/12-core/125W) Processor Kit for HPE Synergy 480/660 Gen10	P12767-B21
Intel Xeon-Gold 6222V (1.8GHz/20-core/115W) Processor Kit for HPE Synergy 480/660 Gen10	P11880-B21
Intel Xeon-Gold 5222 (3.8GHz/4-core/105W) Processor Kit for HPE Synergy 480/660 Gen10	P08679-B21
Intel Xeon-Gold 5220S (2.7GHz/18-core/125W) Processor Kit for HPE Synergy 480/660 Gen10	P11882-B21
Intel Xeon-Gold 5220R (2.2GHz/24-core/150W) Processor Kit for HPE Synergy 480 Gen10	P18507-B21
Intel Xeon-Gold 5218B (2.3GHz/16-core/125W) Processor Kit for HPE Synergy 480/660 Gen10	P12572-B21
Intel Xeon-Gold 5218R (2.1GHz/20-core/125W) Processor Kit for HPE Synergy 480 Gen10	P18506-B21
Intel Xeon-Gold 5218 (2.3GHz/16-core/125W) Processor Kit for HPE Synergy 480/660 Gen10	P07342-B21
Intel Xeon-Gold 5217 (3.0GHz/8-core/115W) Processor Kit for HPE Synergy 480/660 Gen10	P07339-B21
Intel Xeon-Gold 5215 (2.5GHz/10-core/85W) Processor Kit for HPE Synergy 480/660 Gen10	P07336-B21

Intel® Xeon®-Silver Processors

Intel Xeon-Silver 4216 (2.1GHz/16-core/100W) Processor Kit for HPE Synergy 480 Gen10	P11692-B21
Intel Xeon-Silver 4215R (3.2GHz/8-core/130W) Processor Kit for HPE Synergy 480 Gen10	P23586-B21
Intel Xeon-Silver 4215 (2.5GHz/8-core/85W) Processor Kit for HPE Synergy 480 Gen10	P08680-B21
Intel Xeon-Silver 4214Y (2.2GHz/12-10-8-core/85W) Processor Kit for HPE Synergy 480 Gen10	P07334-B21
Intel Xeon-Silver 4214R (2.4GHz/12-core/100W) Processor Kit for HPE Synergy 480 Gen10	P18503-B21
Intel Xeon-Silver 4214 (2.2GHz/12-core/85W) Processor Kit for HPE Synergy 480 Gen10	P11693-B21
Intel Xeon-Silver 4210R (2.4GHz/10-core/100W) Processor Kit for HPE Synergy 480 Gen10	P18502-B21
Intel Xeon-Silver 4210 (2.2GHz/10-core/85W) Processor Kit for HPE Synergy 480 Gen10	P07333-B21
Intel Xeon-Silver 4208 (2.1GHz/8-core/85W) Processor Kit for HPE Synergy 480 Gen10	P08678-B21

Intel® Xeon®-Bronze Processors

Notes:

- All processors within any single compute module must be identical.
- HT indicates that the processor model supports Intel® Hyper-Threading Technology.
- Turbo indicates the maximum potential frequency when using Intel® Turbo Boost Technology. The frequency boost increment is dependent on the processor SKU and the number of active cores. In general, a higher boost increment is obtained when fewer cores are active.
- DDR4 speed is the maximum memory speed of the processor. Actual memory speed may depend on the quantity and type of DIMMs installed.
- Supports 1 or 2 processors. Mixing different processor models is not supported.
- For the Intel® C621 Chipset Scalable Family Processors come with model numbers to indicate SKU level, processor generation, SKU model, integrations-optimizations or memory capacity. (i.e.. 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)
- The HPE Synergy 480 Gen10 Compute Module includes three I/O mezzanine connectors. A processor must be installed in processor slot 1 for access to mezzanine connectors one and three (mezzanine connectors 1 and 3). A processor must be installed in processor slot 2 for access to the mezzanine connector two (mezzanine connector 2).
- 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.

Additional Options

HPE Smart Memory

The following memory supports Intel® Xeon® Scalable processor family 2nd generation

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
HPE 128GB (1x128GB) Quad Rank x4 DDR4-2933 CAS-21-21-21 Load Reduced Smart Memory Kit	P11040-B21

Notes:

- HPE memory from previous generation servers (DDR3) is not compatible with this compute module. HPE Smart Memory is required to realize the memory performance improvements and enhanced functionality listed in this document for Gen10.
- For additional information, please see the **HPE DDR4 Smart Memory QuickSpecs**
- LRDIMM and RDIMM are distinct memory technologies and cannot be mixed within a compute module.
- For more information refer to the **Memory Speed Tables**
- For memory **RAS feature whitepaper** if users want to know more about the memory RAS features.

HPE Persistent Memory Kit featuring Intel Optane DC Persistent Memory

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

For information regarding HPE Persistent Memory visit: **http://www.hpe.com/info/persistentmemory**
https://www.hpe.com/psnow/doc/a00017079enw

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

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

HPE Drives

Notes:

- The HPE Synergy 480 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.
- The mixing of standard SAS drives with SAS SSD is supported within the compute module but limits the RAID configuration to two separate RAID 0 volumes. Mixing of other drives types is not supported.
- HPE drives have either a one year or three year warranty; refer to the specific drive QuickSpecs for details. **HPE Hard Disk Drives** or **HPE Solid State Drives**
- The drive options are not required when configuring a drive-less model.

HPE Synergy 480 Gen10 Compute Module supports all small form factor (SFF) SAS and SATA HDDs and SSDs currently certified in HPE Smart Carriers. Any exceptions to this qualification will be listed on this page by drive description and part number.

SATA Drives (HDD-SDD listed by capacity)

HPE Dual 480GB SATA 6G Read Intensive M.2 to SFF SCM Multi Vendor SSD	P47819-B21
HPE 2TB SATA 6G Business Critical 7.2K SFF SC 1-year Warranty 512e HDD	765455-B21
HPE 1TB SATA 6G Business Critical 7.2K SFF SC 1-year Warranty HDD	655710-B21

Additional Options

HPE 240GB SATA 6G Read Intensive SFF SC Multi Vendor SSD	P18420-B21
HPE 480GB SATA 6G Read Intensive SFF SC Multi Vendor SSD	P18422-B21
HPE 960GB SATA 6G Read Intensive SFF SC PM893 SSD	P47811-B21
HPE 960GB SATA 6G Read Intensive SFF SC Multi Vendor SSD	P18424-B21
HPE 1.92TB SATA 6G Read Intensive SFF SC Multi Vendor SSD	P18426-B21
HPE 1.9TB SATA 6G Read Intensive SFF SC PM893 SSD	P47812-B21
HPE 3.84TB SATA 6G Read Intensive SFF SC PM893 SSD	P47813-B21
HPE 3.84TB SATA 6G Read Intensive SFF SC Multi Vendor SSD	P18428-B21
HPE 7.68TB SATA 6G Read Intensive SFF SC Multi Vendor SSD	P18430-B21
HPE 480GB SATA 6G Read Intensive SFF SC PM893 SSD	P47810-B21
HPE 480GB SATA 6G Mixed Use SFF SC Multi Vendor SSD	P18432-B21
HPE 480GB SATA 6G Mixed Use SFF SC PM897 SSD	P47814-B21
HPE 960GB SATA 6G Mixed Use SFF SC Multi Vendor SSD	P18434-B21
HPE 960GB SATA 6G Mixed Use SFF SC PM897 SSD	P47815-B21
HPE 1.92TB SATA 6G Mixed Use SFF SC Multi Vendor SSD	P18436-B21
HPE 1.92TB SATA 6G Mixed Use SFF SC PM897 SSD	P47816-B21
HPE 3.84TB SATA 6G Mixed Use SFF SC Multi Vendor SSD	P18438-B21

