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HPE Synergy 480 Gen11 Compute Module QuickSpecs

The HPE Synergy 480 Gen11 Compute Module delivers exceptional capacity, efficiency, and flexibility in a two-socket, half-height form factor—featuring up to 64-core 4th- and 5th-Generation Intel® Xeon® Scalable Processors.

HPE DDR5 Smart Memory supporting up to 4 TB per processor, and flexible I/O and storage controller options. As part of the HPE Synergy Composable Infrastructure platform, it dynamically pools and composes compute, storage, and fabric resources to accelerate traditional and next-generation workloads.

Overview

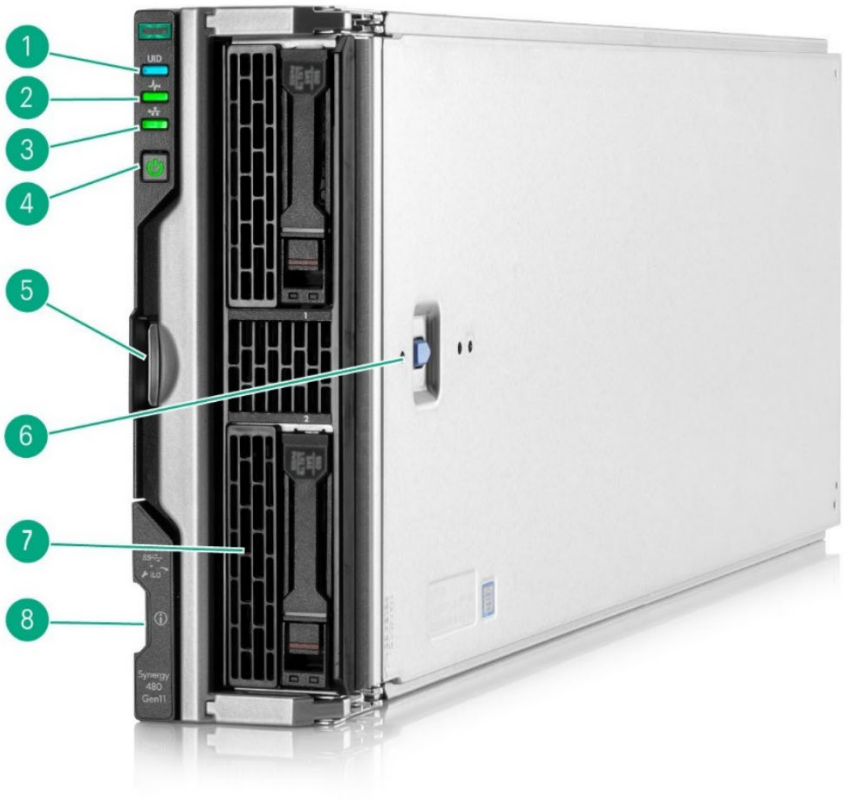
HPE Synergy, the first platform built from the ground up for Composable Infrastructure, offers an experience that empowers IT to create and deliver new value instantly and continuously. It is a single infrastructure that reduces operational complexity for traditional workloads and increases operational 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.

The HPE Synergy 480 Gen11 Compute Module delivers exceptional capacity, efficiency, and flexibility in a two-socket, half-height form factor to support demanding workloads. Powered by the 4th and 5th Generation Intel® Xeon® Scalable Processors with up to 64 cores, HPE DDR5 Smart Memory supporting up to 4TB per processor, flexible storage controller options, multiple I/O connectors, and designed to create a pool of flexible compute capacity within a composable infrastructure the HPE Synergy 480 Gen11 Compute Module is the ideal platform for general-purpose enterprise workload performance now and in the future.

This QuickSpecs document focuses on the HPE Synergy 480 Gen11 Compute Module.

Notes: The HPE Synergy 480 Gen11 compute module installation involves a minimum upgrade requirement for component compatibility purposes. To ensure proper system functionality, you must update your system to the appropriate Synergy Software Release before installing and operating your compute module.
For information on Synergy Releases, go to: http://www.hpe.com/downloads/synergy.

Overview



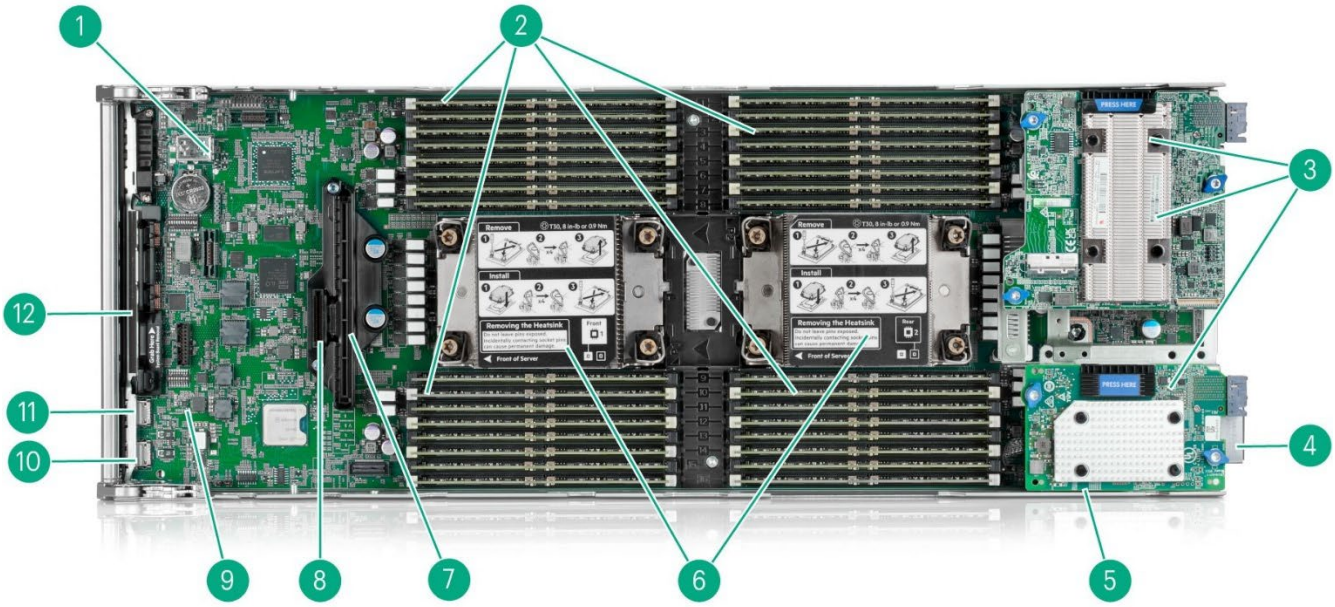
Front View – HPE Synergy 480 Gen11 Compute Module

Item	Description	Item	Description
1.	UID LED	5.	Compute Module handle release latch
2.	Health Status LED	6.	Quick Access Panel
3.	Mezzanine NIC status LED	7.	Removable drive cage[1]
4.	Power On/Standby button and system power LED	8.	Pull Out Label[2]

Notes:

- [1]Options for 2, 4, 8 drive bays, or drive-less.
- [2]Tab used for ID information on product. External USB 3.0 connector & iLO USB connection (behind serial label pull tab).

Overview



Synergy 480 Gen11 Compute Module
(Drive Cage removed)

Item	Description	Item	Description
1.	Internal USB 3.0	7.	Connection point for Optional Drive Cage solutions[2]
2.	Thirty-Two (32) DDR5 DIMM memory slots[1]	8.	HPE NS204i-d Gen11 Boot Controller Connector
3.	Mezzanine connectors (3 x16 PCIe 5.0)	9.	Embedded TPM
4.	Compute Module Power and Management connector	10.	External USB 3.0
5.	Storage Controller Energy Pack connection	11.	External USB iLO
6.	Up to two (2) Gen4 or Gen5 Intel® Xeon® Scalable Family processors	12.	Selectable front cage options[3]

Notes:

- [1]16 per processor.
- [2]2x Drive bays (SAS/SATA/NVMe), 4x Drive Bays (4x NVMe Direct Connect or 4x SAS/SATA/NVMe) or drive-less.
- [3]HPE NS204i-d Gen11 Boot Controller connects under drive cage.

Overview

What's New

- Synergy 480 Gen11 designed to provide increased performance and capacity
- Optional Drive Cage options for 2, 4, 8 drive and drive-less for your needed SAN and vSAN workloads
- HPE NS204i-d Gen11 Boot Controller designed for VMware HW RAID Requirements - operates with all drive cage options (all delivered as Factory Installed or sold as customer installable options)
- Intel® 5th Generation of Xeon® Scalable Family of processors
- 32 Memory DIMMs for up to 16 per processor up to 4TB Max, 16GB to 256GB Capacities @ speeds up to 5600 MT/s
- PCIe 5.0 throughout the module to provide the best performance for Boot, Storage and IO
- Regional Certifications including Energy Star, EU Lot 9, and Top Runner – Japan Fully Compliant

ErP Lot9 Quick Summary

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

SY480 Gen11 meets Lot9 in all configurations.

For additional information, please visit:
https://www.hpe.com/us/en/living-progress/environment/msds-specs-more.html.

Documents provided by HPE: Lot 9 Declarations, White paper, and FAQ.

Platform Information

Form Factor

- Single Slot Blade – Half-Height

Chassis Types

- Single Compute chassis for CTO
- 2 SFF SAS/SATA/NVMe Premium Drive Cage Option
- 4 SFF SAS/SATA/NVMe Premium Drive Cage Option
- 4 SFF NVMe Direct Connect Drive Cage Option
- 8 EDSFF NVMe E3.S Direct Connect Drive Cage Option
- Drive-less Cage Option

System Fans

- Comes with Frame by default and not this product

Notes: The HPE Synergy SY480 Gen11 Compute Module requires the HPE Synergy 12000 Frame to be configured with the HPE Synergy 12000 High Capacity Fan Kits.

Synergy Gen11 – Front Cage Options

The Synergy SY480 Gen11 consists of a single base chassis with multiple selectable drive and controller option kits. These options include multiple **Front Cage options** for boot and storage.

Notes:

- The Front Cage options are offered as factory installed and BTO options offered for later field updates.
- One of the following Drive Chassis options is required to ship to any customer.



HPE SY480 Gen11 2 SFF SAS/SATA/NVMe Premium Drive Cage Kit

A two drive SAS/SATA/NVMe Drive Cage Option for Boot and Store requirements.

Notes: This Drive Cage requires HPE SY480 Gen11 SAS Cable Opt Kit to connect to HPE SR416ie-m Gen11 x16 Lanes 4GB Cache SPDM Mezzanine Storage Controller.



HPE SY480 Gen11 4 SFF SAS/SATA/NVMe Premium Drive Cage Kit

A four drive SAS/SATA/NVMe Drive Cage Option for Boot and Store requirements.

Notes: This Drive Cage requires HPE SY480 Gen11 SAS Cable Opt Kit to connect to HPE SR416ie-m Gen11 x16 Lanes 4GB Cache SPDM Mezzanine Storage Controller.

For more information, contact your local sales office or see the relevant section in this QuickSpecs.

Overview



HPE SY480 Gen11 4SFF NVMe Direct Connect Drive Cage Kit

A four drive solution that supports up to 4x NVMe direct connect drives for Boot and Store requirements.

For more details look further down in this QuickSpecs.



HPE Synergy 480 Gen11 8EDSFF NVMe E3.S Direct Connect Drive Cage Kit

An 8 drive solution that supports up to 8x EDSFF NVMe direct connect drives for Boot and Store requirements.

For more details look further down in this QuickSpecs.

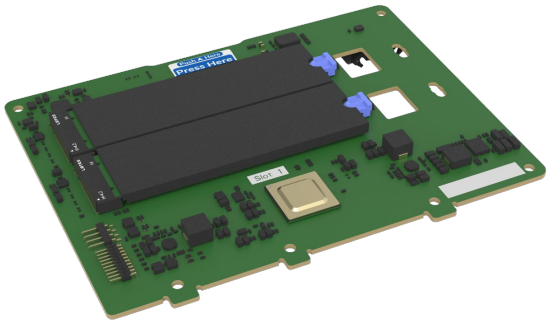
Overview



HPE Synergy 480 Gen11 without Drive Front Cage Kit

A drive-less solution is for when no onboard storage is needed for Boot from SAN solutions or with the new HPE NS204i-d Gen11 Controller solution is used.

For more details look further down in this QuickSpecs.



HPE NS204i-d Gen11 M.2 Boot Controller

The NS204i-d Gen11 Plus M.2 Boot Controller is a HW RAID Solution – requires 2x M.2 NVMe Drives to be configured with Option for Mirrored RAID.

