



Technical White Paper

Contents & navigation

Introduction	2
System Highlights	2
New Technologies	3
I/O and Storage	3
Graphics	4
Other Features	4
HP Z4 Rack G5 vs HP ZCentral 4R Feature comparison	5
HP Z4 G5 Supported CPU Line-up at Introduction	5
Z4 G5 Block Diagram	6
Memory Configurations and Optimization	8
Summary	10
HP Remote System Controller	11
Resources, Contacts, or Additional Links	11



HP Z4 Rack G5 Workstation Architecture



Technical White Paper

Contents & navigation

Introduction	2
System Highlights	2
New Technologies	3
I/O and Storage	3
Graphics	4
Other Features	4
HP Z4 Rack G5 vs HP ZCentral 4R Feature comparison	5
HP Z4 G5 Supported CPU Line-up at Introduction	5
Z4 G5 Block Diagram	6
Memory Configurations and Optimization	8
Summary	10
HP Remote System Controller	11
Resources, Contacts, or Additional Links	11

Introduction

The HP Z4 Rack G5 is the successor to the HP ZCentral 4R rack workstation. Its architecture introduces several new functionalities and technologies. These include all new Intel® memory architecture (DDR5), I/O slot improvements and better performance.



System Highlights

Compactly Rackable. Uniquely Powerful

Empower a flexible workforce with Z by HP pro-level performance in a high-density 1U footprint. Specifically designed to pack more units in a single rack, this slim powerhouse delivers the performance your team needs. All with the ability to upgrade and expand as compute demands evolve.

Dedicated Workstation Power

Equip your teams to work from anywhere with the powerful Z4 Rack. Access dedicated workstation performance from almost any end point device with HP Anyware.¹ Add the HP Remote System Controller and manage hardware all from a single interface.²

Workhorse Power. Compact 1U Size

This 1U workstation packs impressive power for advanced VFX, 3D modeling, and rendering. Get up to 24 cores in an Intel® Xeon® W-2400 CPU,³ support for NVIDIA RTX™ 6000 Ada graphics,⁴ and up to 256 GB DDR5 memory,⁵ all with room to update and expand.

Comprehensive Security, Trusted Reliability

Get peace of mind with a workstation that's built to endure. The Z4 Rack undergoes 360K hours of rigorous testing and is certified for pro apps. And with HP Wolf Security for Business⁵, it's protected below, in and above the OS.⁶

Designed with the planet in mind⁷

At HP, we care about the impact our products have on our people, communities, and the planet. Z products are designed with sustainability at the forefront. So, you can take pride in choosing Z, knowing that you are helping protect our shared future.



Technical White Paper

Contents & navigation

Introduction	2
System Highlights	2
New Technologies	3
I/O and Storage	3
Graphics	4
Other Features	4
HP Z4 Rack G5 vs HP ZCentral 4R Feature comparison	5
HP Z4 G5 Supported CPU Line-up at Introduction	5
Z4 G5 Block Diagram	6
Memory Configurations and Optimization	8
Summary	10
HP Remote System Controller	11
Resources, Contacts, or Additional Links	11

New Technologies

New Intel® Processor

The HP Z4 Rack G5 Workstation uses the Intel® W790 Chipset to support the latest Intel® Xeon® W family processors of up to twenty-four-cores and up to 225W. The Intel® Xeon® W family processors utilize two integrated memory controllers each supporting two DDR5 channels that increase the memory bandwidth over DDR4 by 50%. The processor also supports 64 lanes of PCIe Gen5, providing a substantial I/O performance increase over the previous generation.

Next generation Intel® Active Management Technology

New features for Intel® AMT 16.x include:

- Upgrade to Boot Guard Gen 1.1
- PCHC Firmware Component
- Intel® Total Memory Encryption (Intel® TME)

DDR5 Memory Technology

The HP Z4 Rack G5 Workstation introduces support for DDR5 Registered DIMMs up to 4800MHz at 1 DIMM per channel. The speed that the memory runs is determined by the processors and is limited to 4800MHz for the Intel® Xeon® W processor generation. The HP Z4 Rack G5 supports up to 256GB of memory.