SAS Drives (HDD-SDD listed by Capacity)

HPE 2TB SAS 12G Business Critical 7.2K SFF SC 1-year Warranty 512e HDD	765466-B21
HPE 1TB SAS 12G Business Critical 7.2K SFF SC 1-year Warranty HDD	832514-B21
HPE 300GB SAS 12G Mission Critical 10K SFF SC 3-year Warranty Multi Vendor HDD	872475-B21
HPE 600GB SAS 12G Mission Critical 10K SFF SC 3-year Warranty Multi Vendor HDD	872477-B21
HPE 1.2TB SAS 12G Mission Critical 10K SFF SC 3-year Warranty Multi Vendor HDD	872479-B21
HPE 1.8TB SAS 12G Mission Critical 10K SFF SC 3-year Warranty 512e Multi Vendor HDD	872481-B21
HPE 2.4TB SAS 12G Mission Critical 10K SFF SC 3-year Warranty 512e Multi Vendor HDD	881457-B21
HPE 300GB SAS 12G Mission Critical 15K SFF SC 3-year Warranty Multi Vendor HDD	870753-B21
HPE 600GB SAS 12G Mission Critical 15K SFF SC 3-year Warranty Multi Vendor HDD	870757-B21
HPE 900GB SAS 12G Mission Critical 15K SFF SC 3-year Warranty Multi Vendor HDD	870759-B21
HPE 960GB SAS 12G Read Intensive SFF SC Value SAS Multi Vendor SSD	P36997-B21
HPE 960GB SAS 12G Read Intensive SFF SC Multi Vendor SSD	P49028-B21
HPE 1.92TB SAS 12G Read Intensive SFF SC Multi Vendor SSD	P49030-B21
HPE 1.92TB SAS 12G Read Intensive SFF SC Value SAS Multi Vendor SSD	P36999-B21
HPE 3.84TB SAS 12G Read Intensive SFF SC Multi Vendor SSD	P49034-B21
HPE 3.84TB SAS 12G Read Intensive SFF SC Value SAS Multi Vendor SSD	P37001-B21
HPE 7.68TB SAS 12G Read Intensive SFF SC Value SAS Multi Vendor SSD	P37003-B21
HPE 7.68TB SAS 12G Read Intensive SFF SC Multi Vendor SSD	P49039-B21
HPE 15.36TB SAS 12G Read Intensive SFF SC Multi Vendor SSD	P49044-B21
HPE 960GB SAS 12G Mixed Use SFF SC Value SAS Multi Vendor SSD	P37005-B21
HPE 1.92TB SAS 12G Mixed Use SFF SC Value SAS Multi Vendor SSD	P37011-B21
HPE 3.84TB SAS 12G Mixed Use SFF SC Value SAS Multi Vendor SSD	P37017-B21
HPE 1.6TB SAS 12G Write Intensive SFF SC PM6 SSD	P26376-B21
HPE 800GB SAS 12G Mixed Use SFF SC Multi Vendor SSD	P49046-B21
HPE 1.6TB SAS 12G Mixed Use SFF SC Multi Vendor SSD	P49048-B21
HPE 3.2TB SAS 12G Mixed Use SFF SC Multi Vendor SSD	P49052-B21
HPE 6.4TB SAS 12G Mixed Use SFF SC Multi Vendor SSD	P49056-B21

NVMe Drives (listed by Capacity)

HPE 1.92TB NVMe Gen4 High Performance Read Intensive SFF SCN U.3 PM1733 SSD	P22276-B21
HPE 1.92TB NVMe Gen4 Mainstream Performance Read Intensive SFF SCN U.2 Multi Vendor SSD	P47823-B21
HPE 1.92TB NVMe Gen4 Mainstream Performance Read Intensive SFF SCN U.2 V2 Multi Vendor SSD	P64874-B21



Additional Options

HPE 3.84TB NVMe Gen4 Mainstream Performance Read Intensive SFF SCN U.2 Multi Vendor SSD	P47824-B21
HPE 3.84TB NVMe Gen4 Mainstream Performance Read Intensive SFF SCN U.2 V2 Multi Vendor SSD	P64882-B21
HPE 3.84TB NVMe Gen4 High Performance Read Intensive SFF SCN U.3 PM1733 SSD	P22278-B21
HPE 7.68TB NVMe Gen4 High Performance Read Intensive SFF SCN U.3 PM1733 SSD	P22280-B21
HPE 7.68TB NVMe Gen4 Mainstream Performance Read Intensive SFF SCN U.2 Multi Vendor SSD	P47825-B21
HPE 7.68TB NVMe Gen4 Mainstream Performance Read Intensive SFF SCN U.2 V2 Multi Vendor SSD	P64890-B21
HPE 15.36TB NVMe Gen4 High Performance Read Intensive SFF SCN U.3 PM1733 SSD	P22282-B21
HPE 375GB NVMe Gen3 High Performance Low Latency Write Intensive SFF SCN U.2 P4800X SSD	878014-B21
HPE 750GB NVMe Gen3 High Performance Low Latency Write Intensive SFF SCN U.2 P4800X SSD	P06952-B21
HPE 1.6TB NVMe Gen4 Mainstream Performance Mixed Use SFF SCN U.2 Multi Vendor SSD	P47820-B21
HPE 1.6TB NVMe Gen4 Mainstream Performance Mixed Use SFF SCN U.2 V2 Multi Vendor SSD	P64870-B21
HPE 3.2TB NVMe Gen4 High Performance Mixed Use SFF SCN U.3 PM1735 SSD	P22270-B21
HPE 3.2TB NVMe Gen4 Mainstream Performance Mixed Use SFF SCN U.2 Multi Vendor SSD	P47821-B21
HPE 3.2TB NVMe Gen4 Mainstream Performance Mixed Use SFF SCN U.2 V2 Multi Vendor SSD	P64878-B21
HPE 6.4TB NVMe Gen4 High Performance Mixed Use SFF SCN U.3 PM1735 SSD	P22272-B21
HPE 6.4TB NVMe Gen4 Mainstream Performance Mixed Use SFF SCN U.2 Multi Vendor SSD	P47822-B21
HPE 6.4TB NVMe Gen4 Mainstream Performance Mixed Use SFF SCN U.2 V2 Multi Vendor SSD	P64886-B21
HPE 12.8TB NVMe Gen4 High Performance Mixed Use SFF SCN U.3 PM1735 SSD	P22274-B21

SED Drive Options (Gen4 High Performance Use Self encrypting FIPS)

HPE 1.92TB NVMe RI SCN FIPS U.3 CM6 SSD	P44572-B21
HPE 3.84TB NVMe RI SCN FIPS U.3 CM6 SSD	P44580-B21
HPE 1.6TB NVMe MU SCN FIPS U.3 CM6 SSD	P44588-B21
HPE 3.2TB NVMe MU SCN FIPS U.3 CM6 SSD	P44596-B21

M.2 Drive Options

HPE Synergy 480 Gen10 M2 NGFF Adapter Kit	P38437-B21
HPE 240GB SATA 6G Read Intensive M.2 Multi Vendor SSD	P47817-B21
HPE 480GB SATA 6G Read Intensive M.2 Multi Vendor SSD	P47818-B21

Drive Qualification Exceptions:

At this time there are no exceptions to list.

HPE Security

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

Notes:

- The TPM (Trusted Platform Module) is a microcontroller chip that can securely store artifacts used to authenticate the server platform. These artifacts can include passwords, certificates and encryption keys. Windows® BitLocker™ Drive Encryption (BitLocker) is a data protection feature available in Windows Server® 2012. BitLocker leverages the enhanced security capabilities of a Trusted Platform Module (TPM) version 1.2. The TPM works with BitLocker to help protect user data and to ensure that a server running Windows Server 2012 has not been tampered with while the system was offline.
- HPE Synergy OS pre-installed units will come with the partition required for TPM deployment.
- The TPM key is unique to every TPM deployed server and must be retained. Misplacing or losing the key could result in data loss.

