HP Z4 G6i PRODUCT ARCHITECTURE WHITEPAPER

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Introduction

The HP Z4 G6i Workstation represents the latest evolution in desktop performance, designed to empower professionals across a variety of demanding industries. This whitepaper provides an in-depth look at the architecture, features, and innovations that set the Z4 G6i apart as a powerhouse solution for advanced workflows. This document will guide you through the capabilities and advantages of the Z4 G6i, ensuring you can make informed decisions about your next workstation investment.

System Architecture Overview

Our Best-Selling Workhorse, Now More Powerful
This high-performance desktop workstation does it all. Tackle advanced workflows—from rendering and simulation to advanced video editing and massive dataset preparation. The Z4 G6i accelerates workflows across a wide range of professional apps and provides plenty of room to expand as work evolves.

Customizable performance and acoustics.
Master intense workflows with up to 2 high-end professional GPUs, 48 cores1 in a next- gen Intel® Xeon® 6 processor and 512 GB of memory.2 Now you can render and simulate or analyze advanced datasets faster with customizable performance and acoustics

Upgrade. Expand. Evolve.
Need to expand your workflow capabilities? Evolve your PC with space for up to 2 high- end GPUs, 512 GB memory, 76 TB storage, 2 front accessible NVMe bays, and even 5 PCIe slots (Gen 4/5).3 All easily accessible in a tool-less design.

Comprehensive security. Reliability you can trust.
Get peace of mind with a workstation that's built to endure. The Z4 undergoes 360K hours of rigorous testing, military-standard testing4 and is certified for pro apps. And with HP Wolf Security for Business5, it's protected below, in and above the OS.

Maximize your IT lifecycle
Designed for simpler IT management, the Z4 G6i desktop workstation is built for longevity with a 3 year lifecycle—longer than entry workstations. Plan for the future and avoid re-qualifying devices every year, saving you serious time and money.

HP and Sustainability

HP continues to be a dedicated player in the world of technology and sustainability[9] in order to help protect our shared future. Sustainably built, this product contains 65% recycled plastics[10] and is EPEAT Gold and TCOv10 Certified. Regarding packaging, the outer box and fiber cushions are 100% sustainably sourced[11]. The production of

this workstation prevented materials from ending up in the ocean or a landfill, as its fans contain ocean-bound plastic[12] and all G6i products contain 20% post-industrial recycled steel. This product features 100% recycled rare earth elements in its speaker magnet and is equipped with 80Plus Platinum rated power supplies. This product features a QR code-enabled experience that provides access to a product portal with highlights of product features, sustainability information, getting started guides, and direct setup and support options HP has also taken steps to minimize the amount of polyvinyl chloride in our products, as it is now only present in external power cables and keyboard/mouse cables.

New Technologies

Latest New Intel® Processor

The HP Z4 G6i Workstation uses the Intel® W890 Chipset to support the latest Intel® Xeon® family processors of up to 48 cores and up to 300W. The Intel® Xeon® 6 family processors utilize two of four integrated memory controllers on the Z4 G6i each supporting two DDR5 channels that increase the memory bandwidth over DDR4 by 50%. The processor also supports 80 lanes of PCIe Gen5, providing additional I/O performance increase over the previous generation.

More Telemetry with the HP Remote System Controller

With the latest generation Embedded Controller, Fan Speeds, Temperatures, and much more real-time telemetry is collected and monitored by the Remote System Controller. Stay tuned for many more advancements in out-of-band remote management with the Remote System Controller.

Next generation Intel® Active Management Technology

Latest features for Intel® AMT 19.10 include:

- Support for PSR (Platform Service Record) and UPID.

DDR5 Memory Technology

The HP Z4 G6i Workstation supports DDR5 Registered DIMMs up to 6400MHz at 1 DIMM per channel and up to 5200MHz at 2 DIMMs per channel. The speed that the memory runs is determined by the processors and is limited to 6400MHz for the Intel® Xeon® 6 processor generation. The HP Z4 G6i supports up to 512GB of memory.