Notes:

- May be used with any drive cage option above. May be selected as a CTO or BTO Option.
- Refer to the Boot Devices Advisory Notice for information about changes in VMware ESXi 7.0 or later.

Standard Features

Synergy Management

HPE Composer powered by OneView

Notes: Read and learn more about OneView

On Compute Management Chipset

HPE iLO 6 ASIC

Notes: Read and learn more in the iLO QuickSpecs

Processors

The **HPE Synergy 480 Gen11** is designed and consumes on Intel Xeon Scalable Family Generation 5 processors (x5xx) and Generation 4 processors (x4xx).

Up to 2 of the following.

Notes:

- The 2nd digit of the processor model number "x5xx" is used to denote the processor generation (i.e. 4 = 4th generation or 5 = 5th generation).
- This table covers the public Intel offering only.

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

Intel Xeon Processor		
Processor Suffix	**Description**	**Offering**
N	Network/5G/Edge (High TPT / Low Latency)	Designed for NFV and networking workloads, such as: L3 fwding, 5G UPF, OVS DPDK, VPP FIB router, VPP IPsec, web server/NGINX, vEPC, vBNG, and vCMTS.
P	High performance IaaS	Optimized for orchestration efficiency, IaaS higher frequency for VM markets.
S	Storage and HCI	Optimized for Storage UMA use cases with increased UPI Bandwidth or vs Mainline SKUs.
V	Cloud – SaaS	Optimized for orchestration efficiency that delivers higher core counts and VMs per rack.
Y	Speed Select – Performance Profile	Intel® SST-PP increases base frequency when fewer cores are enabled. Allows greater flexibility, deployment options and platform longevity.
M	Media Transcode	Optimized around AVX frequencies to deliver better performance/Watt around Media, AI and HPC workloads.

Notes:

- 4.0 TB maximum RAM per socket.
- PCIe 5.0 lanes.

Standard Features

5th Generation Intel® Xeon® Scalable Processor Family (Platinum)							
Intel Xeon Models	CPU Frequency (GHz)	Cores	L3 Cache (MB)	Power (Watts)	UPI Links	DDR5 (MT/s)	SGX Enclave size (GB)
Platinum 8592+ Processor	1.9	64	320	350	4	5600	512
Platinum 8592V Processor	2.0	64	320	330	3	5600	512
Platinum 8580 Processor	2.0	60	300	350	4	5600	512
Platinum 8570 Processor	2.1	56	300	350	4	5600	512
Platinum 8568Y+ Processor	2.3	48	300	350	4	5600	512
Platinum 8562Y+ Processor	2.8	32	300	300	3	5600	512
Platinum 8558P Processor	2.7	48	260	350	3	5600	512
Platinum 8558 Processor	2.1	48	260	330	4	5200	512

4th Generation Intel® Xeon® Scalable Processor Family (Platinum)							
Intel Xeon Models	CPU Frequency (GHz)	Cores	L3 Cache (MB)	Power (Watts)	UPI Links	DDR5 (MT/s)	SGX Enclave size (GB)
Platinum 8480+ Processor	2	56	105	350	4	4800	512
Platinum 8470N Processor	1.7	52	97.5	300	3	4800	128
Platinum 8470 Processor	2	52	105	350	4	4800	512
Platinum 8468 Processor	2.1	48	105	350	4	4800	512
Platinum 8468V Processor	2.4	48	97.5	330	3	4800	128
Platinum 8460Y+ Processor	2	40	105	300	4	4800	128
Platinum 8458P Processor	2.7	44	82.5	350	3	4800	512
Platinum 8452Y Processor	2	36	67.5	300	4	4800	128
Platinum 8462Y+ Processor	2.8	32	60	300	3	4800	128

5th Generation Intel® Xeon® Scalable Processor Family (Gold)							
Intel Xeon Models	CPU Frequency (GHz)	Cores	L3 Cache (MB)	Power (Watts)	UPI Links	DDR5 (MT/s)	SGX Enclave size (GB)
Gold 6554S Processor	2.2	36	180	270	4	5200	128
Gold 6548N Processor	2.8	32	60	300	3	5200	128
Gold 6548Y+ Processor	2.5	32	60	250	3	5200	128
Gold 6544Y Processor	3.6	16	45	270	3	5200	128
Gold 6542Y Processor	2.9	24	60	250	3	5200	128
Gold 6538N Processor	2.1	32	60	205	3	5200	128
Gold 6538Y+ Processor	2.2	32	60	225	3	5200	128
Gold 6534 Processor	3.9	8	22.5	195	3	4800	128
Gold 6530 Processor	2.1	32	160	270	3	4800	128
Gold 6526Y Processor	2.8	16	37.5	195	3	5200	128
Gold 5520+ Processor	2.2	28	52.5	205	3	4800	128
Gold 5515+ Processor	3.2	8	22.5	165	3	4800	128

Standard Features

4th Generation Intel® Xeon® Scalable Processor Family (Gold)							
Intel Xeon Models	**CPU Frequency (GHz)**	**Cores**	**L3 Cache (MB)**	**Power (Watts)**	**UPI Links**	**DDR5 (MT/s)**	**SGX Enclave size (GB)**
Gold 6454S Processor	2.2	32	60	270	4	4800	128
Gold 6430 Processor	2.1	32	60	270	3	4400	128
Gold 6448Y Processor	2.1	32	60	225	3	4800	128
Gold 6444Y Processor	3.6	16	45	270	3	4800	128
Gold 6442Y Processor	2.6	24	60	225	3	4800	128
Gold 6438Y+ Processor	2	32	60	205	3	4800	128
Gold 6438N Processor	2	32	60	205	3	4800	128
Gold 6438M Processor	2.2	32	60	205	3	4800	128
Gold 6434 Processor	3.7	8	22.5	195	3	4800	128
Gold 6426Y Processor	2.5	16	37.5	185	3	4800	128
Gold 5420+ Processor	2	28	52.5	205	3	4400	128
Gold 5418Y Processor	2	24	45	185	3	4400	128
Gold 5418N Processor	1.8	24	45	165	3	4400	128
Gold 5416S Processor	2	16	30	150	3	4400	128
Gold 5415+ Processor	2.9	8	22.5	150	3	4400	128

5th Generation Intel® Xeon® Scalable Processor Family (Silver)							
Intel Xeon Models	**CPU Frequency (GHz)**	**Cores**	**L3 Cache (MB)**	**Power (Watts)**	**UPI Links**	**DDR5 (MT/s)**	**SGX Enclave size (GB)**
Silver 4516Y+ Processor	2.2	24	45	185	2	4400	64
Silver 4514Y Processor	2	16	30	150	2	4400	64
Silver 4510 Processor	2.4	12	30	150	2	4000	64

4th Generation Intel® Xeon® Scalable Processor Family (Silver)							
Intel Xeon Models	**CPU Frequency (GHz)**	**Cores**	**L3 Cache (MB)**	**Power (Watts)**	**UPI Links**	**DDR5 (MT/s)**	**SGX Enclave size (GB)**
Silver 4416+ Processor	2	20	37.5	165	2	4000	64
Silver 4410Y Processor	2	12	30	150	2	4000	64

Standard Features

Chipset

Intel C741 Chipset

Notes: For more information regarding Intel® chipsets, please see the following URL: https://www.intel.com/content/www/us/en/products/chipsets/server-chipsets.html.

System Management Chipset

HPE iLO 6 ASIC

Notes: Read and learn more in the iLO QuickSpecs.

Memory

Type	HPE DDR5 Smart Memory, Registered (RDIMM)
DIMM Slots Available	32 16 DIMM slots per processor, 8 channels per processor, 2 DIMMs per channel
Maximum capacity	8.0 TB 32 x 256 GB RDIMM up to 5600 MT/s

Notes:

- All processors support up to 4TB memory per socket.
- The maximum memory speed is limited by the processor selection.
- To realize the performance memory capabilities listed in this document, HPE DDR5 Smart Memory is required.
- The -B21 memory SKUs shown in this document are to be used when ordering stand-alone memory only. For each -B21 SKU, there is a corresponding -F21 SKU which is to be used when configuring servers with integrated memory DIMMs.
- For additional information, please visit the HPE Memory QuickSpecs and Technical White Papers or HPE DDR5 Smart Memory QuickSpecs.

Memory Protection

Advanced ECC

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

Memory

One of the following depending on model

The following memory supports Intel® Xeon® Scalable Family processors 5th generation (Models x5xx)

- HPE 16GB (1x16GB) Single Rank x8 DDR5-5600 CAS-46-45-45 EC8 Registered Smart Memory Kit
- HPE 32GB (1x32GB) Dual Rank x8 DDR5-5600 CAS-46-45-45 EC8 Registered Smart Memory Kit
- HPE 64GB (1x64GB) Dual Rank x4 DDR5-5600 CAS-46-45-45 EC8 Registered Smart Memory Kit
- HPE 96GB (1x96GB) Dual Rank x4 DDR5-5600 CAS-46-45-45 EC8 Registered Smart Memory Kit
- HPE 128GB (1x128GB) Dual Rank x4 DDR5-5600 CAS-46-45-45 EC8 Registered Smart Memory Kit
- HPE 128GB (1x128GB) Quad Rank x4 DDR5-5600 CAS-52-45-45 EC8 Registered 3DS Smart Memory Kit
- HPE 256GB (1x256GB) Quad Rank x4 DDR5-5600 CAS-60-52-52 EC8 Registered 3DS Smart Memory Kit

Standard Features

The following memory supports Intel® Xeon® Scalable Family processors 4th generation (Models x4xx)

- HPE 16GB (1x16GB) Single Rank x8 DDR5-4800 CAS-40-39-39 EC8 Registered Smart Memory Kit
- HPE 32GB (1x32GB) Dual Rank x8 DDR5-4800 CAS-40-39-39 EC8 Registered Smart Memory Kit
- HPE 64GB (1x64GB) Dual Rank x4 DDR5-4800 CAS-40-39-39 EC8 Registered Smart Memory Kit
- HPE 96GB (1x96GB) Dual Rank x4 DDR5-4800 CAS-46-45-45 EC8 Registered Smart Memory Kit
- HPE 128GB (1x128GB) Dual Rank x4 DDR5-4800 CAS-46-45-45 EC8 Registered Smart Memory Kit
- HPE 128GB (1x128GB) Quad Rank x4 DDR5-4800 CAS-46-39-39 EC8 Registered 3DS Smart Memory Kit
- HPE 256GB (1x256GB) Quad Rank x4 DDR5-4800 CAS-60-52-52 EC8 Registered 3DS Smart Memory Kit

Notes: Important: Empty memory slots require DIMM Slot Blanks for improved thermal control. (HPE DDR-4 DIMM Blanks Kit, P07818-B21).

HPE memory from previous generation servers (DDR4) is not compatible with this compute module. HPE DDR5 Smart Memory is required to realize the memory performance improvements and enhanced functionality listed in this document for Gen11.

System requirements

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

The following hardware components are required for a complete Synergy Solution:

- HPE SY480 Gen11 with Fourth-generation Intel Xeon Scalable processors
- HPE DDR5 Standard Memory DIMM
- Boot and Storage solutions
- Network and IO Mezzanine
- Synergy 12000 Frame
  - Composer2/OneView
  - Network and IO InterConnect Modules

Supported firmware versions:

- Latest System ROM version
- Server Platform Services (SPS) Firmware latest version
- HPE iLO Firmware latest version

Operating Systems and Virtualization Software Support

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

Notes:

- Operating System support may change. To get the most updated information, please go to the: HPE Servers Support & Certification Matrices
- For the most up-to-date information on Synergy Service Packs refer to the: HPE Synergy OS Support Tool

Mezzanine Connectors (PCIe 5.0)

Three (3) I/O expansion mezzanine connectors:

- **Mezzanine 1 -- x16 PCIe 5.0**
  - Supports Type C and Type D mezzanine cards

  Notes: This mezzanine connector supports dual-port mezzanine cards: one port is routed to interconnect module bay 1 and the other to bay 4.
- **Mezzanine 2 -- x16 PCIe 5.0**
  - Supports Type C and Type D mezzanine cards

  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.
- **Mezzanine 3 -- x16 PCIe 5.0**
  - Supports Type C mezzanine cards

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

Network & Storage Adapters or Mezzanine options include:

- HPE Synergy 6310C 25/50Gb Ethernet Adapter
- HPE Synergy 4820C 10/20/25Gb CNA Converged Network Adapter
- HPE Synergy 6820C 25/50Gb CNA Converged Network Adapter
- HPE Synergy 5330C 32G Fibre Channel Host Bus Adapters
- HPE Synergy 5830C 32G Fibre Channel Host Bus Adapters
- HPE SR416ie-m Gen11 x16 Lanes 4GB Cache SPDM Mezzanine Storage Controller

Notes: Please refer to the Fabric/Network Options QuickSpecs 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.