Additional Options

HPE Networking Mezzanine CNA's

Notes:

- The compute module requires a minimum of one (1) mezzanine network adapter.
- Mezzanine network adapters can be installed in any mezzanine connector. Hewlett Packard Enterprise best practice is to install the first network adapter in mezzanine connector 3 to facilitate installation of Type C and D mezzanines in mezzanine connectors 1 or 2

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

HPE Fibre Channel

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

HPE Storage Controllers

HPE Synergy Compute Chipset SATA FIO Board Kit	872955-B21
HPE Smart Array P204i-c SR Gen10 (4 Internal Lanes/1GB Cache) 12G SAS Modular Controller	804424-B21
HPE Smart Array P416ie-m SR Gen10 (8 Int 8 Ext Lanes/2GB Cache) 12G SAS Mezzanine Controller	804428-B21
HPE Smart Array P416ie-m SR Gen10 SAS Cable Kit	871573-B21
HPE FIO Enable Smart Array SW RAID	784308-B21
HPE Smart Storage Hybrid Capacitor with 260mm Cable Kit	P02381-B21
HPE 96W Smart Storage Lithium-ion Battery with 260mm Cable Kit	P01367-B21
HPE Smart Storage Hybrid Capacitor with 260mm Cable Kit	P02381-B21
HPE Smart Array E208i-c SR Gen10 (8 Internal Lanes/No Cache) 12G SAS Modular Controller	823852-B21
HPE Synergy 480 Gen10 M2 NGFF Adapter Kit	P38437-B21

Notes:

- For use with premium modules/front drives.
- HPE Smart Array S100i SR Gen10 SW RAID is off by default and can be enabled RBSU.
- HPE Smart Array S100i SR Gen10 SW RAID is an HPE factory setting(784308-B21), will operate in UEFI mode only and requires HPE Synergy FIO Gen10 SATA Brd Kit (872955-B21) for enablement to Local Drives
- HPE Smart Array S100i SR Gen10 SW RAID is an HPE factory setting(784308-B21), will operate in UEFI mode only.
- HPE Synergy 480 Gen10 M.2 NGFF FIO Adapter Board Kit(873165-B21) required for enablement of optional internal M.2 SATA Drives.
- HPE Synergy 480 Gen10 M.2 NGFF Adapter Board Kit(P38437-B21) required for enablement of optional internal M.2 SATA Drives.(Replacement for 873165-B21)
- For legacy support select Legacy mode settings part, 758959-B22.
- Premium Backplane Modules, CTO offers a Premium Backplane Compute Module for use with NVMe drives in front drive cage. Also, supports P416ie-m with specific SAS cable(871573-B21) connections allowing P416ie-m to manage SATA/SAS drives in both front drive cage and D3940.

HPE Synergy Services

HPE Synergy Tech Care Services

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

Notes: DMR – Defective Media Retention

Additional Options

Deployment/Installation & Start-up Services

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

Notes: For more information visit **HPE Support Services Central**

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	
Name	**Description**
ORM-INS-ENT	Enterprise Customer Site
ORM-INS-SP	Service Provider Customer Site

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

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

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

Memory

Memory Subsystem Architecture

Each processor socket contains six memory channels that support two DIMMs each for a total of 12 DIMM per installed processor or a grand total of twenty-four (24) DIMMs for the compute module.

Memory Population Rules and Guidelines

- A minimum of one DIMM is required per processor.
- Install DIMMs only if the corresponding processor is installed.
- If only one processor is installed in a two processor system, only half of the DIMM slots are available.
- DIMM sizes can be mixed in channel. To maximize performance, it is recommended to balance the total memory capacity between all installed processors and to load the channels similarly whenever possible.
- LRDIMM and RDIMMs are all distinct memory technologies and cannot be mixed within a compute module.
- DIMMs of different speeds may be mixed in any order; the compute module will select a common optimal speed.
- The maximum memory speed is a function of the memory type, memory configuration, and processor model.
- The maximum memory capacity is a function of the memory type and number of installed processors.
- HPE memory from previous generation servers is not compatible with the HPE Synergy 480 Gen10 Compute Module.

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

Memory

Synergy 480 Gen10 Compute Module

Memory Speed Table for Memory used with Intel Scalable Family Gen2 Processors					
	Register DIMM (RDIMM)				
HPE SKU P/N	P00918-B21	P00920-B21	P00922-B21	P28225-B21	P28217-B21
SKU Description	HPE 8GB (1x8GB) Single Rank x8 DDR4-2933 CAS-21-21-21 Registered Smart Memory Kit	HPE 16GB (1x16GB) Single Rank x4 DDR4-2933 CAS-21-21-21 Registered Smart Memory Kit	HPE 16GB (1x16GB) Dual Rank x8 DDR4-2933 CAS-21-21-21 Registered Smart Memory Kit	HPE Synergy 32GB (1x32GB) Dual Rank x4 DDR4-2933 CAS-21-21-21 Registered Smart Memory Kit	HPE Synergy 64GB (1x64GB) Dual Rank x4 DDR4-2933 CAS-21-21-21 Registered Smart Memory Kit
DIMM Rank ->	Single Rank (1R)	Single Rank (1R)	Dual Rank (2R)	Dual Rank (2R)	Dual Rank (2R)
DIMM Capacity ->	**8GB**	**16GB**	**16GB**		**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
HPE Server Memory speed (MT/s): Intel® Xeon® Platinum/Gold 82xx/62xx processors* (6262V & 6222V run max 2400)					
1 DIMM Per Channel	2933	2933	2933	2933	2933
2 DIMM Per Channel (HPE)	2933	2933	2933	2933	2933
HPE Server Memory speed (MT/s): Intel Xeon Gold 52xx processors*					
1 DIMM Per Channel	2666	2666	2666	2666	2666
2 DIMM Per Channel	2666	2666	2666	2666	2666
HPE Server Memory speed (MT/s): Intel Xeon Silver 42xx processors & 6262V, 6222V					
1 DIMM Per Channel	2400	2400	2400	2400	2400
2 DIMM Per Channel	2400	2400	2400	2400	2400
HPE Server Memory speed (MT/s): Intel Xeon Bronze 32xx processors					
1 DIMM Per Channel	2133	2133	2133	2133	2133
2 DIMM Per Channel	2133	2133	2133	2133	2133

Notes:

- *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

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

Notes:

- *The 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.

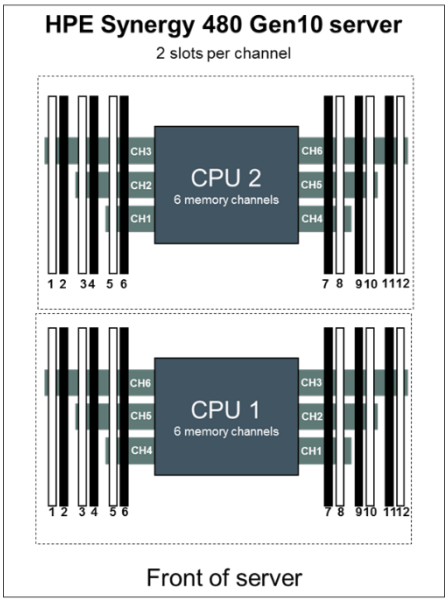
Memory Speed Table for Memory used with Intel Scalable Family Gen1 Processors

Notes: For more information refer to: **http://www.hpe.com/docs/memory-speed-table**

Memory

Memory Population Rules and Guidelines

Drawing showing SY480 system board layout for processors and memory.