Flex-IO Interface

The HP Z4 G6i 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 Ports

Internal I/O

The HP Z4 G6i provides a total of five high-performance Graphics and I/O slots including three PCIe5 x16, one PCIe5 x4 and one PCIe4 x4 dedicated electrical slots. An additional four PCIe5 x4 buses feed the four on-board M.2 slots.

The Z4 G6i also supports an optional Front Removable NVME storage enclosure and has two PCIe5 x4 buses to support two Front Removable M.2.

The HP Z4 G6i provides an internal 1-port USB3.0 header and an internal 1-port USB2.0 header.

Wi-Fi® 7 & BT® 5.47

The HP Z4 G6i offers flexible Wi-Fi® connectivity with a options for Wi-Fi® 7 & Bluetooth® 5.4 via a Flex-IO module with an integrated antenna, or a PCIe slot module and an external antenna.

20Gbps Type-C®

The HP Z4 G6i configured with the Premium Front I/O module provides two 20Gbps Type-C ports in addition to two 5Gbps 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.

Thunderbolt™ 5

The HP Z8 & Z4 G6i offers an add-on Thunderbolt™ 5 Dual Port PCIe Gen4 x4 Add-in Card, delivering a peak bandwidth of 80 Gb/s bidirectional or 120Gb/s outbound 40Gbps inbound bandwidth in asymmetric mode for high-volume video traffic. Thunderbolt™ 5 is backwards compatible with Thunderbolt™ 3 and 4. Thunderbolt™ 5 supports up to DP2.1 (UHBR10/UHBR20) display standards.

Display Capabilities: The Thunderbolt™ 5 card must be connected to a discrete graphics card in the same system using the two provided DP-to-mini-DP cables to get display functionality. Display bandwidth will be limited by the capabilities of the connected discrete graphics card. For full DP2.1 display capabilities, The Thunderbolt™ 5 card must be connected to a DP2.1 capable discrete graphics card.

Windows Driver & Software: Thunderbolt™ 5 now utilizes a Microsoft in-box USB4 Host Router Driver and will show up in Device Manager under Universal Serial Bus Controllers. The previous Thunderbolt Control Center has also been retired and replaced by the Windows USB4 Hubs and Devices window in Settings.

External I/O

On the front I/O area, the HP Z4 G6i can be configured two ways:

- The Entry Front I/O option provides four 5Gbps Type-A ports (the left-most supports battery charging), combo headset/microphone jack, and the option for an SD card reader.
- The Premium Front I/O option provides two 20Gbps Type-C® ports, two 5Gbps Type-A ports (the left-most supports battery charging), combo headset/ microphone jack, and the option for an SD card reader.

In the rear I/O area, the HP Z4 G6i provides five 5Gbps USB-A ports and a 10Gbps Type-C port, a gigabit Ethernet LAN port, and a retaskable Universal Audio Jack.

The HP Z4 G6i 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 v3, Dual 5Gbps USB-A ports, Dual 10 Gbps USB-C® ports, 10GbE RJ45 single

port, 2.5GbE RJ45 LAN single port, 1GbE LC Fiber single port, 1GbE RJ45 single port, and a Wi-Fi 7 + Bluetooth® 5.4 WLAN with integrated antenna.

The HP Z4 G6i rear I/O area also provides a dedicated slot for a single HP custom networking module that does not occupy a PCIe slot. There are two modules available. One module is a dual port 10GbE Base-T. The other is a dual port fiber optic module that supports either 10G or 25G in each port (SFP28 transceiver cages).

Additional rear I/O ports can be added via PCIe add-in cards.

Storage

The HP Z4 G6i supports up to ten NVME devices. Four PCIe5 x4 buses feed the four on-board M.2 slots, one of the PCIe5 x16 slots can be used for the Gen5 Quadpro to give an additional 4 NVME devices, additionally the Gen5 Front Removable Storage can be installed to gain an additional 2 NVME devices.

The Z4 G6i supports two on-board 6 Gb/s SATA ports via the Intel® W890 Chipset's SATA controller operates in RAID mode.

A header is present on the mainboard to support the addition of an Intel® VROC upgrade key to support RAID on NVMe devices.