USB 3.2 Gen2x2 Type-C®

The HP Z4 Rack G5 configured with the Premium Front I/O module provides two USB 3.2 Gen2x2 Type-C ports in addition to two USB3.1 Gen1 Type-A ports. The Type-C® ports each deliver up to 15W of power (3A @ 5V) when the system is running. More information on USB Technology and Performance measurements can be found in the “Resources, contacts, or additional links” section below.

Flex-IO Interface

The HP Z4 Rack G5 adds a rear Flex-IO interface which grants customers the ability to customize their rear I/O ports without using additional PCIe slots or USB ports with external adapters. See the external I/O section for more details.

I/O and Storage

Internal I/O

The HP Z4 Rack G5 provides a total of three high-performance Graphics and I/O slots including one PCIe5 x16 slot that comes standard with the single slot riser and an additional two PCIe5x16 slots available via the optional dual slot riser. If just the topmost slot of this dual slot riser is populated, then it has the full electrical bandwidth of a x16 slot. However, if both slots are populated, then they both have x8 electrical bandwidth. The dual slot riser is automatically included out of the factory with any doublewide graphics card configuration, or if more than one PCIe device is configured. An additional two PCIe4 x4 buses feed the two on-board M.2 slots. The Z4 Rack G5 also supports up to two front accessible M.2 modules and has two PCIe4 x5 buses to support these drives.

The HP Z4 Rack G5 provides an internal 1-port USB3.0 header

Storage

The HP Z4 Rack G5 supports one 6Gb/s SATA ports on the Intel® W790 Chipset's SATA controller and has a single 3.5" internal bay to fit a 3.5" Enterprise Hard Drive. A header is present on the mainboard to support the addition of an Intel® VROC upgrade key to support RAID on NVMe devices.



Technical White Paper

Contents & navigation

Introduction	2
System Highlights	2
New Technologies	3
I/O and Storage	3
Graphics	4
Other Features	4
HP Z4 Rack G5 vs HP ZCentral 4R Feature comparison	5
HP Z4 G5 Supported CPU Line-up at Introduction	5
Z4 G5 Block Diagram	6
Memory Configurations and Optimization	8
Summary	10
HP Remote System Controller	11
Resources, Contacts, or Additional Links	11

External I/O

On the front I/O area, the HP Z4 Rack G5 can be configured two ways:

- The Entry Front I/O option provides 4 USB 3.1 Gen1 Type-A 5 Gbps signaling rate ports (the left-most supports battery charging), and a combo headset/microphone jack
- The Premium Front I/O option provides 2 USB3.2 Gen2x2 20 Gbps signaling rate Type-C ports, 2 USB3.1 Gen1 5 Gbps signaling rate Type-A ports (the left-most supports battery charging), and combo headset/microphone jack

In the rear I/O area, the HP Z4 Rack G5 provides 2 USB 3.1 Gen1 ports via a hub and 1 gigabit Ethernet LAN port. The HP Z4 Rack G5 rear I/O area also provides a Flex-IO module connector which can support up to one of the following (optional) Flex-IO Modules: Serial Port v2, 10GbE RJ45 single port, 2.5GbE RJ45 LAN single port, and a 1GbE LC Fiber single port. The HP Z4 Rack G5 can also support the main board adapter for the HP Remote System Controller. Additional rear I/O ports can be added via PCIe add-in cards.

Graphics

Graphics

The HP Z4 Rack G5, depending on system configurations, can support up to two 140W cards or one 300W card. Only one graphics card can be configured from the factory. An additional graphics card can be bought aftermarket and integrated by the user as long as it's singlewide in width and has been tested in a dual graphics configuration on the Z4 Rack G5 by HP. 3rd party graphics not qualified by HP will likely not be recognized by the BIOS which can lead to high fan speeds and other strange behavior. Certain consumer graphics cards may not fit or have power connectors aligned correctly. It is recommended to consult the QuickSpecs before installing any 3rd party graphics into the Z4 Rack G5.

