QuickSpecs

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 SmartMemory supporting up to 1.5TB, 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

HPE Synergy offers additional compute module options (that have individual QuickSpecs) including:
- HPE Synergy 660 Gen10 (2-4-socket, general purpose)
- HPE Synergy 620 Gen9 (2-socket, mission critical)
- HPE Synergy 680 Gen9 (4-socket, mission critical)

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

NOTE: The HPE Synergy Gen10 compute modules installation involves a minimum upgrade requirement for component compatibility purposes. To ensure proper system functionality, you must update your system to Release Set Version 3.00.20170707 (or later) before installing and operating your compute module. Go to **http://www.hpe.com/downloads/synergy** and see the **HPE Synergy Firmware Update Overview** guide at for specific details on updating compute module components.
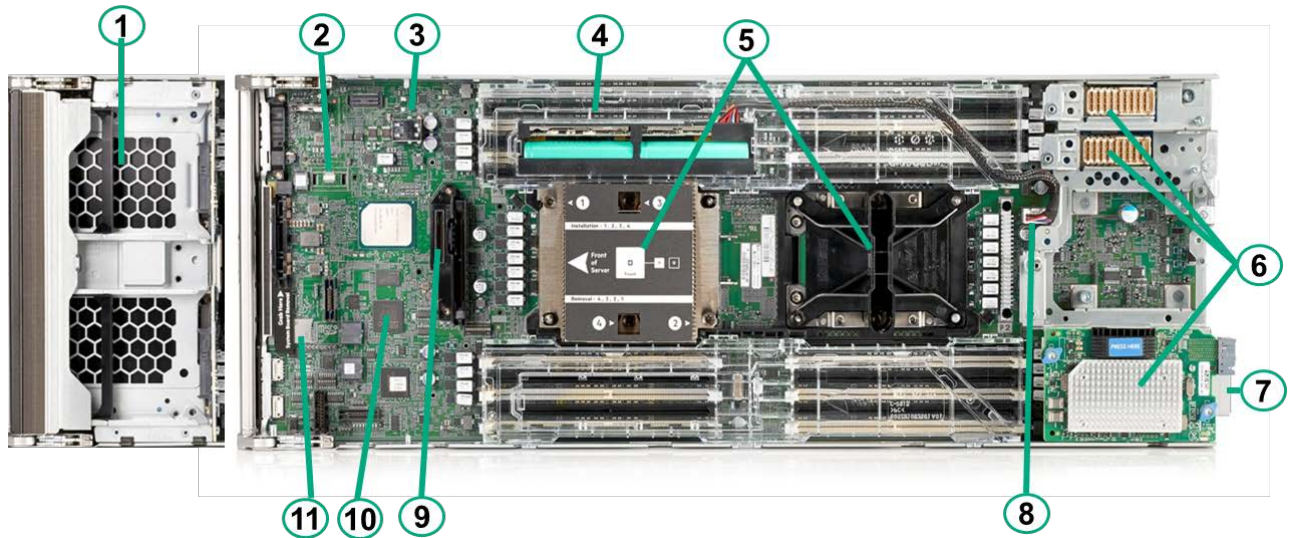
Overview
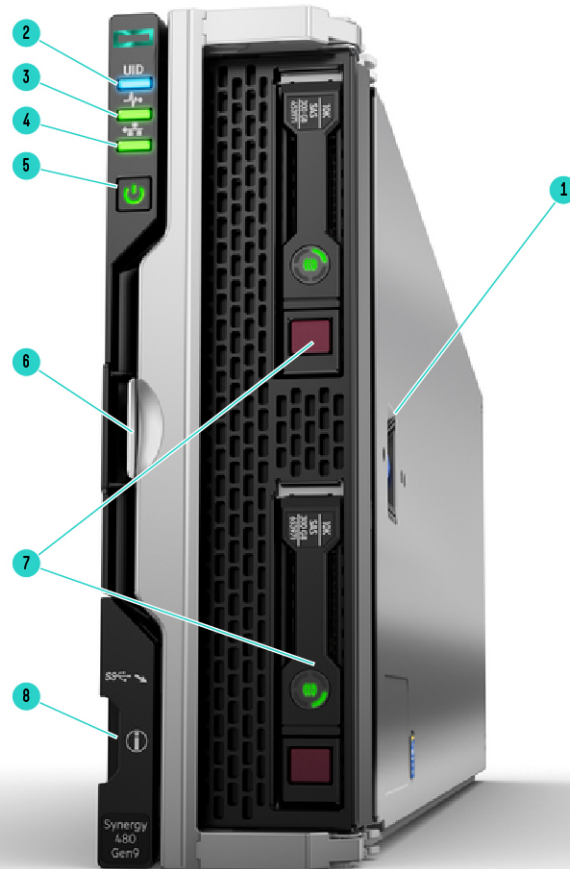
Synergy 480 - Front View

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)

Overview

Synergy 480 Gen10 Compute Module
(Drive Cage removed)

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

What's New

- More choice with new Intel Xeon Scalable Family of processors – 3100, 4100, 5100, 6100, and 8100 series.
- New HPE Smart Array controller options for better managemt of storage of all types.
- Faster DDR4 SmartMemory choices @ 2666 MT/s.
- Enhanced Storage solutions including internal M.2 drive options.
- Expanded DAS drive connectivity (up to 200 drives per frame).
- Build Your Own Work Station - Synergy Graphics Accelerator solutions with MXM mezz option and MXM or PCIe Expansion Modules.

Standard Features

Processors – Up to 2 of the following depending on model.

