Overview

HPE Synergy 480 Gen11 Compute Module

HPE Synergy, the first platform built from the ground up for Composable Infrastructure, offers an experience that empowers IT to create and deliver new value instantly and continuously. It is a single infrastructure that reduces operational complexity for traditional workloads and increases operational velocity for the new breed of applications and services. Through a single interface, HPE Synergy composes physical and virtual compute, storage, and fabric pools into any configuration for any application. As an extensible platform, it easily enables a broad range of applications and operational models such as virtualization, hybrid cloud, and DevOps. With HPE Synergy, IT can become not just the internal service provider but the business partner to rapidly launch new applications that become the business.
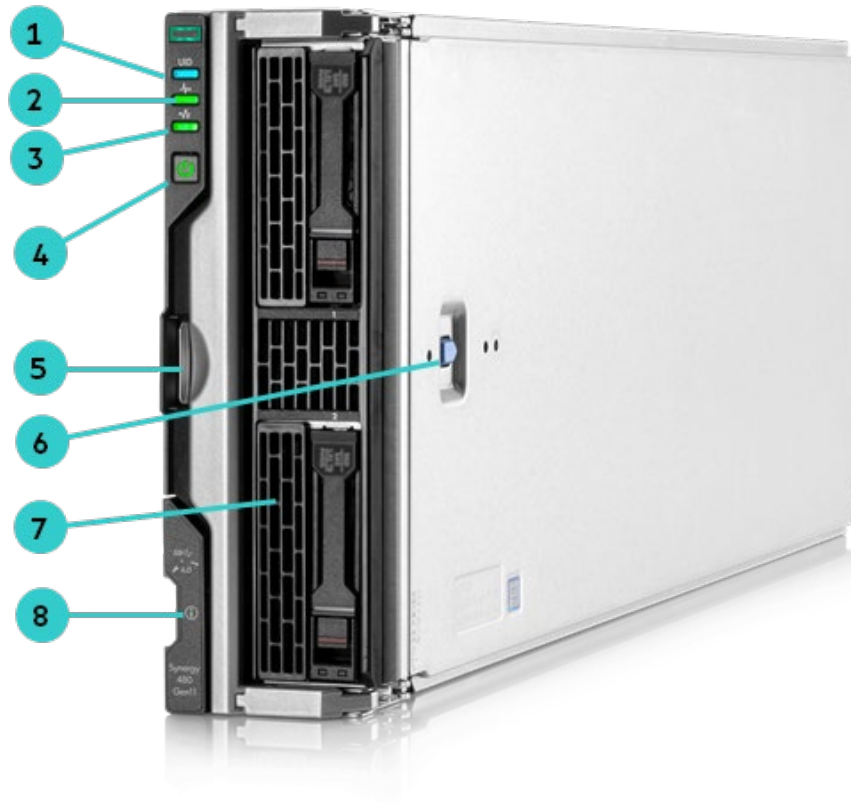
The HPE Synergy 480 Gen11 Compute Module delivers exceptional capacity, efficiency, and flexibility in a two-socket, half-height form factor to support demanding workloads. Powered by the 4th Generation Intel® Xeon® Scalable Processors with up to 56 cores, HPE DDR5 Smart Memory supporting up to 4TB per 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 modules installation involves a minimum upgrade requirement for component compatibility purposes. To ensure proper system functionality, you must update your system to the appropriate Release Set before installing and operating your compute module.
For information on Synergy Release Sets, go to: **http://www.hpe.com/downloads/synergy.**