Standard Features

HPE Synergy Compute ROM is used to configure the following:

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

Storage Drive cages and Controllers

One of the following depending on model.

Drive Cage Options

HPE SY480 Gen11 Premium 2 Drive Cage Kit

- Supports 2 SFF SAS, SATA, or NVMe Drives.
- Requires HPE SR416ie-m Gen11 x16 Lanes 4GB Cache SPDM Mezzanine Storage Controller (requires SR416 SAS cable P39956-B21).
  - HPE NS204i-d Gen11 Controller option
    Notes: NS204i-d Gen11 Controller works with SR416ie-m Gen11 Controller.

HPE SY480 Gen11 Premium 4 Drive Cage Kit

- Supports 4 SFF SAS, SATA, or NVMe Drives.
- Requires HPE SR416ie-m Gen11 x16 Lanes 4GB Cache SPDM Mezzanine Storage Controller (requires SR416 SAS cable P39956-B21).
  - HPE NS204i-d Gen11 Controller option
    Notes: NS204i-d Gen11 Controller works with SR416ie-m Gen11 Controller.

HPE SY480 Gen11 4SFF NVMe Direct Connect Drive Cage Kit

- Supports 4 SFF NVMe drives direct connected to Socket 1.
- The SR416ie-m controller may also be used for connection to the HPE D3940 Storage Module.
  - HPE NS204i-d Gen11 Controller option
    Notes: NS204i-d Gen11 Controller works with SR416ie-m Gen11 Controller.

HPE Synergy 480 Gen11 8EDSFF NVMe E3.S Direct Connect Drive Cage Kit supports 4 SFF NVMe drives direct connected to Socket 1

- The SR416ie-m controller may also be used for connection to the HPE D3940 Storage Module.
  - HPE NS204i-d Gen11 Controller option
    Notes: NS204i-d Gen11 Controller works with SR416ie-m Gen11 Controller.

HPE SY480 Gen11 without Drive Front Cage Kit

- Designed for the Stateless or No Drive solution where customer boots from SAN or alternate boot & store devices such as the new HPE NS204i-d Gen11 Controller.

Standard Features

RAID solutions

NVMe Boot Devices – HW RAID

- HPE NS204i-d Synergy Gen11 Boot Controller for HPE
  Notes: Direct PCIe connection below drive cages. Supports 2x M.2 NVMe Drives ready for Boot.

Intel® VROC – SW RAID

Notes: Only available with 4SFF NVMe Drive Direct Connect and 8EDSFF NVMe Drive Direct Connect drive cages.

Performance RAID Controller

- HPE SR416ie-m Gen11 x16 Lanes 4GB Cache SPDM Mezzanine Storage Controller
  Tri-Mode support -PCIe Gen4 NVME, 24G SAS, 6G SATA), 8 internal 8 external lanes/2GB cache for use with Synergy D3940 Storage Modules, as well as, 2 and 4 Drive Premium front cages for SAS/SATA/NVME drives).

Maximum Internal Storage		
Drive	**Capacity**	**Configuration**
Hot Plug SFF SAS SSD	61.44 TB	4 x 15.36 TB (with Premium front SFF drive cage)
Hot Plug SFF SATA SSD	30.72 TB	4 x 7.68 TB (with Premium front SFF drive cage)
Hot Plug SFF NVMe SSD	122.88 TB	4 x 30.72TB (with Premium front SFF drive cage)
Hot Plug EDSFF NVMe E3.S SSD	491.52 TB	8 x 61.44TB (with 8 EDSFF front drive cage)

Interfaces

- One (1) internal USB 3.0 connector for USB flash media drive keys
  Notes: The above options are intended for integrated hypervisor virtualization environments.
- External USB 3.0 Port for updates to Server Code
- One (1) external USB 3.0 connector for USB flash media drive keys
- One external iLO Service Port

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 Gen11 Compute Modules
- Synergy 480 Gen11 Compute Module require HPE Synergy 12000 High Capacity Fans be installed in the frame

Standard Features

Industry Standard Compliance

- Microsoft® Logo certifications
- WOL enabled on some adapters
- PXE support enabled
- USB 3.0 Compliant; iLO USB 2.0 Compliant
- TPM 2.0 Support
- 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 5.0 Compliant
- UEFI (Unified Extensible Firmware Interface Forum)
- Redfish API (iLO6)
- Energy Star Compliant
- Top Runner – Japan Compliant
- ErP Lot9 Compliant (see Technical Specifications) HPE Environmental Declarations website for HPE Lot9 Declarations, a White Paper, FAQs and products list of verified products

Notes: See requirements at end of this document or in OCA for valid configurations to meet ErP Lot9 requirements.

Graphics (iLO)

Integrated Matrox G200eH2 video standard with 16 MB of Video RAM

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

HPE iLO 6 on system management memory

- 32 MB Flash
- 8 Gbit DDR4 with ECC protection

HPE Server UEFI

Unified Extensible Firmware Interface (UEFI) is an industry standard that provides better manageability and more secured configuration while interacting with your server at boot time. HPE ProLiant Gen11 servers have a UEFI Class 2 implementation.

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.

Standard Features

UEFI enables numerous new capabilities specific to HPE Synergy Compute Modules such as:

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

UEFI Boot Mode only:

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

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

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 https://www.hpe.com/info/ilo.

UEFI

Configure and boot your servers securely with industry standard Unified Extensible Firmware Interface (UEFI). Learn more at UEFI System Utilities (hpe.com).

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 https://www.hpe.com/info/restfulapi.

Security

Newest forms of security based on iLO6 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) 2.0 support
- 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 compromise has occurred. It is achieved by storing iLO 6 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 6 QuickSpecs for recovery processes.

Warranty

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

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

Optional Features

Server Management

HPE OneView Advanced

HPE OneView brings a new level of automation to infrastructure management by taking a template driven approach to provisioning, updating, and integrating compute, storage, and networking infrastructure. It provides full-featured licenses which can be purchased for managing Gen9, Gen10, Gen10 Plus, and Gen11 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. This also includes the enhanced security and power management functionality.

Fibre Channel Support

Up to two (2) optional Fibre Channel Mezzanine HBAs are supported on the HPE Synergy 480 Gen11

- HPE Synergy 5330C 32G Fibre Channel Host Bus Adapters
- HPE Synergy 5830C 32G Fibre Channel Host Bus Adapters

Compatible SAN

HPE Synergy 480 Gen11 Compute Modules are optimized for HPE MSA, Nimble, Primera, and Alletra.

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 100Gb F32 Module, primary modules, 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 100Gb F32 Module eliminates 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.

Optional Features

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 100 Gb F32 module avoids the confusion of traditional and other converged network solutions by eliminating the need for multiple Ethernet and Fibre Channel switches, extension modules, cables and software licenses. Also, Virtual Connect wire-once connection management is built-in enabling compute modules adds, moves, and replacement in minutes instead of days or weeks. The Primary/Satellite disaggregated architecture removes fixed ratios of interconnects in every frame and allows extending networking resources pool for Virtual Connect to satellite frames.

For more information on Virtual Connect and converged network options, see HPE Virtual Connect SE 100Gb F32 Module for Synergy for more details.

One Config Simple (SCE)

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

Service and Support

For the most up-to-date information on HPE Services, please refer to the HPE Services – Supplemental QuickSpecs, which provides a comprehensive and regularly updated overview of available services.

Configuration Information

Factory Integrated Models (CTO – Configure-To-Order Process)

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 a Hewlett Packard Enterprise approved configurator. Contact your local sales representative for information on CTO product offerings and requirements.

Notes:

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

CTO Compute Module	HPE Synergy 480 Gen11 CTO Compute Module
SKU Number	P39531-B21
TAA SKU [1]	P39531-B22
Processor	Up to 2 Selectable Intel Xeon Scalable Family Processors Generation 4 or 5
DIMM Slots	Up to 32 DIMM slots (16 per processor) selectable below
Storage	Optional, not included in above SKUs: selectable 2 Drive, 4 Drive, 4 Drive Direct Connect, 8 Drive Direct Connect or no Drive cage options below.
Storage Controllers	Optional, not included in above SKUs: HPE NS204i-d SY Gen11 Boot Controller Front Drive Cage Controller Options: HPE SR416ie-m Gen11 x16 Lanes 4GB Cache SPDM Mezzanine Storage Controller for 2 and 4 Drive Premium Drive Cages and D3940 Storage Module (cable selectable), Intel VROC SW RAID capable for 4 Drive Direct Connect Drive Cage.
Drives supported	Optional, not included in above SKUs: SAS/SATA/NVMe/M.2
IO Expansion/ Mezzanine slots	3x 16 PCIe 5.0 Slots for Mezzanine Options
Network	Optional, not included in above SKUs: HPE Synergy 6820c 25/50Gb CNA, HPE Synergy 4820c 10/20/25 CNA, HPE Synergy 5330C 32G Fibre Channel Host Bus Adapters, HPE Synergy 5830C 32G Fibre Channel Host Bus Adapters
Security	iLO 6
USB and MicroSD	1 Internal USB 3.0
Management	OneView 8.2 and iLO 6 Advanced (standard)

Notes:

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

Configuration Information

- The 2 Drive Premium Backplane Option supports 2 SFF SAS/SATA/NVMe drives and is designed for flexible use of the Compute Module for most workloads. This SKU uses the HPE SR416ie-m Gen11 Mezzanine Controller. The SR416ie-m controller may also be used for connection to the HPE D3940 Storage Module.
- The Drive-Less CTO option is intended for stateless on SAN/NAS boot use cases and will support the HPE SR416ie-m Gen11 x16 Lanes 4GB Cache SPDM Mezzanine Storage Controller for Synergy D3940 Storage Modules. Additionally, this model supports adding the HPE NS204i-d SY Gen11 Boot Controller for dual M.2 drive HW RAID options.
- The 4 Drive Premium Backplane option supports 4 SFF SAS/SATA/NVMe drives. This SKU uses the HPE SR416ie-m Gen11 Mezzanine Controller. The SR416ie-m controller may also be used for connection to the HPE D3940 Storage Module.
- The 4 Drive Direct Connect Drive Cage option supports 4 NVMe drives direct connected to Socket 1. The SR416ie-m controller may also be used for connection to the HPE D3940 Storage Module.
- The 8 Drive Direct Connect Drive Cage option supports 8 NVMe drives direct connected to Socket 1. The SR416ie-m controller may also be used for connection to the HPE D3940 Storage Module.
- Optional NS204i-d SY Gen11 Boot Controller is a Direct Connect to PCIe from the processor and is configured with 2 M.2 drives for Hardware RAID Boots. This option resides below the front drive cages and allows for dual configurations with all drive cage options.
- [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.
- With over 75,000 server deployments, HPE is a worldwide market leader in infrastructure solutions for the entire SAP ecosystem. To ensure correct slotting and support when configuring the Synergy 480 Gen11 Compute Module for SAP solutions, please use P83805-B21- HPE Synergy 480 Gen11 Solution Node. Visit this website for more information on HPE's portfolio solutions for SAP.

Step 1: Base Configuration

Description	SKU
HPE Synergy 480 Gen11 Configure-to-order Compute Module	P39531-B21
HPE Synergy 480 Gen11 TAA-compliant Configure-to-order Compute Module	P39531-B22

Step 2: Choose your Boot, Drive Cage and Controller Options

Option 1: Front Drive Cage

Description	SKU
HPE Synergy 480 Gen11 2SFF SAS/SATA/NVMe Premium Drive Cage Kit	P39590-B21
HPE Synergy 480 Gen11 4SFF SAS/SATA/NVMe Premium Drive Cage Kit	P39591-B21

Required Controller for above Drive Cages:

HPE SR416ie-m Gen11 x16 Lanes 4GB Cache SPDM Mezzanine Storage Controller	P39959-B21

Notes: Also works with D3940 Storage Drive if installed in Frame.

Configuration Information

Description	SKU
HPE Synergy 480 Gen11 SAS SR416ie-m Controller Cable Kit	P39956-B21

Notes: Cable Required for 2 & 4 Premium Drive Cage Kit.

