Technical white paper

HP Z Workstations and PTC Creo

Selection of HP Workstations for running PTC Creo 2.0, 3.0 and 4.0.

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Why use a HP Z Workstations for PTC Creo?

- Complimentary technical leadership with HP Z Workstations and PTC Creo.
- Numerous, certified, high-performing platforms offering scale and choice.
- Investment protection. HP Z Workstations certified on Creo 2.0 are supported on Creo 3.0 and Creo 4.0. Based on PTC N+2 certification policy.

For more information:

hp.com/go/workstations

hp.com/go/workstationfinder

hp.com/go/ptc

hp.com/go/mcad

How to select an HP Workstation for PTC Creo

Processor (CPU)
CPU frequency has the greatest influence on Creo Parametric and Simulation performance.

For the majority of Creo Parametric and Simulation workflows the 4 core Intel® Xeon® processor E3-1240v5 or the Intel® Core™ i7-7700 available in the HP Z2 Mini and HP Z240 Workstation provides an optimum price performance.

For workflows such Creo assembly analysis, simulation, design optimization, advanced rendering, designers who run Creo Simulate or other structural, thermal or CFD tools in conjunction with Creo Parametric the 6 core Intel® Xeon® processor E5-1650v4 available in the HP Z440 Workstation will provide additional computing cores and relative high CPU frequency.

Mobile workstation users will benefit from the 4 core Intel® Core™ i7-6820HQ processor available in the HP ZBook Studio G3, HP ZBook 15 G3 and HP 17 ZBook G3 Mobile Workstation.

Memory (RAM)
Intel® Xeon® E3 and E5 family of processors require **ECC memory**. Error Correction Code identifies and corrects single bit memory errors. Undetected, single bit memory errors that occur in a high order bits can have a significant impact on parametric and simulation calculations.

Configure two DIMMs minimum in a HP Z2 Mini. 2X8GB DDR4 2133MHz ECC.

Configure two DIMMs minimum in a HP Z240. 2X8GB DDR4 2133MHz ECC.

Configure four DIMMs minimum in a HP Z440. 4X8GB DDR4 2400MHz ECC.

Configure two DIMMS minimum in a HP ZBook Mobile Workstation. 2X8GB DDR4-2133MHz SDRAM.

3D Graphics (GPU)
Professional 3D graphics cards and drivers such as NVIDIA® Quadro®, AMD Radeon™ Pro, and Intel® HD are extensively tuned and tested with Creo OpenGL-based interactive design and rendering.

Graphics performance is influenced by GPU capabilities, specifically the number of processing cores, and the capacity of onboard discrete graphics cards memory.

Creo Parametric has model and entity display options which influence the amount of graphics memory necessary for high performance interactivity. Entity Display options such as Edge display quality and Anti-Aliasing modes and Model Display option shade quality will increase the amount GPU memory necessary to maintain high–performance interactivity.

Display options

A 16:10 display aspect ratio found in the HP Z24n 24-inch Narrow Bezel IPS Display is a good choice when the 'ribbon' user interface is located at top of the application window.

Many users are considering UHD (Ultra-High-Definition) 4K displays such as the HP Z24s and HP Z27s. This is a good choice with Creo 4.0 and Windows 10 as both are optimized for high-definition and high pixel count. Users can adjust the Windows DPI scaling from the Windows Settings panel. The Windows 10 DPI scaling tool found in Windows Settings -> Display is a convenient manner to adjust the size of text, icons, applications, and other items.

Two HP Z displays is also a common option. Two displays allow for separation of 3D and 2D office tasks, such as Creo on Display 2 and desktop office tools on Display 1.

Local storage (HDD, SSD)

A solid state drive is recommended for optimum performance. SSD are available in both the older SATA protocol and the newer advanced NVMe protocol. NVMe SSD such as the HP Z Turbo G2 or Z Turbo Quad Pro can sustain very high throughput and offer very low latency. SSDs can be used for the operating system, applications, and short-term live datasets. RAID levels; 0 (stripe), 1 (mirror), and 10 (stripe + mirror) are available using Windows Disk Management. HDDs maintain an advantage because they have very large capacity compared to SSDs. The high capacity of hard drives (HDDs) can be used to store larger archive data.

Tuning and measuring

HP Performance Advisor

Home page hp.com/go/hpperformanceadvisor

Certified graphics drivers for PTC Creo + HP Z Workstation are easily identified and available for download.

