Overview

HPE Synergy 480 Gen10 Compute Module - Carrier Grade Supplement

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® 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.

This QuickSpecs document focuses on the HPE Synergy 480 Gen10 Compute Module - Carrier Grade Supplement. This document includes all the options that have been NEBS (GR-63 and GR-1089) and ETSI (EN 300 132-2 and EN 300 386) certified.

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

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 connectore & iLO USB connection (behind serial label pull tab)

Standard Features

Processors

Up to 2 of the following depending on model.

Notes: For more information regarding Intel Xeon processors, please see the following **http://www.intel.com/xeon.**

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**
Gold 6252N Processor	2.3	24	150	2933	1	Yes
Gold 6240 Processor	2.6	18	150	2933	1	Yes
Gold 5218R Processor	2.1	20	125	2666	1	Yes
Gold 5218 Processor	2.3	16	125	2666	1	Yes
Silver 4208 Processor	2.1	8	85	2400	1	No

Notes:

- Gold - 5100, 6100 Series - Supports 2 socket (Synergy 480 Gen10) or up to 4 socket (Synergy 660 Gen10) compute modules, 2 Socket supports 2UPI and 4 Socket supports 3UPI @ 10.4 GT/s, supports 6-Channel DDR4 @ 2400 MHz (SKU 5122=supports 2666) providing up to 768GB memory capacity (1.5 TB on select skus). Intel Turbo Boost Technology, Intel Hyper-Threading Technology, Intel AVX-512(1x 512-bit FMA) (SKU 5122 supports 2x 512 bit FMA), 48 lanes PCIe 3.0, advanced RAS supported.
- Silver - 4100 Series - Supports 2 socket (Synergy 480 Gen10) compute module, 2 Socket supports 2UPI @ 9.6 GT/s, 6-Channel DDR4 @ 2400 MHz providing up to 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 supported.
- Bronze - 3100 Series - Supports 2 socket (Synergy 480 Gen10) compute module, 2 Socket supports 2UPI @ 9.6 GT/s, supports 6-Channel DDR4 @ 2133 MHz providing up to 768GB memory capacity. Intel AVX-512(1x 512-bit FMA), 48 lanes PCIe 3.0, standard RAS supported.
- Silver and Bronze level processors are primarily designed for 2 Socket Compute modules and will have Synergy 480 Gen10 only in the processor names.

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**

Standard Features

Memory

One of the following depending on model:

- HPE 8GB (1x8GB) Single Rank x8 DDR4-2666 CAS-19-19-19 Registered Memory Kit
- HPE 16GB (1x16GB) Single Rank x4 DDR4-2666 CAS-19-19-19 Registered Memory Kit
- HPE 16GB (1x16GB) Dual Rank x8 DDR4-2666 CAS-19-19-19 Registered Memory Kit
- HPE 32GB (1x32GB) Dual Rank x4 DDR4-2666 CAS-19-19-19 Registered Memory Kit

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 @ 2666 MT/s
Maximum capacity (RDIMM)	768 GB	24 x 32 GB RDIMM @ 2666 MHz
Maximum capacity (NVDIMM)	192 GB	12 x 16 GB NVDIMM @ 2666 MT/s

Notes:

– The 128 GB LRDIMM may not be mixed with other DIMM capacities/types.

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

– HPE memory from previous generation servers (DDR3) is not compatible with this compute module. HPE DDR4 Smart Memory is required to realize the memory performance improvements and enhanced functionality listed in this document for Gen10. Please see Memory Speed Tables for memory speed changes based on processors selected. For additional information, please see the **HPE DDR4 Smart Memory QuickSpecs**.

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.**

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.