Other Features

- Dual 675W power supplies that can be configured in redundant or aggregate mode.
- Rear panel power on/off switch and LED for easier rack maintenance
- ENERGY STAR® qualified configurations, China's Energy Conservation Program (CECP) configurations, European Union's ErP LOT6 2013 power limit of 0.5W in Max Power Savings off mode.
- Intel® vPro™ manageability with support both for DASH and Intel® AMT (Advanced Manageability Technology) on all the Xeon® processors. IT managers have increased flexibility in optimizing their Enterprise manageability strategy across HP's Commercial Laptops, Desktops and Workstations



Technical White Paper

Contents & navigation

Introduction	2
System Highlights	2
New Technologies	3
I/O and Storage	3
Graphics	4
Other Features	4
HP Z4 Rack G5 vs HP ZCentral 4R Feature comparison	5
HP Z4 G5 Supported CPU Line-up at Introduction	5
Z4 G5 Block Diagram	6
Memory Configurations and Optimization	8
Summary	10
HP Remote System Controller	11
Resources, Contacts, or Additional Links	11

HP Z4 Rack G5 vs HP ZCentral 4R Feature comparison

Figure 1: Z4 Rack G5 vs ZCentral 4R Feature comparison

	HP Z4 Rack G5	HP ZCentral 4R
Processors	Intel® Xeon Scalable Processor 4th Generation up to 225W	Intel® Xeon Scalable Processor
New Instruction Set	AMX (Advanced Matrix Extensions)	AVX-512 AES-NI
Memory Technology	DDR5: Registered DIMMs Up to 4800MHz at 1DPC	DDR4: Registered DIMMs Up to 2933MHz with a 2nd Generation Intel® Xeon Scalable Processor
PCIe Support	PCIe Gen 4/5	PCIe Gen3
USB Enhancement	Two USB 3.2 Gen2x2 Type-C ports (Premium Front I/O option)	Two USB 3.1 Gen2 Type-C ports (Premium Front I/O option)
USB SuperSpeed Ports	2 Rear, 4 USB-A Front (Entry Front I/O) or 2USB-A +2USB-C Front (Premium Front I/O), 1 Internal	6 Rear, 4 Front (Entry Front I/O) or 2 Front (Premium Front I/O), 1 Internal
Manageability	Intel® ME16, Intel® vPro™	Intel® ME11, Intel® vPro™
Operating System	Windows 11 Pro for Workstations 64-bit Windows 10 Pro for Workstations 64-bit	Windows 11 Pro for Workstations 64-bit Windows 10 Pro for Workstations 64-bit

HP Z4 G5 Supported CPU Line-up at Introduction

Name	Clock Speed (GHz)	Cores	Cache (MB)	Memory Speed (MHz)	TDP (W)
Intel® Xeon® w7-2495X processor	2.5	24	45	4800	225
Intel® Xeon® w7-2475X processor	2.6	20	37.5	4800	225
Intel® Xeon® w5-2465X processor	3.1	16	33.75	4800	200
Intel® Xeon® w5-2455X processor	3.2	12	30	4800	200
Intel® Xeon® w5-2445 processor	3.1	10	26.25	4800	175
Intel® Xeon® w3-2435 processor	3.1	8	22.5	4400	165
Intel® Xeon® w3-2425 processor	3.0	6	15	4400	130
Intel® Xeon® w5-3423 processor	2.1	6	15	4400	120



Technical White Paper

Contents & navigation

Introduction	2
System Highlights	2
New Technologies	3
I/O and Storage	3
Graphics	4
Other Features	4
HP Z4 Rack G5 vs HP ZCentral 4R Feature comparison	5
HP Z4 G5 Supported CPU Line-up at Introduction	5
Z4 G5 Block Diagram	6
Memory Configurations and Optimization	8
Summary	10
HP Remote System Controller	11
Resources, Contacts, or Additional Links	11

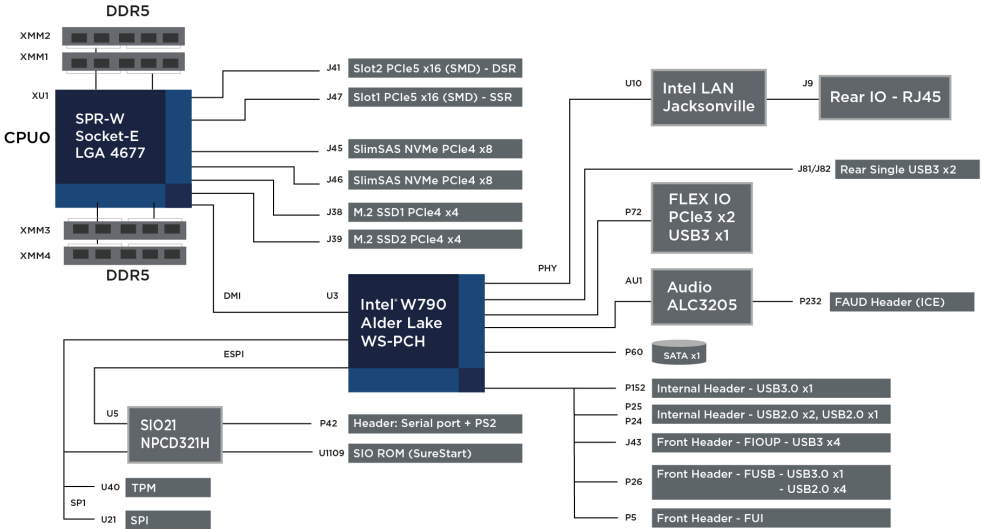
All processors feature Intel® vPro™ Technology, feature Intel® Turbo Boost Technology, and support hyperthreading.