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

Intel Xeon Models	CPU Frequency	Cores	L3 Cache	Power	UPI	DDR4 MT/s	Memory per socket
Platinum 8180M Processor	2.5 GHz	28	38.50 MB	205W	3 @ 10.4 GT/s	2666 MT/s	1.5TB
Platinum 8180 Processor	2.5 GHz	28	38.50 MB	205W	3 @ 10.4 GT/s	2666 MT/s	768GB
Platinum 8176M Processor	2.1 GHz	28	38.50 MB	165W	3 @ 10.4 GT/s	2666 MT/s	1.5TB
Platinum 8176 Processor	2.1 GHz	28	38.50 MB	165W	3 @ 10.4 GT/s	2666 MT/s	768GB
Platinum 8170M Processor	2.1 GHz	26	35.75 MB	165W	3 @ 10.4 GT/s	2666 MT/s	1.5TB
Platinum 8170 Processor	2.1 GHz	26	35.75 MB	165W	3 @ 10.4 GT/s	2666 MT/s	768GB
Platinum 8168 Processor	2.7 GHz	24	33.00 MB	205W	3 @ 10.4 GT/s	2666 MT/s	768GB
Platinum 8164 Processor	2.0 GHz	26	35.75 MB	150W	3 @ 10.4 GT/s	2666 MT/s	768GB
Platinum 8160M Pro essor	2.1 GHz	24	33.00 MB	150W	3 @ 10.4 GT/s	2666 MT/s	1.5 TB
Platinum 8160 Processor	2.1 GHz	24	33.00 MB	150W	3 @ 10.4 GT/s	2666 MT/s	768 GB
Platinum 8158 Processor	3.0 GHz	12	24.75 MB	150W	3 @ 10.4 GT/s	2666 MT/s	768 GB
Platinum 8156 Processor	3.6 GHz	4	16.50 MB	105W	3 @ 10.4 GT/s	2666 MT/s	768 GB
Platinum 8153 Processor	2.0 GHz	16	22.00 MB	125W	3 @ 10.4 GT/s	2666 MT/s	768 GB
Gold 6154 Processor	3.0 GHz	18	24.75 MB	200W	3 @ 10.4 GT/s	2666 MT/s	768 GB
Gold 6152 Processor	2.1 GHz	22	30.25 MB	140W	3 @ 10.4 GT/s	2666 MT/s	768 GB
Gold 6150 Processor	2.7 GHz	18	24.75 MB	165W	3 @ 10.4 GT/s	2666 MT/s	768 GB
Gold 6148 Processor	2.4 GHz	20	27.50 MB	150W	3 @ 10.4 GT/s	2666 MT/s	768 GB
Gold 6142M Processor	2.6 GHz	16	22.00 MB	150W	3 @ 10.4 GT/s	2666 MT/s	1.5 TB
Gold 6142 Processor	2.6 GHz	16	22.00 MB	150W	3 @ 10.4 GT/s	2666 MT/s	768 GB
Gold 6140M Processor	2.3 GHz	18	24.75 MB	140W	3 @ 10.4 GT/s	2666 MT/s	1.5 TB
Gold 6140 Processor	2.3 GHz	18	24.75 MB	140W	3 @ 10.4 GT/s	2666 MT/s	768 GB
Gold 6138 Processor	2.0 GHz	20	27.50 MB	125W	3 @ 10.4 GT/s	2666 MT/s	768 GB
Gold 6136 Processor	3.0 GHz	12	24.75 MB	150W	3 @ 10.4 GT/s	2666 MT/s	768 GB
Gold 6134M Processor	3.2 GHz	8	24.75 MB	130W	3 @ 10.4 GT/s	2666 MT/s	1.5 TB
Gold 6134	3.2 GHz	8	24.75 MB	130W	3 @ 10.4 GT/s	2666 MT/s	768 GB

Standard Features

Processor							
Gold 6132 Processor	2.6 GHz	14	19.25 MB	140W	3 @ 10.4 GT/s	2666 MT/s	768 GB
Gold 6130 Processor	2.1 GHz	16	22.00 MB	125W	3 @ 10.4 GT/s	2666 MT/s	768 GB
Gold 6128 Processor	3.4 GHz	6	19.25 MB	115W	3 @ 10.4 GT/s	2666 MT/s	768GB
Gold 6126 Processor	2.6 GHz	12	19.25 MB	125W	3 @ 10.4 GT/s	2666 MT/s	768 GB
Gold 5122 Processor	3.6 GHz	4	16.50 MB	105W	2 @ 10.4 GT/s	2666 MT/s	768 GB
Gold 5120 Processor	2.2 GHz	14	19.25 MB	105W	2 @ 10.4 GT/s	2400 MT/s	768 GB
Gold 5118 Processor	2.3 GHz	12	16.50 MB	105W	2 @ 10.4 GT/s	2400 MT/s	768 GB
Gold 5115 Processor	2.4 GHz	10	13.75 MB	85W	2 @ 10.4 GT/s	2400 MT/s	768 GB
Silver 4116 Processor	2.1 GHz	12	16.50 MB	85W	2 @ 9.6 GT/s	2400 MT/s	768 GB
Silver 4114 Processor	2.2 GHz	10	13.75 MB	85W	2 @ 9.6 GT/s	2400 MT/s	768 GB
Silver 4112 Processor	2.6 GHz	4	8.25 MB	85W	2 @ 9.6 GT/s	2400 MT/s	768 GB
Silver 4110 Processor	2.1 GHz	8	11.00 MB	85W	2 @ 9.6 GT/s	2400 MT/s	768 GB
Silver 4108 Processor	1.8 GHz	8	11.00 MB	85W	2 @ 9.6 GT/s	2400 MT/s	768 GB
Bronze 3106 Processor	1.7 GHz	8	11.00 MB	85W	2 @ 9.6 GT/s	2133 MT/s	768 GB
Bronze 3104 Processor	1.7 GHz	6	11.00 MB	85W	2 @ 9.6 GT/s	2133 MT/s	768 GB

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

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

NOTE: 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.

NOTE: 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.

NOTE: 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

NOTE: For more information regarding Intel® chipsets, please see the following URL:

http://www.intel.com/products/server/chipsets/

Standard Features

Synergy Management

HPE Composer powered by OneView

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

On Compute Management Chipset

HPE iLO 5 ASIC

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

Memory

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

Type:		HPE DDR4 SmartMemory, 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)	1.5 TB	24 x 64 GB LRDIMM @ 2666 MT/s
Maximum capacity (RDIMM)	768 GB	24 x 32 GB RDIMM @ 2666 MHz

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

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.

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).

NOTE: 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).

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

NOTE: 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

Mezzanine options include:

- HPE Synergy 3820C 10/20Gb Converged Network Adapter
- HPE Synergy 3830C 16G FC HBA
- HPE Synergy 3530C 16G FC HBA
- HPE Synergy 10Gb 2820C Ethernet Adapter
- HPE Synergy 6810C 25/50Gb Ethernet

NOTE: 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.