Option 2: Front Drive Cage

Description	SKU
HPE Synergy 480 Gen11 4SFF NVMe Direct Connect Drive Cage Kit	P39592-B21
HPE Synergy 480 Gen11 8EDSFF NVMe E3.S Direct Connect Drive Cage Kit	P39593-B21

Optional Controller:

HPE SR416ie-m Gen11 x16 Lanes 4GB Cache SPDM Mezzanine Storage Controller	P39959-B21

Notes: Works with D3940 Storage Drive if installed in Frame.

Option 3: Front Drive Cage

Description	SKU
HPE Synergy 480 Gen11 without Drive Front Cage Kit	P39594-B21

Optional Controller:

HPE SR416ie-m Gen11 x16 Lanes 4GB Cache SPDM Mezzanine Storage Controller	P39959-B21

Notes: Works with D3940 Storage Drive if installed in Frame.

HPE Synergy NS204i-d Gen11 NVMe Boot Storage Device	P39568-B21

Notes:

- M.2 HW RAID Controller.
- Installs below any Drive Cage option and can be used with any of the Drive Cage options above.

Step 3: Choose Required Options

Please select up to two matching processors.

Notes:

- Mixing two different processor models is not supported.
- CTO server requires selection of heatsinks with your selection of 1 or 2 processors.

Configuration Information

Processor Option Kits

5th Generation Intel® Xeon®-Platinum

Notes:

- All SKUs below ship with processor only. Appropriate heatsinks must be selected.
- Requires HPE Synergy 480 Gen11 CPU Front Heat Sink Kit P39587-B21 or Rear Heat Sink Kit P39589-B21.
- 5600 MT/S maximum memory speed unless otherwise noted.

Description	SKU
Intel Xeon-Platinum 8592+ 1.9GHz 64-core 350W Processor for HPE	P67089-B21
Intel Xeon-Platinum 8592V 2.0GHz 64-core 330W Processor for HPE	P67107-B21
Intel Xeon-Platinum 8580 2.0GHz 60-core 350W Processor for HPE	P67088-B21
Intel Xeon-Platinum 8570 2.1GHz 56-core 350W Processor for HPE	P67087-B21
Intel Xeon-Platinum 8568Y+ 2.3GHz 48-core 350W Processor for HPE	P67086-B21
Intel Xeon-Platinum 8562Y+ 2.8GHz 32-core 300W Processor for HPE	P67065-B21
Intel Xeon-Platinum 8558P 2.7GHz 48-core 350W Processor for HPE	P67108-B21
Intel Xeon-Platinum 8558 2.1GHz 48-core 330W Processor for HPE	P67097-B21

5th Generation Intel® Xeon®-Gold

Notes:

- All SKUs below ship with processor only. Appropriate heatsinks must be selected.
- Requires HPE Synergy 480 Gen11 CPU Front Heat Sink Kit P39587-B21 or Rear Heat Sink Kit P39589-B21.
- 5600 MT/S maximum memory speed unless otherwise noted.

Description	SKU
Intel Xeon-Gold 6554S 2.2GHz 36-core 270W Processor for HPE	P67110-B21
Intel Xeon-Gold 6548N 2.8GHz 32-core 250W Processor for HPE	P67105-B21
Intel Xeon-Gold 6548Y+ 2.5GHz 32-core 250W Processor for HPE	P67082-B21
Intel Xeon-Gold 6544Y 3.6GHz 16-core 270W Processor for HPE	P67084-B21
Intel Xeon-Gold 6542Y 2.9GHz 24-core 250W Processor for HPE	P67081-B21
Intel Xeon-Gold 6538N 2.1GHz 32-core 205W Processor for HPE	P67104-B21
Intel Xeon-Gold 6538Y+ 2.2GHz 32-core 225W Processor for HPE	P67096-B21
Intel Xeon-Gold 6534 3.9GHz 8-core 195W Processor for HPE	P67083-B21
Intel Xeon-Gold 6530 2.1GHz 32-core 270W Processor for HPE	P67095-B21
Intel Xeon-Gold 6526Y 2.8GHz 16-core 195W Processor for HPE	P67080-B21
Intel Xeon-Gold 5520+ 2.2GHz 28-core 205W Processor for HPE	P67094-B21
Notes: 4800 MT/S maximum memory speed.	
Intel Xeon-Gold 5515+ 3.2GHz 8-core 165W Processor for HPE	P67079-B21
Notes: 4800 MT/S maximum memory speed.	

Configuration Information

5th Generation Intel® Xeon®-Silver

Notes:

- All SKUs below ship with processor only. Appropriate heatsinks must be selected.
- Requires HPE Synergy 480 Gen11 CPU Front Heat Sink Kit P39587-B21 or Rear Heat Sink Kit P39589-B21.
- 4400 MT/S maximum memory speed unless otherwise noted.

Description	SKU
Intel Xeon-Silver 4516Y+ 2.2GHz 24-core 185W Processor for HPE	P67093-B21
Intel Xeon-Silver 4514Y 2.0GHz 16-core 150W Processor for HPE	P67092-B21
Intel Xeon-Silver 4510 2.4GHz 12-core 150W Processor for HPE	P67091-B21

Notes: 4000 MT/S maximum memory speed.

Intel Xeon-Platinum 8480+ 2.0GHz 56-core 350W Processor for HPE	P49607-B21

Notes:

- All SKUs below ship with processor only. Appropriate heatsinks must be selected.
- Requires HPE Synergy 480 Gen11 CPU Front Heat Sink Kit P39587-B21 or Rear Heat Sink Kit P39589-B21.
- 4800 MT/S maximum memory speed unless otherwise noted.

Intel Xeon-Platinum 8480+ 2.0GHz 56-core 350W Processor for HPE	P49607-B21
Intel Xeon-Platinum 8470N 1.7GHz 52-core 300W Processor for HPE	P49649-B21
Intel Xeon-Platinum 8470 2.0GHz 52-core 350W Processor for HPE	P49606-B21
Intel Xeon-Platinum 8468 2.1GHz 48-core 350W Processor for HPE	P49605-B21
Intel Xeon-Platinum 8460Y+ 2.0GHz 40-core 300W Processor for HPE	P49604-B21
Intel Xeon-Platinum 8458P 2.7GHz 44-core 350W Processor for HPE	P49632-B21
Intel Xeon-Platinum 8452Y 2.0GHz 36-core 300W Processor for HPE	P49616-B21
Intel Xeon-Platinum 8462Y+ 2.8GHz 32-core 300W Processor for HPE	P49603-B21

4th Generation Intel® Xeon®-Gold

Notes:

- All SKUs below ship with processor only. Appropriate heatsinks must be selected.
- Requires HPE Synergy 480 Gen11 CPU Front Heat Sink Kit P39587-B21 or Rear Heat Sink Kit P39589-B21.
- 4800 MT/S maximum memory speed unless otherwise noted.

Description	SKU
Intel Xeon-Gold 6430 2.1GHz 32-core 270W Processor for HPE	P49614-B21
Intel Xeon-Gold 6426Y 2.5GHz 16-core 185W Processor for HPE	P49598-B21
Intel Xeon-Gold 6442Y 2.6GHz 24-core 225W Processor for HPE	P49599-B21
Intel Xeon-Gold 6448Y 2.1GHz 32-core 225W Processor for HPE	P49600-B21
Intel Xeon-Gold 6434 3.7GHz 8-core 195W Processor for HPE	P49601-B21
Intel Xeon-Gold 6444Y 3.6GHz 16-core 270W Processor for HPE	P49602-B21
Intel Xeon-Gold 6438Y+ 2.0GHz 32-core 205W Processor for HPE	P49615-B21
Intel Xeon-Gold 5415+ 2.9GHz 8-core 150W Processor for HPE	P49597-B21

Notes: 4400 MT/S maximum memory speed.

Configuration Information

Description	SKU
Intel Xeon-Gold 5418Y 2.0GHz 24-core 185W Processor for HPE	P49612-B21
Notes: 4400 MT/S maximum memory speed.	
Intel Xeon-Gold 5418N 1.8GHz 24-core 165W Processor for HPE	P49640-B21
Notes: 4400 MT/S maximum memory speed.	
Intel Xeon-Gold 5416S 2.0GHz 16-core 150W Processor for HPE	P49653-B21
Notes: 4400 MT/S maximum memory speed.	

4th Generation Intel® Xeon®-Silver

Notes:

- All SKUs below ship with processor only. Appropriate heatsinks must be selected.
- Requires HPE Synergy 480 Gen11 CPU Front Heat Sink Kit P39587-B21 or Rear Heat Sink Kit P39589-B21.
- 4000 MT/S maximum memory speed unless otherwise noted.

Description	SKU
Intel Xeon-Silver 4410Y 2.0GHz 12-core 150W Processor for HPE	P49610-B21
Intel Xeon-Silver 4416+ 2.0GHz 20-core 165W Processor for HPE	P49611-B21

Step 4: Choose Memory Options

Please select one or more memory DIMMs from below.

For new Gen11 memory population rule whitepaper and optimal memory performance guidelines, please go to: https://www.hpe.com/docs/memory-population-rules.

Notes:

- The maximum memory speed and capacity is a function of the memory type, memory configuration, and processor model.
- Quantity of memory DIMMs selected per socket must be 1, 2, 4, 6, 8, 12 or 16.
- The -B21 memory SKUs shown in this document are to be used when ordering stand-alone memory only. For each -B21 SKU, there is a corresponding -F21 SKU which is to be used when configuring servers with integrated memory DIMMs.
- For additional information, please see the HPE DDR5 Smart Memory QuickSpecs.

Registered DIMMs DDR5 (RDIMMs)

DDR5-5600 (applies to the 5th Generation Intel® Xeon® Scalable Processors)

Description	SKU
HPE 16GB (1x16GB) Single Rank x8 DDR5-5600 CAS-46-45-45 EC8 Registered Smart Memory Kit	P64705-B21
HPE 32GB (1x32GB) Dual Rank x8 DDR5-5600 CAS-46-45-45 EC8 Registered Smart Memory Kit	P64706-B21
HPE 64GB (1x64GB) Dual Rank x4 DDR5-5600 CAS-46-45-45 EC8 Registered Smart Memory Kit	P64707-B21
HPE 96GB (1x96GB) Dual Rank x4 DDR5-5600 CAS-46-45-45 EC8 Registered Smart Memory Kit	P64708-B21
HPE 128GB (1x128GB) Dual Rank x4 DDR5-5600 CAS-46-45-45 EC8 Registered Smart Memory Kit	P69976-B21

Configuration Information

Description	SKU
Notes:	
– 5600 MT/s memory SKUs offer a transfer rate of 5600 MT/s at 1 DIMM per channel and 4800 MT/s at 2 DIMMs per channel.	
– 96 GB Memory cannot be mixed with any other Memory.	
HPE 16GB (1x16GB) Single Rank x8 DDR5-4800 CAS-40-39-39 EC8 Registered Smart Memory Kit	P43322-B21
HPE 32GB (1x32GB) Dual Rank x8 DDR5-4800 CAS-40-39-39 EC8 Registered Smart Memory Kit	P43328-B21
HPE 64GB (1x64GB) Dual Rank x4 DDR5-4800 CAS-40-39-39 EC8 Registered Smart Memory Kit	P43331-B21
HPE 96GB (1x96GB) Dual Rank x4 DDR5-4800 CAS-46-45-45 EC8 Registered Smart Memory Kit	P66675-B21
HPE 128GB (1x128GB) Dual Rank x4 DDR5-4800 CAS-40-39-39 EC8 Registered Smart Memory Kit	P69974-B21
Notes:	
– 4800 MT/s memory SKUs offer a transfer rate of 4800 MT/s at 1 DIMM per channel and 4400 MT/s at 2 DIMMs per channel.	
– 96 GB Memory cannot be mixed with any other Memory.	
– If 96 GB memory is selected, either 8 or 16 memory quantity can be allowed per processor.	

Memory Blank Kit

Description	SKU
HPE DDR4 DIMM Blank Kit	P07818-B21
Notes:	
– Important: Empty memory slots require DIMM Slot Blanks for improved thermal control. (HPE DDR4 DIMM Blanks Kit, P07818-B21).	
– HPE memory from previous generation servers (DDR4) is not compatible with this compute module.	