Standard Features

Network Adapters or Mezzanine options include:

- HPE Synergy 3820C 10/20Gb Converged Network Adapter
  Notes: Supports full hardware offload option of FCoE storage protocol processing for highest performance converged Ethernet data and storage networks
- HPE Synergy 2820C 10GbE Converged Network Adapter
  Notes: Delivers flexibility to compose multiple network flows including Ethernet and FCoE or iSCSI within each connection.
- HPE Synergy 10Gb 2820C Ethernet Adapter
- HPE Synergy 6810C 25/50Gb Ethernet

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) and removable media (USB), to continue operation to the operating system.
HPE ROM performs very early configuration of the video controller, to allow monitoring of initialization progress via an attached monitor. If configuration or hardware errors are discovered during this early phase of hardware initialization, suitable messages are now displayed on the connected monitor. Additionally, these configuration or hardware errors are logged to the Integrated Management Log (IML) to assist in diagnosis.
HPE Synergy Compute ROM is used to configure the following:

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

Notes: For further information, please refer to the **RBSU and UEFI System Utilities User Guide**

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 Smart Array S100i SR Gen10 SW RAID is an HPE factory setting(784308-B21), will operate in UEFI mode only and requires HPE Synergy 480 Gen10 M.2 FIO Adptr Brd Kit(873165-B21) for enablement of optional internal M.2 SATA Drives.

– 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)

Standard Features

Performance RAID Controller

- HPE Smart Array P204i-c SR Gen10 12G SAS Modular Controller (4 internal lanes/1GB cache)

Maximum Internal Storage		
	CAPACITY	**CONFIGURATION**
Hot Plug SFF SAS SSD	30.6 TB	2 x 15.3 TB (with standard front SFF drive cage)

Interfaces

- Micro SDHC Slot
  One (1) internal Micro Secure Digital High Capacity (Micro SDHC) card slot
- USB 3.0 Port
  One (1) internal USB 3.0 connector for USB flash media drive keys

Notes: The above options are intended for integrated hypervisor virtualization environments.

- USB 3.0 Port
  One (1) external USB 3.0 connector for USB flash media drive keys
- iLO Port
  One (1) external USB port for direct iLO access to compute.

Operating Systems and Virtulization Software Support

- Microsoft Windows Server
- Microsoft Hyper-V Server
- Red Hat Enterprise Linux
- SUSE Linux Enterprise Server
- VMware ESVi
- VMware vSphere
- Citrix Xenserver 7.0, 7.1 (primary use for HPE GPU Options/XENDesktop)

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 XEN &KVM)

Notes: For Operating Systems tested with the NVIDIA and AMD GPU options, please see the Graphics Adapter Quick Specs for details. **https://www.hpe.com/h20195/v2/getpdf.aspx/a00000611enw.pdf?ver=1** .

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)

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 Synery Compute Modules such as:

- Secure Boot and Secure Start enable for enhanced security
- Operating system specific functionality
- Support for > 2.2 TB (using GPT) boot drives
- USB 3.0 Stack
- Embedded UEFI Shell
- Mass Configuration Deployment Tool using iLO RESTful API that is Redfish API Conformant.
- PXE boot support for IPv6 networks
- Workload Profiles for simple performance optimization

UEFI Boot Mode only:

- TPM 2.0 Support
- NVMe Boot Support
- Platform Trust Technology (PTT) can be enabled.

Standard Features

- 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 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

Standard Features

- 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: **https://support.hpe.com/connect/s/?language=en_US.**

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 iLO Scale-Out (optional)

HPE iLO Scale-Out is the preferred license built for web hosting, cloud service providers, and high performance computing data centers, managing massive scale out environments. This license offers sophisticated scripting tools that provide remote access through Text Console via SSH, Dynamic power capping, Email-based Alerting and proactive notifications.

Compatible SAN

HPE Synergy 480 Gen10 Compute Module - Carrier Grade Supplements are optimized for HPE MSA, EVA, 3PAR, 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 top of rack switch need and substantially reduces cost. The reduction in components also simplifies fabric management at scale while consuming fewer ports at the data center aggregation layer.

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

Optional Features

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 **HPE Virtual Connect**. .

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

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

Notes:

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

– 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.