Thermal and Acoustics

Enhanced Airflow
50% more peak airflow, fewer fans and customizable performance modes means higher CPU performance, higher-powered GPUs and better ergonomics

Smarter Cooling, Greater Efficiency
The redesigned chassis enables more efficient airflow for both flow-through and ducted graphics configurations—requiring fewer system fans, which reduces potential points of failure.

The base chassis, Optimized for High-Power Graphics, supports single monolithic GPUs—including quad-wide, 600W flow-through cards

Graphics

The HP Z4 G6i supports NVIDIA RTX™ Professional graphics cards. Depending on the system configuration and installed power supply, the workstation can accommodate up to two 300 W GPUs or a single 600 W GPU. For peak single-GPU performance, configurations with a single 600 W card deliver the highest graphics capability. For maximum scalability and multi-GPU workloads, the system supports configurations of up to two 300 W cards. Actual GPU configurations may be limited by total system power, cooling capacity, and other installed components.

If a graphics card is not configured at the time of purchase, it is strongly recommended to add one of the following fan assembly options to ensure full performance and avoid POST errors when a graphics card is installed later: B50TZAV for NVIDIA RTX™ PRO series graphics cards, or B50U4AV for all other graphics cards.

Additional Features

- Two PSU options are available, 775W and 1350W at 115V/60 Hz (1700W at 200V and higher). These are both 92% Efficiency Platinum PSUs.
- Rear panel power on/off switch and LED for easier rack maintenance.
- ENERGY STAR® certified configurations, China's Energy Conservation Program (CECP) configurations, European Union's ErP LOT6 2013 power limit of 0.3W in Max Power Savings off mode.
- Intel® vPro™[8] 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.
- Cover Removal Sensor & Safety Interlock
  - Cover Removal Sensor is a firmware feature that notifies a user via a post screen F1 prompt and F10 BIOS Event log/count if and when the system chassis cover has been removed. This feature is not included in a system by default and must be configured when ordering a system by selecting additional security configuration options.
    - To disable this feature if the system has it configured, go to the F10 > Security > Smart Cover > Cover Removal Sensor > "Disable".
  - Safety Interlock is a hardware feature that shuts down (removes main power from) the system if the system chassis cover has been removed. Auxiliary power to the unit will remain. A user will see a 3.7 beep/blink code if main power is currently being blocked from the system due to cover removal. This feature will be automatically enabled for systems ordered for geographical regions that require interlock functionality for regulatory compliance. Outside of those geographies, this feature is not included in the system by default and must be configured when ordering a system by selecting additional security configuration options.
    - To disable this feature if the system has it configured, go to the F10 > Security > Smart Cover > Uncheck "Safety Interlock".

HP Z4 G6i vs HP Z4 G5 Feature Comparison

Figure 1: Z4 G6i vs Z4 G5 Feature Comparison

	HP Z4 G6i	HP Z4 G5
Processors	Intel® Xeon® 6 Processor up to 300W	Intel® Xeon® Scalable Processor
New Instruction Set	AMX AVX-512 AVX2 AVX AES-NI	AMX AVX-512 AVX2 AVX AES-NI
Memory Technology	DDR5: Registered DIMMs Up to 6400MHz at 1DPC Up to 5200MHz at 2DPC	DDR5: Registered DIMMs Up to 4800MHz at 1DPC Up to 4400MHz at 2DPC
PCIe Support	5x PCIe slots (3 x16 Gen 5, 1 x4 Gen 5, 1 x4 Gen 4)	5x PCIe slots (1x x16 Gen 5, 2x x16 Gen 4, 2x x4 Gen 4)
USB Enhancement	Two 20 Gbps Type-C ports (Premium Front I/O option) One 10 Gbps Type-C port on Rear I/O	Two 20Gbps Type-C ports (Premium Front I/O option)
USB SuperSpeed Ports	5 Rear, 4 Front (Entry Front I/O) or 2 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® ME19.10, Intel® vPro™	Intel® ME16.10, 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