Disclaimers:

Intel® vPro™ requires Windows 10 Pro 64 bit or higher, a vPro supported processor, vPro enabled chipset, vPro enabled wired LAN and TPM 2.0. Some functionality requires additional third-party software in order to run. Features of vPro Essentials and Enterprise vary. See <http://Intel®.com/vpro>.

Intel® Turbo Boost performance varies depending on hardware, software, and overall system configuration. See www.Intel®.com/technology/turboboost for more information.

Z4 Rack G5 Block Diagram



Integrated PCI-Express 5.0

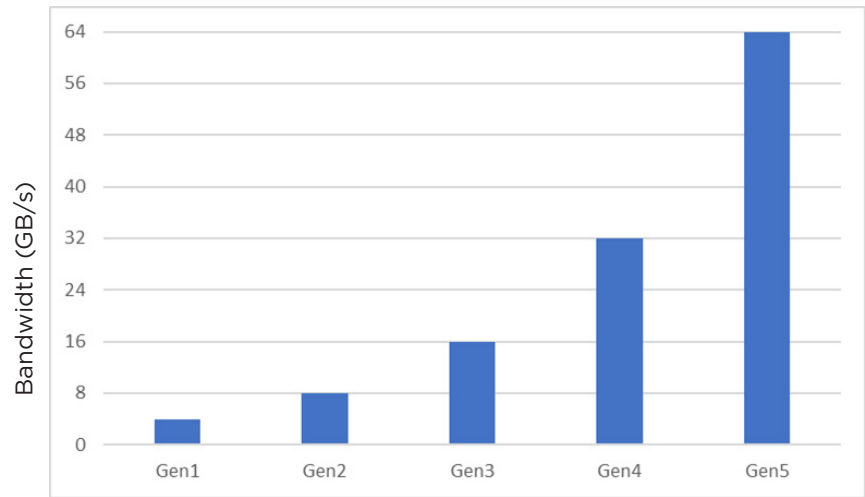
The HP Z4 Rack G5 uses the Intel® Xeon® W processor Scalable family, with integrated PCI-Express 5.0 controllers delivering a peak bandwidth of 64 GB/s per direction for 4 GB/s per lane. PCIExpress 5.0 is backward compatible with 1.0, 2.0, 3.0, and 4.0. All PCIe slots will train to the highest common speed supported by the slot and card installed in the slot. PCI-Express slots will initialize at 1.0 and then transition to the max common speed through a training sequence that involves multiple adaptive training phases. It is recommended to carefully evaluate and validate PCI-Express devices that are not available or supported by HP.

PCI-Express Performance

The HP Z4 Rack G5 integrates several features within the processor: Multiple PCIe 5.0 controllers, DMA caching, and two 2-channel memory controllers per processor (2 DIMMs per channel). This produces excellent performance in I/O bandwidth, remote bandwidth, and latency.

Introduction	2
System Highlights	2
New Technologies	3
I/O and Storage	3
Graphics	4
Other Features	4
HP Z4 Rack G5 vs HP ZCentral 4R Feature comparison	5
HP Z4 G5 Supported CPU Line-up at Introduction	5
Z4 G5 Block Diagram	6
Memory Configurations and Optimization	8
Summary	10
HP Remote System Controller	11
Resources, Contacts, or Additional Links	11

Figure 2. x16 Peak Bandwidth per Direction (GB/s)



Recipe for Optimizing PCI-Express I/O Performance

For high I/O bandwidth applications, the choice of slot loading, processor, and memory configuration can be optimized to ensure maximum bandwidth available. Applications and cards sensitive to I/O latency may benefit as well from some of the tips below.