NOTE: 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

NOTE: HPE Smart Array S100i SR Gen10 SW RAID is off by default and can be enabled RBSU.
NOTE: HPE Smart Array S100i SR Gen10 SW RAID is an HPE factory setting(784308-B21), will operate in UEFI mode only and requires HPE Synergy FIO Gen10 SATA Brd Kit (872955-B21) for enablement to Local Drives.
NOTE: HPE Smart Array S100i SR Gen10 SW RAID is an HPE factory setting(784308-B21), will operate in UEFI mode only and requires HPE Synergy 480 Gen10 M.2 FIO Adptr Brd Kit(873165-B21) for enablement of optional internal M.2 SATA Drives.
NOTE: 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. Also, supports P416ie-m with specific SAS cable connections allowing P416ie-m to manage SATA/SAS drives in both front drive cage and D3940)

NOTE: For more details on HPE Smart Array Controller solutions please see their **Quick Specs**

Standard Features

Maximum Internal Storage

	CAPACITY	CONFIGURATION
Hot Plug SFF SAS HDD	4.0 TB	2 x 2 TB (with standard front SFF drive cage)
Hot Plug SFF SATA HDD	4.0 TB	2 x 2 TB (with standard front SFF drive cage)
Hot Plug SFF SAS SSD	7.68 TB	2 x 3.84 TB (with standard front SFF drive cage)
Hot Plug SFF NVMe PCIe SSD	7.68 TB	2 x 3.84 TB (with standard front SFF drive cage)
M.2 SATA SSD Option Drives	960 GB	2 x 480 GB SATA M.2 Drives (internal w/ adaptor)

Interfaces

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

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

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

Operating Systems, Hpervisors

Microsoft Windows Server 2012, 2012 R2 Standard and Datacenter Editions, 2012 R2 Essentials
Microsoft Windows Server 2016 Standard and Datacenter Editions
Microsoft Hyper-V Server 2012, 2012 R2
Red Hat Enterprise Linux 6.9, 7.3 (64-bit-includes KVM and RHEVH), 8.0 (at availability)
SUSE Linux Enterprise Server 11 SP4, 12 SP1, 12 SP2 (64-bit - includes XEN and KVM)

Citrix Xenserver 7.0, 7.1 (primary use for HPE GPU Options/XENDesktop)
VMware vSphere 6.0 U3, 6.5 U1

Client OS (with GPU Options Only)

Windows 7, 10 Pro & Enterprise Client OS
Red Hat Enterprise Linux Desktop/Workstation 6.9, 7.3, 8.0
SLES Desktop 12 SP1, SP2 (64 bit - includes XEN &KVM)

NOTE: For Operating Systems tested with the NVIDIA and AMD GPU options, please see the Graphics Adapter Quick Specs for details.
NOTE: Operating System support may change. To get the most updated information, please go to the HPE OS Support Matrix at **http://www.hpe.com/info/ossupport**.

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 Gen9 Compute Modules

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)

Standard Features

- IEEE (specific IEEE standards depending on Ethernet adapter card(s) installed)
- Advanced Encryption Standard (AES)
- Triple Data Encryption Standard (3DES)
- SNMP
- SSL 2.0
- DMTF Systems Management Architecture for Server Hardware Command Line Protocol (SMASH CLP)
- Active Directory v1.0
- PCIe 3.0 Compliant
- UEFI (Unified Extensible Firmware Interface Forum)
- Redfish API (iLO5)

Graphics (ilO)

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.

NOTE: 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.
- iSCSI Software Initiator Support.
- HTTP/HTTPs Boot support as a PXE alternative.
- Boot support for option cards that only support a UEFI option ROM

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

Embedded Management

HPE Synergy Composer 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

Standard Features

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

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.

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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 Care Pack services or customized service agreements. Hard drives have either a one year or three year warranty; refer to the specific hard drive QuickSpecs for details.

NOTE: Server Warranty includes 3-Year Parts, 3-Year Labor, 3-Year Onsite support with next business day response. Warranty repairs may be accomplished through the use of Customer Self Repair (CSR) parts. These parts fall into two categories: 1) Mandatory CSR parts are designed for easy replacement. A travel and labor charge will result when customers decline to replace a Mandatory CSR part; 2) Optional CSR parts are also designed for easy replacement but may involve added 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://h17007.www1.hpe.com/us/en/enterprise/servers/warranty/.

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.

Graphics Accelerators

Mezzanine Graphics Adapter Options for 480 Compute Modules

- NVIDIA Quadro M3000SE MXM server graphics
- AMD FirePro S7100X graphics
- NVIDIA Tesla M6 graphics

NOTE: All MXM graphics card options are sold in pairs of GPUs. If there are GPU slots available in the Module, it can be field upgraded with additional GPUs. Note mixing GPUs is not supported.

MXM Graphics Card Options for use In the Multi MXM Expansion Module

- NVIDIA Quadro M3000SE MXM
- AMD FirePro S7100X MXM
- NVIDIA Tesla M6 MXM

PCIe Graphics Card Options for use In the 2x 16 PCIe Expansion Module

- NVIDIA Quadro P6000
- NVIDIA Tesla M10
- NVIDIA Tesla M60

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

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

Compatible SAN

HPE Synergy 480 Gen10 Compute Modules 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 master/satellite architecture.

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

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

The HPE VC SE 40 Gb F8 modules eliminate up to 95% of network sprawl at the compute module edge with one device that converges traffic inside frames and directly connects to external LANs. Each redundant pair of Virtual Connect modules provide eight adjustable downlink connections (six Ethernet and two Fibre Channel, or eight Ethernet) to dual-port 10 Gb and in case of 20 Gb Converged Network Adapters 16 adjustable downlinks connections 14 Ethernet and two Fibre Channel) on each

Optional Features

compute module. Up to six uplinks using QSFP+ interfaces are available for connection to upstream Ethernet switches. Including splitter cables up to 24 uplinks are available for connection to upstream Ethernet and Fibre Channel. The HPE VC SE 40 Gb F8 modules avoid the confusion of traditional and other converged network solutions by eliminating the need for multiple Ethernet and Fibre Channel switches, extension modules, cables and software licenses. Also, Virtual Connect wire-once connection management is built-in enabling compute modules adds, moves and replacement in minutes instead of days or weeks. The Master/Satellite disaggregated architecture removes fixed of ratios of interconnects in every frame and allows extending networking resources pool for Virtual Connect to satellite frames.

For more information on Virtual Connect and converged network options, see **http://www.hpe.com/info/virtualconnect.**

One Config Simple (SCE)

SCE is a guided self-service tool to help sales and non-technical people provide customers with initial configurations in 3 to 5 minutes. You may then send the configuration on for configuration help, or use in your existing ordering processes. If you require "custom" rack configuration or configuration for products not available in SCE, please contact Hewlett Packard Enterprise Customer Business Center or an Authorized Partner for assistance.
https://h22174.www2.hpe.com/SimplifiedConfig/Welcome#

Service and Support

Pointnext - Service and Support

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

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

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

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.