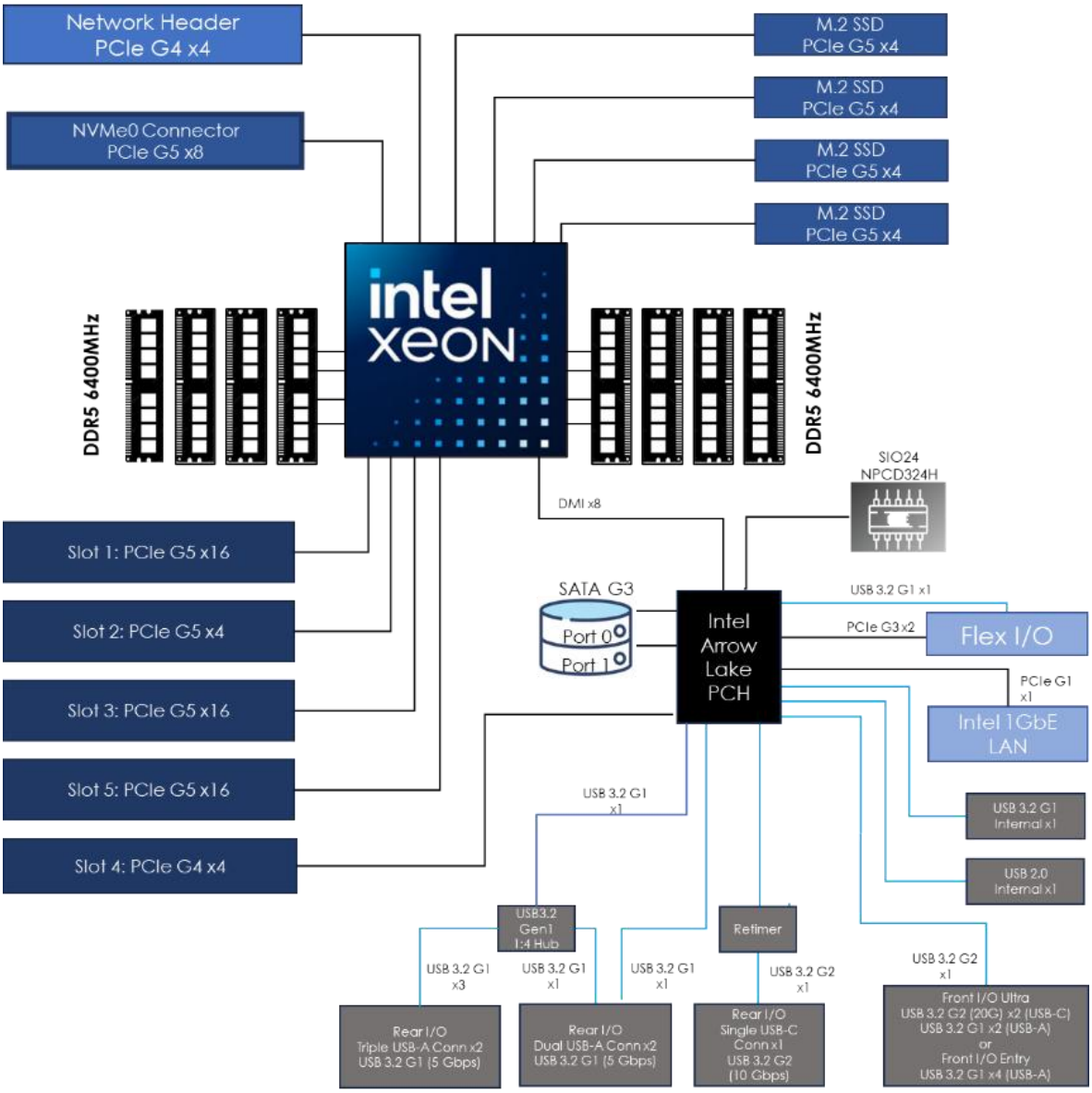
HP Z4 G6i - CPUs Supported

Figure 2: Intel® Xeon® 6xx Processors supported at introduction

Name	**Clock Speed (GHz)**	**Cores**	**Cache (MB)**	**Memory Speed (MHz)**	**TDP (W)**
Xeon® 678X processor	2.4	48	192	6400*	300W
Xeon® 676X processor	2.8	32	144	6400*	275W
Xeon® 674X processor	3.0	28	144	6400*	270W
Xeon® 658X processor	3.0	24	144	6400*	250W
Xeon® 656 processor	2.9	20	72	6400*	210W
Xeon® 654 processor	3.1	18	72	6400*	200W
Xeon® 638 processor	3.2	16	72	6400*	180W
Xeon® 636 Processor	3.5	12	48	6400*	170
Xeon® 634 processor	2.7	12	48	6400*	150