Overview

Front View – HPE Synergy 480 Gen11 Compute Module

1. UID LED
2. Health Status LED
3. Mezzanine NIC status LED
4. Power On/Stand by button and system power LED

5. Compute Module handle release latch
6. Quick Access Panel
7. Removable drive cage[1]
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
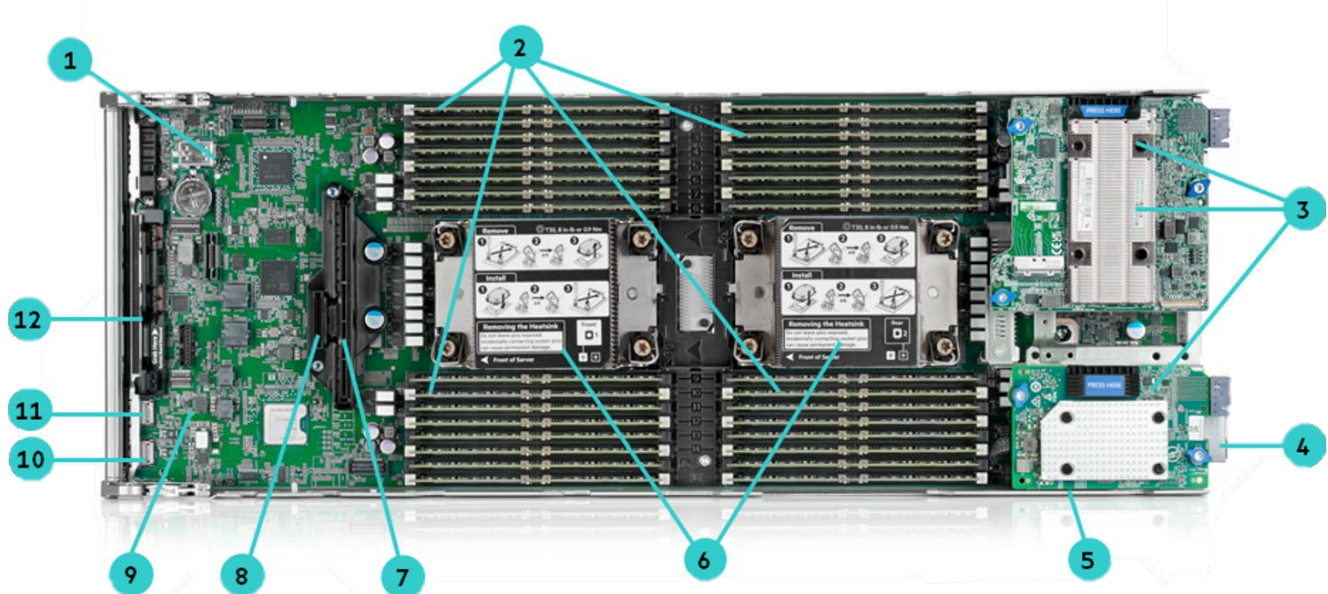
Synergy 480 Gen11 Compute Module
(Drive Cage removed)

1. Internal USB 3.0
2. Thirty Two (32) DDR5 DIMM memory slots[1]
3. Mezzanine connectors (3 x16 PCIe 5.0)
4. Compute Module Power and Management connector
5. Storage Controller Energy Pack connection
6. Up to two (2) Gen4 Intel® Xeon® Scalable Family processors

7. Connection point for Optional Drive Cage solutions[2]
8. HPE NS204i-d Gen11 Boot Controller Connector
9. Embedded TPM
10. External USB 3.0
11. External USB iLO
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

What's New

- Synergy 480 Gen11 designed to provide increased performance and capacity.
- New 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® 4th 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 4800MT/s
- HPE 96GB 2Rx4 PC5-4800B-R Smart Kit
- 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.

Overview

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/about/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

- Come with Frame by default and not this product.
  Notes: The HPE Synergy SY480 Gen11 Compute Module requires the Synergy 12000 Frame to be configured with the HPE Synergy 12000 High Capacity Fan Kits.

Overview

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 below 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 details check your local sales office or see more details below 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 Quick Spec.

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 Quick Spec.
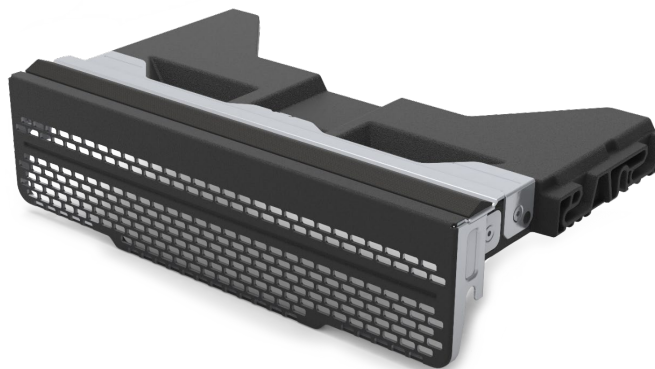
HPE Synergy 480 Gen11 without Drive Front Cage Kit

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.

Overview
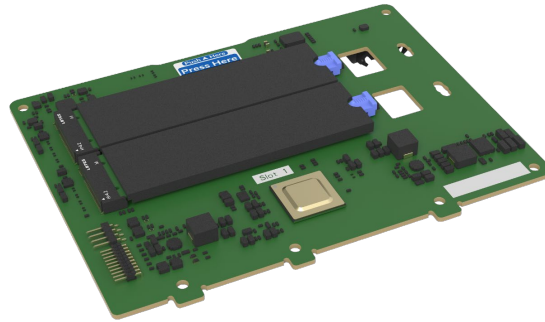
HPE NS204i-d Gen11 M.2 Boot Controller

The NS204i-d Gen11 Plus M.2 Boot Controller is a HW RAID Solution – requires 2x M.2 NVMe Drives 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
Synergy 480 Gen11 is designed and consumes on Intel Xeon Scalable Family Generation 4 processors(x4xx)

Up to 2 of the following..