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

Other Related Services

HPE Server Hardware Installation
Provides for the basic hardware installation of HPE branded servers, storage devices and networking options to assist you in bringing your new hardware into operation in a timely and professional manner.
https://www.hpe.com/h20195/V2/GetPDF.aspx/5981-9356EN.pdf

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

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

Service and Support

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

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

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

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

Pre-configured Models

SKU	Entry	Base	Performance
[SKU Number]	871946-B21	871945-B21	871943-B21
TAA SKU [1]	871946-B22	871945-B22	871943-B22
Model Name	HPE Synergy 480 Gen10 Entry Compute Module	HPE Synergy 480 Gen10 Base Compute Module	HPE Synergy 480 Gen10 Performance Compute Module
Processor	1x Intel Xeon-B 3104 (6C, 1.7G, 85W)	1x Intel Xeon-G 5118 (12C, 2.3G, 105W)	2x Intel Xeon-G 6130 (16C, 2.1G, 125W)
Number of Processors	1	1	2
Memory	16GB (2x 8GB DIMMs)	32GB (2x 16GB DIMMs)	64GB (4x 16GB DIMMs)
Network Controller	HPE Synergy 3820C 10/20G Converged Network Adapter	HPE Synergy 3820C 10/20G Converged Network Adapter	HPE Synergy 3820C 10/20G Converged Network Adapter
Storage Controller	HPE Smart Array S100i Gen10 Embedded SATA Software RAID, No Cache	HPE Smart Array E208i-c Gen10 12G SAS Modular Controller(HBA)	HPE Smart Array P204i-c Gen10 12G SAS Modular Controller
Drive Cage	Standard BP with 2 SFF, 4 uFF Drive bays for optional SATA or SAS Drives	Standard BP with 2 SFF, 4 uFF Drive bays for optional SATA or SAS Drives	Standard BP with 2 SFF/4 uFF Drive bays for optional SATA/SAS Drives
Mezzanine Slots	3 x16 PCIe 3.0		
Management	OneView 3.1 and iLO 5 Advanced (standard)		

NOTE: UEFI is the standard default for all Predefined models.

Configuration Information - Factory Integrated Models

NOTE: This section lists some of the steps required to configure a Factory Integrated Model (configure-to-order or CTO compute module). To ensure only valid configurations are ordered, Hewlett Packard Enterprise recommends the use of an Hewlett Packard Enterprise approved configurator. Contact your local sales representative for information on CTO product offerings and requirements.
NOTE: Configure-to-order compute modules must start with a CTO Compute Module.
NOTE: FIO indicates that this option is only available as a factory installable option.
NOTE: All Factory Integrated Models will be populated with sufficient drive blanks based on the number of initial drives ordered with the server.
 NOTE: The Factory integrated w/o drive bay model ships with a grill blank in place of the drive cage and drive backplane.

Step 1: 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 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 6810C 25/50Gb Ethernet Adapter, HPE Synergy 3530C 16G FC HBA, HPE Synergy 3830C 16G FC HBA)		
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)		

NOTE: CTO SKUs are designed for specific use case fits.
NOTE: This information applies to factory CTO configurations, Field upgrades may differ depending field configurations.
NOTE: BackPlane in the chassis description refers to the type of controller backplane in the Drive Cage modules.

Configuration Information - Factory Integrated Models

NOTE: Standard BackPlane 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.

NOTE: The Drive-Less 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.

NOTE: The Premium BackPlane 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] **NOTE:** HPE offers multiple Trade Agreement Act (TAA) compliant configurations to meet the needs of US Federal Government customers. These products are either manufactured or substantially transformed in a designated country.

Step 2a: Choose Required Options - Processors

Processor Option Kits

Intel Xeon-Platinum Processors

HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8180M (2.5GHz/28-core/205W) FIO Processor Kit	872131-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8180 (2.5GHz/28-core/205W) FIO Processor Kit	872119-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8176M (2.1GHz/28-core/165W) FIO Processor Kit	876871-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8176 (2.1GHz/28-core/165W) FIO Processor Kit	872120-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8170M (2.1GHz/26-core/165W) FIO Processor Kit	873377-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8170 (2.1GHz/26-core/165W) FIO Processor Kit	872121-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8168 (2.7GHz/24-core/205W) FIO Processor Kit	872122-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8164 (2.0GHz/26-core/150W) FIO Processor Kit	872123-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8160M (2.1GHz/24-core/150W) FIO Processor Kit	872130-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8160 (2.1GHz/24-core/150W) FIO Processor Kit	872129-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8158 (3.0GHz/12-core/150W) FIO Processor Kit	873385-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8156 (3.6GHz/4-core/105W) FIO Processor Kit	873382-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8153 (2.0GHz/16-core/125W) FIO Processor Kit	873389-L21

Intel Xeon-Gold Processors

HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6154 (3.0GHz/18-core/200W) FIO Processor Kit	872132-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6152 (2.1GHz/22-core/140W) FIO Processor Kit	872133-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6150 (2.7GHz/18-core/165W) FIO Processor Kit	872134-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6148 (2.4GHz/20-core/150W) FIO Processor Kit	872135-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6142M (2.6GHz/16-core/150W) FIO Processor Kit	872117-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6142 (2.6GHz/16-core/150W) FIO Processor Kit	872138-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6140M (2.3GHz/18-core/140W) FIO Processor Kit	872116-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6140 (2.3GHz/18-core/140W) FIO Processor Kit	872139-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6138 (2.0GHz/20-core/125W) FIO Processor Kit	873376-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6136 (3.0GHz/12-core/150W) FIO Processor Kit	873378-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6134M (3.2GHz/8-core/130W) FIO Processor Kit	872115-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6134 (3.2GHz/8-core/130W) FIO Processor Kit	873379-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6132 (2.6GHz/14-core/140W) FIO Processor Kit	873380-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6130 (2.1GHz/16-core/125W) FIO Processor Kit	873381-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6128 (3.4GHz/6-core/115W) FIO Processor Kit	873383-L21

Configuration Information - Factory Integrated Models

HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6126 (2.6GHz/12-core/125W) FIO Processor Kit	873384-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5122 (3.6GHz/4-core/105W) FIO Processor Kit	873386-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5120 (2.2GHz/14-core/105W) FIO Processor Kit	873388-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5118 (2.3GHz/12-core/105W) FIO Processor Kit	873387-L21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5115 (2.4GHz/10-core/85W) FIO Processor Kit	873390-L21

Intel Xeon-Silver Processors

HPE Synergy 480 Gen10 Intel Xeon-Silver 4116 (2.1GHz/12-core/85W) FIO Processor Kit	872114-L21
HPE Synergy 480 Gen10 Intel Xeon-Silver 4114 (2.2GHz/10-core/85W) FIO Processor Kit	872112-L21
HPE Synergy 480 Gen10 Intel Xeon-Silver 4112 (2.6GHz/4-core/85W) FIO Processor Kit	872113-L21
HPE Synergy 480 Gen10 Intel Xeon-Silver 4110 (2.1GHz/8-core/85W) FIO Processor Kit	872110-L21
HPE Synergy 480 Gen10 Intel Xeon-Silver 4108 (1.8GHz/8-core/85W) FIO Processor Kit	872111-L21

Intel Xeon-Bronze Processors

HPE Synergy 480 Gen10 Intel Xeon-Bronze 3106 (1.7GHz/8-core/85W) FIO Processor Kit	873391-L21
HPE Synergy 480 Gen10 Intel Xeon-Bronze 3104 (1.7GHz/6-core/85W) FIO Processor Kit	872118-L21

NOTE: All processors within any single compute module must be identical.