*1 DPC 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/or Wi-Fi 6E WLAN 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 G6i Block Diagram



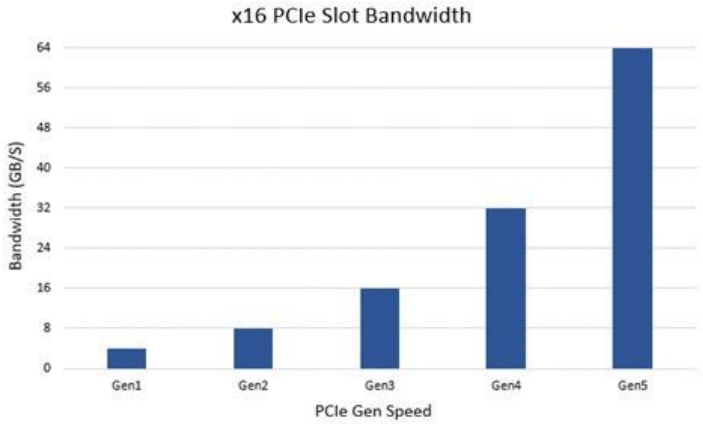
Integrated PCI-Express 5.0

The HP Z4 G6i 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 G6i 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/0 bandwidth, remote bandwidth, and latency.

Figure 3: 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

1. Place GPU and graphics cards first, following the slot order listed in Figure 3.
2. 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.
3. Additional I/O bandwidth refinements may be possible. If necessary, refer to the tips below

Figure 4: HP Z4 G6i I/O Slot Recommended Load Order

Card Load Order	PCIe Card/Cable Description	Bandwidth (max lanes)	Slot 1 PCIe5-x16 CPU	Slot 2 PCIe5-x4 CPU	Slot 3 PCIe5-x16 CPU	Slot 4 PCIe4-x4 PCH	Slot 5 PCIe5-x16 CPU	Slot 6 Mechanical
1	1st Graphics	x16			Only			
2	2nd Graphics /GPU Compute Card	x16	1				2	
3	Thunderbolt-5 (2-port)	x4	3			1	2	
4	Z Turbo Drive Quad Pro (4x M.2 card)	x16	1				2	
5	Network Interface (LAN, etc.)	*x1/x4/x8		2		1		
6	Intel E810-CQDA2	x16	2				1	
7	Network Interface (WLAN External atenna)	x1				1	2	
8	Remote System Controller	NA		1		2	3	
9	Serial Module	NA		3		2	4	1

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 Figure 4).
- For cards that are latency sensitive, load these cards in slots located off the CPU .
- Use the latest system BIOS version available on hp.com.
- Check for updates in the latest performance optimization white papers

System Performance

In addition to the hardware configuration, there are several BIOS and OS settings that influence system performance. First, regarding the hardware configuration, ensure you follow the guidelines in this whitepaper describing the optimal PCIe and memory configuration to ensure best performance.

Regarding BIOS and OS settings: performance varies based on the application being used, and some settings will improve performance for certain applications while decreasing performance for others. Key performance-related settings are briefly described below.

- **BIOS Performance Mode.** This setting is available in the F10 BIOS menu, in *Advanced->Performance*. Most significantly, the performance mode controls CPU power limits and system cooling. Selecting *Ultimate Performance* will give the best performance, especially on higher powered CPUs and for multi-threaded workloads. Note: To provide adequate cooling, selecting this setting may result in higher fan noise from the system.