Step 5: Choose Networking Adapters

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

Description	SKU
HPE Synergy 4820C 10/20/25Gb Converged Network Adapter	876449-B21
HPE Synergy 6820C 25/50Gb Converged Network Adapter	P02054-B21
HPE Synergy 6310C 25/50Gb Ethernet Adapter	P64724-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 6: Additional Factory Integratable Options

HPE Storage Controllers

Description	SKU
HPE Synergy NS204i-d Gen11 NVMe Boot Storage Device	P39568-B21
Notes: Can be used with any Front Drive Cage options.	
HPE SR416ie-m Gen11 x16 Lanes 4GB Cache SPDM Mezzanine Storage Controller	P39959-B21
Notes: New HPE SR416ie-m manages the drives in the HPE D3940 Synergy Storage Module (40 Frame shared SFF drives) and is for SATA/SAS/NVMe drives in the Front 2 and 4 Drive Premium Cages. For more information on the 2 and 4 Drive Premium Cages with SAS Cable defined, see the Drive Cage sections of documents above.	

HPE I/O Expansion Options

Description	SKU
HPE Synergy 6310C 25/50Gb Ethernet Adapter	P64724-B21
HPE Synergy 6820C 25/50Gb Converged Network Adapter	P02054-B21
HPE Synergy 4820C 10/20/25Gb Converged Network Adapter	876449-B21
HPE Synergy 5330C 32Gb Fibre Channel Host Bus Adapter	870828-B21
HPE Synergy 5830C 32Gb Fibre Channel Host Bus Adapter	777456-B21
Notes: See specific Frame and Interconnect QuickSpecs below for Best Practices and requirements for options placement in correct mezzanine slots that match with Interconnect model slotting for correct operations.	

Step 7: Choose additional options for Factory Integration from Additional Options sections below or the following:

- HPE Synergy 12000 Frame QuickSpecs
  https://www.hpe.com/psnow/doc/c04815113
- HPE Synergy Interconnect and Mezzanine Components QuickSpecs
  https://www.hpe.com/psnow/doc/c04815110
- HPE Synergy D3940 Storage Module QuickSpecs
  https://www.hpe.com/psnow/doc/c04815141

Step 8: Choose from Pointnext Services for HPE Synergy

HPE Synergy Operational Services

Description	SKU
HPE 5Y Tech Care Essential Service	HU4A6A5
HPE 5Y Tech Care Critical Service	HU4A3A5
HPE 5Y Complete Care Addon Essential Service	HU4D5A5
HPE 5Y Complete Care Addon Critical Service	HU4D2A5

Additional Options Available

Notes: wDMR, Defective Media Retention; cDMR, Comprehensive Defective Media Retention.

Description	SKU
HPE 3Y Tech Care Basic Service	HU4B2A3
HPE 3Y Tech Care Basic with Defective Media Retention Service	HU4B3A3
HPE 3Y Tech Care Basic with Comprehensive Defective Material Retention Service	HU4B4A3
HPE 3Y Complete Care Addon Basic Service	HU4D8A3
HPE 3Y Complete Care Addon Basic with Defective Media Retention Service	HU4D9A3
HPE 3Y Complete Care Addon Basic with Comprehensive Defective Material Retention Service	HU4E0A3
HPE 3Y Tech Care Essential Service	HU4A6A3
HPE 3Y Tech Care Essential with Defective Media Retention Service	HU4A7A3
HPE 3Y Tech Care Essential with Comprehensive Defective Material Retention Service	HU4A8A3
HPE 3Y Complete Care Addon Essential Service	HU4D5A3
HPE 3Y Complete Care Addon Essential with Defective Media Retention Service	HU4D6A3
HPE 3Y Complete Care Addon Essential with Comprehensive Defective Material Retention Service	HU4D7A3
HPE 3Y Tech Care Critical Service	HU4A3A3
HPE 3Y Tech Care Critical with Defective Media Retention Service	HU4A4A3
HPE 3Y Tech Care Critical with Comprehensive Defective Material Retention Service	HU4A5A3
HPE 3Y Complete Care Addon Critical Service	HU4D2A3
HPE 3Y Complete Care Addon Critical with Defective Media Retention Service	HU4D3A3
HPE 3Y Complete Care Addon Critical with Comprehensive Defective Material Retention Service	HU4D4A3
HPE 4Y Tech Care Basic Service	HU4B2A4
HPE 4Y Tech Care Basic with Defective Media Retention Service	HU4B3A4
HPE 4Y Tech Care Basic with Comprehensive Defective Material Retention Service	HU4B4A4
HPE 4Y Complete Care Addon Basic Service	HU4D8A4
HPE 4Y Complete Care Addon Basic with Defective Media Retention Service	HU4D9A4
HPE 4Y Complete Care Addon Basic with Comprehensive Defective Material Retention Service	HU4E0A4
HPE 4Y Tech Care Essential Service	HU4A6A4
HPE 4Y Tech Care Essential with Defective Media Retention Service	HU4A7A4
HPE 4Y Tech Care Essential with Comprehensive Defective Material Retention Service	HU4A8A4
HPE 4Y Complete Care Addon Essential Service	HU4D5A4
HPE 4Y Complete Care Addon Essential with Defective Media Retention Service	HU4D6A4
HPE 4Y Complete Care Addon Essential with Comprehensive Defective Material Retention Service	HU4D7A4
HPE 4Y Tech Care Critical Service	HU4A3A4
HPE 4Y Tech Care Critical with Defective Media Retention Service	HU4A4A4
HPE 4Y Tech Care Critical with Comprehensive Defective Material Retention Service	HU4A5A4
HPE 4Y Complete Care Addon Critical Service	HU4D2A4
HPE 4Y Complete Care Addon Critical with Defective Media Retention Service	HU4D3A4
HPE 4Y Complete Care Addon Critical with Comprehensive Defective Material Retention Service	HU4D4A4

Additional Options

Description	SKU
HPE 5Y Tech Care Basic Service	HU4B2A5
HPE 5Y Tech Care Basic with Defective Media Retention Service	HU4B3A5
HPE 5Y Tech Care Basic with Comprehensive Defective Material Retention Service	HU4B4A5
HPE 5Y Complete Care Addon Basic Service	HU4D8A5
HPE 5Y Complete Care Addon Basic with Defective Media Retention Service	HU4D9A5
HPE 5Y Complete Care Addon Basic with Comprehensive Defective Material Retention Service	HU4E0A5
HPE 5Y Tech Care Essential Service	HU4A6A5
HPE 5Y Tech Care Essential with Defective Media Retention Service	HU4A7A5
HPE 5Y Tech Care Essential with Comprehensive Defective Material Retention Service	HU4A8A5
HPE 5Y Complete Care Addon Essential Service	HU4D5A5
HPE 5Y Complete Care Addon Essential with Defective Media Retention Service	HU4D6A5
HPE 5Y Complete Care Addon Essential with Comprehensive Defective Material Retention Service	HU4D7A5
HPE 5Y Tech Care Critical Service	HU4A3A5
HPE 5Y Tech Care Critical with Defective Media Retention Service	HU4A4A5
HPE 5Y Tech Care Critical with Comprehensive Defective Material Retention Service	HU4A5A5
HPE 5Y Complete Care Addon Critical Service	HU4D2A5
HPE 5Y Complete Care Addon Critical with Defective Media Retention Services	HU4D3A5
HPE 5Y Complete Care Addon Critical with Comprehensive Defective Material Retention Service	HU4D4A5

HPE Drives

Notes:

- The HPE Synergy 480 Gen11 Compute Module supports the HPE hot-plug small form factor (SFF) Basic Carrier Drives. HPE drives from generation G10 Plus servers and before are not compatible with the HPE Synergy 480 Gen11 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 drive types is not supported.
- HPE NVMe Gen4 U.3 Static Solid State Drives are only supported on the Premium Drive Cages.
- 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.
- For the most up to date HDD & SSDs options available Hewlett Packard Enterprise recommends the use of a Hewlett Packard Enterprise approved configurator.

HPE Hard Disk Drives

Enterprise - 12G SAS - SFF Drives

Description	SKU
HPE 1.8TB SAS 12G Mission Critical 10K SFF BC 3-year Warranty 512e Multi Vendor HDD	P53562-B21
HPE 600GB SAS 12G Mission Critical 10K SFF BC 3-year Warranty Multi Vendor HDD	P53561-B21

Additional Options

SSD Selection

For SSD selection guidance, please visit https://ssd.hpe.com.

Read Intensive - SAS - SFF - Solid State Drives

Description	SKU
HPE 15.36TB SAS 24G Read Intensive SFF BC Multi Vendor SSD	P49045-B21
HPE 7.68TB SAS Read Intensive SFF BC Self-encrypting FIPS 140-3 PM7 SSD	P83350-B21
HPE 7.68TB SAS 12G Read Intensive SFF BC Value SAS Multi Vendor SSD	P40509-B21
HPE 7.68TB SAS 24G Read Intensive SFF BC Multi Vendor SSD	P49041-B21
HPE 3.84TB SAS Read Intensive SFF BC Self-encrypting FIPS 140-3 PM7 SSD	P83347-B21
HPE 3.84TB SAS 12G Read Intensive SFF BC Value SAS Multi Vendor SSD	P40508-B21
HPE 3.84TB SAS 24G Read Intensive SFF BC Multi Vendor SSD	P49035-B21
HPE 1.92TB SAS 24G Read Intensive SFF BC Multi Vendor SSD	P49031-B21
HPE 1.92TB SAS 12G Read Intensive SFF BC Value SAS Multi Vendor SSD	P40507-B21
HPE 960GB SAS 12G Read Intensive SFF BC Value SAS Multi Vendor SSD	P40506-B21
HPE 960GB SAS 24G Read Intensive SFF BC Multi Vendor SSD	P49029-B21

Mixed Use - SAS - SFF - Solid State Drives

Description	SKU
HPE 6.4TB SAS 24G Mixed Use SFF BC Multi Vendor SSD	P49057-B21
HPE 3.84TB SAS 12G Mixed Use SFF BC Value SAS Multi Vendor SSD	P40512-B21
HPE 3.2TB SAS 24G Mixed Use SFF BC Multi Vendor SSD	P49053-B21
HPE 1.92TB SAS 12G Mixed Use SFF BC Value SAS Multi Vendor SSD	P40511-B21
HPE 1.6TB SAS Mixed Use SFF BC Self-encrypting FIPS 140-3 PM7 SSD	P83344-B21
HPE 1.6TB SAS 24G Mixed Use SFF BC Multi Vendor SSD	P49049-B21
HPE 960GB SAS 12G Mixed Use SFF BC Value SAS Multi Vendor SSD	P40510-B21
HPE 800GB SAS 24G Mixed Use SFF BC Multi Vendor SSD	P49047-B21

Read Intensive - SATA - SFF - Solid State Drives

Description	SKU
HPE 7.68TB SATA 6G Read Intensive SFF BC Multi Vendor SSD	P40501-B21
HPE 3.84TB SATA 6G Read Intensive SFF BC Multi Vendor SSD	P40500-B21
HPE 1.92TB SATA 6G Read Intensive SFF BC Multi Vendor SSD	P40499-B21
HPE 480GB SATA 6G Read Intensive SFF BC Multi Vendor SSD	P40497-B21
HPE 960GB SATA 6G Read Intensive SFF BC Multi Vendor SSD	P40498-B21

Additional Options

Mixed Use - SATA - SFF - Solid State Drives

Description	SKU
HPE 3.84TB SATA 6G Mixed Use SFF BC Multi Vendor SSD	P40505-B21
HPE 1.92TB SATA 6G Mixed Use SFF BC Multi Vendor SSD	P40504-B21
HPE 960GB SATA 6G Mixed Use SFF BC Multi Vendor SSD	P40503-B21
HPE 480GB SATA 6G Mixed Use SFF BC Multi Vendor SSD	P40502-B21