Population guidelines for HPE Smart Memory DIMMs in HPE Synergy 480 Gen10 compute modules

HPE Synergy 480 Gen10 compute modules have twelve DIMM slots per CPU.

Table: Population guidelines for HPE Smart Memory DIMMs in HPE Synergy 480 Gen10 compute modules

DIMM population order for SY480 Gen10												
	CPU1											
DIMM Count	DIMM Slot 1	DIMM Slot 2	DIMM Slot 3	DIMM Slot 4	DIMM Slot 5	DIMM Slot 6	DIMM Slot 7	DIMM Slot 8	DIMM Slot 9	DIMM Slot 10	DIMM Slot 11	DIMM Slot 12
1								R				
2								R		R		
3								R		R		R
4			R		R			R		R		
5*			R		R			R		R		R
6	R		R		R			R		R		R
7*	R		R		R		R	R		R		R
8			R	R	R	R	R	R	R	R		
9*	R		R		R		R	R	R	R	R	R
10*	R		R	R	R	R	R	R	R	R		R
11*	R		R	R	R	R	R	R	R	R	R	R
12	R	R	R	R	R	R	R	R	R	R	R	R

Unbalanced configuration (operational, but performance degraded)

Memory

DIMM population order for SY480 Gen10												
	CPU2											
DIMM Count	DIMM Slot 1	DIMM Slot 2	DIMM Slot 3	DIMM Slot 4	DIMM Slot 5	DIMM Slot 6	DIMM Slot 7	DIMM Slot 8	DIMM Slot 9	DIMM Slot 10	DIMM Slot 11	DIMM Slot 12
1					R							
2			R		R							
3	R		R		R							
4			R		R			R		R		
5*	R		R		R			R		R		
6	R		R		R			R		R		R
7*	R		R		R	R		R		R		R
8			R	R	R	R	R	R	R	R		
9*	R	R	R	R	R	R		R		R		R
10*	R	R	R	R	R	R		R		R	R	R
11*	R	R	R	R	R	R	R	R	R	R		R
12	R	R	R	R	R	R	R	R	R	R	R	R

For more information or additional DIMM configurations go to:
Server Memory and Persistent Memory Population rules for HPE Gen10 servers

Population guidelines for HPE NVDIMM-Ns in HPE Synergy 480 Gen10 compute modules

A single NVDIMM-N remains available for Intel Xeon Scalable Family Generaton 1. (not available for Generation 2 processors) Since HPE NVDIMM-Ns are designed to unleash maximum system performance, systems using HPE NVDIMM-Ns should have one HPE Smart Memory DPC to provide maximum memory performance (i.e., six HPE Smart Memory DIMMs per processor). One to six HPE NVDIMM-Ns (based on persistent memory capacity and performance needs) should then be added as described in Table above. The HPE Smart Storage battery is connected to all DIMM slots and supports a maximum of twelve HPE NVDIMM-Ns across all CPUs.

Table: Population guidelines for HPE NVDIMM-Ns with six HPE Smart Memory DIMMs attached to CPU 1 in HPE Synergy 480 Gen10 compute modules

DIMM population order for SY480 Gen10												
	CPU1											
NVDIMM-N Count	DIMM Slot 1	DIMM Slot 2	DIMM Slot 3	DIMM Slot 4	DIMM Slot 5	DIMM Slot 6	DIMM Slot 7	DIMM Slot 8	DIMM Slot 9	DIMM Slot 10	DIMM Slot 11	DIMM Slot 12
0	R		R		R			R		R		R
1	R	N	R		R			R		R		R
2	R	N	R	N	R			R		R		R
3		N	R	N	R	N		R		R		
4	R	N	R	N	R			R	N	R	N	R
5	R	N	R	N	R	N		R	N	R	N	R
6	R	N	R	N	R	N	N	R	N	R	N	R

Key:

- R = Regular DIMM (i.e., an HPE Smart Memory DIMM),
- N = HPE NVDIMM-N.
- 1 = CPU 3 is only available on HPE Synergy 660 Gen10 compute modules.
- 2 = Persistent memory capacity assumes that 16 GiB NVDIMM-Ns are used.
- 3 = Nominal persistent memory bandwidth assumes that the system is running at 2667 MT/s, NVDIMM-N interleaving is enabled, and that no bandwidth is being used for the HPE Smart Memory DIMMs.
- 4 = Non-interleaved—NVDIMM-N interleaving should be disabled for this configuration.

Memory

Population guidelines for HPE NVDIMM-Ns with six HPE Smart Memory DIMMs attached to CPU 2 in HPE Synergy 480 Gen10 compute modules

DIMM population order for SY480 Gen10												
	CPU2											
NVDIMM-N Count	DIMM Slot 1	DIMM Slot 2	DIMM Slot 3	DIMM Slot 4	DIMM Slot 5	DIMM Slot 6	DIMM Slot 7	DIMM Slot 8	DIMM Slot 9	DIMM Slot 10	DIMM Slot 11	DIMM Slot 12
0	R		R		R			R		R		R
1	R		R		R			R		R	N	R
2	R		R		R			R	N	R	N	R
3	R		R		R		N	R	N	R	N	R
4	R	N	R	N	R			R	N	R	N	R
5	R	N	R	N	R		N	R	N	R	N	R
6	R	N	R	N	R	N	N	R	N	R	N	R

Key:

- R = Regular DIMM (i.e., an HPE Smart Memory DIMM),
- N = HPE NVDIMM-N.
- 1 = CPU 4 is only available on HPE Synergy 660 Gen10 compute modules.
- 2 = Persistent memory capacity assumes that 16 GiB NVDIMM-Ns are used.
- 3 = Nominal bandwidth assumes that the system is running at 2667 MT/s and NVDIMM-N interleaving is enabled, and that no bandwidth is being used for the HPE Smart Memory DIMMs.
- 4 = Non-interleaved—NVDIMM-N interleaving should be disabled if five NVDIMM-Ns are used.

Although Hewlett Packard Enterprise recommends that HPE NVDIMM-Ns be used with six HPE Smart Memory DIMMs, they may also be combined with smaller quantities of HPE Smart Memory DIMMs as described in Tables 19 to 22 if regular memory performance is not as important or if larger persistent memory capacity is needed.

Population guidelines for HPE Persistent Memory

For data-intensive workloads where latency and capacity are key considerations, HPE Apollo, HPE ProLiant, and HPE Synergy servers deliver faster data access at a reasonable price point when equipped with HPE Persistent Memory 128, 256, or 512 GB modules featuring Intel Optane DC Persistent Memory. This new persistent memory offering, based on phase-change memory technology, must be included alongside HPE Smart Memory DIMMs.

DIMMs and HPE Persistent Memory modules are installed in specific configurations based on the workload requirements of the server. Supported configurations are optimized for persistent memory capacity, volatile memory capacity, and performance. Persistent memory capacity—the available capacity is equal to the HPE Persistent Memory capacity.

Volatile memory capacity

- App Direct (1 LM) mode—the volatile capacity is equal to the DIMM capacity.
- Memory (2 LM) mode—the volatile capacity is some or all of the HPE Persistent Memory capacity.

Performance

- Uses all channels to efficiently utilize processor resources.
- Memory (2 LM) mode—more regular DIMMs provide a better cache ratio.