- **Windows Power Plan**. This setting is available within Windows' Control Panel. You can find it by typing "Choose a power plan" in the Windows search bar. *HP Ultimate Performance* is recommended for best performance. It keeps CPU cores more active, improving responsiveness and reducing latency. Alternatively, *HP Optimized* focuses on reducing idle energy consumption while optimizing performance.

- **C1 Auto Demotion.** This setting is available in the F10 BIOS menu, in *Advanced->Performance*. When enabled, it improves system responsiveness by reducing latency caused by waking cores up. However, disabling it can improve single-core or low-core turbo frequencies, since less cores may be active.

- **Sub-NUMA Clustering (SNC).** This setting only has an effect on the 64-core and 86-core CPUs. Leaving this disabled is generally best for multi-threaded workflows that scale to many cores. However, enabling this can improve performance of some applications that use a moderate number of cores or are NUMA-optimized.

The above settings have the largest impact on performance; however, several other performance-related settings exist in the F10 BIOS Setup menu that can influence performance. More details can be found in the dedicated Performance for Z Workstations whitepaper found on HP's website

Memory Configurations and Optimization

The purpose of this section is to provide an overview of the memory configurations for the HP Z4 G6i Workstation and to provide recommendations to optimize performance.

Supported Memory Modules

Types of memory supported on an HP Z4 G6i Workstation are:

1. 16GB, 32GB, 64GB 6400MHz DDR5 Registered DIMMs
2. Single and dual rank DIMMs based on 16Gb DRAMs are supported

Types of memory NOT supported on an HP Z4 G6i Workstation include:

1. Unbuffered DIMMs
2. Non-ECC DIMMs
3. DDR, DDR2, DDR3, or DDR4 DIMMs

Platform Capabilities

Maximum Capacity 512GB

- Total of 8 memory sockets.
- 4 Memory controllers with 1 channel per memory controller for a total of 4 channels and 2 sockets per channel.

Speed

- 6400MHz and 5200MHz memory speeds are supported in this platform
- For 1 DIMM per channel configurations, the max memory speed is 6400MHz
- For 2 DIMM per channel configurations, the max memory speed is 5200MHz

- Memory will operate at the slower of the following two speeds: the platform's max speed or the installed DIMM's max speed. E.g., if using 6400 MHz DIMMs at 2 DIMMs per channel, the speed will be 5200 MHz; if using 5600 MHz DIMMs at 1 DIMM per channel, the speed will be 5600 MHz.

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 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.

Optimal Memory Configuration

Generally, to obtain the best performance with regard to memory, it is advised that you follow the following guidelines:

- Load memory into all channels.
- Evenly distribute total desired memory across all operational channels and memory controllers. E.g. using 4x 32 GB DIMMs will generally provide better performance than 2x 64 GB DIMMs.
- Install multiple ranks in each channel. This can be accomplished by installing 2 single ranked DIMMs in the same channel.

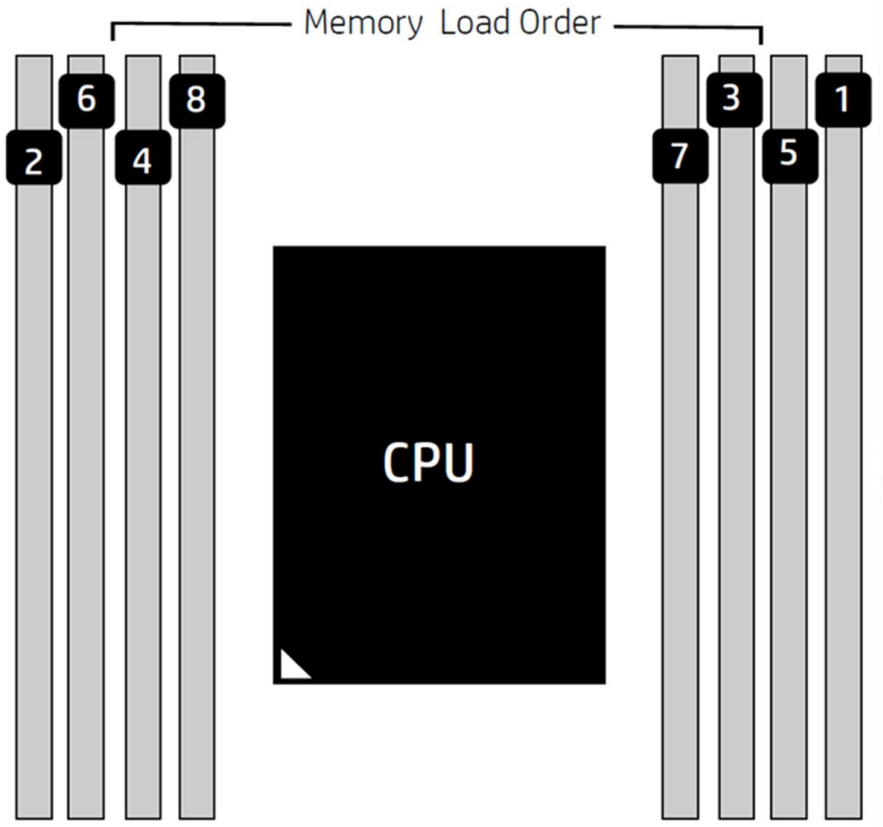
Figure 5: Optimal configurations for the HP Z4 G6i (Note: the following tables do not include all available orderable configurations)