Notes:
- The 2nd digit of the processor model number "x4xx" is used to denote the processor generation (i.e. 4 = 4th 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 for 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:
- 4.0TB maximum RAM per socket.
- PCIe 5.0 lanes.

Standard Features

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

Notes:

- 8-Channel DDR5 @ 4800 MT/s .
- 2 socket capable, up to 4 UPI @ 16 GT/s.

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

Notes:

- 8-Channel DDR5 @ up to 4800 MT/s .
- 2 socket capable, up to 4 UPI @ 16 GT/s.

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

Notes:

- 8-Channel DDR5 @ up to 4000 MT/s .
- 2 socket capable, 2 UPI @ 16 GT/s.

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, 8channels per processor, 2 DIMMs per channel
Maximum capacity	8.0 TB 32 x 256 GB RDIMM @ 4800 MT/s

Notes: The maximum memory speed is limited by the processor selection.
−   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.
−   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 error that occurs within a single DRAM chip.

Online Spare
Memory online spare mode detects a rank that is degrading and switches operation to the spare rank.
Notes: For more information see our **Memory RAS feature technical whitepaper**.

Memory
One of the following depending on model

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) Quad Rank x4 DDR5-4800 CAS-46-39-39 EC8 Registered 3DS Smart Memory Kit
- HPE 256GB (1x256GB) Octal Rank x4 DDR5-4800 CAS-46-39-39 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.

Standard Features

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**

Standard Features

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 PCIe5.0**
    - 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 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 Quick Specs for more details.

HPE Compute Module ROM

HPE ROM (read only memory) is now digitally signed using the HPE Corporate Signing Service. As part of the Secure Start, this signature is verified before the flash process starts, reducing accidental programming and preventing malicious efforts to corrupt system ROM.

HPE ROM provides for essential initialization and validation of hardware components before control is passed to the customer-installed operating system. The ROM also provides the capability of booting from various fixed media (HDD, CD-ROM) and removable media (USB), to continue operation to the operating system.

HPE ROM performs very early configuration of the video controller, to allow monitoring of initialization progress via an attached monitor. If configuration or hardware errors are discovered during this early phase of hardware initialization, suitable messages are now displayed on the connected monitor. Additionally, these configuration or hardware errors are logged to the Integrated Management Log (IML) to assist in diagnosis.

HPE Synergy Compute ROM is used to configure the following:

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

Standard Features

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 KitSupports 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 and the new HPE NS204i-d Gen11 Controller.

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 with Synergy D3940 Storage Modules, as well as, 2 and 4 Drive Premium front cages for SAS/SATA/NVME drives)

Standard Features

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	61.44 TB	4 x 15.36TB (with Premium front SFF drive cage)
Hot Plug EDSFF NVMe E3.S SSD	122..88 TB	8 x 15.36TB (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

Industry Standard Compliance

- Microsoft® Logo certifications
- WOL enabled on some adaptors
- PXE support enabled
- USB 3.0 Compliant; iLO USB 2.0 Compliant
- TPM 2.0 Support
- 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 see **HPE Environmental Declarations website** for HPE Lot9 Declarations, a White Paper, FAQs and products list of verified products.

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

Standard Features

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**

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)**

Standard Features

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 compromised 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.

Standard Features

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. 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 of ratios of interconnects in every frame and allows extending networking resources pool for Virtual Connect to satellite frames.

For more information on Virtual Connect and converged network options, see **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.

Service and Support

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

Consulting Services
No matter where you are in your journey to hybrid cloud, experts can help you map out your next steps. From determining what workloads should live where, to handling governance and compliance, to managing costs, our experts can help you optimize your operations.
https://www.hpe.com/services/consulting

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

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

HPE Complete Care Service
HPE Complete Care Service is a modular, edge-to-cloud IT environment service designed to help optimize your entire IT environment and achieve agreed upon IT outcomes and business goals through a personalized experience. All delivered by an assigned team of HPE Services experts. HPE Complete Care Service provides:
- A complete coverage approach -- edge to cloud
- An assigned HPE team
- Modular and fully personalized engagement
- Enhanced Incident Management experience with priority access
- Digitally enabled and AI driven customer experience

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

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

Service and Support

HPE Lifecycle Services

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

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

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

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

Other Related Services from HPE Services:

HPE Education Services

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

Defective Media Retention

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

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

Parts and Materials

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

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

How to Purchase Services

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

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

Service and Support

AI Powered and Digitally Enabled Support Experience
Achieve faster time to resolution with access to product-specific resources and expertise through a digital and data driven customer experience

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

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

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

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

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

Configuration Information

Factory Integrated Models (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 an Hewlett Packard Enterprise approved configurator. Contact your local sales representative for information on CTO product offerings and requirements.