Memory

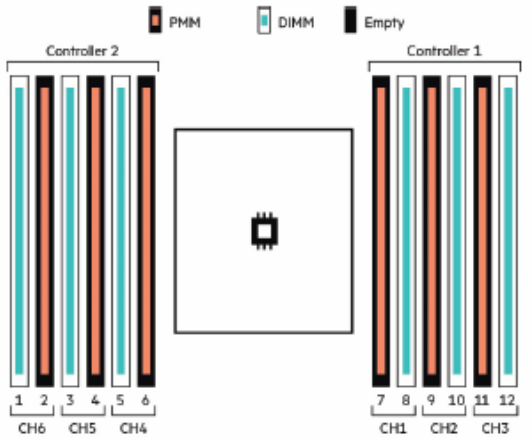
DIMMs and HPE Persistent Memory modules can be installed in the server in the following configurations:												
	Slot 1	**Slot 2**	**Slot 3**	**Slot 4**	**Slot 5**	**Slot 6**	**Slot 7**	**Slot 8**	**Slot 9**	**Slot 10**	**Slot 11**	**Slot 12**
6+6	D	P	D	P	D	P	P	D	P	D	P	D
4+6	D		D	P	D	P	P	D	P	D		D
2+8	P		D	D	D	D	D	D	D	D		P
2+6	D		D		D	P	P	D		D		D
2+4	P		D		D			D		D		P
1+6	D		D		D			D		D	P	D

- P = HPE Persistent Memory
- D = DIMMs

Notes: P00918-B21—HPE 8GB 1Rx8 2933 RDIMM does not support pairing with HPE Persistent Memory.

6+6 configuration

This configuration is also referred to as a 2-2-2 configuration, based on the number of modules populated per channel, per memory controller. This configuration is symmetric and uses all slots. It provides the best bandwidth for both DRAM DIMMs and HPE Persistent Memory, using all the channels and pins on the processor. Since DRAM DIMMs and HPE Persistent Memory modules share channels, there might be some competition for access; the HPE Persistent Memory module will slow down the DRAM compared to a system without HPE Persistent Memory.

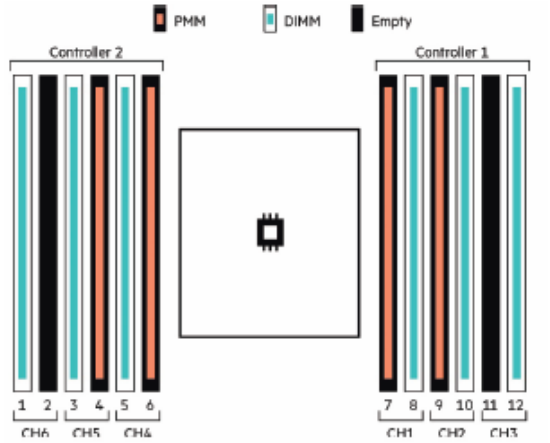


HPE Persistent Memory capacity up to 3 TB using 512 GB modules and DIMM capacity up to 768 GB using 128 GB DIMMs

Memory

4+6 configuration

This configuration is also referred to as a 2-2-1 configuration (that nomenclature does not consider whether there are two HPE Persistent Memory modules or one DIMM and one HPE Persistent Memory module in a channel). By using all channels, this configuration provides the best performance for DIMMs. It offers less capacity for HPE Persistent Memory. Since DIMMs and HPE Persistent Memory modules share four channels, they might compete for access.

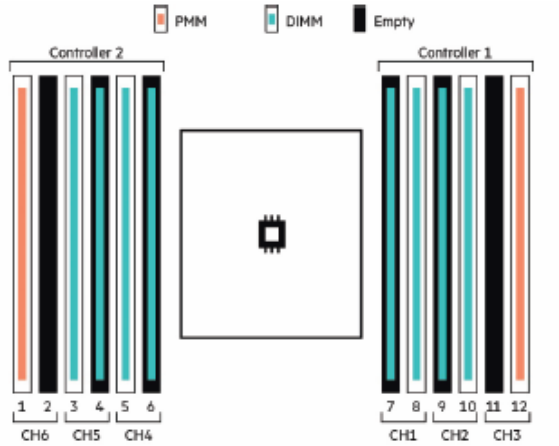


HPE Persistent Memory capacity up to 2 TB using 512 GB modules and DIMM capacity up to 768 GB using 128 GB DIMMs

2+8 configuration

This configuration is also referred to as a 2-2-1 configuration (that nomenclature does not consider whether there are two DIMMs or one DIMM and one HPE Persistent Memory module in a channel). This configuration does not support Memory (2 LM) mode because the capacity of the DIMMs is likely too large to use as a cache for the small number of HPE Persistent Memory modules. This configuration offers the largest regular DIMM capacity but only offers 66% of the possible DIMM bandwidth, since DIMMs are not installed on all channels.

Notes: Only App Direct mode is supported with 2+8 configuration.

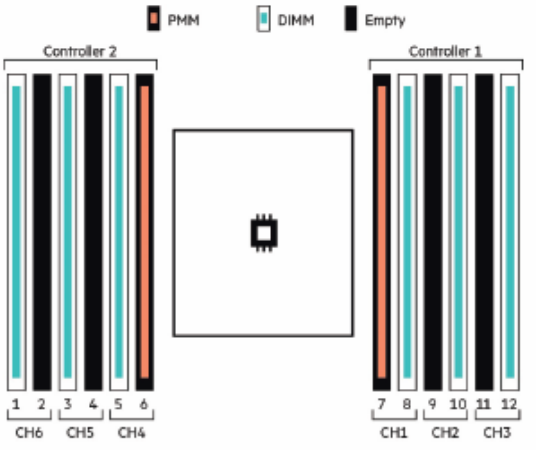


HPE Persistent Memory capacity up to 1 TB using 512 GB HPE Persistent Memory and DIMM capacity up to 1 TB using 128 GB DIMMs

Memory

2+6 configuration

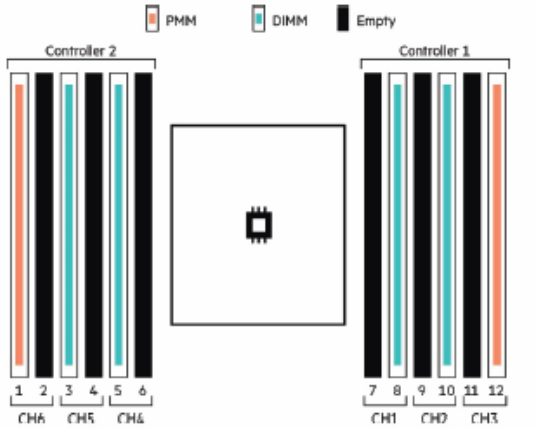
This configuration is also referred to as a 2-1-1 configuration. Two channels are shared, so there is still some competition between DRAM and HPE Persistent Memory traffic.



HPE Persistent Memory capacity up to 1 TB using 512 GB HPE Persistent Memory and DIMM capacity up to 768 GB using 128 GB DIMMs

2+4 configuration

This configuration is also referred to as a 1-1-1 configuration. Although HPE Persistent Memory traffic stays out of the way of DIMM traffic, the regular DIMMs are only interleaved four ways and provide less bandwidth than a +6 configuration.



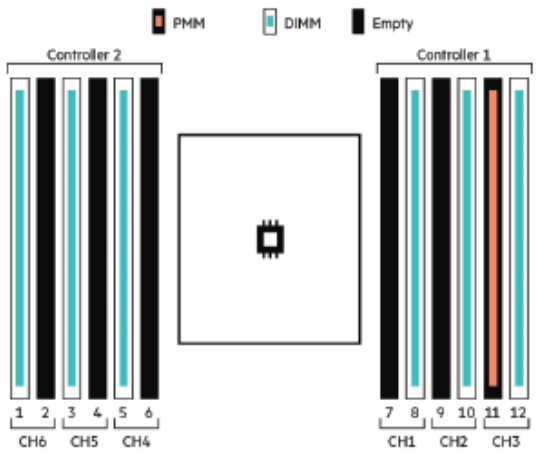
HPE Persistent Memory capacity up to 1 TB using 512 GB HPE Persistent Memory and DIMM capacity up to 512 GB using 128 GB DIMMs

Memory

1+6 configuration

This configuration is also referred to as a 1-1-1 asymmetric configuration. It offers the smallest HPE Persistent Memory capacity. This configuration does not support memory (2 LM) mode because 2 LM mode requires symmetrical population under each memory controller.