– 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 Configure-to-order Compute Module	871940-B21
HPE Synergy 480 Gen10 TAA-compliant Configure-to-order Compute Module	871940-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
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
Drives supported	Optional: 2x SAS/SATA/SSD, 4x uFF or 2x Internal M.2 SATA drives or 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 5330C 32G Fibre Channel Host Bus Adapters,
Graphic Processing Units	Optional Mezzanine and Module solutions
Security	iLO 5
USB and MicroSD	1 Internal USB 3.0, 1 Internal microSD
Management	OneView 3.1 and iLO 5 Advanced (standard)

Configuration Information

Notes:

- [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.
- CTO SKUs are designed for specific use case fits.
- This information applies to factory CTO configurations, Field upgrades may differ depending field configurations.
- BackPlane in the chassis description refers to the type of controller backplane in the Drive Cage modules.
- Standard BackPlane CTO Chassis is designed for flexible use of the Compute Module for most workloads. This SKU may use the SATA Board Option, or SmartArray options. This SKU may also use the Mezzanine P416ie-m for connection to the HPE D3940 Storage Module, but no links to local front drive.
- The Drive-Less CTO option is intended for stateless on SAN/NAS boot use cases and still supports messanine Smart Array for Synergy D3940 Storage Modules. Additional, this model supports adding the M.2 Adapter for dual M.2 drive options. This SKU may also use the Mezzanine P416ie-m for connection to the HPE D3940 Storage Module, but no links to local front drive.
- The Premium BackPlane CTO option supports NVMe drives directly in the Front Drive cage. SATA/SAS drives may optionally be supported in the Front Drive Cage in combination with the D3940 Storage Module with a mezzanine Smart Array P416ie-m and addition SAS Cables that connect the mezzanine card directly to the Premium Backplane on the Local Drive Cage

Step 2: Choose Required Options

Step 2a: Processors

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-Gold Processors	
Intel Xeon-Gold 6252N (2.3GHz/24-core/150W) FIO Processor Kit for HPE Synergy 480/660 Gen10	P08920-L21
Intel Xeon-Gold 6240R (2.4GHz/24-core/165W) FIO Processor Kit for HPE Synergy 480 Gen10	P23590-L21
Intel Xeon-Gold 5218R (2.1GHz/20-core/125W) FIO Processor Kit for HPE Synergy 480 Gen10	P18506-L21
Intel Xeon-Gold 5218 (2.3GHz/16-core/125W) FIO Processor Kit for HPE Synergy 480/660 Gen10.	P07342-L21
Intel Xeon-Silver Processors	
Intel Xeon-Silver 4208 (2.1GHz/8-core/85W) FIO Processor Kit for HPE Synergy 480 Gen10.	P08678-L21

Notes:

- All processors within any single compute module must be identical.
- HT indicates that the processor model supports Intel® Hyper-Threading Technology.
- Turbo indicates the maximum potential frequency when using Intel® Turbo Boost Technology. The frequency boost increment is dependent on the processor SKU and the number of active cores. In general, a higher boost increment is obtained when fewer cores are active.

Configuration Information

– 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. (ie. HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6136; 6 is the SKU Level, 1 is the processor generation, 34 is the SKU model, m indicates memory sku)

– 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 connector 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.

– Gold - 5100, 6100 Series - 2 and 4 socket capable, 2S - 2UPI, 4S - 3UPI @ 10.4 GT/s, 6-Channel DDR4 @ 2400 MHz (SKU 5122=supports 2666), 768 GB memory capacity (1.5 TB on select skus), Intel Turbo Boost Technology, Intel Hyper-Threading Technology, Intel AVX-512(1x 512-bit FMA) (SKU 5122 supports 2x 512 bit FMA), 48 lanes PCIe 3.0, advanced RAS.

– 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 MHz, 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 MHz, 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

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

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**.

Configuration Information

Step 2c: Choose Networking Adapters

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

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

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
HPE Smart Array E208i-c SR Gen10 (8 Internal Lanes/No Cache) 12G SAS Modular Controller	823852-B21
HPE 96W Smart Storage Lithium-ion Battery with 260mm Cable Kit	P01367-B21

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

HPE I/O Expansion Options

HPE Synergy 6810C 25/50Gb Ethernet Adapter	867322-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

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

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

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

Step 5: Choose HPE Synergy Services

HPE Synergy Tech Care Services

HPE 3 Year Tech Care 24x7 Synergy SY480 Gen10 Service	H7MC1E
HPE 3 Year Tech Care 24x7 with DMR Synergy SY480 Gen10 Service	H7MC2E
HPE 3 Year Tech Care Advanced 24x7 Synergy SY480 Gen10 Service	H7MC4E
HPE 3 Year Tech Care Advanced 24x7 with DMR Synergy SY480 Gen10 Service	H7MC5E

Additional Options

Notes: 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.

