HP and Bentley MicroStation V8i SS3

Introduction

The purpose of this document is to provide information that will aid in selection of HP Workstations for running Bentley MicroStation V8i SS3. A performance study was completed on the MicroStation V8i SS3 PhotoRealisticRendering.dgn document file. Detailed results are provided for the HP Z820 and HP Z800 workstation running Windows® 7 Professional 64-bit. Recommended configurations are provided for the new HP Workstations Z1, HP Z220, HP Z420, HP Z620 and HP Z820. Tips are also provided for running the solutions at ultimate performance.

- HP Z820 speedup compared to the HP Z800 is significant with the rendering engine.

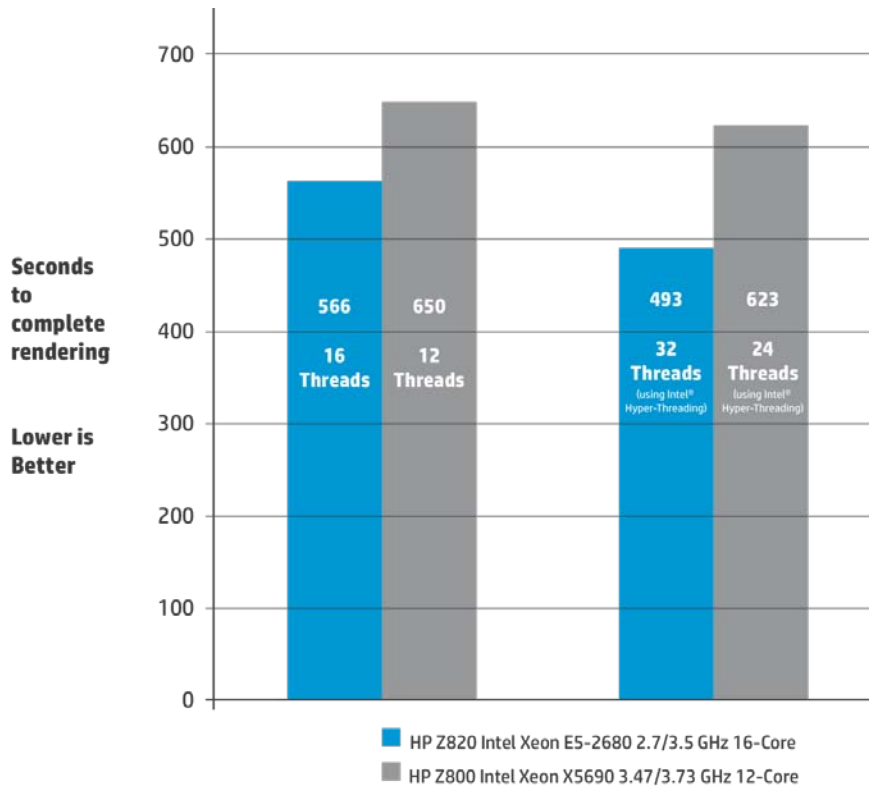## What type of application is Bentley MicroStation V8i SS3?

MicroStation is an information modeling environment explicitly for the architecture, engineering, construction, and operation of all infrastructure types. The solution provides immersive interaction with 3D models and 2D designs. It enables performance simulation of designs, including lifelike rendering and compelling animations. If your operating system is Windows 7 Professional 64-bit with a DirectX 11 capable graphics card, then MicroStation SS3 will use DirectX 11. For most configurations DirectX 11 display is significantly faster, especially for edges, transparency, and shadows. MicroStation Visualization uses the Luxology rendering engine for lifelike rendering. The rendering engine runs in parallel and can utilize all existing processor cores.