 Notes:

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

—   Configure-to-order compute modules must start with a CTO Compute Module.

—   FIO indicates that this option is only available as a factory installable option.

—   All Factory Integrated Models will be populated with sufficient drive blanks based on the number of initial drives ordered with the server.

—   The Factory integrated w/o drive bay model ships with a grill blank in place of the drive cage and drive backplane.

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 below
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 field configurations.

—   Backplane in the chassis description refers to the type of controller backplane in the Drive Cage modules.

—   2Drive 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 supports 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.

Configuration Information

- 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.

Step 1: Base Configuration

HPE Synergy 480 Gen11 CTO Compute Module	P39531-B21
HPE Synergy 480 Gen11 TAA CTO Compute Module	P39531-B22

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

Option 1: Front Drive Cage

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

HPE SAS Cable SR416ie-m Gen11 Storage Controller	P39956-B21

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

Option 2: Front Drive Cage

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

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 NS204i-d Synergy Gen11 Boot Controller	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.

Configuration Information

Step 3: Choose Required Options

Please select up to two matching processors.

Notes:

– Mixing of 2 different processor models is not supported.

– CTO server requires selection of heatsinks with your selection of 1 or 2 processors.

Processor Option Kits

4th Generation Intel® Xeon®-Platinum

Notes:

– All SKUs below ship with processor only. Appropriate heatsinks must be selected.

– 4800 MT/S maximum memory speed unless otherwise noted.

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

Notes: Requires HPE Synergy 480 Gen11 CPU Front Heat Sink Kit P39587-B21 or Rear Heat Sink Kit P39589-B21.

Intel Xeon-Platinum 8470N 1.7GHz 52-core 300W Processor for HPE P49649-B21

Notes: Requires HPE Synergy 480 Gen11 CPU Front Heat Sink Kit P39587-B21 or Rear Heat Sink Kit P39589-B21.

Intel Xeon-Platinum 8470 2.0GHz 52-core 350W Processor for HPE P49606-B21

Notes: Requires HPE Synergy 480 Gen11 CPU Front Heat Sink Kit P39587-B21 or Rear Heat Sink Kit P39589-B21.

Intel Xeon-Platinum 8468 2.1GHz 48-core 350W Processor for HPE P49605-B21

Notes: Requires HPE Synergy 480 Gen11 CPU Front Heat Sink Kit P39587-B21 or Rear Heat Sink Kit P39589-B21.

Intel Xeon-Platinum 8468V 2.4GHz 48-core 330W Processor for HPE P49631-B21

Notes: Requires HPE Synergy 480 Gen11 CPU Front Heat Sink Kit P39587-B21 or Rear Heat Sink Kit P39589-B21.

Intel Xeon-Platinum 8460Y+ 2.0GHz 40-core 300W Processor for HPE P49604-B21

Notes: Requires HPE Synergy 480 Gen11 CPU Front Heat Sink Kit P39587-B21 or Rear Heat Sink Kit P39589-B21.

Intel Xeon-Platinum 8458P 2.7GHz 44-core 350W Processor for HPE P49632-B21

Notes: Requires HPE Synergy 480 Gen11 CPU Front Heat Sink Kit P39587-B21 or Rear Heat Sink Kit P39589-B21.

Intel Xeon-Platinum 8452Y 2.0GHz 36-core 300W Processor for HPE P49616-B21

Notes: Requires HPE Synergy 480 Gen11 CPU Front Heat Sink Kit P39587-B21 or Rear Heat Sink Kit P39589-B21.

Intel Xeon-Platinum 8462Y+ 2.8GHz 32-core 300W Processor for HPE P49603-B21

Notes: Requires HPE Synergy 480 Gen11 CPU Front Heat Sink Kit P39587-B21 or Rear Heat Sink Kit P39589-B21.

4th Generation Intel® Xeon®-Gold

Notes:

– All SKUs below ship with processor only. Appropriate heatsinks must be selected.

– 4800 MT/S maximum memory speed unless otherwise noted.