Recommended Configuration Steps

- Place GPU and graphics cards first, following the slot order listed in Figure 3
- Place I/O cards next, from highest bandwidth to lowest, following the slot order listed in Figure 3. This is the optimal load order for most applications.
- Additional I/O bandwidth refinements may be possible. If necessary, refer to the tips below

Figure 3. HP Z4 G5 I/O Slot Recommended Load Order

PCIe Slot			Slot Load Order		
Card Load Order	PCIe Card/Cable Description	Bandwidth (Max lanes)	With SSR	With DSR	
			slot 1 J47	slot 2 J48*	slot 3 J49
			PCIe5-x16 CPU	PCIe5x16 CPU	PCIe5x8 CPU
1	HP Integrated Remote System	N/A	1		
2	Graphics Card	x16	1**	2	
3	HP Z Turbo Drive Dual Pro PCIe Gen4 Carrier	x8	3	2	1
4	NIC - NVIDIA Mellanox-Connect-6 DX 25GB	x8	1	2	3
5	NIC - AT-2914SX/LC	x1	1	2	3
6	NIC - Intel® X550-T2 10GB	x4	3	1	2
7	NIC - Intel® I225-T1 2.5GB	x1	3	1	2
8	NIC- AT-2911 T/2 1GB	x1	3	1	2
9	PS2/Serial port	N/A	2		1



Technical White Paper

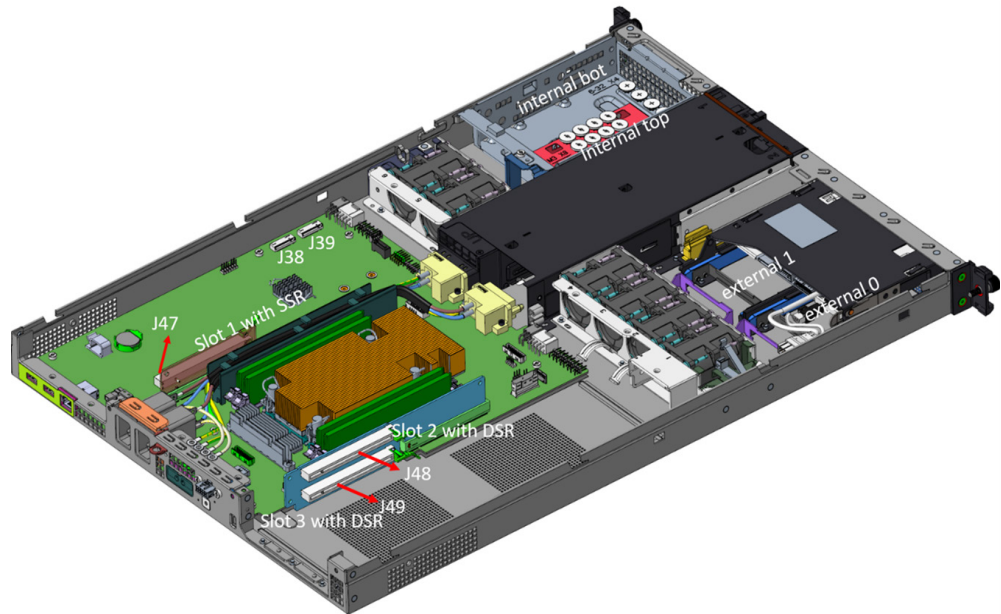
Contents & navigation

Introduction	2
System Highlights	2
New Technologies	3
I/O and Storage	3
Graphics	4
Other Features	4
HP Z4 Rack G5 vs HP ZCentral 4R Feature comparison	5
HP Z4 G5 Supported CPU Line-up at Introduction	5
Z4 G5 Block Diagram	6
Memory Configurations and Optimization	8
Summary	10
HP Remote System Controller	11
Resources, Contacts, or Additional Links	11

Note:

- * x8 if installed card is less than x16 width or if J49 is configured with a PCIe card
- ** Double-wide graphics is not supported

Figure 4. HP Z4 G5 I/O Slot Recommended Load Order



Header	Description
J38	M.2 SSD 0
J39	M.2 SSD 1
J47	Single-Slot Riser Slot1: PCIe5 x16
J48	Dual-Slot Riser Slot2: PCIe5 x16/x8
J49	Dual-Slot Riser Slot3: PCIe5 x8 (x16 mechanical)