Read Intensive - NVMe - SFF - Solid State Drives

Description	
HPE 30.72TB NVMe Gen4 High Performance Read Intensive SFF BC U.3 PQC27 CM9 SSD	P85676-B21
HPE 15.36TB NVMe Gen4 High Performance Read Intensive SFF BC U.3 PS1010 SSD	P70436-B21
HPE 15.36TB NVMe Gen4 High Performance Read Intensive SFF BC U.3 Multi Vendor SSD	P91249-B21
HPE 15.36TB NVMe Gen4 High Performance Read Intensive SFF BC U.3 PQC27 CM9 SSD	P85674-B21
HPE 15.36TB NVMe Gen4 High Performance Read Intensive SFF BC U.3 Static PM1753 SSD	P78810-B21
HPE 15.36TB NVMe Gen4 Mainstream Performance Read Intensive SFF BC U.3 SPDM 7500b SSD	P84239-B21
HPE 15.36TB NVMe Gen4 Mainstream Performance Read Intensive BC U.3 Static V2 SPDM Multi Vendor SSD	P84236-B21
HPE 15.36TB NVMe Gen4 High Performance Read Intensive SFF BC U.3 PM1733a SSD	P50224-B21
HPE 15.36TB NVMe Gen4 High Performance Read Intensive SFF BC U.3 CM7 SSD	P63841-B21
HPE 7.68TB NVMe Gen4 High Performance Read Intensive SFF BC U.3 PS1010 SSD	P70434-B21
HPE 7.68TB NVMe Gen4 High Performance Read Intensive SFF BC U.3 Multi Vendor SSD	P91247-B21
HPE 7.68TB NVMe Gen4 High Performance Read Intensive SFF BC U.3 PQC27 CM9 SSD	P85672-B21
HPE 7.68TB NVMe Gen4 High Performance Read Intensive SFF BC U.3 PM1733a SSD	P50222-B21
HPE 7.68TB NVMe Gen4 High Performance Read Intensive SFF BC U.3 CM7 SSD	P63837-B21
HPE 3.84TB NVMe Gen4 High Performance Read Intensive SFF BC U.3 Multi Vendor SSD	P91245-B21
HPE 3.84TB NVMe Gen4 High Performance Read Intensive SFF BC U.3 PQC27 CM9 SSD	P85670-B21
HPE 3.84TB NVMe Gen4 High Performance Read Intensive SFF BC U.3 Static PM1753 SSD	P78806-B21
HPE 3.84TB NVMe Gen4 High Performance Read Intensive SFF BC U.3 PM1733a SSD	P50219-B21
HPE 3.84TB NVMe Gen4 High Performance Read Intensive SFF BC U.3 CM7 SSD	P63833-B21
HPE 1.92TB NVMe Gen4 High Performance Read Intensive SFF BC U.3 Multi Vendor SSD	P91243-B21
HPE 1.92TB NVMe Gen4 High Performance Read Intensive SFF BC U.3 PQC27 CM9 SSD	P85668-B21
HPE 1.92TB NVMe Gen4 High Performance Read Intensive SFF BC U.3 PM1733a SSD	P50216-B21
HPE 1.92TB NVMe Gen4 High Performance Read Intensive SFF BC U.3 CM7 SSD	P63829-B21
HPE 1.92TB NVMe Gen4 High Performance Read Intensive SFF BC U.3 Self-encrypting FIPS 140-3 CM7 SSD	P61019-B21
HPE 3.84TB NVMe Gen4 High Performance Read Intensive SFF BC U.3 Static PM1753 SSD	P78806-B21
HPE 3.84TB NVMe Gen4 High Performance Read Intensive SFF BC U.3 Self-encrypting FIPS 140-3 CM7 SSD	P61027-B21
HPE 7.68TB NVMe Gen4 High Performance Read Intensive SFF BC U.3 Static PM1753 SSD	P78808-B21

Additional Options

HPE 7.68TB NVMe Gen4 High Performance Read Intensive SFF BC U.3 Self-encrypting FIPS 140-3 CM7 SSD	P61035-B21
HPE 7.68TB NVMe Gen4 Mainstream Performance Read Intensive SFF BC U.3 SPDM 7500 SSD	P84242-B21
HPE 7.68TB NVMe Gen4 Mainstream Performance Read Intensive SFF BC U.3 Static V2 Multi Vendor SSD	P64848-B21
HPE 3.84TB NVMe Gen4 Mainstream Performance Read Intensive SFF BC U.3 SPDM 7500 SSD	P84244-B21
HPE 3.84TB NVMe Gen4 Mainstream Performance Read Intensive SFF BC U.3 Static V2 Multi Vendor SSD	P64846-B21
HPE 1.92TB NVMe Gen4 Mainstream Performance Read Intensive SFF BC U.3 Static V2 Multi Vendor SSD	P64844-B21
HPE 960GB NVMe Gen4 Mainstream Performance Read Intensive SFF BC U.3 Static V2 Multi Vendor SSD	P64842-B21

Mixed Use - NVMe - SFF - Solid State Drives

Description	SKU
HPE 6.4TB NVMe Gen4 High Performance Mixed Use SFF BC U.3 PS1030 SSD	P70428-B21
HPE 6.4TB NVMe Gen4 High Performance Mixed Use SFF BC U.3 Multi Vendor SSD	P91241-B21
HPE 6.4TB NVMe Gen4 High Performance Mixed Use SFF BC U.3 PQC27 CM9 SSD	P85666-B21
HPE 6.4TB NVMe Gen4 High Performance Mixed Use SFF BC U.3 PM1735a SSD	P50233-B21
HPE 6.4TB NVMe Gen4 High Performance Mixed Use SFF BC U.3 CM7 SSD	P63853-B21
HPE 3.2TB NVMe Gen4 High Performance Mixed Use SFF BC U.3 PS1030 SSD	P70426-B21
HPE 3.2TB NVMe Gen4 High Performance Mixed Use SFF BC U.3 Multi Vendor SSD	P91239-B21
HPE 3.2TB NVMe Gen4 High Performance Mixed Use SFF BC U.3 PQC27 CM9 SSD	P85664-B21
HPE 3.2TB NVMe Gen4 High Performance Mixed Use SFF BC U.3 Static PM1755 SSD	P78801-B21
HPE 3.2TB NVMe Gen4 High Performance Mixed Use SFF BC U.3 PM1735a SSD	P50230-B21
HPE 3.2TB NVMe Gen4 High Performance Mixed Use SFF BC U.3 CM7 SSD	P63849-B21
HPE 1.6TB NVMe Gen4 High Performance Mixed Use SFF BC U.3 Multi Vendor SSD	P91237-B21
HPE 1.6TB NVMe Gen4 High Performance Mixed Use SFF BC U.3 PQC27 CM9 SSD	P85662-B21
HPE 1.6TB NVMe Gen4 High Performance Mixed Use SFF BC U.3 PM1735a SSD	P50227-B21
HPE 1.6TB NVMe Gen4 High Performance Mixed Use SFF BC U.3 CM7 SSD	P63845-B21
HPE 1.6TB NVMe Gen4 High Performance Mixed Use SFF BC U.3 Self-encrypting FIPS 140-3 CM7 SSD	P61043-B21
HPE 3.2TB NVMe Gen4 High Performance Mixed Use SFF BC U.3 Self-encrypting FIPS 140-3 CM7 SSD	P61051-B21
HPE 6.4TB NVMe Gen4 High Performance Mixed Use SFF BC U.3 Static PM1755 SSD	P78804-B21
HPE 6.4TB NVMe Gen4 High Performance Mixed Use SFF BC U.3 Self-encrypting FIPS 140-3 CM7 SSD	P61059-B21
HPE 6.4TB NVMe Gen4 Mainstream Performance Mixed Use SFF BC U.3 Static V2 Multi Vendor SSD	P65023-B21
HPE 3.2TB NVMe Gen4 Mainstream Performance Mixed Use SFF BC U.3 Static V2 Multi Vendor SSD	P65015-B21
HPE 1.6TB NVMe Gen4 Mainstream Performance Mixed Use SFF BC U.3 Static V2 Multi Vendor SSD	P65007-B21
HPE 800GB NVMe Gen4 Mainstream Performance Mixed Use SFF BC U.3 Static V2 Multi Vendor SSD	P64999-B21

Additional Options

Read Intensive – NVMe – EDSFF E3.S – Solid State Drives

Description	SKU
HPE 30.72TB NVMe Gen5 High Performance Read Intensive E3.S EC1 E3 Thin PQC27 CM9 SSD	P85745-B21
HPE 30.72TB NVMe Gen5 High Performance Read Intensive E3.S EC1 EDSFF SPDM 9550 SSD	P79965-B21
HPE 15.36TB NVMe Gen5 High Performance Read Intensive E3S EC1 EDSFF SPDM 9550 SSD	P77061-B21
HPE 15.36TB NVMe Gen5 High Performance Read Intensive E3S EC1 Self-encrypting FIPS 140-3 CM7 SSD	P79122-B21
HPE 15.36TB NVMe Gen5 High Performance Read Intensive E3.S EC1 E3 Thin Multi Vendor SSD	P91233-B21
HPE 15.36TB NVMe Gen5 High Performance Read Intensive E3.S EC1 E3 Thin PQC27 CM9 SSD	P85743-B21
HPE 15.36TB NVMe Gen5 High Performance Read Intensive E3.S EC1 PM1753 SSD	P78793-B21
HPE 15.36TB NVMe Gen5 High Performance Read Intensive E3S EC1 EDSFF SPDM PM1743 SSD	P57807-B21
HPE 15.36TB NVMe Gen5 High Performance Read Intensive E3S EC1 EDSFF SPDM CM7 SSD	P61187-B21
HPE 7.68TB NVMe Gen5 High Performance Read Intensive E3S EC1 EDSFF SPDM 9550 SSD	P77059-B21
HPE 7.68TB NVMe Gen5 High Performance Read Intensive E3.S EC1 E3 Thin Multi Vendor SSD	P91231-B21
HPE 7.68TB NVMe Gen5 High Performance Read Intensive E3.S EC1 E3 Thin PQC27 CM9 SSD	P85741-B21
HPE 7.68TB NVMe Gen5 High Performance Read Intensive E3.S EC1 PM1753 SSD	P78791-B21
HPE 7.68TB NVMe Gen5 High Performance Read Intensive E3S EC1 EDSFF SPDM PM1743 SSD	P57803-B21
HPE 7.68TB NVMe Gen5 High Performance Read Intensive E3S EC1 EDSFF SPDM CM7 SSD	P61183-B21
HPE 7.68TB NVMe Gen5 High Performance Read Intensive E3S EC1 Self-encrypting FIPS 140-3 CM7 SSD	P70674-B21
HPE 3.84TB NVMe Gen5 High Performance Read Intensive E3S EC1 EDSFF SPDM 9550 SSD	P77057-B21
HPE 3.84TB NVMe Gen5 High Performance Read Intensive E3.S EC1 E3 Thin Multi Vendor SSD	P91229-B21
HPE 3.84TB NVMe Gen5 High Performance Read Intensive E3.S EC1 E3 Thin PQC27 CM9 SSD	P85739-B21
HPE 3.84TB NVMe Gen5 High Performance Read Intensive E3.S EC1 PM1753 SSD	P78789-B21
HPE 3.84TB NVMe Gen5 High Performance Read Intensive E3S EC1 EDSFF SPDM PM1743 SSD	P57799-B21
HPE 3.84TB NVMe Gen5 High Performance Read Intensive E3S EC1 EDSFF SPDM CM7 SSD	P61179-B21
HPE 3.84TB NVMe Gen5 High Performance Read Intensive E3S EC1 PS1010 SSD	P70392-B21
HPE 7.68TB NVMe Gen5 High Performance Read Intensive E3S EC1 PS1010 SSD	P70395-B21
HPE 15.36TB NVMe Gen5 High Performance Read Intensive E3S EC1 PS1010 SSD	P70397-B21
HPE 30.72TB NVMe Gen5 Mainstream Performance Read Intensive E3S EC1 EDSFF SPDM PM9D3a SSD	P78923-B21
HPE 15.36TB NVMe Gen5 Mainstream Performance Read Intensive E3S EC1 EDSFF SPDM PM9D3a SSD	P78921-B21
HPE 15.36TB NVMe Gen5 Mainstream Performance Read Intensive E3S EC1 SPDM 7600 SSD	P85128-B21
HPE 15.36TB NVMe Gen5 Mainstream Performance Read Intensive E3S EC1 EDSFF SPDM PE1010 SSD	P77275-B21
HPE 15.36TB NVMe Gen5 Mainstream Performance Read Intensive E3.S EC1 E3 Thin Multi Vendor SSD	P91096-B21
HPE 15.36TB NVMe Gen5 Mainstream Performance Read Intensive E3S EC1 CD8P SSD	P69546-B21
HPE 7.68TB NVMe Gen5 Mainstream Performance Read Intensive E3S EC1 EDSFF SPDM PM9D3a SSD	P78919-B21