Notes: Only App Direct mode is supported with 1+6 configuration.



HPE Persistent Memory capacity up to 512 GB using 512 GB HPE Persistent Memory and DIMM capacity up to 768 GB using 128 GB DIMMs

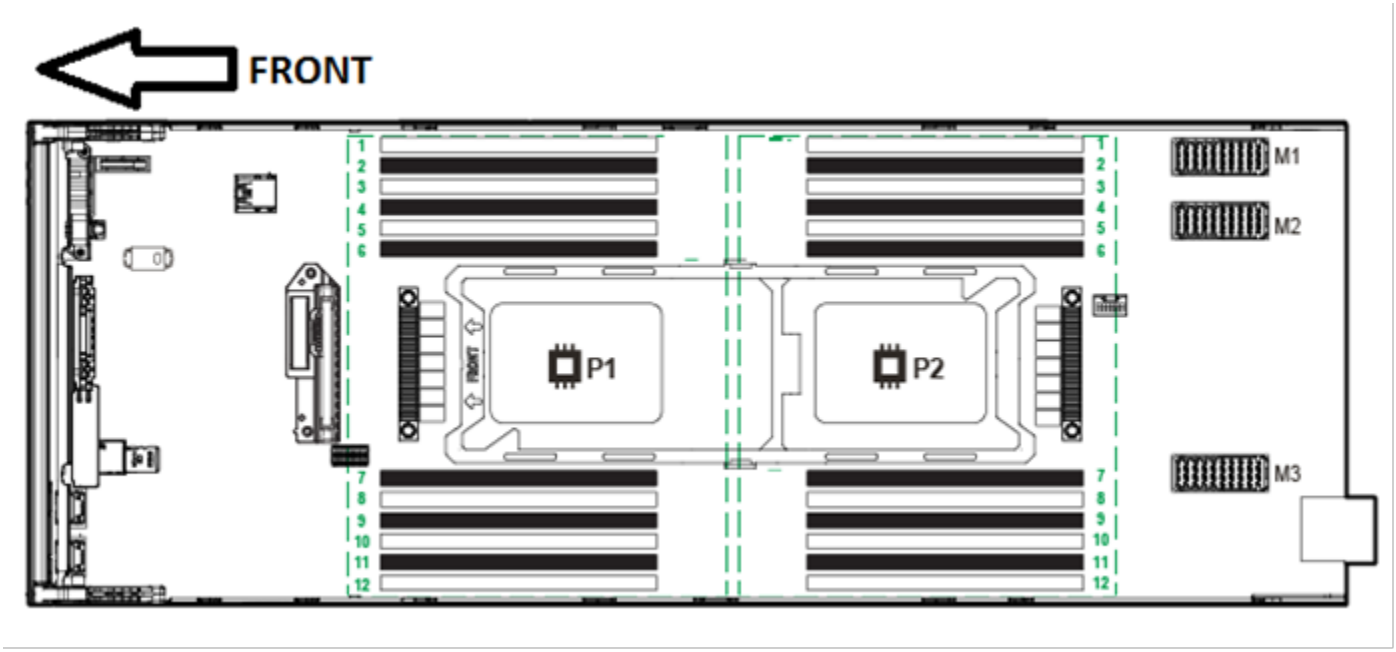
For more details, please refer to Persistent Memory details on our website
https://www.hpe.com/us/en/servers/persistent-memory.html

Storage

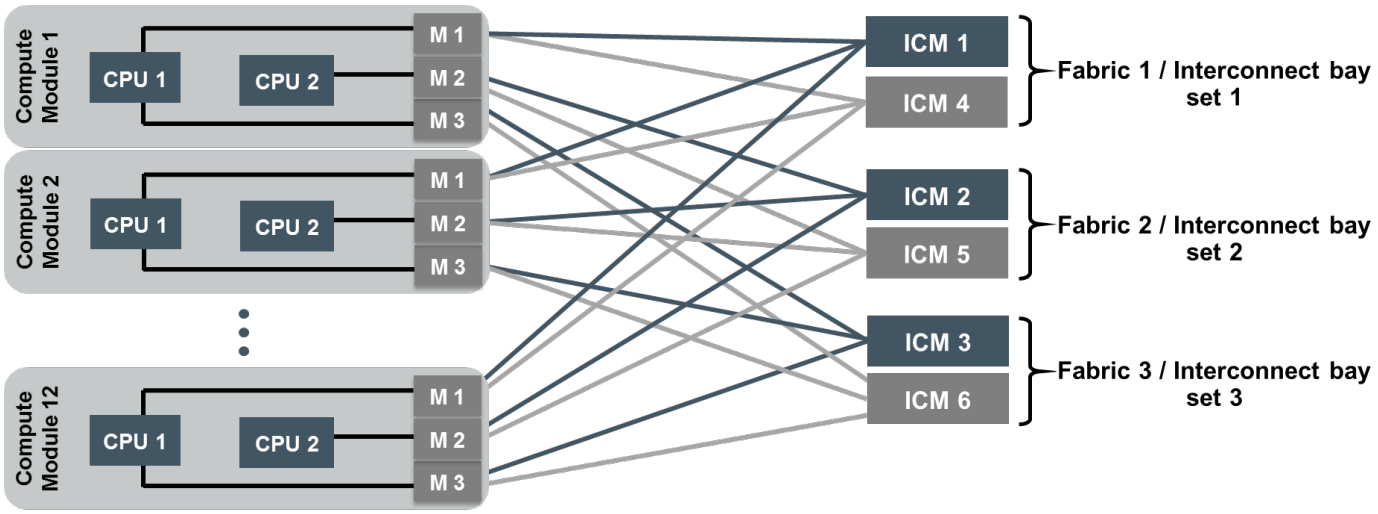
Front Local Storage



1-2 2 x SFF hot-plug drive bays for SAS, SATA, SAS SDD, SATA SSD, NVMe PCIe



Internal Fabric Routing



Technical Specifications

System Unit

Dimensions (H x W x D)

With Bezel

- 6.35 x 21.4 x 60.0 cm
- 2.5 x 8.43 x 23.62 in

Weight (approximate)

- 8.16 kg / 18 lb
  Maximum: all processors, 24 DIMMs, drives, mezzanine cards, and one flash cache battery installed)
- 6.57 kg / 14.5 lb
  Minimum: one processor and 1 DIMM installed

Power Specifications

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

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/hpepoweradvisor.**

System Inlet Temperature

- Operating: 10°C to 35°C (50°F to 95°F)
  - The upper limit may be limited by the type and number of options installed.
  - System performance may be reduced if operating with a fan fault.
- Non-operating: -30C to 60C (-22F to 140F).

Extended Ambient Operating Support

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

Relative Humidity (non-condensing)

- Operating: 10% to 90% @ 28C (82.4F)
- Non-operating: 5% to 95% @ 38.7C (101.7F)

Acoustic Noise

For acoustic noise specifications, please see the HPE Synergy 12000 Frame QuickSpecs.

Notes:

- For technical information on the controllers for this product, visit the HPE Smart Array E208i-c SR Gen10 (8 Internal Lanes/No Cache) 12G SAS Modular Controller **QuickSpecs**.
- For technical information on the controllers for this product, visit the HPE Smart Array P204i-c SR Gen10 (4 Internal Lanes/1GB Cache) 12G SAS Modular Controller **QuickSpecs**.
- For technical information on the controllers for this product, visit the HPE Smart Array P416ie-m SR Gen10 (8 Int 8 Ext Lanes/2GB Cache) 12G SAS Mezzanine Controller **QuickSpecs**.