Additional Tips:

- For applications doing direct bus Peer-to-Peer transfers between cards, load the corresponding cards in slots located off the CPU
- If possible, make sure all I/O cards are loaded in slots that have a PCI-Express Lane Width at least as wide as the card (see Table 2).
- For cards that are latency sensitive, load these cards in processor slots.
- Ensure Idle Power Savings BIOS setting is set to Normal (BIOS setup menu -> Advanced -> Power Options -> Idle Power Savings = Normal).
- Use the latest system BIOS version available on hp.com.
- Check for updates in the latest performance optimization white papers (link below).

Memory Configurations and Optimization

The purpose of this section is to provide an overview of the memory configurations for the HP Z4 Rack G5 Workstation and to provide recommendations to optimize performance.

Supported Memory Modules

Types of memory supported on an HP Z4 Rack G5 Workstation are:

1. 16GB, 32GB, and 64GB PC5-4800-R 4800 MHz DDR5 Registered DIMMs
2. Single and dual rank DIMMs based on 16GB DRAMs are supported



Technical White Paper

Contents & navigation

Introduction	2
System Highlights	2
New Technologies	3
I/O and Storage	3
Graphics	4
Other Features	4
HP Z4 Rack G5 vs HP ZCentral 4R Feature comparison	5
HP Z4 G5 Supported CPU Line-up at Introduction	5
Z4 G5 Block Diagram	6
Memory Configurations and Optimization	8
Summary	10
HP Remote System Controller	11
Resources, Contacts, or Additional Links	11

Types of memory NOT supported on an HP Z4 Rack G5 Workstation are:

1. Unbuffered DIMMs
2. Non-ECC DIMMs
3. DDR, DDR2, DDR3, or DDR4 DIMMs
4. DDR5 3DS RDIMMs

See Memory Technology White Paper for more memory module technical information.

Platform Capabilities

This platform supports the new DDR5 technology:

- Total of 4 memory sockets.
- 2 Memory controllers with 2 channels per memory controller for a total of 4 channels and 1 socket per channel.

Speed

- 4800MHz, 4400MHz and 4000MHz memory speeds are supported in this platform
- For 1 DIMM per channel configurations, the max memory speed is 4800MHz
- For 2 DIMM per channel configurations, the max memory speed is 4400MHz
- Memory will operate at the speed of the slowest rated installed processor or DIMM

Mixing of DIMMs in a system

Mixing x4 DRAMs with x8 DRAMs is not supported.

- 16GB and 32GB RDIMMs supported by HP are x8 and can be mixed in a system
- 64GB RDIMMs supported by HP are x4 and cannot be mixed with other sized DIMMs in a system

Memory Features

This platform supports the new DDR5 technology:

- DDR5 supports higher bandwidths, capacities, and power efficiencies.
- Improves reliability features
- DDR5 has increased technology efficiencies
- Adds support for on die ECC
 - On Die ECC is where the data stored on the memory module is monitored by the DRAM for errors
 - Only single-bit errors are automatically corrected, multi-bit errors are not detected
- But system ECC is still supported on all RDIMMs
 - Single-bit errors are automatically corrected.
 - Multi-bit errors are detected and will cause the system to immediately reboot and halt with an F1 prompt error message.
 - By way of comparison, non-ECC memory (not supported on this platform) does not detect or correct single-bit or multi-bit errors which can cause instability, or corruption of data, in the platform. See Memory Technology White Paper for more information.

Command and Address parity is supported

- Command and Address errors are detected and will cause the system to immediately reboot and halt with an F1 prompt error message.

Optimize performance

System performance is largely based on the applications being used. Generally, to obtain the best performance, it is advised that you follow the following guidelines:

- For best performance, it is recommended to load memory into all memory controllers and channels. Since these platforms have 2 memory controllers and 4 channels, install memory in sets of 4.



