HP Z Workstations Performance Data and Sizing Guide for PTC Creo® Users

Introduction

Performance data was generated by running the SPEC APC Creo 2.0 benchmark which is located at http://www.spec.org

This document will provide sizing guidelines for the following components.

- **CPU**: The CPU frequency is a primary influence on the performance of parametric kernels.

- **Graphics:** Graphics display styles such as Reflection, Edges, and Transparency take advantage of GPU computing features available in OpenGL and are tuned for Professional 3D graphics and certified graphics device drivers.

- **RAM:** Application performance is limited when the OS must page to slower disk in order to access needed data.

- **Monitor:** Image accuracy, wide viewing angle, and WUXGA widescreen aspect ratio enhance the product design and review process. Multiple monitors can be configured for larger configurable desktop.

CPU

High CPU clock frequency, efficient instruction pipelines, larger L2 and L3 CPU cache, and high memory bandwidth are necessary to achieve maximum performance in many CAD operations.

Our tests have shown that within a processor family, the CPU frequency has the greatest influence on reducing the time to complete many CAD operations. During these operations the Intel® Turbo Boost feature will be enabled to run the CPU at its highest frequency. The chart below demonstrates that the CPU composite score for the SPEC APC Creo 2.0 benchmark increases relative to CPU clock frequency.

SPEC APC Creo 2.0 CPU composite and max frequency relative to E5-1603.

Z220 E3-12xxV2
Z420 E5-16xx
8GB RAM
Quadro 2000
Win7 x64
250GB SATA
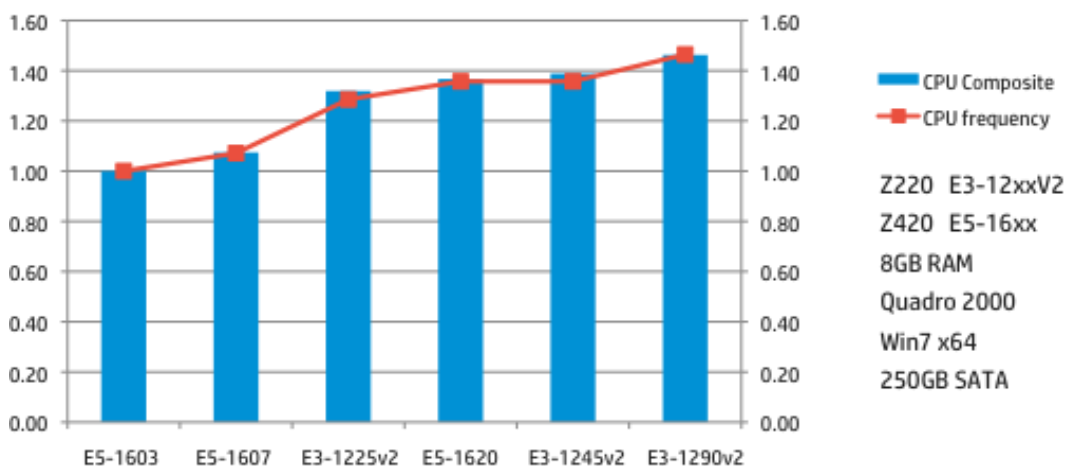
Frequency and core optimized CPU choices include:

Workstation Model	CPU	# of cores	Base frequency	Max Turbo frequency
HP Z220	E3-1245v2	4	3.4 GHz	3.8 GHz
HP Z420	E3-1620	4	3.6 GHz	3.8 GHz

Recommendation: The highest CPU clock frequency performs best.
The best price/performance found in E5-1620 and E3-1245v2.

Graphics

HP recommends certified professional 3D graphics from the NVIDIA® Quadro® and AMD FirePro™ product families.

HP recommends using HP Performance Advisor to guide you to the best certified driver for your HP Z Workstation or EliteBook configuration. HP Performance Advisor is available at no cost from http://www.hp.com/go/hpperformanceadvisor.

Larger on-board discrete and ultra fast memory, high-performance geometry engines, and optimized driver code paths are necessary to achieve maximum performance for 3D-intense workflows.

The chart below demonstrates that within a product family, the GPU composite scores for the SPEC APC Creo 2.0 benchmark increase relative to the size of the graphics card discrete memory and the number and capabilities of the OpenGL computing cores.