Intel Xeon-Gold 6454S 2.2GHz 32-core 270W Processor for HPE P49654-B21

Notes: Requires HPE Synergy 480 Gen11 CPU Front Heat Sink Kit P39587-B21 or Rear Heat Sink Kit P39589-B21.

Intel Xeon-Gold 6430 2.1GHz 32-core 270W Processor for HPE P49614-B21

Notes: Requires HPE Synergy 480 Gen11 CPU Front Heat Sink Kit P39587-B21 or Rear Heat Sink Kit P39589-B21.

Intel Xeon-Gold 6426Y 2.5GHz 16-core 185W Processor for HPE P49598-B21

Notes: Requires HPE Synergy 480 Gen11 CPU Front Heat Sink Kit P39587-B21 or Rear Heat Sink Kit P39589-B21.

Intel Xeon-Gold 6442Y 2.6GHz 24-core 225W Processor for HPE P49599-B21

Notes: Requires HPE Synergy 480 Gen11 CPU Front Heat Sink Kit P39587-B21 or Rear Heat Sink Kit P39589-B21.

Configuration Information

Intel Xeon-Gold 6448Y 2.1GHz 32-core 225W Processor for HPE   P49600-B21
Notes: Requires HPE Synergy 480 Gen11 CPU Front Heat Sink Kit P39587-B21 or Rear Heat Sink Kit P39589-B21.
Intel Xeon-Gold 6434 3.7GHz 8-core 195W Processor for HPE   P49601-B21
Notes: Requires HPE Synergy 480 Gen11 CPU Front Heat Sink Kit P39587-B21 or Rear Heat Sink Kit P39589-B21.
Intel Xeon-Gold 6444Y 3.6GHz 16-core 270W Processor for HPE   P49602-B21
Notes: Requires HPE Synergy 480 Gen11 CPU Front Heat Sink Kit P39587-B21 or Rear Heat Sink Kit P39589-B21.
Intel Xeon-Gold 6438Y+ 2.0GHz 32-core 205W Processor for HPE   P49615-B21
Notes: Requires HPE Synergy 480 Gen11 CPU Front Heat Sink Kit P39587-B21 or Rear Heat Sink Kit P39589-B21.
Intel Xeon-Gold 6438N 2.0GHz 32-core 205W Processor for HPE   P49638-B21
Notes: Requires HPE Synergy 480 Gen11 CPU Front Heat Sink Kit P39587-B21 or Rear Heat Sink Kit P39589-B21.
Intel Xeon-Gold 6438M 2.2GHz 32-core 205W Processor for HPE   P49648-B21
Notes: Requires HPE Synergy 480 Gen11 CPU Front Heat Sink Kit P39587-B21 or Rear Heat Sink Kit P39589-B21.
Intel Xeon-Gold 5415+ 2.9GHz 8-core 150W Processor for HPE   P49597-B21
Notes:
— 4400 MT/S maximum memory speed.
— Requires HPE Synergy 480 Gen11 CPU Front Heat Sink Kit P39587-B21 or Rear Heat Sink Kit P39589-B21.
Intel Xeon-Gold 5418Y 2.0GHz 24-core 185W Processor for HPE   P49612-B21
 Notes:
— 4400 MT/S maximum memory speed.
— Requires HPE Synergy 480 Gen11 CPU Front Heat Sink Kit P39587-B21 or Rear Heat Sink Kit P39589-B21.
Intel Xeon-Gold 5420+ 2.0GHz 28-core 205W Processor for HPE   P49613-B21
 Notes:
— 4400 MT/S maximum memory speed.
— Requires HPE Synergy 480 Gen11 CPU Front Heat Sink Kit P39587-B21 or Rear Heat Sink Kit P39589-B21.
Intel Xeon-Gold 5418N 1.8GHz 24-core 165W Processor for HPE   P49640-B21
 Notes:
— 4400 MT/S maximum memory speed.
— Requires HPE Synergy 480 Gen11 CPU Front Heat Sink Kit P39587-B21 or Rear Heat Sink Kit P39589-B21.
Intel Xeon-Gold 5416S 2.0GHz 16-core 150W Processor for HPE   P49653-B21
 Notes:
— 4400 MT/S maximum memory speed.
— Requires HPE Synergy 480 Gen11 CPU Front Heat Sink Kit P39587-B21 or Rear Heat Sink Kit P39589-B21.

Configuration Information

4th Generation Intel® Xeon®-Silver

Notes:
- All SKUs below ship with processor only. Appropriate heatsinks must be selected.
- 4000 MT/S maximum memory speed unless otherwise noted.