Configuration	DIMM1	DIMM2	DIMM3	DIMM4	CPU	DIMM5	DIMM6	DIMM7	DIMM8	Rating
16GB (1x16GB)	x									Good
32GB (2x16GB)	x								x	Better
32GB (1x32GB)	x									Good
64GB (4x16GB)	x		x				x		x	Best
64GB (2x32GB)	x								x	Better
64GB (1x64GB)	x									Good
128GB (8x16GB)	x	x	x	x		x	x	x	x	Best
128GB (4x32GB)	x		x				x		x	Best
128GB (2x64GB)	x								x	Better
256GB (8x32GB)	x	x	x	x		x	x	x	x	Best
256GB (4x64GB)	x		x				x		x	Best
512GB (8x64GB)	x	x	x	x		x	x	x	x	Best

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 6: Loading order



Memory Cooling

A memory cooling duct is required for any configuration that includes one or more DIMMs with a capacity of 32 GB or higher. Configurations populated only with DIMMs of 16 GB or less will be cooled appropriately without the optional memory cooling duct installed.

Summary

The memory configurations of the HP Z4 G6i 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.

System Security

The HP Z4 G6i Workstation integrates a comprehensive security architecture designed to protect platform integrity, safeguard sensitive data, and support enterprise-grade manageability. Building on HP's established security framework across commercial desktops and workstations, this generation introduces enhanced hardware, firmware, and software defenses aligned to modern threat landscapes.

Platform Firmware Security

HP Sure Start is HP's hardware-enforced, self-healing firmware protection that automatically detects, stops, and recovers from attacks or corruption across most of the boot-critical system firmware. Every boot, it validates firmware integrity and uses an isolated "golden copy" to restore the system within minutes, delivering NIST SP 800-193–aligned resiliency with minimal user disruption.

HP Sure Start Key Features:

- BIOS Integrity Protection - HP Sure Start provides hardware-enforced BIOS protection to ensure that only trusted firmware executes. BIOS integrity verification occurs not only at boot, but also during shutdown and while the system is powered on—continuously protecting against rootkits, boot-level malware, and unauthorized modifications.
- Automated, Policy-Driven BIOS Recovery - If the BIOS becomes corrupted or compromised, HP Sure Start automatically restores a known-good, HP-authorized firmware image. Recovery behavior is policy-driven so IT can tailor protection levels and enforcement across enterprise fleets.
- Protection Beyond BIOS - HP Sure Start extends its integrity checking beyond the BIOS region to safeguard other critical platform data, including:
    - Network configuration parameters
    - Platform-specific identifiers (e.g., system IDs)
    - Secure Boot credentials
    - Other essential boot-related code and configuration structures
      This holistic protection helps maintain a trusted platform state across multiple firmware components.

- Audit & Event Logging - HP Sure Start includes integrated audit capabilities. Event logs capture security-relevant actions—such as integrity check failures, automatic repairs, and timestamps for each incident—supporting security investigations, compliance reporting, and operational forensics.