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

NOTE: Turbo indicates the maximum potential frequency when using Intel® Turbo Boost Technology. The frequency boost increment is dependent on the processor SKU and the number of active cores. In general, a higher boost increment is obtained when fewer cores are active.

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

NOTE: Supports 1 or 2 processors. Mixing different processor models is not supported. First processor is xxxxxx-L21 and second processor selection will be corresponding xxxxxx-B21.

NOTE: For the Intel® C621 Chipset Scalable Family Processors come with model numbers to indicate SKU level, processor generation, SKU model, integrations-optimizations or memory capacity. (ie. HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6134M; 6 is the SKU Level, 1 is the processor generation, 34 is the SKU model, m indicates memory sku)

NOTE: The HPE Synergy 480 Gen9 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).

NOTE: The processor model as well as the memory configuration determines the maximum speed memory can operate. Please see the see the "Memory" section later in this document.

NOTE: Platinum – 8100 Series - 2 and 4 socket capable, 2S - 2UPI, 4S - 3UPI @ 10.4 GT/s, 6-Channel DDR4 @ 2666 MT/s, 768 GB memory capacity (1.5 TB on select skus), Intel Turbo Boost Technology, Intel Hyper-Threading Technology Intel AVX-512 (2x 512-bit FMA), 48 lanes PCIe 3.0, advanced RAS.

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

NOTE: Silver and Bronze processors are primarily designed for 2 Socket servers and will appear as Synergy 480 Gen10 only processors.

NOTE: 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.

NOTE: 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

Configuration Information - Factory Integrated Models

One or more of the following Memory Kits must be selected. Two processors requires two memory kits.

Memory Options

HPE 8GB (1x8GB) Single Rank x8 DDR4-2666 CAS-19-19-19 Registered Memory Kit	815097-B21
HPE 16GB (1x16GB) Single Rank x4 DDR4-2666 CAS-19-19-19 Registered Memory Kit	815098-B21
HPE 16GB (1x16GB) Dual Rank x8 DDR4-2666 CAS-19-19-19 Registered Memory Kit	835955-B21
HPE 32GB (1x32GB) Dual Rank x4 DDR4-2666 CAS-19-19-19 Registered Memory Kit	815100-B21
HPE 64GB (1x64GB) Quad Rank x4 DDR4-2666 CAS-19-19-19 LRDIMM Memory Kit	815101-B21

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

Step 2c: Choose Networking Adapters

At least one Network adapter is required:

HPE Synergy 3820C 10/20Gb Converged Network Adapter	777430-B21
HPE Synergy 6810C 25/50Gb Ethernet Adapter	867322-B21
HPE Synergy 2820C 10Gb Converged Network Adapter	794538-B21

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

Step 3: Choose Additional Factory Integratable Options

One or more of the following as desired unless otherwise noted.
NOTE: At least one HPE Storage Controller is required if selecting HPE Synergy 480 Gen10 CTO Standard BackPlane Compute Module (871940-B21 or 871940-B22).

HPE Storage Controllers

HPE Smart Array Software RAID S100i Gen10 Controller FIO setting(FIO Enable Smart Array SW RAID)	784308-B21
HPE Synergy FIO Gen10 SATA Board Kit (required with above FIO setting for local SATA drives)	872955-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 Smart Array P416ie-m SR Gen10 (8 Int 8 Ext Lanes/2GB Cache) 12G SAS Mezzanine Controller	804428-B21

NOTE: HPE Smart Array S100i SR Gen10 SW RAID is off by default and can be enabled RBSU.
NOTE: HPE Smart Array S100i SR Gen10 SW RAID is an HPE factory setting (784308-B21), will operate in UEFI mode only and requires HPE Synergy FIO Gen10 SATA Brd Kit (872955-B21) for enablement to Local Drives.
NOTE: HPE Smart Array S100i SR Gen10 SW RAID is an HPE factory setting (784308-B21), will operate in UEFI mode only and requires HPE Synergy 480 Gen10 M.2 FIO Adapter Board Kit (873165-B21) for enablement of optional internal M.2 SATA Drives.

HPE M.2 Mezzanine Options

HPE SY 480 Gen10 M.2 FIO Adapter Board Kit	873165-B21

    NOTE: For use with M.2 SSD drives.

HPE Graphics Accelerators and Expansion Options

Configuration Information - Factory Integrated Models

HPE SY 480 Gen10 Multi MXM FIO Expansion Module	872627-B21
HPE SY 480 Gen10 PCIe FIO Expansion Module	872628-B21
HPE Synergy 480 NVIDIA Tesla M6 FIO Mezzanine Card	869224-B21
HPE Synergy 480 NVIDIA Quadro M3000SE Mezzanine FIO Graphics Kit	869228-B21
HPE Synergy AMD FirePro S7100X FIO Mezzanine Card	869226-B21

NOTE: 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.
NOTE: NVIDIA Tesla M6 requires NVIDIA Grid 2.0 or later to enable vGPU features. vGPU not enabled by default on the card alone. For more information, go to NVIDIA: **http://www.nvidia.com/grid**
NOTE: GRID license for use with NVIDIA Tesla M6 must be purchased separately through an NVIDIA verified virtualization partner at **http://www.nvidia.com/buygrid**

BIOS Mode

HPE Legacy FIO Mode Setting	758959-B22

    NOTE: Cannot be selected with HPE Smart Array Software RAID S100i Gen10 Controller FIO Setting

Memory Setting

HPE Memory Fast Fault Tolerance FIO Kit	875293-B21

    NOTE: Enables HPE Smart Server memory to run at the resiliency of Double Device Data Correct (DDDC) with significantly higher performance.