Technical White Paper

Contents & navigation

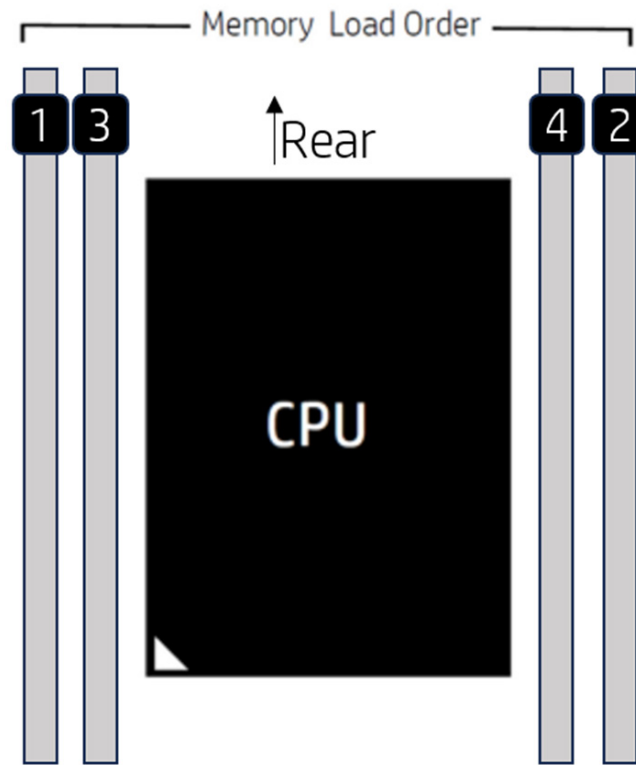
Introduction	2
System Highlights	2
New Technologies	3
I/O and Storage	3
Graphics	4
Other Features	4
HP Z4 Rack G5 vs HP ZCentral 4R Feature comparison	5
HP Z4 G5 Supported CPU Line-up at Introduction	5
Z4 G5 Block Diagram	6
Memory Configurations and Optimization	8
Summary	10
HP Remote System Controller	11
Resources, Contacts, or Additional Links	11

- Proper individual DIMM capacity selection is essential to maximizing performance. Evenly distributing total desired memory across all operational channels and memory controllers will deliver the best performance.
- To increase overall performance, install multiple ranks in each channel. This can be accomplished by installing 2 single ranked DIMMs in the same channel.

Loading Rules

- Load the memory modules in order of size, starting with the largest module and finishing with the smallest module.
- Each channel includes two DIMM sockets; black and white connector pairs represent a channel. The DIMMs should be loaded first in the black sockets and then in the white sockets. The DIMMs should be loaded starting with the DIMM furthest from the CPU, with the first DIMM loaded in the right most socket and alternating sides of the CPU.
- See the figure below for loading order.

Figure 5. Loading order



Summary

The memory configurations of the HP Z4 G5 Workstation have been specifically crafted to meet strict long-term reliability standards with an optimized performance that provides users with seamless functionality. Design, cooling, and power solutions were validated to ensure DIMMs met max performance. HP values product quality and end user productivity, which is why the products discussed in this document are backed by HP's warranty. For more information, visit <https://www.hp.com/us-en/workstations/desktop-workstation-pc.html>.



Technical White Paper

Contents & navigation

Introduction	2
System Highlights	2
New Technologies	3
I/O and Storage	3
Graphics	4
Other Features	4
HP Z4 Rack G5 vs HP ZCentral 4R Feature comparison	5
HP Z4 G5 Supported CPU Line-up at Introduction	5
Z4 G5 Block Diagram	6
Memory Configurations and Optimization	8
Summary	10
HP Remote System Controller	11
Resources, Contacts, or Additional Links	11

HP Remote System Controller

Compatibility

The HP Z4 Rack G5 is fully compatible with the HP Remote System Controller and HP Integrated Remote System Controller for complete out-of-band management. The HP Anyware Remote System Controller and Integrated Remote System Controller can be configured as a configure-to-order component out of the factory or can be purchased aftermarket. For more information on compatibility, visit