Technical Specifications

Network Options QuickSpecs/Details:

- For 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 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**
- Support for Network Partitioning (NPAR) when using Pass-thru modules.
  http://h20195.www2.hpe.com/v2/redirect.aspx?/products/quickspecs/15418_div/15418_div.PDF

ErP Lot9

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

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

Environment-friendly Products and Approach - End-of-life Management and Recycling

Hewlett Packard Enterprise offers **End-of-life product return, Trade-in, and Rrecycling programs**, in many geographic areas, for our products. Products returned to Hewlett Packard Enterprise will be recycled, recovered or disposed of in a responsible manner.

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

Summary of Changes

Date	Version History	Action	Description of Change
04-Dec-2023	Version 37	Changed	Service and Support section was updated
16-Oct-2023	Version 36	Changed	Overview, Standard Features, Optional Features, Configuration Information, and Additional Options sections were updated.
05-Sep-2023	Version 35	Changed	Standard Features, Configuration Information, and Additional Options sections were updated.
08-Aug-2022	Version 34	Changed	Additional Options section was updated
01-Aug-2022	Version 33	Changed	Standard Features, Configuration Information, Additional Options and Memory sections were updated Obsolete SKUs were removed
20-Jun-2022	Version 32	Changed	Additional Options section was updated SKU - R9H23C was added Obsolete SKUs were removed and replaced with PM SKUs provided
02-May-2022	Version 31	Changed	Standard Features, Configuration Information and Additional Options sections were updated Obsolete SKUs were removed
06-Dec-2021	Version 30	Changed	Overview, Standard Features, Configuration Information and Additional Options sections were updated
01-Nov-2021	Version 29	Changed	Service and Support Pointnext Tech Care and Complete Care information updated Obsolete SKUs were removed
07-Sep-2021	Version 28	Changed	Additional Options section was updated Services and Support Pointnext Tech Care information added Removed Aug 30 OBS drives. Added new FIPS drives HPE 1.6TB NVMe MU SCN FIPS U.3 CM6 SSD - P44588-B21 HPE 3.2TB NVMe MU SCN FIPS U.3 CM6 SSD - P44596-B21 HPE 1.92TB NVMe RI SCN FIPS U.3 CM6 SSD - P44572-B21 HPE 3.84TB NVMe RI SCN FIPS U.3 CM6 SSD - P44580-B21 HPE 1.6TB NVMe MU SCN FIPS U.3 CM6 SSD - P44588-B21 HPE 3.2TB NVMe MU SCN FIPS U.3 CM6 SSD - P44596-B21 HPE 1.92TB NVMe RI SCN FIPS U.3 CM6 SSD - P44572-B21 HPE 3.84TB NVMe RI SCN FIPS U.3 CM6 SSD - P44580-B21
02-Aug-2021	Version 27	Changed	Service and Support Pointnext information added Obsolete SKUs were removed
06-July-2021	Version 26	Changed	Standard Features, Configuration Information and Additional Options sections were updated Obsolete SKUs were removed
01-Feb-2021	Version 25	Changed	SKUs added and Obsolete SKUs deleted in Additional Options section.
07-Dec-2020	Version 24	Changed	Standard Features, Configuration Information and Additional Options sections were updated. SKUs deleted in Configuration Information and Additional Options sections.
05-Oct-2020	Version 23	Changed	Overview, Standard Features, Configuration Information and Additional Options sections were updated.
03-Aug-2020	Version 22	Changed	Overview, Standard Features, Configuration Information, and Additional Options sections were updated.
15-Jun-2020	Version 21	Changed	Overview, Standard Features, Optional Features, Service and Support, Configuration Information, Additional Options, and Memory sections were updated.
06-Apr-2020	Version 20	Changed	Overview, Standard Features, Optional Features, Configuration Information, Additional Options, and Memory sections were updated.
02-Mar-2020	Version 19	Changed	Overview, Standard Features, Optional Features, Configuration Information, and Core Options sections were updated.
03-Feb-2020	Version 18	Changed	Standard Features, Configuration Information, Additional Options, Memory sections were updated.

Summary of Changes

Date	Version History	Action	Description of Change
02-Dec-2019	Version 17	Changed	Configuration Information and Additional Options sections were updated.
07-Oct-2019	Version 16	Changed	QuickSpecs was updated.
05-Aug-2019	Version 15	Changed	QuickSpecs was updated. SKUs added: P18424-B21, P18432-B21, P18420-B21, P18430-B21, P18434-B21, P18438-B21, P18436-B21, P18422-B21, P18426-B21, P18428-B21, P02054-B21.
01-Jul-2019	Version 14	Changed	Standard Features, Configuration Information - Factory Integrated Models, and Additional Options sections were updated. The U.S. version of QuickSpecs is no longer being updated, please reference the Worldwide QuickSpecs for latest information. SKUs added in Additional Obsolete SKUs were deleted: P08920-L21, P08919-L21, 870763-B21.
03-Jun-2019	Version 13	Changed	Overview, Standard Features, Configuration Information - Factory Integrated Models, Optional Features, Additional Options, Memory, and Storage sections were updated. SKUs added: P11881-L21, P08920-L21, P16385-L21, P11886-L21, P11884-L21, P11885-L21, P11883-L21, P07337-L21, P11694-L21, P08919-L21, P12767-L21, P11880-L21, P11882-L21, P07341-L21, 835804-B21, 835807-B21, 835810-B21, P11881-B21, P08920-B21, P16385-B21, P11886-B21, P11884-B21, P11885-B21, P11883-B21, P07337-B21, P11694-B21, P08919-B21, P07344-B21, P12767-B21, P11880-B21, P11882-B21, P07341-B21, R0W29C, R0Z45C, R1F95C, Q9U36C, P17391-B21, 870763-B21, 765464-B21, P05938-B21, P05946-B21, P05924-B21, P05928-B21, P05932-B21, P05976-B21, P05980-B21, P10448-B21, P10454-B21, , P10460-B21, P05986-B21, P05994-B21, P13699-B21, P13701-B21, P13703-B21, P07179-B21, P07181-B21, P10222-B21, P07183-B21, P07185-B21, P10224-B21, P10226-B21, P13695-B21, P13697-B21, P10220-B21, P10208-B21, P07190-B21, P07192-B21, P10210-B21, P07194-B21, P10212-B21, P07196-B21, P07198-B21.
02-Apr-2019	Version 12	Changed	Overview, Standard Features, Physical and Environmental Information, and Technical Specifications sections were updated. SKUs added in Configuration Information and Additional Options sections: P07363-L21, P07362-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-L21, P07339-L21, P12142-L21, P12143-L21, P07336-L21, P11692-L21, P08681-L21, P07334-L21, P11693-L21, P07333-L21, P08678-L21, P07332-L21, 813890-B21, 876449-B21, P00918-B21, P00920-B21, P00922-B21, P00924-B21, P00930-B21, P00926-B21, P00928-B21, 815097-B21, 815098-B21, 835955-B21, 815100-B21, 815101-B21, 815102-B21, 875488-B21, 813890-B21, 876449-B21, 870828-B21, 777456-B21, P01367-B21, P02381-B21, 813890-B21, H7MC1E, H7MC2E, H7MC4E, H7MC5E. SKUs added in Configuration Information and Additional Options sections: 881653-L21, 881652-L21, 845264-B21, 868417-B21, 765464-B21, 765463-B21, 873351-B21, 873355-B21, 873357-B21, 868814-B21, 868818-B21, 868822-B21, 868826-B21, 875511-B21, 875513-B21, 875311-B21, 872390-B21, 872392-B21, 872394-B21, 875313-B21, 875326-B21, 875330-B21, 870144-B21, 870148-B21, 872374-B21, 872376-B21, 872382-B21, 872386-B21, 875483-B21, 872344-B21, 875470-B21, , 872348-B21, 875474-B21, 872352-B21, 875478-B21, 880295-B21, 877994-B21, 877986-B21, 877998-B21, 875488-B21, 872374-B21, 873359-B21, 873363-B21, 873365-B21, 873367-B21, 868417-B21, 875509-B21.