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

SATA Drives (listed by capacity)	
HPE 1TB SATA 6G Business Critical 7.2K SFF SC 1-year Warranty HDD	655710-B21
SAS Drives (listed by Capacity)	
HPE 2TB SAS 12G Business Critical 7.2K SFF SC 1-year Warranty 512e HDD	765466-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 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 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 Networking

Additional Options

10/20Gb Mezzanine Adapters

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

HPE Storage Controllers

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

Notes:

– 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 and requires HPE Synergy 480 Gen10 M.2 FIO Adapter Board Kit(873165-B21) for enablement of optional internal M.2 SATA Drives.

– For legacy support select Legacy mode settings part, 758959-B22.

– Premium Backplane Modules, CTO offers a Premium Backplane Compute Module for use with NVMe drives in front drive cage. Also, supports P416ie-m with specific SAS cable(871573-B21) connections allowing P416ie-m to manage SATA/SAS drives in both front drive cage and D3940.

HPE Flash Media Kits

HPE Enterprise Mainstream Flash Media Kits for Memory Cards

HPE 8GB microSD Enterprise Mainstream Flash Media Kit	737959-B21
HPE 32GB microSD Flash Memory Card	700139-B21

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

HPE Synergy Services

HPE Synergy Tech Care Services

Notes: DMR - Defective Media Retention

Deployment/Installation & Start-up Services

HPE Factory Express Synergy Initial Frame Package 4 Service	HA454A1-300
HPE Factory Express Synergy Add-on Frame Package 4 Service	HA454A1-301

Additional Options

HPE Synergy First Frame Startup Service	U8JM3E
HPE Synergy Additional Frame Startup Service	U8JM4E

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

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**

Synergy 480 Gen10 Compute Module

Memory Speed Table				
6DPC	**Synergy 480 Gen10 Compute Module**			
DIMM Type	**Register DIMM (RDIMM)**			
HPE SKU P/N	815097-B21	815098-B21	835955-B21	815100-B21
SKU Description	HPE 8 GB 1Rx8 PC4-2666V-R	HPE 16 GB 1Rx4 PC4-2666V-R	HPE 16 GB 2Rx8 PC4-2666V-R	HPE 32 GB 2Rx4 PC4-2666V-R
DIMM Rank	Single Rank (1R)	Single Rank (1R)	Dual Rank (2R)	Dual Rank (2R)
DIMM Capacity	**8 GB**	**16 GB**	**16 GB**	**32 GB**
Voltage	1.2V	1.2V	1.2V	1.2V
DRAM depth [bit]	1G	2G	1G	2G
DRAM Width [bit]	x8	x4	x8	x4
DRAM Density	8 Gb	8 Gb	8 Gb	8 Gb
CAS Latency	19-19-19	19-19-19	19-19-19	19-19-19
DIMM Native Speed (MT/s)	2666	2666	2666	2666
HPE Server Memory Speed (MT/s) with Intel Xeon 8100, 6100 Series Scalable Family Processors (Platinum) (also supported 5122)				
1 DIMM Per Channel	2666 MT/s	2666 MT/s	2666 MT/s	2666 MT/s
2 DIMM Per Channel	2666 MT/s	2666 MT/s	2666 MT/s	2666 MT/s
HPE Server Memory Speed (MT/s) with Intel Xeon 5100 & 4100 Series Scalable Family Processors (Silver/Gold) (except for 5122 processor above)				
1 DIMM Per Channel	2400 MT/s	2400 MT/s	2400 MT/s	2400 MT/s
2 DIMM Per Channel	2400 MT/s	2400 MT/s	2400 MT/s	2400 MT/s
HPE Server Memory Speed (MT/s) with Intel Xeon 3100 Series Scalable Family Processors (Bronze)				
1 DIMM Per Channel	2133 MT/s	2133 MT/s	2133 MT/s	2133 MT/s
2 DIMM Per Channel	2133 MT/s	2133 MT/s	2133 MT/s	2133 MT/s