<https://h20195.www2.hp.com/v2/GetDocument.aspx?docname=c08611076>

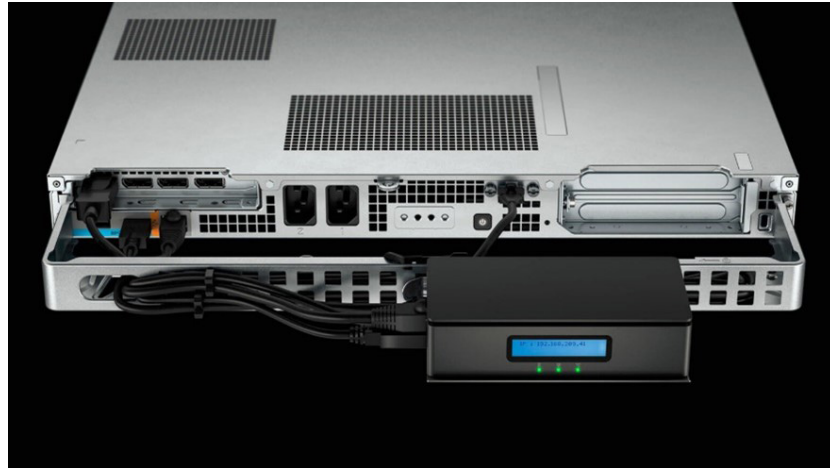
Rack Options

When configuring the HP Remote System Controller with the HP Z4 Rack G5 in a racked environment, HP suggests one of the below options for the best experience:

HP Z4 Rack Remote System Controller Support Bracket

This configure to order option (8D8X7AV) allows the HP Remote System Controller to be mounted to a secure bracket that screws into the rear of the chassis as shown in the image below.

Figure 6. HP Z4 Rack Remote System Controller Support Bracket



Cable Management Arm Bracket

For users who choose to use the HP Rack Cable Management Arm (sold aftermarket), to help with cable management in a racked environment, the HP Z4 Rack Remote System Controller Arm Bracket can be added on which allows the HP Anyware Remote System Controller to be fixed securely to the Cable Management Arm. More information about this and other rack options can be found by visiting <https://h20195.www2.hp.com/V2/GetPDF.aspx/4AA7-1800ENW.pdf>

Resources, Contacts, or Additional Links

Visit **HP's White Paper site** to learn more about the innovation in HP Workstations and the latest technologies offered in the products.



Technical White Paper

Contents & navigation

Disclaimers

1. Network access required Network access required. HP Anyware software and licensing are available through a 1- or 3-year subscription. Renewal is required after the subscription term. HP Anyware subscriptions are based on the number of concurrent PCoIP connections used (pay for the number of host connections, not the software) with a minimum order quantity of 5. For a limited time, an HP Anyware Professional subscription also includes access and support for ZCentral Remote Boost and ZCentral Connect and is available for purchase through an HP reseller or contact sales at hp.com/anyware. ZCentral Remote Boost Sender requires Windows 10 and 11, RHEL/CentOS (7 or 8), or UBUNTU 18.04 or 20.04 LTS operating systems. macOS (10.14 or newer) operating system and ThinPro 7.2 are only supported on the receiver side. ZCentral Connect requires Windows (10 or 11) or Windows Server (2016 or 2019) operating system, Microsoft Active Directory, and Intel® Active Management Technology for select features. For system requirements and to install HP Anyware and Anyware Manager, refer to the Admin Guides at: <https://docs.teradici.com/find/product/hp-anyware>.
2. HP Remote System Controller is sold separately and requires internet access. Automation of tasks and viewing system information only available with select Z desktop workstations, see datasheet for details. HP Integrated Remote System Controller not compatible with Z2 Mini platforms and not recommended for non-Z devices. HP service and support not available for non-Z devices. Full suite of hardware alerts available with select Z desktop workstations. See datasheet for details. HP Remote System Management must be purchased separately and is required for fleet management and viewing of consolidated reports from all devices. Planned to be available 2H of 2023.
3. Multicore is designed to improve performance of certain software products. Not all customers or software applications will necessarily benefit from use of this technology. Performance and clock frequency will vary depending on application workload and your hardware and software configurations. Intel®'s numbering, branding and/or naming is not a measurement of higher performance.
4. Graphics are sold separately or as an optional feature.
5. Optional, configurable feature.
6. HP Wolf Security for Business requires Windows 10 Pro or higher, includes various HP security features and is available on HP Pro, Elite and Workstation products. See product details for included security features and OS requirement.
7. Applies to HP PCs, Workstations and Displays manufactured after January 2019. Based on most Gold and Silver EPEAT® registrations by meeting all required criteria and achieving 50-74% of the optional points for EPEAT® Silver and 75-100% of the optional points for EPEAT® Gold according to IEEE 1680.1-2018 EPEAT®. Status varies by country. Visit www.epeat.net for more information.



[LEARN MORE](#)