Additional Options

HPE 7.68TB NVMe Gen5 Mainstream Performance Read Intensive E3S EC1 SPDM 7600 SSD	P85126-B21
HPE 7.68TB NVMe Gen5 Mainstream Performance Read Intensive E3S EC1 Self-encrypting 7600 SSD	P87723-B21
HPE 7.68TB NVMe Gen5 Mainstream Performance Read Intensive E3S EC1 EDSFF SPDM PE1010 SSD	P77273-B21
HPE 7.68TB NVMe Gen5 Mainstream Performance Read Intensive E3.S EC1 E3 Thin Multi Vendor SSD	P91094-B21
HPE 7.68TB NVMe Gen5 Mainstream Performance Read Intensive E3S EC1 CD8P SSD	P69239-B21
HPE 3.84TB NVMe Gen5 Mainstream Performance Read Intensive E3S EC1 EDSFF SPDM PE1010 SSD	P77271-B21
HPE 3.84TB NVMe Gen5 Mainstream Performance Read Intensive E3S EC1 EDSFF SPDM PM9D3a SSD	P78917-B21
HPE 3.84TB NVMe Gen5 Mainstream Performance Read Intensive E3S EC1 SPDM 7600 SSD	P85124-B21
HPE 3.84TB NVMe Gen5 Mainstream Performance Read Intensive E3S EC1 Self-encrypting 7600 SSD	P87721-B21
HPE 3.84TB NVMe Gen5 Mainstream Performance Read Intensive E3.S EC1 E3 Thin Multi Vendor SSD	P91092-B21
HPE 3.84TB NVMe Gen5 Mainstream Performance Read Intensive E3S EC1 CD8P SSD	P69237-B21
HPE 1.92TB NVMe Gen5 Mainstream Performance Read Intensive E3S EC1 EDSFF SPDM PM9D3a SSD	P78914-B21
HPE 1.92TB NVMe Gen5 Mainstream Performance Read Intensive E3S EC1 SPDM 7600 SSD	P85121-B21
HPE 1.92TB NVMe Gen5 Mainstream Performance Read Intensive E3S EC1 Self-encrypting 7600 SSD	P87719-B21
HPE 1.92TB NVMe Gen5 Mainstream Performance Read Intensive E3S EC1 EDSFF SPDM PE1010 SSD	P77269-B21
HPE 1.92TB NVMe Gen5 Mainstream Performance Read Intensive E3.S EC1 E3 Thin Multi Vendor SSD	P91090-B21
HPE 1.92TB NVMe Gen5 Mainstream Performance Read Intensive E3S EC1 CD8P SSD	P69234-B21
HPE 61.44TB NVMe Gen5 Mainstream Performance Very Read Optimized E3.S EC1 EDSFF 6550 SSD	P79618-B21
HPE 30.72TB NVMe Gen5 Mainstream Performance Very Read Optimized E3.S EC1 EDSFF 6550 SSD	P79615-B21
HPE 30.72TB NVMe Gen4 Mainstream Performance Very Read Optimized E3S EC1 EDSFF P5430 SSD	P79065-B21
HPE 15.36TB NVMe Gen4 Mainstream Performance Very Read Optimized E3S EC1 EDSFF P5430 SSD	P63938-B21
HPE 7.68TB NVMe Gen4 Mainstream Performance Very Read Optimized E3S EC1 EDSFF P5430 SSD	P63934-B21
HPE 3.84TB NVMe Gen4 Mainstream Performance Very Read Optimized E3S EC1 EDSFF P5430 SSD	P63930-B21

Mixed Use – NVMe – EDSFF E3.S – Solid State Drives

Description	SKU
HPE 12.8TB NVMe Gen5 High Performance Mixed Use E3S EC1 EDSFF SPDM 9550 SSD	P77055-B21
HPE 12.8TB NVMe Gen5 High Performance Mixed Use E3.S EC1 E3 Thin Multi Vendor SSD	P91102-B21
HPE 12.8TB NVMe Gen5 High Performance Mixed Use E3.S EC1 E3 Thin PQC27 CM9 SSD	P85735-B21
HPE 12.8TB NVMe Gen5 High Performance Mixed Use E3S EC1 PS1030 SSD	P70403-B21
HPE 6.4TB NVMe Gen5 High Performance Mixed Use E3S EC1 EDSFF SPDM 9550 SSD	P77053-B21
HPE 6.4TB NVMe Gen5 High Performance Mixed Use E3.S EC1 E3 Thin Multi Vendor SSD	P91100-B21
HPE 6.4TB NVMe Gen5 High Performance Mixed Use E3.S EC1 E3 Thin PQC27 CM9 SSD	P85733-B21
HPE 6.4TB NVMe Gen5 High Performance Mixed Use E3.S EC1 PM1755 SSD	P78787-B21
HPE 6.4TB NVMe Gen5 High Performance Mixed Use E3S EC1 PS1030 SSD	P70401-B21
HPE 6.4TB NVMe Gen5 High Performance Mixed Use E3S EC1 Self-encrypting FIPS 140-3 CM7 SSD	P70672-B21
HPE 6.4TB NVMe Gen5 High Performance Mixed Use E3S EC1 EDSFF SPDM CM7 SSD	P61195-B21

Additional Options

HPE 3.2TB NVMe Gen5 High Performance Mixed Use E3S EC1 EDSFF SPDM 9550 SSD	P77050-B21
HPE 3.2TB NVMe Gen5 High Performance Mixed Use E3.S EC1 E3 Thin Multi Vendor SSD	P91098-B21
HPE 3.2TB NVMe Gen5 High Performance Mixed Use E3.S EC1 E3 Thin PQC27 CM9 SSD	P85731-B21
HPE 3.2TB NVMe Gen5 High Performance Mixed Use E3.S EC1 PM1755 SSD	P78784-B21
HPE 3.2TB NVMe Gen5 High Performance Mixed Use E3S EC1 EDSFF SPDM CM7 SSD	P61191-B21
HPE 3.2TB NVMe Gen5 High Performance Mixed Use E3S EC1 PS1030 SSD	P70399-B21
HPE 3.2TB NVMe Gen5 High Performance Mixed Use E3S EC1 Self-encrypting FIPS 140-3 CM7 SSD	P70669-B21
HPE 6.4TB NVMe Gen5 Mainstream Performance Mixed Use E3S EC1 SPDM 7600 SSD	P85119-B21
HPE 6.4TB NVMe Gen5 Mainstream Performance Mixed Use E3S EC1 EDSFF SPDM PE1030 SSD	P77267-B21
HPE 6.4TB NVMe Gen5 Mainstream Performance Mixed Use E3.S EC1 E3 Thin Multi Vendor SSD	P91088-B21
HPE 6.4TB NVMe Gen5 Mainstream Performance Mixed Use E3S EC1 CD8P SSD	P69245-B21
HPE 3.2TB NVMe Gen5 Mainstream Performance Mixed Use E3S EC1 SPDM 7600 SSD	P85117-B21
HPE 3.2TB NVMe Gen5 Mainstream Performance Mixed Use E3.S EC1 Self-encrypting 7600 SSD	P87717-B21
HPE 3.2TB NVMe Gen5 Mainstream Performance Mixed Use E3S EC1 EDSFF SPDM PE1030 SSD	P77265-B21
HPE 3.2TB NVMe Gen5 Mainstream Performance Mixed Use E3.S EC1 E3 Thin Multi Vendor SSD	P91086-B21
HPE 3.2TB NVMe Gen5 Mainstream Performance Mixed Use E3S EC1 CD8P SSD	P69243-B21
HPE 1.6TB NVMe Gen5 Mainstream Performance Mixed Use E3.S EC1 Self-encrypting 7600 SSD	P87715-B21
HPE 1.6TB NVMe Gen5 Mainstream Performance Mixed Use E3S EC1 EDSFF SPDM PE1030 SSD	P77262-B21
HPE 1.6TB NVMe Gen5 Mainstream Performance Mixed Use E3.S EC1 E3 Thin Multi Vendor SSD	P91084-B21
HPE 1.6TB NVMe Gen5 Mainstream Performance Mixed Use E3S EC1 SPDM 7600 SSD	P85114-B21
HPE 1.6TB NVMe Gen5 Mainstream Performance Mixed Use E3S EC1 CD8P SSD	P69241-B21

Additional Options

M.2 Drive Options

Description	SKU
HPE 480GB NVMe Gen4 Mainstream Performance Read Intensive M.2 2280 PE9010 SSD	P80318-B21
HPE 960GB NVMe Gen4 Mainstream Performance Read Intensive M.2 2280 PE9010 SSD	P80321-B21

Notes: 2x M.2 SSD required for HPE NS204i-d Synergy Gen11 Boot Controller.

Drive Qualification Exceptions

At this time there are no exceptions to list.

HPE Security

Description	SKU
HPE iLO Common Password FIO Setting	P08040-B21

HPE Networking Mezzanine CNA's

Notes:

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

Description	SKU
HPE Synergy 4820C 10/20/25Gb Converged Network Adapter	876449-B21
HPE Synergy 6820C 25/50Gb Converged Network Adapter	P02054-B21

HPE Fibre Channel

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

HPE Storage Controllers

Description	SKU
HPE SR416ie-m Gen11 x16 Lanes 4GB Cache SPDM Mezzanine Storage Controller	P39959-B21
HPE Synergy NS204i-d Gen11 NVMe Boot Storage Device	P39568-B21
HPE 16W Smart Hybrid Capacitor with 260mm Cable	P65042-B21

Notes:

- HPE NS204i-d Gen11 Boot Controller requires 2x NVMe M.2 SSD.
- Premium Front Drive Cages, CTO offers 2 and 4 drive Premium Front Drive Cages for use with 4 SFF SATA, SAS, or NVMe drives. Supports HPE SR416ie-m Controller with HPE SY480 Gen11 SAS Cable Opt Kit (P39956-B21). The HPE SR416ie-m also supports/manages the HPE D3940 Storage Module.

Third Party Solutions

Orumco Cloud Solution (Service Provider)

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

Solution – see http://www.Ormuco.com.

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

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

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

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

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

Memory Subsystem Architecture

Each processor socket contains eight memory channels that support two DIMMs each for a total of 16 DIMM per installed processor or a grand total of thirty two (32) DIMMs for the compute module with 2 processors..

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.
- The -B21 memory SKUs shown in this document are to be used when ordering stand-alone memory only. For each -B21 SKU, there is a corresponding -F21 SKU which is to be used when configuring servers with integrated memory DIMMs.
- HPE memory from previous generation servers is not compatible with the HPE Synergy 480 Gen11 Compute Module.

For additional information, please see the HPE DDR5 Smart Memory.

Synergy 480 Gen11 Compute Module Memory Tables

Registered DIMM (RDIMM)					
HPE SKU P/N	**P43322-B21**	**P43328-B21**	**P43331-B21**	**P43331-B21**	**P90550-B21**
SKU Description	HPE 16GB (1x16GB) Single Rank x8 DDR5-4800 CAS-40-39-39 EC8 Registered Smart Memory Kit	HPE 32GB (1x32GB) Dual Rank x8 DDR5-4800 CAS-40-39-39 EC8 Registered Smart Memory Kit	HPE 64GB (1x64GB) Dual Rank x4 DDR5-4800 CAS-40-39-39 EC8 Registered Smart Memory Kit	HPE 64GB (1x64GB) Dual Rank x4 DDR5-4800 CAS-40-39-39 EC8 Registered Smart Memory Kit	HPE 256GB (1x256GB) Quad Rank x4 DDR5-4800 CAS-60-52-52 EC8 Registered 3DS Smart Memory Kit
DIMM Rank ->	Single Rank (1R)	Dual Rank (2R)	Dual Rank (2R)	Dual Rank (2R)	Octal Rank (8R)
DIMM Capacity ->	16GB	32GB	64GB	96GB	256GB
Voltage	1.1V	1.2V	1.2V	1.2V	1.2V
DRAM depth [bit]	2G	2G	4G	6G	4G
DRAM Width [bit]	x8	x8	x4	x4	x4
DRAM Density	16Gb	16Gb	16Gb	24Gb	32Gb
CAS Latency	40-39-39	40-39-39	40-39-39	46-45-45	40-39-39
DIMM Native Speed (MT/s)	4800	4800	4800	4800	4800