How does the new HP Workstation family (HP Z1, HP Z220, HP Z420, HP Z620 and HP Z820) provide ultimate MicroStation performance?
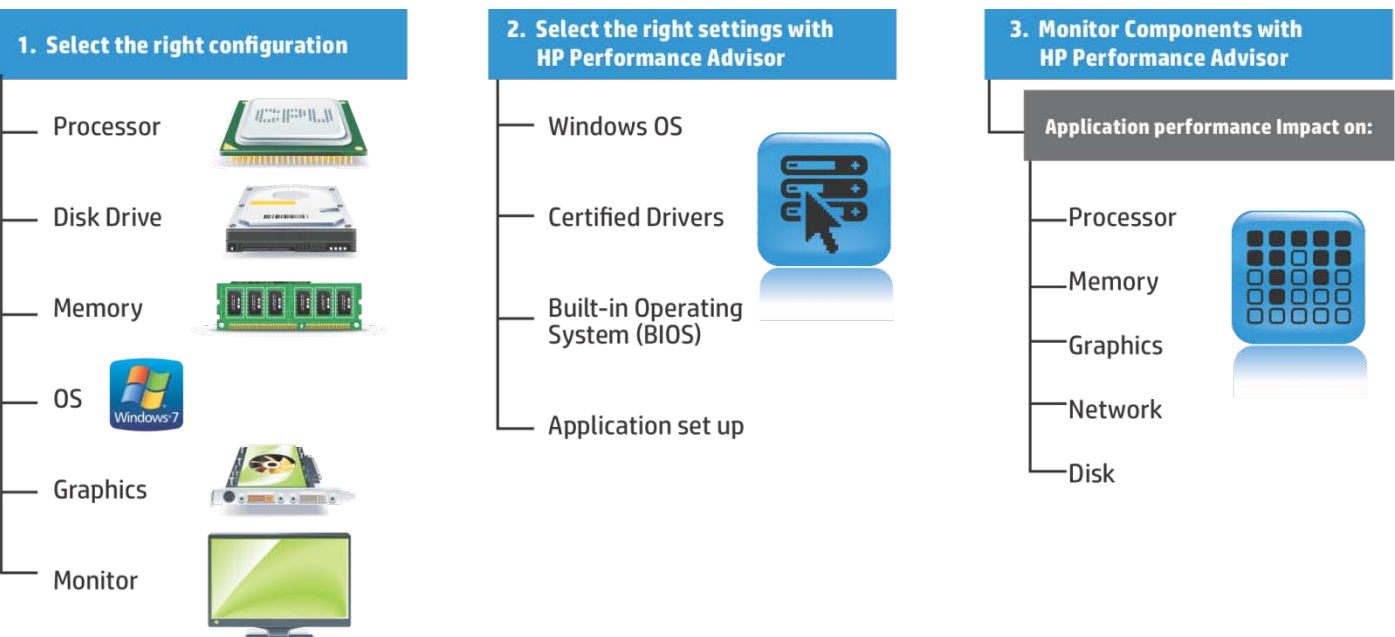
- <u>Compute</u> performance is improved over previous-generation Intel processor-based workstations. The new HP Z420, HP Z620 and HP Z820 workstations utilize the Intel® Xeon® processor E5-XXXX family and the Intel C602 chipset. The HP Z1 Workstation utilizes the Intel Xeon processor E3v2 family or the Intel Core i3 family and the Intel PCH C206 chipset. The HP Z220 workstations utilize the Intel Xeon processor E3v2 family or Intel Core i7 processor or Intel Pentium processor and Intel PCH C216 chipset.
- <u>Memory</u> bandwidth and latency is improved. The HP Z620 and HP Z820 have Dual QPI links in parallel with up to 8GT/s.
- <u>Memory</u> speed (1600Mhz) is improved.
- <u>Memory</u> design is improved with either 2 or 4 channels per processor
    - HP Z1 and HP Z220 Workstations supports unbuffered DIMMS and non-ECC unbuffered DIMMS
        - 4 DIMM sockets, 2 channels, 2 DIMMs per channel
    - HP Z420 Workstation supports unbuffered DIMMs (UDIMM)
        - 8 DIMM sockets, 4 channels, 2 DIMMs per channel
    - HP Z620 Workstation supports unbuffered DIMMS (UDIMM) and registered DIMMS (RDIMM)
        - 12 DIMM sockets, 4 channels
        - 2 DIMMs per channel - CPU0 – 8 sockets
        - 1 DIMM per channel - CPU1 – 4 sockets
    - HP Z820 Workstation supports unbuffered DIMMs (UDIMM), registered DIMMS (RDIMM) and load-reduced DIMMS 1333Mhz (LRDIMM)
        - Mixing UDIMM / RDIMM / LRDIMM is not permitted
        - 16 DIMM sockets, 4 channels
        - 2 DIMMS per channel – CPU0 – 8 sockets
        - 2 DIMMS per channel – CPU1 – 8 sockets
- <u>Storage I/O</u> performance is improved. PCI-Express 3.0, 6 Gb/s SATA and SAS ports, DMA bandwidth, 6 Gb/s hard drives (HDD) and 6 Gb/s solid state drives (SSD) can be configured with RAID 0 striped volumes for speed, USB 3.0

What MicroStation V8i SS3 visualization rendering improvement did HP measure on HP Z820?

- HP Z820 speedup is 1.26 compared to HP Z800

Seconds to complete rendering

Lower is Better

Bar	Value	Threads
HP Z820	566	16 Threads
HP Z800	650	12 Threads
HP Z820	493	32 Threads (using Intel® Hyper-Threading)
HP Z800	623	24 Threads (using Intel® Hyper-Threading)

■ HP Z820 Intel Xeon E5-2680 2.7/3.5 GHz 16-Core
■ HP Z800 Intel Xeon X5690 3.47/3.73 GHz 12-Core

How to manage your desktop for MicroStation

1. Select the right configuration

- Processor
- Disk Drive
- Memory
- OS
- Graphics
- Monitor

2. Select the right settings with HP Performance Advisor

- Windows OS
- Certified Drivers
- Built-in Operating System (BIOS)
- Application set up

3. Monitor Components with HP Performance Advisor

Application performance Impact on:

- Processor
- Memory
- Graphics
- Network
- Disk

HP recommends Windows® 7.

HP MicroStation Recommendations for running Bentley MicroStation V8i SS3?