Recommended system BIOS settings for HP Z Workstation + PTC Creo are easily identified and applied.

The Workstation Monitor feature found in HP Performance Advisor can record system-wide and application-specific resource utilization. Setup the record function and run your workflows. Once the data is recorded, use the analyzer and playback features to identify resource over allocation and visualize resource usage over a period of time.

The image below shows the GPU resource usage while running the SPECapc Creo 3.0 benchmark. The green metric represents the utilization of the GPU computing cores and the pink metric represents the allocation of discrete GPU memory. The top plot was captured on a GPU with 1 GB of discrete memory and the bottom plot was captured on a GPU with 2 GB of discrete memory. HP Performance Advisor will generate a performance Alert in both of these cases. Alerts for both high GPU activity and high GPU memory usage will be generated based on the resource usage found in the top plot. Application performance is restricted when system resources, such as GPU memory are over-allocated.

Application settings for enhanced graphics quality

Apply the Creo configuration options listed below to enhance graphics quality.

- Edge Quality = High
- Shade Quality = 6
- Small Surfaces = On
- FSAA = 8X

Resources, contacts or additional links

hp.com/go/workstations

hp.com/go/hpperformanceadvisor

hp.com/go/workstationfinder

hp.com/go/ptc

hp.com/go/mcad

HP Workstations recommended configurations for running PTC Creo

	HP Z2 Mini	HP Z440 Workstation	HP ZBook Studio
Workflows	The majority of Creo Parametric and Simulation workflows	Workflows such as Creo very large assembly analysis, simulation, design optimization, advanced rendering, and for designers who run Creo Simulate or other structural, thermal, or CFD tools in conjunction with Creo Parametric	The majority of Creo Parametric and Simulation workflows for both desktop replacement and on-the-go performance
Operating System[4]	Windows 10 Pro	Windows 10 Pro	Windows 10 Pro
Processor[1]	Intel® Core™ i7-7700 (3.6 GHz, up to 4.2 GHz with Intel® Turbo Boost Technology 2.0, 8 MB cache, 4 cores)	Intel® Xeon® processor E5-1650 v4 6-Core 3.6/4.0 GHz with Turbo Boost	Intel® Core™ i7-6820HQ Quad-core 2.7/3.6 GHz with Turbo Boost
Memory[2]	2 x 8 GB DDR4-2400 non-ECC SDRAM	4 x8 GB DDR4 2400 MHz ECC	2X8GB DDR4-2133 SDRAM
Graphics	NVIDIA® Quadro® M620	AMD FirePro™ WX7100 or NVIDIA® Quadro® P4000	NVIDIA® Quadro® M2000M
Storage[3]	HP Z Turbo Drive G2 (NVMe PCIe TLC SSD) 256 GB 1 TB SATA 7200 RPM	HP Z Turbo Drive G2 (NVMe PCIe TLC SSD) 256 GB 2 x 2 TB SATA 7200 RPM	HP Z Turbo Drive G2 512 GB (NVMe PCIe SSD)

For the most current recommendations, refer to hp.com/go/workstationfinder

Screen images courtesy of PTC.

Notes

[1] Multi-Core is designed to improve performance of certain software products. Not all customers or software applications will necessarily benefit from use of this technology. 64-bit computing on Intel® architecture requires a computer system with a processor, chipset, BIOS, operating system, device drivers, and applications enabled for Intel® 64 architecture. Processors will not operate (including 32-bit operation) without an Intel® 64 architecture-enabled BIOS. Performance will vary depending on your hardware and software configurations. Intel's numbering is not a measurement of higher performance.

[2] Maximum memory capacities assume Windows 64-bit operating systems or Linux. With Windows 32-bit operating systems, memory above 3 GB may not all be available due to system resource requirements.

[3] 1 GB = 1 billion bytes, TB = 1 trillion bytes. Actual formatted capacity is less. Up to 30 GB of system disk is reserved for system recovery software (for Windows 8).14. Not all features are available in all editions or versions of Windows 8. Systems may require upgraded and/or separately purchased hardware, drivers and/or software to take full advantage of Windows 8 functionality. See microsoft.com

[4] Not all features are available in all editions of Windows. Systems may require upgraded and/or separately purchased hardware, drivers and/or software to take full advantage of Windows functionality. See microsoft.com

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