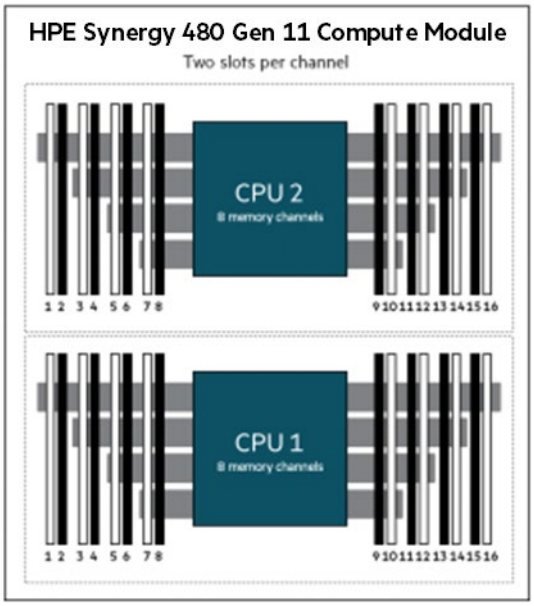
Memory

Registered DIMM (RDIMM)					
HPE SKU P/N	**P64705-B21**	**P64706-B21**	**P64707-B21**	**P64708-B21**	**P90554-B21**
SKU Description	HPE 16GB (1x16GB) Single Rank x8 DDR5-5600 CAS-46-45-45 EC8 Registered Smart Memory Kit	HPE 32GB (1x32GB) Dual Rank x8 DDR5-5600 CAS-46-45-45 EC8 Registered Smart Memory Kit	HPE 64GB (1x64GB) Dual Rank x4 DDR5-5600 CAS-46-45-45 EC8 Registered Smart Memory Kit	HPE 96GB (1x96GB) Dual Rank x4 DDR5-5600 CAS-46-45-45 EC8 Registered Smart Memory Kit	HPE 256GB (1x256GB) Quad Rank x4 DDR5-5600 CAS-60-52-52 EC8 Registered 3DS Smart Memory Kit
DIMM Rank ->	Single Rank (1R)	Dual Rank (2R)	Dual Rank (2R)	Dual Rank (2R)	Quad Rank (4R)
DIMM Capacity ->	16GB	32GB	64GB	96GB	128GB
Voltage	1.1V	1.2V	1.2V	1.2V	1.2V
DRAM depth [bit]	2G	2G	4G	6G	4G
DRAM Width [bit]	x8	x8	x4	x4	x4
DRAM Density	16Gb	16Gb	16Gb	24Gb	32Gb
CAS Latency	46-45-45	40-39-39	46-45-45	46-45-45	52-45-45
DIMM Native Speed (MT/s)	5600	5600	5600	5600	5600

Notes: The maximum memory speed is a function of the memory type, memory configuration, and processor model.

Memory Population Rules and Guidelines

Drawing showing SY480 Gen11 system board layout for processors and memory.



Population guidelines for HPE Smart Memory DIMMs in HPE Synergy 480 Gen11 Compute Modules

HPE Synergy 480 Gen11 Compute Modules have twelve DIMM slots per CPU.

Table: Population guidelines for HPE Smart Memory DIMMs in HPE Synergy 480 Gen11 Compute Modules

HPE Synergy 480 Gen11 servers per CPU DIMM population order																
CPU 1																
1 DIMM										10						
2 DIMMs[2]			3							10						
4 DIMMs[2]			3				7			10				14		
6 DIMMs[2]			3		5		7			10				14		16
8 DIMMs[1]	1		3		5		7			10		12		14		16
12 DIMMs	1	2	3		5	6	7			10	11	12		14	15	16
16 DIMMs[1,2]	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

CPU 2																
1 DIMM							7									
2 DIMMs[2]							7							14		
4 DIMMs[2]			3				7			10				14		
6 DIMMs	1		3				7			10		12		14		
8 DIMMs[1,2]	1		3		5		7			10		12		14		16
12 DIMMs	1	2	3		5	6	7			10	11	12		14	15	16
16 DIMMs[1,2]	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

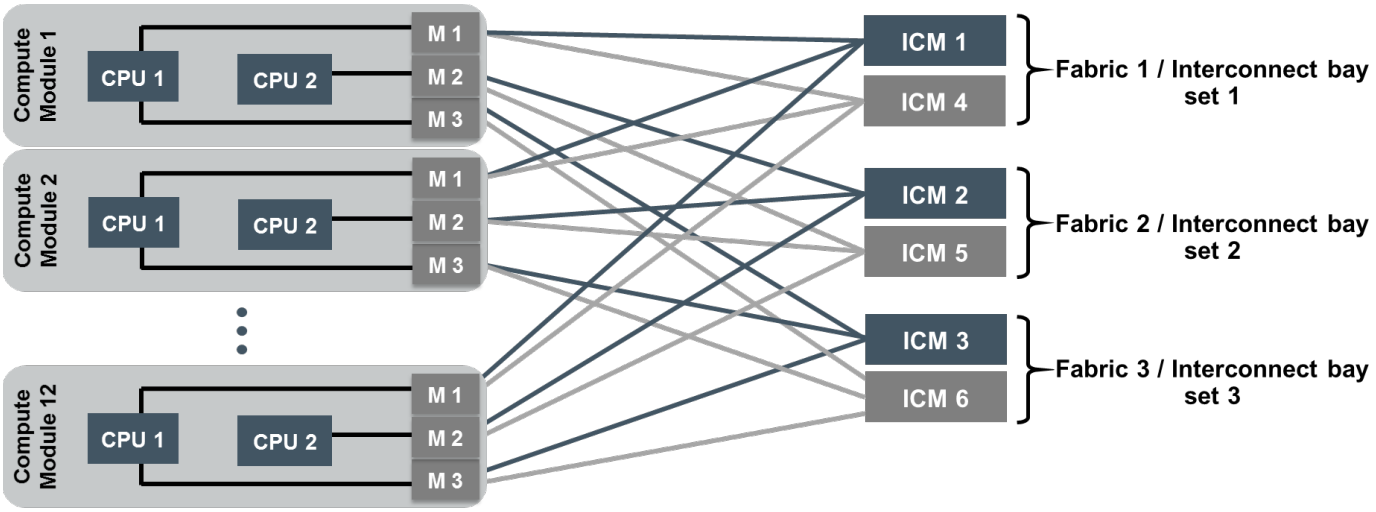
Memory

Notes:

- [1]Supports SGX (Software Guard Extensions).
- [2]Supports Hemi (hemisphere mode).
- Cells without entries represent configurations not supported, and if populated, the server may result in non-optimal memory performance or other unexpected behavior.

For more information or additional DIMM configurations go to: https://www.hpe.com/psnow/doc/a50007437enw.

Internal Fabric Routing



Technical Specifications

System Unit

Dimensions (H x W x D)

With Bezel

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

Weight (approximate)

- 8.16 kg / 18 lb
  Maximum: all processors, 32 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 https://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: -30°C to 60°C (-22°F to 140°F).
- Standard Operating Temperature 10° to 35°C (50° to 95°F) at sea level with an altitude derating of 1.0°C per every 305 m (1.8°F per every 1000 ft) above sea level to a maximum of 3050 m (10,000 ft), no direct sustained sunlight. Maximum rate of change is 20°C/hr. (36°F/hr.). The upper limit and rate of change may be limited by the type and number of options installed.
  System performance during standard operating support may be reduced if operating with a fan fault or above 30°C (86°F).
- Extended Ambient Operating Temperature For approved hardware configurations, the supported system inlet range is extended to be: 5° to 10°C (41° to 50°F) and 35° to 40°C (95° to 104°F) at sea level with an altitude derating of 1.0°C per every 175 m (1.8°F per every 574 ft) above 900 m (2953 ft) to a maximum of 3050 m (10,000 ft). The approved hardware configurations for this system are listed at the URL: http://www.hpe.com/servers/ashrae. For approved hardware configurations, the supported system inlet range is extended to be: 40° to 45°C (104° to 113°F) at sea level with an altitude derating of 1.0°C per every 125 m (1.8°F per every 410 ft) above 900 m (2953 ft) to a maximum of 3050 m (10,000 ft). The approved hardware configurations for this system are listed at the URL: https://www.hpe.com/servers/ashrae.
  System performance may be reduced if operating in the extended ambient operating range or with a fan fault.
- Non-operating -30° to 60°C (-22° to 140°F). Maximum rate of change is 20°C/hr. (36°F/hr.).

Extended Ambient Operating Support

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

Relative Humidity (non-condensing)

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

Acoustic Noise

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

ErP Lot9

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

For additional information, please visit: https://www.hpe.com/us/en/about/environment/msds-specs-more.html

Documents provided by HPE: Lot 9 Declarations, White paper, and FAQ.

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

Hewlett Packard Enterprise offers End-of-life product return, Trade-in, and 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
08-Sep-2026	Version 27	Changed	Standard Features and Additional Options sections were updated
06-July-2026	Version 26	Changed	Additional Options section was updated
01-Jun-2026	Version 25	Changed	Additional Options section was updated
04-May-2026	Version 24	Changed	Additional Options section was updated
		Added	GreenLake statement was updated
			New SKU added - P65042-B21
06-Apr-2026	Version 23	Changed	This version represents a substantive update rather than a cosmetic refresh. The changes concentrate on hardware capability expansion, SKU lifecycle governance, memory clarification, and storage option growth, with multiple reviewer comments flagging SKU obsolescence dates, visibility warnings, and data source validation. **Main changes:** Standard Features – Reinforced positioning of Gen11 as a high-performance, composable compute platform. – Explicit alignment with: • 4th and 5th Generation Intel® Xeon® Scalable processors, PCIe Gen5 end-to-end, and DDR5 Smart Memory. Configuration Information – Expanded CTO (Configure-to-Order) guidance with clearer step-by-step configuration flow. – Improved clarity around: • Mandatory selection rules (e.g., drive cage requirement), Controller dependencies (SR416ie-m vs. NS204i-d), and Processor pairing restrictions (no mixed CPU SKUs). – Refined mapping between mezzanine slots and interconnect module bays. – New and Expanded NVMe Options. Memory – Confirmed 32 DDR5 DIMM slots total (16 per processor). – Clarified maximum memory capacities: – Expanded and corrected: • DDR5-4800 vs DDR5-5600 behavior, Population rules, and Speed limitations by processor generation. – Explicitly reiterated: • DDR4 memory is not supported, and 96 GB DIMMs cannot be mixed with other DIMM sizes.
		Added	New SKUs added - P78806-B21, P78801-B21, P78787-B21, P78784-B21, P78810-B21, P78808-B21, P78804-B21
		Removed	Obsolete SKUs removed - P64709-B21, P49654-B21, P49638-B21, P49613-B21

Summary of Changes

Date	Version History	Action	Description of Change
05-Jan-2026	Version 22	Changed	Standard Features, Configuration Information, and Technical Specifications sections were updated.
01-Dec-2025	Version 21	Changed	Standard Features section was updated.
		Added	New SKUs were added in Additional Options section: P83347-B21, P83344-B21
03-Nov-2025	Version 20	Changed	Additional Options section was updated – New Read Intensive - NVMe - SFF - Solid State Drives, Drive options and Storage controllers were added
		Added	P84239-B21, P84236-B21, P80318-B21, P80321-B21, P65042-B21
08-Sep-2025	Version 19	Changed	Additional Options section was updated – Solid State Drive SKUs were re-aligned and updated
		Added	P84242-B21, P84244-B21
28-Jul-2025	Version 18	Changed	Standard Features section was updated – New Network & Storage Adapters or Mezzanine options was added. HPE Synergy 6310C 25/50Gb Ethernet Adapter. Configuration Information section was updated – New SKU for options was added.
		Added	New SKU added - P64724-B21
23-Jun-2025	Version 17	Added	This SKU was added P64724-B21
05-May-2025	Version 16	Changed	Configuration Information section was updated
02-Dec-2024	Version 15	Changed	Additional Options section was updated
07-Oct-2024	Version 14	Changed	Standard Features and Additional Options sections were updated. Obsolete SKUs were removed.
01-Jul-2024	Version 13	Changed	Additional Options section was updated
03-Jun-2024	Version 12	Changed	Additional Options section was updated
06-May-2024	Version 11	Changed	Overview, Standard Features, Service and Support, Configuration Information, and Additional Options sections were updated. Obsolete SKUs were removed.
05-Feb-2024	Version 10	Changed	Overview, Standard Features, Configuration Information and Additional Options sections were updated. Removed obsolete SKUs (HPE Hard Disk Drives).
08-Jan-2024	Version 9	Changed	Additional Options section was updated
18-Dec-2023	Version 8	Changed	Additional Options section was updated
06-Nov-2023	Version 7	Changed	Service and Support and Configuration Information sections were updated
18-Sep-2023	Version 6	Changed	Memory Options updated
05-Sep-2023	Version 5	Changed	Optional Features and Additional Options sections were updated.
10-Jul-2023	Version 4	Changed	Overview, Standard Features, Service and Support, Configuration Information, and Additional Options sections were updated
05-Jun-2023	Version 3	Changed	Standard Features section was updated.
03-Apr-2023	Version 2	Changed	Standard Features, Configuration Information and Additional Options sections were updated.
06-Mar-2023	Version 1	New	New QuickSpecs

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

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