Intel Xeon-Silver 4410Y 2.0GHz 12-core 150W Processor for HPE   P49610-B21

Notes: Requires HPE Synergy 480 Gen11 CPU Front Heat Sink Kit P39587-B21 or Rear Heat Sink Kit P39589-B21.

Intel Xeon-Silver 4416+ 2.0GHz 20-core 165W Processor for HPE   P49611-B21

Notes: Requires HPE Synergy 480 Gen11 CPU Front Heat Sink Kit P39587-B21 or Rear Heat Sink Kit P39589-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.
- For additional information, please see the **HPE DDR5 Smart Memory QuickSpecs**

Registered DIMMs DDR5 (RDIMMs)

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) Quad Rank x4 DDR5-4800 CAS-46-39-39 EC8 Registered 3DS Smart Memory Kit   P43334-B21
HPE 256GB (1x256GB) Octal Rank x4 DDR5-4800 CAS-46-39-39 EC8 Registered 3DS Smart Memory Kit   P43337-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.
- 96GB Memory cannot be mixed with any other Memory.
- 96GB Memory can be selected only with XCC (Extreme Core Counts) of the New 4th Generation Intel® Xeon® Scalable Processors.
- If 96GB memory is selected, either 8 or 16 memory quantity can be allowed per processor.

Memory Blank Kit

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.

Configuration Information

Step 5: Choose Networking Adapters

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

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

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

Step 6: Additional Factory Integratable Options

HPE Storage Controllers

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

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

Step 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

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

Additional Options Available
Notes: wDMR, Defective Media Retention; cDMR, Comprehensive Defective Media Retention

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
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

Additional Options

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 drives 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.

HPE Hard Disk Drives

Enterprise - 12G SAS - SFF Drives
HPE 1.8TB SAS 12G Mission Critical 10K SFF BC 3-year Warranty 512e Multi Vendor HDD	P53562-B21
HPE 1TB SAS 12G Business Critical 7.2K SFF BC 1-year Warranty HDD	P53563-B21
HPE 600GB SAS 12G Mission Critical 15K SFF BC 3-year Warranty Multi Vendor HDD	P53560-B21
HPE 600GB SAS 12G Mission Critical 10K SFF BC 3-year Warranty Multi Vendor HDD	P53561-B21

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

Read Intensive - 12G SAS - SFF - Solid State Drives
HPE 15.36TB SAS 24G Read Intensive SFF BC Multi Vendor SSD	P49045-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 12G Read Intensive SFF BC Value SAS Multi Vendor SSD	P40508-B21

Additional Options

HPE 3.84TB SAS 24G Read Intensive SFF BC Multi Vendor SSD	P49035-B21
HPE 1.92TB SAS 12G Read Intensive SFF BC Value SAS Multi Vendor SSD	P40507-B21
HPE 1.92TB SAS 24G Read Intensive SFF BC Multi Vendor SSD	P49031-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 - 12G SAS - SFF - Solid State Drives

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 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 - 6G SATA - SFF - Solid State Drives

HPE 7.68TB SATA 6G Read Intensive SFF BC Multi Vendor SSD	P40501-B21
HPE 7.68TB SATA 6G Very Read Optimized SFF BC 5400 SSD	P58228-B21
HPE 3.84TB SATA 6G Read Intensive SFF BC Multi Vendor SSD	P40500-B21
HPE 3.84TB SATA 6G Read Intensive SFF BC PM893 SSD	P44010-B21
HPE 1.92TB SATA 6G Read Intensive SFF BC Multi Vendor SSD	P40499-B21
HPE 1.92TB SATA 6G Read Intensive SFF BC PM893 SSD	P44009-B21
HPE 480GB SATA 6G Read Intensive SFF BC Multi Vendor SSD	P40497-B21
HPE 480GB SATA 6G Read Intensive SFF BC PM893 SSD	P44007-B21
HPE 960GB SATA 6G Read Intensive SFF BC Multi Vendor SSD	P40498-B21
HPE 960GB SATA 6G Read Intensive SFF BC PM893 SSD	P44008-B21
HPE 240GB SATA 6G Read Intensive SFF BC Multi Vendor SSD	P40496-B21

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

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 1.92TB SATA 6G Mixed Use SFF BC PM897 SSD	P44013-B21
HPE 960GB SATA 6G Mixed Use SFF BC Multi Vendor SSD	P40503-B21
HPE 960GB SATA 6G Mixed Use SFF BC PM897 SSD	P44012-B21
HPE 480GB SATA 6G Mixed Use SFF BC Multi Vendor SSD	P40502-B21
HPE 480GB SATA 6G Mixed Use SFF BC PM897 SSD	P44011-B21