HPE TPM Mode Setting

HPE Gen10 TPM 1.2 FIO Setting	872108-B21

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

- HPE Synergy 12000 Frame QuickSpecs
  https://www.hpe.com/h20195/v2/GetHtml.aspx?docname=c04815113
- HPE Synergy Interconnect and Mezzanine Components QuickSpecs
  https://www.hpe.com/h20195/v2/GetHtml.aspx?docname=c04815110
  https://www.hpe.com/h20195/v2/GetHtml.aspx?docname=c04815110
- HPE Synergy D3940 Storage Module QuickSpecs
  https://www.hpe.com/h20195/v2/GetHtml.aspx?docname=c04815141

Additional Options

HPE Graphics Accelerators and Expansion

Mezzanine GPU Options for Synergy 480 Compute Module

HPE Synergy 480 NVIDIA M6 Multi MXM Option Kit	826043-B21
HPE Synergy AMD FirePro S7100X Multi MXM Option Kit	868417-B21
HPE Synergy 480 Multi MXM with 2 NVIDIA M3000SE Graphics Kit	868663-B21
HPE NVIDIA Tesla M60 RAF Dual GPU Module	M3X67A
HPE NVIDIA Quadro P6000 GPU Module	Q0V76A
NVIDIA Tesla M10 Quad GPU Module	Q0J62A

NOTE: 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.

NOTE: NVIDIA Tesla M6 requires NVIDIA Grid 2.0 or later to enable vGPU features. vGPU not enabled by default on the card alone. For more information, go to NVIDIA: **http://www.nvidia.com/grid**

NOTE: GRID license for use with NVIDIA Tesla M6 must be purchased separately through an NVIDIA verified virtualization partner at **http://www.nvidia.com/buygrid**.

HPE Processors

Intel Xeon-Platinum Processors

HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8180M (2.5GHz/28-core/205W) Processor Kit	872131-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8180 (2.5GHz/28-core/205W) Processor Kit	872119-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8176M (2.1GHz/28-core/165W) Processor Kit	876871-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8176 (2.1GHz/28-core/165W) Processor Kit	872120-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8170M (2.1GHz/26-core/165W) Processor Kit	873377-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8170 (2.1GHz/26-core/165W) Processor Kit	872121-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8168 (2.7GHz/24-core/205W) Processor Kit	872122-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8164 (2.0GHz/26-core/150W) Processor Kit	872123-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8160M (2.1GHz/24-core/150W) Processor Kit	872130-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8160 (2.1GHz/24-core/150W) Processor Kit	872129-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8158 (3.0GHz/12-core/150W) Processor Kit	873385-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8156 (3.6GHz/4-core/105W) Processor Kit	873382-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Platinum 8153 (2.0GHz/16-core/125W) Processor Kit	873389-B21

Intel Xeon-Gold Processors

HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6154 (3.0GHz/18-core/200W) Processor Kit	872132-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6152 (2.1GHz/22-core/140W) Processor Kit	872133-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6150 (2.7GHz/18-core/165W) Processor Kit	872134-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6148 (2.4GHz/20-core/150W) Processor Kit	872135-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6142M (2.6GHz/16-core/150W) Processor Kit	872117-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6142 (2.6GHz/16-core/150W) Processor Kit	872138-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6140M (2.3GHz/18-core/140W) Processor Kit	872116-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6140 (2.3GHz/18-core/140W) Processor Kit	872139-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6138 (2.0GHz/20-core/125W) Processor Kit	873376-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6136 (3.0GHz/12-core/150W) Processor Kit	873378-B21

Additional Options

HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6134M (3.2GHz/8-core/130W) Processor Kit	872115-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6134 (3.2GHz/8-core/130W) Processor Kit	873379-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6132 (2.6GHz/14-core/140W) Processor Kit	873380-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6130 (2.1GHz/16-core/125W) Processor Kit	873381-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6128 (3.4GHz/6-core/115W) Processor Kit	873383-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6126 (2.6GHz/12-core/125W) Processor Kit	873384-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5122 (3.6GHz/4-core/105W) Processor Kit	873386-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5120 (2.2GHz/14-core/105W) Processor Kit	873388-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5118 (2.3GHz/12-core/105W) Processor Kit	873387-B21
HPE Synergy 480/660 Gen10 Intel Xeon-Gold 5115 (2.4GHz/10-core/85W) Processor Kit	873390-B21

Intel Xeon-Silver Processors

HPE Synergy 480 Gen10 Intel Xeon-Silver 4116 (2.1GHz/12-core/85W) Processor Kit	872114-B21
HPE Synergy 480 Gen10 Intel Xeon-Silver 4114 (2.2GHz/10-core/85W) Processor Kit	872112-B21
HPE Synergy 480 Gen10 Intel Xeon-Silver 4112 (2.6GHz/4-core/85W) Processor Kit	872113-B21
HPE Synergy 480 Gen10 Intel Xeon-Silver 4110 (2.1GHz/8-core/85W) Processor Kit	872110-B21
HPE Synergy 480 Gen10 Intel Xeon-Silver 4108 (1.8GHz/8-core/85W) Processor Kit	872111-B21

Intel Xeon-Bronze Processors

HPE Synergy 480 Gen10 Intel Xeon-Bronze 3106 (1.7GHz/8-core/85W) Processor Kit	873391-B21
HPE Synergy 480 Gen10 Intel Xeon-Bronze 3104 (1.7GHz/6-core/85W) Processor Kit	872118-B21

NOTE: All processors within the compute module must be identical.

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

NOTE: Turbo indicates the maximum potential frequency when using Intel® Turbo Boost Technology. The frequency boost increment is dependent on the processor SKU and the number of active cores. In general, a higher boost increment is obtained when fewer cores are active.

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

NOTE: Mixing different processor models is not supported.

NOTE: For the Intel® C621 Chipset Scalable Family Processors come with model numbers to indicate SKU level, processor generation, SKU model, integrations-optimizations or memory capacity (ie. HPE Synergy 480/660 Gen10 Intel Xeon-Gold 6134M; 6 is the SKU Level, 1 is the processor generation, 34 is the SKU model, m indicates memory sku).

NOTE: The HPE Synergy 480 Gen9 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).

NOTE: The processor model as well as the memory configuration determines the maximum speed memory can operate. Please see the see the "Memory" section later in this document.

NOTE: Platinum – 8100 Series - 2 and 4 socket capable, 2S - 2UPI, 4S - 3UPI @ 10.4 GT/s, 6-Channel DDR4 @ 2666 MT/s, 768 GB memory capacity (1.5 TB on select skus), Intel Turbo Boost Technology, Intel Hyper-Threading Technology Intel AVX-512 (2x 512-bit FMA), 48 lanes PCIe 3.0, advanced RAS.

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

NOTE: Silver and Bronze processors are primarily designed for 2 Socket servers and will appear as Synergy 480 Gen10 only processors.

NOTE: 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.

NOTE: Bronze – 3100 Series - 2 socket capable, 2S - 2UPI @ 9.6 GT/s, 6-Channel DDR4 @ 2133 MHz, 768

Additional Options

GB memory.