Graphics composite scores relative to Quadro 600
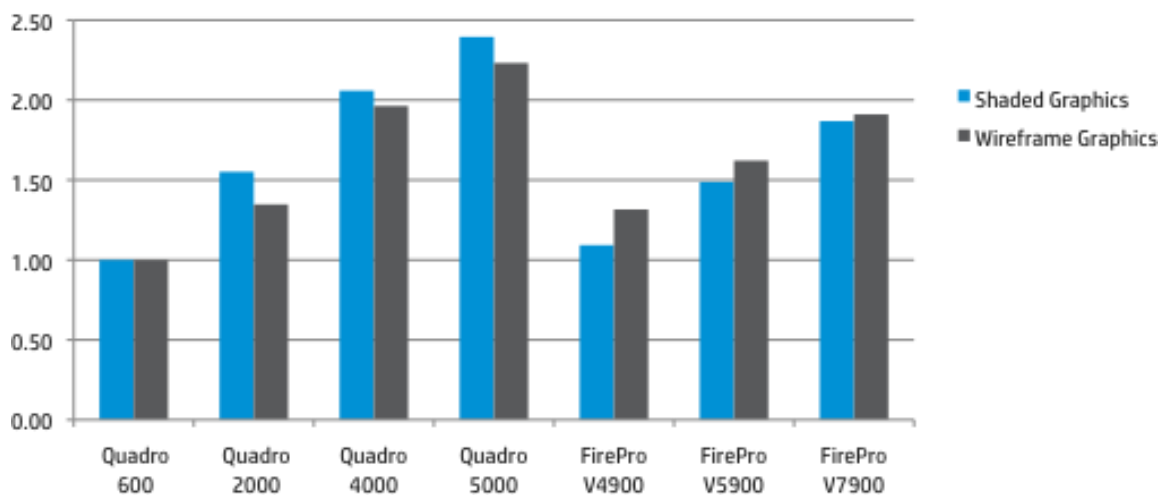
Recommended professional 3D graphics choices include:

Graphics Card Model	Memory	Compute capability
NVIDIA Quadro 600	1.0GB DDR3	96 CUDA Parallel Computing Core
NVIDIA Quadro 2000	1.0GB GDDR5	192 CUDA Parallel Computing Core
NVIDIA Quadro 4000	2.0GB GDDR5	256 CUDA Parallel Computing Core
NVIDIA Quadro 5000	2.5GB GDDR5	352 CUDA Parallel Computing Core
AMD FirePro V4900	1.0GB GDDr5	480 Stream Processors
AMD FirePro V5900	2.0GB GDDR5	512 Stream Processors
AMD FirePro V7900	2.0GB GDDR5	1280 Stream Processors

Recommendation: Users that require high quality shaded tangent edges, high display resolutions, multiple graphics windows, and most importantly responsive model dynamics will benefit from the NVIDIA Quadro 4000, Quadro 5000 and AMD FirePro V7900.

System Memory – size and layout

Optimum performance is only possible when application data resides in system RAM. Waiting on slower disk I/O to the OS page file adversely impacts system and application performance.

HP recommends using ECC Memory to increase the reliability of your workstation and programs.

HP recommends Windows 7 64-bit version.

Recommended system memory configurations:

Usage	HP Z Workstation	Size and Layout
Creating and viewing product designs	HP Z1 and HP Z220	8GB: 4 dimms X 2 GB
Analyzing and viewing product designs	HP Z420	16GB: 8 dimms X 2 GB
Simulation and optimization of product designs	HP Z620 and HP Z820	24GB: 12 dimms X 2 GB

HP Performance Displays

HP recommends high display resolution, large screen size and multiple monitors for the creation and review of your product designs. The HP ZR2440W 24” LED backlit IPS Monitor is perfectly suited for this task.

- 1920 x 1200 WUXGA native resolution.

- 16:10 Widescreen aspect ratio

- S-IPS panel for enhanced color accuracy at ultra-wide viewing angles.

- Multiple monitors allow the application windows to span across monitors for greater size and detail.

- Multiple monitors allow more options for the layout and organization of CAD model and drawing windows.

Here is an example of AMD Eyefinity which allows up to four physical displays connected to a single ATI FirePro V7900 graphics card. In this example the model window can expand to cover the 4x1 display configuration.

Displays 1 through 4

For more information

hp.com/go/whitepapers

Whitepapers with more depth on the capabilities and benefits of HP Z Workstations

hp.com/go/workstations

Information about HP Workstations

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