Read Intensive - NVMe - SFF - Solid State Drives

HPE 15.36TB NVMe Gen4 High Performance Read Intensive SFF BC U.3 PM1733a SSD	P50224-B21
HPE 15.3TB 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 PM1733a SSD	P50222-B21
HPE 7.68TB NVMe Gen4 Mainstream Performance Read Intensive SFF BC U.3 Static Multi Vendor SSD	P47847-B21
HPE 7.68TB NVMe Gen4 Mainstream Performance Read Intensive SFF BC U.3 Static V2 Multi Vendor SSD	P64848-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 PM1733a SSD	P50219-B21
HPE 3.84TB NVMe Gen4 Mainstream Performance Read Intensive SFF BC U.3 Static Multi Vendor SSD	P47846-B21
HPE 3.84TB NVMe Gen4 Mainstream Performance Read Intensive SFF BC U.3 Static V2 Multi Vendor SSD	P64846-B21

Additional Options

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 PM1733a SSD	P50216-B21
HPE 1.9TB NVMe Gen4 Mainstream Performance Read Intensive SFF BC U.3 Static Multi Vendor SSD	P47845-B21
HPE 1.92TB NVMe Gen4 Mainstream Performance Read Intensive SFF BC U.3 Static V2 Multi Vendor SSD	P64844-B21
HPE 1.92TB NVMe Gen4 High Performance Read Intensive SFF BC U.3 CM7 SSD	P63829-B21
HPE 960GB NVMe Gen4 Mainstream Performance Read Intensive SFF BC U.3 Static Multi Vendor SSD	P47844-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

HPE 6.4TB NVMe Gen4 High Performance Mixed Use SFF BC U.3 PM1735a SSD	P50233-B21
HPE 6.4TB NVMe Gen4 Mainstream Performance Mixed Use SFF BC U.3 Static Multi Vendor SSD	P47840-B21
HPE 6.4TB NVMe Gen4 Mainstream Performance Mixed Use SFF BC U.3 Static V2 Multi Vendor SSD	P65023-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 PM1735a SSD	P50230-B21
HPE 3.2TB NVMe Gen4 Mainstream Performance Mixed Use SFF BC U.3 Static Multi Vendor SSD	P47839-B21
HPE 3.2TB NVMe Gen4 Mainstream Performance Mixed Use SFF BC U.3 Static V2 Multi Vendor SSD	P65015-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 PM1735a SSD	P50227-B21
HPE 1.6TB NVMe Gen4 Mainstream Performance Mixed Use SFF BC U.3 Static Multi Vendor SSD	P47838-B21
HPE 1.6TB NVMe Gen4 High Performance Mixed Use SFF BC U.3 CM7 SSD	P63845-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 Multi Vendor SSD	P47837-B21
HPE 800GB NVMe Gen4 Mainstream Performance Mixed Use SFF BC U.3 Static V2 Multi Vendor SSD	P64999-B21

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

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 PM1743 SSD	P57803-B21
HPE 7.68TB NVMe Gen5 High Performance Read Intensive E3S EC1 EDSFF SPDM CM7 SSD	P61183-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 1.92TB NVMe Gen5 Mainstream Performance Read Intensive E3S EC1 EDSFF CD7 SSD	P56585-B21

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

HPE 6.4TB NVMe Gen5 High Performance Mixed Use E3S EC1 EDSFF SPDM CM7 SSD	P61195-B21
HPE 3.2TB NVMe Gen5 High Performance Mixed Use E3S EC1 EDSFF SPDM CM7 SSD	P61191-B21

M.2 Drive Options

HPE 480GB NVMe Gen3 Mainstream Performance Read Intensive M.2 Multi Vendor SSD	P40513-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

HPE iLO Common Password FIO Setting	P08040-B21

Additional Options

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

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

HPE Fibre Channel

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

HPE Storage Controllers

HPE SR416ie-m Gen11 x16 Lanes 4GB Cache SPDM Mezzanine Storage Controller	P39959-B21
HPE Synergy NS204i-d Gen11 NVMe Boot Storage Device	P39568-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 Cagese 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

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.
- 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**