HPE Memory

HPE 8GB (1x8GB) Single Rank x8 DDR4-2666 CAS-19-19-19 Registered Memory Kit	815097-B21
HPE 16GB (1x16GB) Single Rank x4 DDR4-2666 CAS-19-19-19 Registered Memory Kit	815098-B21
HPE 16GB (1x16GB) Dual Rank x8 DDR4-2666 CAS-19-19-19 Registered Memory Kit	835955-B21
HPE 32GB (1x32GB) Dual Rank x4 DDR4-2666 CAS-19-19-19 Registered Memory Kit	815100-B21
HPE 64GB (1x64GB) Quad Rank x4 DDR4-2666 CAS-19-19-19 LRDIMM Memory Kit	815101-B21

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

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

NOTE: For more information refer to the **Memory Speed Tables**

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

HPE Drives

NOTE: 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.

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

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

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.

Enterprise - 12G SAS - SFF Drives

HPE 300GB SAS 12G Enterprise 10K SFF (2.5in) SC 3yr Wty HDD	785067-B21
HPE 300GB SAS 12G Enterprise 10K SFF (2.5in) SC 3yr Wty Digitally Signed Firmware HDD	872475-B21
HPE 600GB SAS 12G Enterprise 15K SFF (2.5in) SC 3yr Wty 512e HDD	748387-B21
HPE 600GB SAS 12G Enterprise 15K SFF (2.5in) SC 3yr Wty Digitally Signed Firmware HDD	870757-B21
HPE 600GB SAS 12G Enterprise 10K SFF (2.5in) SC 3yr Wty HDD	781516-B21
HPE 600GB SAS 12G Enterprise 10K SFF (2.5in) SC 3yr Wty Digitally Signed Firmware HDD	872477-B21
HPE 900GB SAS 12G Enterprise 10K SFF (2.5in) SC 3yr Wty HDD	785069-B21
HPE 900GB SAS 12G Enterprise 15K SFF (2.5in) SC 3yr Wty DS Digitally Signed Firmware HDD	870759-B21
HPE 900GB SAS 12G Enterprise 15K SFF (2.5in) SC 3yr Wty 512e Digitally Signed Firmware HDD	870765-B21
HPE 1.2TB SAS 12G Enterprise 10K SFF (2.5in) SC 3yr Wty HDD	781518-B21
HPE 1.2TB SAS 12G Enterprise 10K SFF (2.5in) SC 3yr Wty Digitally Signed Firmware HDD	872479-B21
HPE 1.8TB SAS 12G Enterprise 10K SFF (2.5in) SC 3yr Wty 512e HDD	791034-B21
HPE 1.8TB SAS 12G Enterprise 10K SFF (2.5in) SC 3yr Wty 512e Digitally Signed Firmware HDD	872481-B21

Midline 6G SATA - SFF Drives

HPE 1TB SATA 6G Midline 7.2K SFF (2.5in) SC 1yr Wty HDD	655710-B21
HPE 1TB SATA 6G Midline 7.2K SFF (2.5in) SC 1yr Wty 512e HDD	765453-B21
HPE 2TB SATA 6G Midline 7.2K SFF (2.5in) SC 1yr Wty 512e HDD	765455-B21

Midline - 12G SAS - SFF Drives

Additional Options

HPE 1TB SAS 12G Midline 7.2K SFF (2.5in) SC 1yr Wty 512e HDD	765464-B21
HPE 2TB SAS 12G Midline 7.2K SFF (2.5in) SC 1yr Wty 512e HDD	765466-B21
HPE 1TB SAS 12G Midline 7.2K SFF (2.5in) SC 1yr Wty HDD	832514-B21

Write Intensive - PCIe/NVMe - SFF - Solid State Drives

HPE 400GB NVMe x4 Lanes Write Intensive SFF (2.5in) SCN 3yr Wty SSD	736936-B21
HPE 800GB NVMe x4 Lanes Write Intensive SFF (2.5in) SCN 3yr Wty SSD	736939-B21
HPE 1.6TB NVMe x4 Lanes Write Intensive SFF (2.5in) SCN 3yr Wty SSD	764892-B21
HPE 2TB NVMe x4 Lanes Write Intensive SFF (2.5in) SCN 3yr Wty SSD	764894-B21

Write Intensive - 6G SATA - SFF - Solid State Drives

HPE 400GB SATA 6G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	872355-B21
HPE 800GB SATA 6G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	872359-B21
HPE 1.6TB SATA 6G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	872363-B21

Read Intensive - 6G SATA - SFF - Solid State Drives

HPE 150GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	869374-B21
HPE 240GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	868814-B21
HPE 240GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	869376-B21
HPE 480GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	868818-B21
HPE 480GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	869378-B21
HPE 960GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	868822-B21
HPE 960GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	869384-B21
HPE 1.6TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	869386-B21
HPE 1.92TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	868826-B21
HPE 3.8TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	868830-B21

SATA M.2 - Solid State Drives(for use with internal M.2 drive options)

Read Intensive – SATA M.2 Solid State Drives

HPE 120GB 6G SATA Read Intensive M.2 2280 3yr Wty Solid State Drive	777262-B21
HPE 150GB SATA Read Intensive M.2 2280 DS Solid State Drive	875317-B21
HPE 340GB 6G SATA Read Intensive M.2 2280 3yr Wty Solid State Drive	777264-B21
HPE 480GB SATA Read Intensive M.2 2280 DS Solid State Drive	875319-B21

Read Intensive – 6G SATA uFF - Solid State Drives

HPE 120GB SATA 6G Read Intensive uFF 3yr Wty M.2 Kit	822594-B21
HPE 120GB SATA 6G Read Intensive uFF 3yr Wty Dual M.2 Kit	822593-B21
HPE 340GB SATA 6G Read Intensive uFF 3yr Wty M.2 Kit	815606-B21
HPE 340GB SATA 6G Read Intensive uFF 3yr Wty Dual M.2 Kit	815605-B21

Mixed Use - 6G SATA - SFF - Solid State Drives

HPE 480GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	872344-B21
HPE 960GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	872348-B21
HPE 1.92TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	872352-B21

Drive Qualification Exceptions:

At this time there are no exceptions to list.

HPE Security

HPE Trusted Platform Module Option	488069-B21

Additional Options

HPE Trusted Platform Module 2.0 Kit 745823-B21

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

HPE Networking

10/20Gb Mezzanine Adapters

HPE Synergy 3820C 10/20Gb Converged Network Adapter 777430-B21
HPE Synergy 6810C 25/50 Gb Ethernet 867322-B21
HPE Synergy 2820C 10Gb Converged Network Adapter 794538-B21

HPE Fibre Channel

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

HPE Storage Controllers

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 Battery (up to 20 Devices) with 260mm Cable Kit 875242-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
 NOTE: For use with premium modules/front drives.
NOTE: Premium Backplane Modules, CTO offers a Premium Backplane Compute Module for use with NVMe drives in front drive cage. Also, supports P416ie-m with specific SAS cable (871573-B21) connections allowing P416ie-m to manage SATA/SAS drives in both front drive cage and D3940.