Virtualization Based BIOS Protection

Virtualization Based BIOS Protection is a firmware-level defense that uses hardware-assisted micro-virtualization to safely isolate untrusted UEFI code—such as PCIe Option ROMs or third-party bootloaders—so it cannot

compromise system integrity even if it is properly signed and allowed by Secure Boot. Unlike traditional protections that rely solely on signature validation, this technology creates a virtualized execution environment beneath the operating system, preventing malicious or vulnerable firmware from accessing privileged system resources or undermining the boot chain. By containing initialization code from add-in devices and early-boot loaders within a controlled, isolated context, HP ensures that even if attacker-supplied firmware executes, it cannot alter critical BIOS structures or weaken platform security, providing a stronger safeguard against below-the-OS persistence attacks.

Memory & Data Protection

Intel® Total Memory Encryption (TME)

Intel® TME encrypts system memory to protect against physical attacks such as cold-boot extraction or DIMM probing. This ensures sensitive information is protected even if memory is physically removed.

Chassis Tamper Protections

Cover Removal Sensor

A firmware feature that logs cover removal events and prompts the user before booting the OS that the system may have been tampered with.

Safety Interlock

A hardware interlock that shuts down main system power when the chassis is opened in specified geographies requiring this safeguard. This ensures compliance with electrical safety standards.

HP TamperLock

To protect the physical integrity of the PC, HP TamperLock can be configured to take action when the system detects the cover has been removed. Configuration options include clearing the TPM (effectively removing the Bitlocker keys), alerting IT, and disabling boot to only allow admin credentials, which is useful for the security team to conduct forensics on the device.

OS-Level Security & Configuration

The workstation supports modern Windows 11 platform security standards, including:

- TPM 2.0
- Secure Boot
- Virtualization-based Security (VBS)
- Kernel DMA Protection

Combined with HP's BIOS and OS performance modes, the HP Z4 G6i Workstation delivers a security-hardened platform optimized for engineering, AI/ML, virtualization, and mission-critical workloads.

Warranty

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.

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.

1. . **Disclaimers**
2. Multicore is designed to improve the performance of certain software products. Not all customers or software applications will necessarily benefit from the 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.
3. Optional, configurable features.
4. Optional, configurable features. Configurations for 76TB storage and for front accessible NVME . Configuration for 76TB requires after-market purchase. Two fronts accessible NVMe bays require a 5.25 bay carrier.
5. Testing is not intended to demonstrate fitness of U.S. Department of Defense (DoD) contract requirements or for military use. Test results are not a guarantee of future performance under these test conditions. Accidental damage requires an optional HP Accidental Damage Protection Care Pack.
6. HP Wolf Security for Business requires Windows 10 or 11 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. Wi-Fi 6: Wireless access point and Internet service required and sold separately. Availability of public wireless access points limited. Wi-Fi 6 (802.11ax) is backwards compatible with prior 802.11 specs.

8. Wi-Fi 7: Wi-Fi 7 requires a Wi-Fi 7 router, sold separately, and Windows 11 to function in the 6GHz band. Availability of public wireless access points limited. Wi-Fi 6E is backwards compatible with prior 802.11 specs. And available in countries where Wi-Fi 7 is supported

9. Intel® vPro™ requires Windows 10 Pro 64 bit or higher, a vPro supported processor, vPro enabled chipset, vPro enabled wired LAN and/or Wi-Fi 6E WLAN and TPM 2.0. Some functionality requires additional 3rd party software in order to run. Features of vPro® Essentials and Enterprise vary. See http://intel.com/vprointel.com/vpro" \hhttp://intel.com/vpro

10. Based on US EPEAT® registration EPEAT® various status by country. Visit www.epeat.net for more information.

11. Recycled plastic content percentage is based on the definition set in the IEEE 1680.1- 2018 EPEAT standard.

12. Fiber cushions made from 100% recycled wood fiber and organic material. Any plastic cushions are made from >90% recycled plastic.

13. Fans contain up to 25% ocean-bound plastic by weight

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