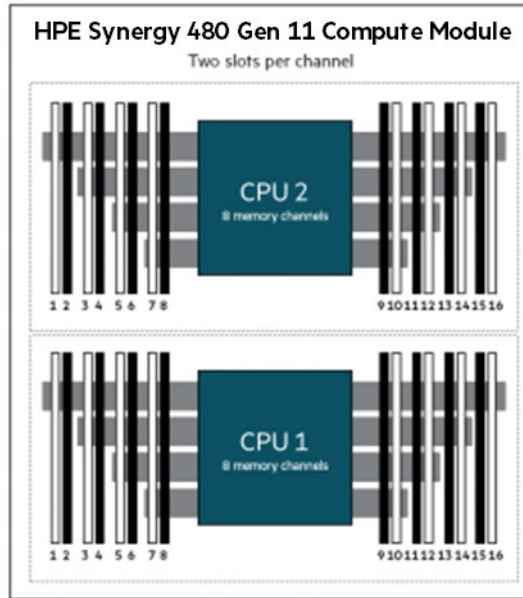### Synergy 480 Gen11 Compute Module Memory Tables

Registered DIMM (RDIMM)

HPE SKU P/N	P43322-B21	P43328-B21	P43331-B21	P43331-B21	P43334-B21	P43337-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 96GB (1x96GB) 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) Octal Rank x4 DDR5-4800 CAS-46-39-39 EC8 Registered 3DS Smart Memory Kit
DIMM Rank ->	Single Rank (1R)	Dual Rank (2R)	Dual Rank (2R)	Dual Rank (2R)	Quad Rank (4R)	Octal Rank (8R)
DIMM Capacity ->	16GB	32GB	64GB	96GB	128GB	256GB
Voltage	1.1V	1.2V	1.2V	1.2V	1.2V	1.2V
DRAM depth [bit]	2G	2G	4G	6G	4G	4G
DRAM Width [bit]	x8	x8	x4	x4	x4	x4
DRAM Density	16Gb	16Gb	16Gb	24Gb	16Gb	16Gb
CAS Latency	40-39-39	40-39-39	40-39-39	46-45-45	40-39-39	40-39-39
DIMM Native Speed (MT/s)	4800	4800	4800	4800	4800	4800

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

Memory

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	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
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	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
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
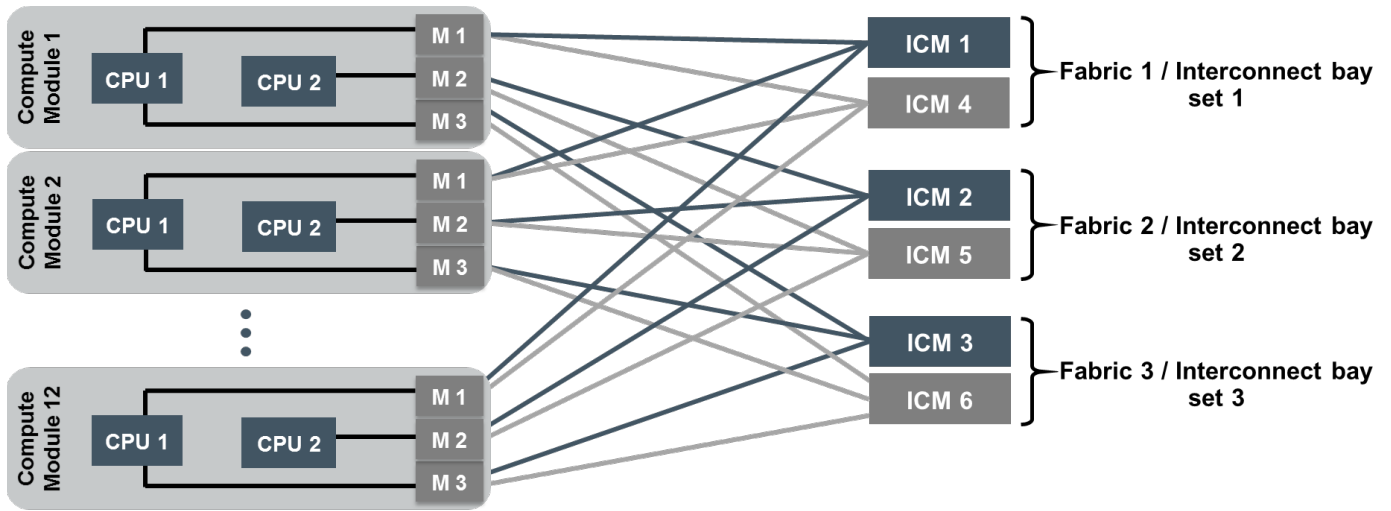
Technical Specifications

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: -30C to 60C (-22F to 140F).
- 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**

Technical Specifications

Relative Humidity (non-condensing)

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

Acoustic Noise

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

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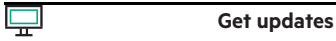
The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard Enterprise web site. These instructions may be used by recyclers and other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