HPE Flash Media Kits

HPE Enterprise Mainstream Flash Media Kits for Memory Cards

HPE 8GB microSD Enterprise Mainstream Flash Media Kit 726116-B21
HPE 8GB microSD Enterprise Mainstream Flash Media Kit 737959-B21
HPE 32GB microSD Mainstream Flash Media Kit 700139-B21
HP Dual 8GB microSD Enterprise Midline USB Kit 741279-B21

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

HPE Synergy Services

HPE Synergy Proactive Care Services

HPE 3 Year Proactive Care 24x7 Synergy 480 Service H0UT1E
HPE 3 Year Proactive Care 24x7 with DMR Synergy 480 Service H0UT2E

Additional Options

HPE 3 Year Proactive Care Advanced 24x7 Synergy 480 Service   H0UT4E
HPE 3 Year Proactive Care Advanced 24x7 with DMR Synergy 480 Service   H0UT5E

Deployment/Installation & Start-up Services

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

NOTE: 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 SmartMemory is required. For additional information, please see the **HPE DDR4 SmartMemory 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 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 6100, 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)				

Memory

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

| DIMM Type	Load Reduced (LRDIMM)
HPE SKU P/N	815101-B21
SKU Description	HPE 64GB 4Rx4 PC4-2400V-L
DIMM Rank	Quad Rank (4R)
DIMM Capacity	**64GB**
Voltage	1.2V
DRAM depth [bit]	2G
DRAM Width [bit]	x4
DRAM Density	8 Gb
CAS Latency	19-19-19
DIMM Native Speed (MT/s)	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
2 DIMM Per Channel	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
2 DIMM Per Channel	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
2 DIMM Per Channel	2133 MT/s

Memory Population

HPE Synergy Gen10 – Memory Population													
NOTE: 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	■	■	■	■	■	■	■	■	■	■	■	■
* Unbalanced Not Recommended												

Memory

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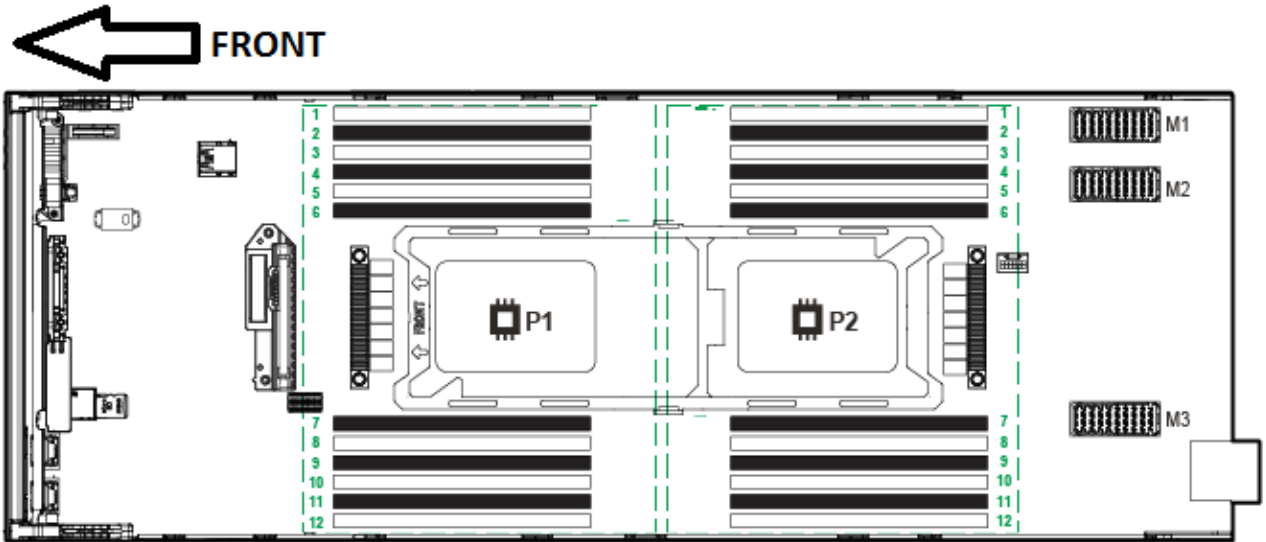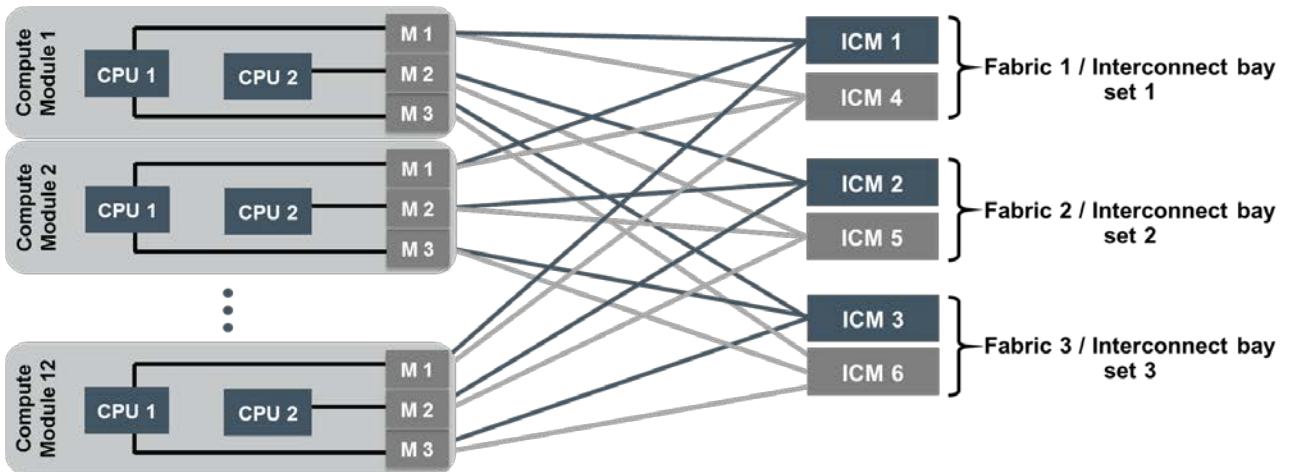

FRONT STORAGE

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)	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.	

NOTE: 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**.

NOTE: 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**.

NOTE: 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 recycling programs**, in many geographic areas, for our products. Products returned to Hewlett Packard Enterprise will be recycled, recovered or disposed of in a responsible manner.
	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
11 Jul-2017	Version 1	Created	New QuickSpecs

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