Summary of Changes

Date	Version History	Action	Description of Change
03-Dec-2018	Version 11	Changed	Overview, Standard Features, Optional Features, Configuration Information - Factory Integrated Models, Additional Options, and Technical Specifications sections were updated SKUs added in Configuration Information - Factory Integrated Models and Additional Options sections: 877740-B21, 877746-B21, 877752-B21, 877758-B21, 877764-B21, 875587-B21, 875589-B21, 875591-B21, 877776-B21, 877782-B21, 877788-B21, 877994-B21, 877984-B21, 877988-B21, 875490-B21, 875492-B21. SKUs deleted: 877740-B21, 877746-B21, 877752-B21, 877758-B21, 877764-B21, 875587-B21, 875589-B21, 875591-B21, 877776-B21, 877782-B21, 877788-B21, 877994-B21, 877984-B21, 877988-B21, 875490-B21, 875492-B21.
01-Oct-2018	Version 10	Changed	Recommended/Extended updates were applied. Overview section was updated. SKUs added in Additional Options sections: P04474-B21, P04476-B21, P04478-B21, P04480-B21, P04482-B21, P06584-B21, P06586-B21, P06588-B21, P06590-B21, P06592-B21, P07922-B21, P07926-B21, P07930-B21.
06-Aug-2018	Version 9	Changed	Overview, Standard Features, Optional Features, Configuration Information - Factory Integrated Models, Additional Options SKUs added in Additional Options sections: 876449-B21, P06194-B21, P06196-B21, P06198-B21, P06200-B21, P01367-B21. Obsolete SKU was deleted: 875242-B21
04-Jun-2018	Version 8	Changed	Overview, Standard Features, Optional Features, Configuration Information - Factory Integrated Models, and Additional Options sections were updated. SKUs added: 873377-L21, 872111-L21, 869226-B21, 869224-B21, 826043-B21, M3X67A, Q0J76A, 872111-B21, 870763-B21, 765453-B21, 872355-B21, 872359-B21, 872363-B21, 868814-B21, 868818-B21, 868822-B21, 868826-B21, 868830-B21, 880875-B21, 880877-B21, 875317-B21, 875319-B21, 875311-B21, 872344-B21, 872348-B21, 872352-B21, 875490-B21, 875492-B21, 872374-B21, 873359-B21, 872376-B21, 873363-B21, 872382-B21, 877365-B21, 872386-B21, 877367-B21, 488069-B21, 745823-B21. SKUs deleted: 872131-L21, 872130-L21, 872116-L21, Q0V76A, 872131-B21, 872130-B21, 872116-B21, 878014-B21, P04556-B21, P04560-B21, P04564-B21, P04566-B21, P04570-B21, P06607-B21, P06609-B21, 873165-B21, 85488-B21, 875490-B21, 875492-B21, P00896-B21, 872374-B21, 872376-B21, 872382-B21, 872386-B21, 877994-B21, 877998-B21, 877984-B21, 877986-B21, 877988-B21, 875488-B21, 873359-B21, 873363-B21, 873365-B21, 873367-B21, 872108-B21, 864279-B21.
02-Apr-2018	Version 7	Changed	Optional Features and Additional Options sections were updated. SKUs added in QuickSpecs: 880708-B21, 880709-B21, Q0V80C, Q0J76A, Q0J62C, 870763-B21, 872359-B21, 872363-B21, 815605-B21, 815606-B21, 822593-B21, 822594-B21, 875311-B21, 872344-B21, 877984-B21, 877986-B21, 877988-B21. Obsolete SKUs removed: Q0V76A, 815605-B21, 815606-B21, 822593-B21, 822594-B21.

Summary of Changes

Date	Version History	Action	Description of Change
12-Feb-2018	Version 6	Changed	Overview, Standard Features, and Additional Options sections were updated. SKUs added in Configuration Information – Factory Integrated Models section: 700076-B21, 700767-B21, 700748-B21, 665246-B21, 655639-B21, 700065-B21, 700763-B21, 766490-B21, 873351-B21, 873355-B21, 873357-B21, 877740-B21, 875503-B21, 877746-B21, 875509-B21, 877752-B21, 875511-B21, 877758-B21, 875513-B21, 877764-B21, 880875-B21, 880877-B21, 875587-B21, 875589-B21, 875591-B21, 875317-B21, 875319-B21, 875498-B21, 875500-B21, 872390-B21, 872392-B21, 872394-B21, 875311-B21, 875313-B21, 875326-B21, 875330-B21, 870144-B21, 870148-B21, 880295-B21, 875483-B21, 877776-B21, 875470-B21, 877782-B21, 875474-B21, 877788-B21, 875478-B21, 877994-B21, 877998-B21, 875488-B21, 875490-B21, 875492-B21, 872374-B21, 873359-B21, 872376-B21, 873363-B21, 872382-B21, 873365-B21, 872386-B21, 873367-B21. SKUs deleted in Configuration Information - Factory Integrated Models, Core Options, and Additional Options sections: 875954-L21, 875955-L21, 875956-L21, 877851-L21, 877807-L21, 875952-L21, 875953-L21, 872009-L21, 872006-L21, 872007-L21, 700066-B21, 700764-B21, 766491-B21, 684214-B21, 759208-B21, 785067-B21, 759210-B21, 759212-B21, 781516-B21, 785069-B21, 781518-B21, 791034-B21, 870763-B21, 875492-B21, 872359-B21, 872363-B21, 869374-B21, 869376-B21, 869378-B21, 869384-B21, 869386-B21, 748387-B21, 873391-L21, 872115-L21, 872116-L21, 872131-L21, 876871-L21, 872130-L21.
04-Dec-2017	Version 5	Changed	Overview, Standard Features, Optional Features, Configuration Information - Factory Integrated Models, and Memory sections were updated. SKUs added in Configuration Information - Factory Integrated Models, and Memory sections: 881653-L21, 881652-L21, 845264-B21, 881653-B21, 881652-B21, P01367-B21, H7ML8E, H7ML9E, H7ML9E, H7MM2E, 815102-B21, 845264-B21, 870144-B21. OBS SKUs deleted: 764894-B21, 822593-B21.
25-Sep-2017	Version 4	Changed	Standard Features, Configuration Information - Factory Integrated Models, Additional Options, and Memory sections were updated. SKUs added in Configuration Information - Factory Integrated Models, Additional Options sections: 872136-L21, 872137-L21, 815102-B21. SKUS removed in Configuration Information - Factory Integrated Models, Additional Options sections:777262-B21, 777262-B21, 875494-B21.
14-Aug-2017	Version 3	Changed	Standard Features and Additional Options sections were updated. SKUs added in Additional Options section: H7MC1E, H7MC2E, H7MC4E, H7MC5E. Obsolete SKU was deleted: 875494-B21.
17-Jul-2017	Version 2	Changed	Overview section was updated.
11-Jul-2017	Version 1	Created	New QuickSpecs

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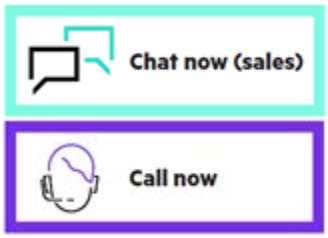

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