Memory

DIMM Type	Load Reduced (LRDIMM)	
HPE SKU P/N	815101-B21	815102-B21
SKU Description	HPE 64GB 4Rx4 PC4-2400V-L	HPE 128GB 8Rx4 PC4-2666V-L
DIMM Rank	Quad Rank (4R)	Octal Rank (8R)
DIMM Capacity	**64GB**	**128GB**
Voltage	1.2V	1.2V
DRAM depth [bit]	2G	2G
DRAM Width [bit]	x4	X4
DRAM Density	8 Gb	8Gb
CAS Latency	19-19-19	19-19-19
DIMM Native Speed (MT/s)	2666	2666
HPE Server Memory Speed (MT/s) with Intel Xeon 8100 & 6100 +5122 Series Scalable Family Processors (Gold/Platinum)		
1 DIMM Per Channel	2666 MT/s	2666 MT/s
2 DIMM Per Channel	2666 MT/s	2666 MT/s
HPE Server Memory Speed (MT/s) with Intel Xeon 5100 & 4100 Series Scalable Family Processors (Silver/Gold)		
1 DIMM Per Channel	2400 MT/s	2400 MT/s
2 DIMM Per Channel	2400 MT/s	2400 MT/s
HPE Server Memory Speed (MT/s) with Intel Xeon 3100 Series Scalable Family Processors (Bronze)		
1 DIMM Per Channel	2133 MT/s	2133 MT/s
2 DIMM Per Channel	2133 MT/s	2133 MT/s

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

DIMM Type	NVDIMM(Persistent Memory)
HPE 16GB NVDIMM Single Rank x4 DDR4-2666 Module Kit	845264-B21
SKU Description	HPE 16GB 1Rx4 PC4-2666 NVDIMM
DIMM Rank	Single Rank (1R)
DIMM Capacity	16 GB
Voltage	1.2V
DRAM depth [bit]	
DRAM Width [bit]	
DRAM Density	
CAS Latency	
DIMM Native Speed (MT/s)	2666
1 DIMM Per Channel	2666 MT/s
2 DIMM Per Channel	

Memory Population

Memory

HPE Synergy Gen10 - Memory Population

Notes: For more details on memory population please see **http://www.hpe.com/docs/memory-population-rules**

Synergy Gen10 DIMM Population Guidelines per Socket(6 Channels/Socket, 2 DIMMs/channel)												
DIMM Slot	1	2	3	4	5	6	7	8	9	10	11	12
Number of DIMMs installed												
1 DIMM												
2 DIMMs												
3 DIMMs												
4 DIMMs												
5 DIMMs*												
6 DIMMs												
7 DIMMs*												
8 DIMMs												
9 DIMMs*												
10 DIMMs												
11 DIMMs*												
12 DIMMs												

Notes:

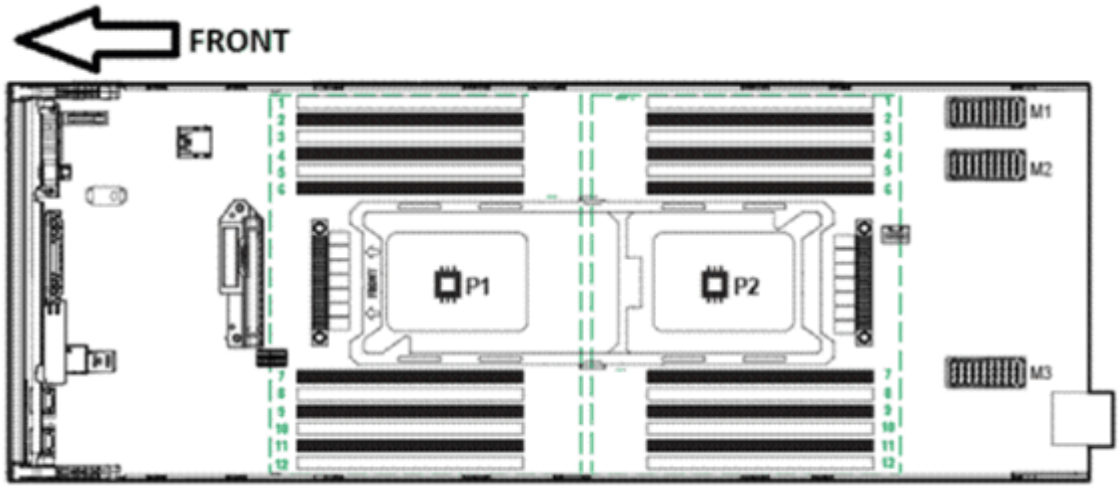
– *Unbalanced Not Recommended

– For more information or additional DIMM configurations go to: **http://www.hpe.com/docs/memory-population-rules**

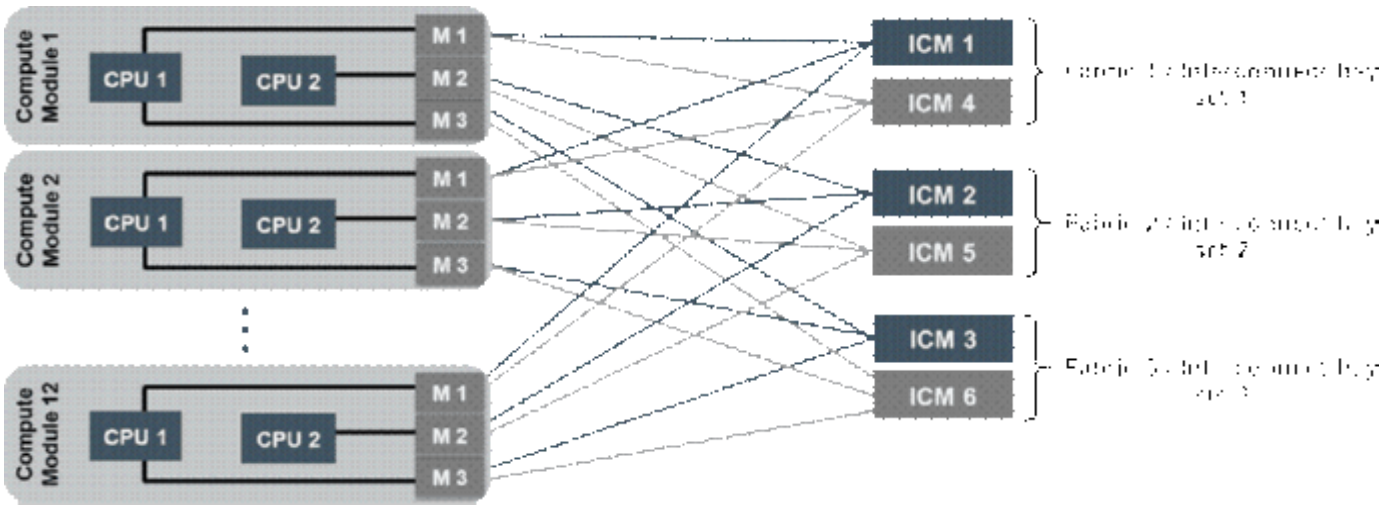
Front local storage

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

Memory



Internal fabric routing



Technical Specifications

System Unit		
Dimensions (H x W x D)	6.35 x 21.4 x 60.0 cm 2.5 x 8.43 x 23.62 in	With bezel
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**.

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 6	Changed	Service and Support section was updated
07-Nov-2022	Version 5	Changed	Overview, Standard Features, Additional Options and Memory sections were updated.
15-Nov-2021	Version 4	Changed	Service and Support Pointnext Tech Care and Complete Care information updated
15-Feb-2021	Version 3	Changed	Rebranding applied to QuickSpecs
18-Jan-2021	Version 2	Changed	Standard Features and Configuration Information section was updated. Obsolete SKUs were deleted in Configuration Information section.
07-May-2018	Version 1	Created	New QuickSpecs

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Make the right purchase decision. Contact our presales specialists.

Hewlett Packard Enterprise

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

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