- HP Workstation Recommendations for running Bentley MicroStation V8i SS3
  - o MicroStation is a 32-bit application and uses DirectX graphics technology.
  - o HP Z1 with Windows® 7 Professional 64-bit, Intel Xeon E3-1245 4-Core 3.3/3.7 tb or Intel Xeon E3-1245v2 3.4/3.8 tb, 16 GB memory, Intel HD Graphics P3000
  - o HP Z420 with Windows® 7 Professional 64-bit, 2x Intel Xeon E5-1660 6-Core 3.3/3.9 tb, 16 GB memory, AMD FirePro™ V5900
  - o HP Z220 with Windows® 7 Professional 64-bit, 2x Intel Xeon E3-1280v2 4Core 3.6/4.0 tb, 16 GB memory, AMD FirePro™ V5900
  - o HP 8570w with Windows® 7 Professional 64-bit, Intel Core i7 4-Core, 8 GB memory DDR3 1600MHz memory, AMD FirePro™ M4000
- MicroStation V8i - Visualization Rendering
  - o The Luxology rendering engine is a 32-bit/64-bit application and provides multi-core support.
  - o HP Z420 with Windows® 7 Professional 64-bit, Intel Xeon E5-1650 6-Core 3.2/3.8tb, 16 GB memory, AMD FirePro™ V5900
  - o HP Z620 with Windows® 7 Professional 64-bit, 2x Intel Xeon E5-2680 8-Core 2.7/3.5 tb, 32 GB memory, AMD FirePro™ V5900
  - o HP Z820 with Windows® 7 Professional 64-bit, 2x Intel Xeon E5-2680 8-Core 2.7/3.5 tb, 32 GB memory, AMD FirePro™ V5900
  - o HP 8770w with Windows® 7 Professional 64-bit, Intel Core i7 4Core 8 GB memory, AMD FirePro™ M4000
- Memory sizing/selection is critical. For best performance, use same total memory size on each channel. Use same total size on each CPU.
- Windows® 7 Professional 64-bit Service Pack 1. 32-bit programs like MicroStation will have full 4 GB memory access on Windows 64-bit and beyond.
- Windows® 7 Professional 64-bit uses physical memory for dynamic buffer cache when available. The buffer cache prevents slower Disk I/O transactions. Memory is much faster than disk I/O. Additional memory for the OS is necessary.
- HP Z420, HP Z620 and HP Z820 chipset design has 6 Gb/s and 3 Gb/s disk I/O ports. The 6 Gb/s I/O ports are recommended for 6 Gb/s devices
- 3 Gb/s devices will negotiate 3 Gb/s protocol when plugged into 6 Gb/s ports
- 6 Gb/s SSD drive for operating system

Tips for running Bentley MicroStation V8i SS3

- communities.bentley.com/products/microstation/w/microstation__wiki/selectsupport-technotes-and-faqs.aspx

- **Operating System**

Operating System / Setting	Default	Recommend
Windows® 7 Professional 64-bit		Service Pack 1
Control Panel/Power Options	Balanced	High Performance

- **System BIOS**

BIOS Setting	Default	Recommend
Power/OS Power Management/Runtime Power Management	Enable	Enable
Power/OS Power Management/Idle Power Savings	Extended	Normal
Power/OS Power Management/Turbo Mode	Enable	Enable
Advanced/Device Options/Hyper-Threading	Enable	Enable
Advanced/Bus Options/NUMA (HP Z620 and HP Z820 Dual processor)	Enable	Enable

- HP Performance Advisor can be used to install graphics drivers, select BIOS settings and help characterize MicroStation memory usage. Download from hp.com/go/hpperformanceadvisor
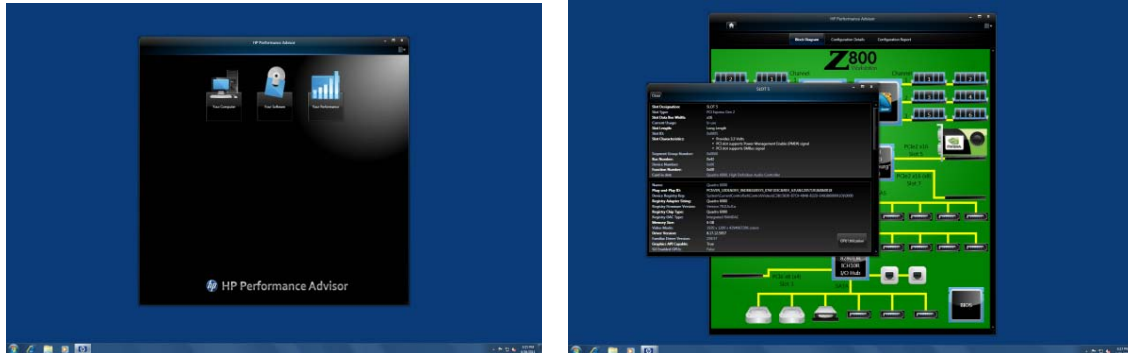
Additional resources

hp.com/go/whitepapers