



## Comparison of the HP Z820 and HP Z800 Architectures



### Introduction

The HP Z820 is the successor to the HP Z800 personal workstation. Its architecture introduces several improvements. The most significant of these are PCI Express 3.0 (integrated into the processor), USB 3.0, 1600 MHz memory and capacity enhancements, I/O slot improvements, and better performance.

### Processor Technology

The HP Z820 uses the Intel® C602 chipset to support the latest eight-, six-, and four-core Intel® Xeon® processor E5-2600 Series (Sandy Bridge, 32nm), including processors up to 150W.<sup>1,2,3</sup> An integrated 4-channel memory controller, integrated PCI Express 3.0, and a dual QPI processor interconnect at up to 8 GT/s, significantly increase peak data transfer bandwidth over the HP Z800. Microarchitecture improvements and a large L3 cache improve performance for demanding applications.

### Memory Technology

The HP Z820's DIMMs are based on DDR3 1600MHz technology, and are ECC-protected. The addition of a fourth channel of memory on each CPU provides significant performance advantages over the HP Z800 architecture, as well as four additional memory slots. LRDIMMs (load-reduced DIMMs) enable a total system memory size up to 512 GB.<sup>4</sup> Address parity enhances reliability, and NUMA and NMI modes optimize memory performance for applications.

### Graphics

The HP Z820 introduces support for PCIe 3.0 bus speeds and for up to three PCIe 3.0 graphics cards in PCIe 3.0 x16 slots. With the standard 850W power supply, certain system configurations can support up to three cards totaling 160W. With the optional 1125W supply, certain configurations can support up to two 300W, or three 225W, cards.

### I/O Slots

The HP Z820 provides a total of seven high-performance Graphics and I/O slots. The integration of PCIe 3.0 controllers within the CPU, combined with PCIe 3.0 speeds, results in dramatic improvements in I/O bandwidth and latency. An additional bulkhead allows for an eighth mechanical-only IO card (e.g. SDI card).

### Storage

The HP Z820 has an embedded LSI 2308 SAS controller, which supports eight 6 Gb/s SAS/SATA ports, and SW RAID modes 0,1, and 10. The C602 chipset supports two additional SATA controllers—the SCU supports four 3 Gb/s ports and RAID modes 0,1,10, and 5, while the AHCI supports two 6 Gb/s ports and RAID modes 0 and 1. The AHCI ports can be routed to the rear panel with an eSATA option.

### USB 3.0

The HP Z820 has two USB 3.0 ports on the front panel and two USB 3.0 ports on the rear.

## Other Features:

- USB 2.0 ports: Four rear, one front, and five internal.
- 850W power supply, 88% efficient.
- Optional 1125W power supply, 90% efficient.
- ENERGY STAR® v5.2, China's Energy Conservation Program (CECP) configurations, European Union's ErP LOT6 2013 power limit of 0.5W in off mode.
- Rear panel power on/off switch and LED for easier rack maintenance.
- Intel® vPro™ manageability with support both for DASH and Intel® AMT (Advanced Manageability Technology) on all the Xeon® processors. IT managers now have increased flexibility in optimizing their Enterprise manageability strategy across HP's Commercial Laptops, Desktops and Workstations.

FIGURE 1

## HP Z820 Workstation Block Diagram

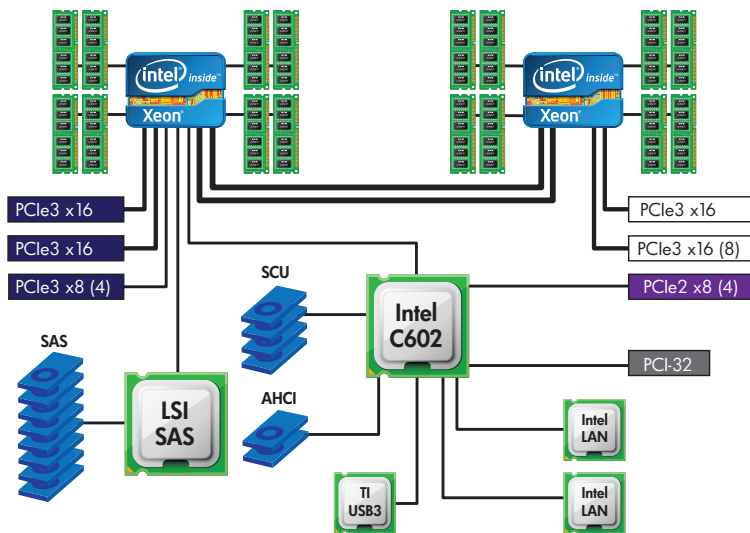
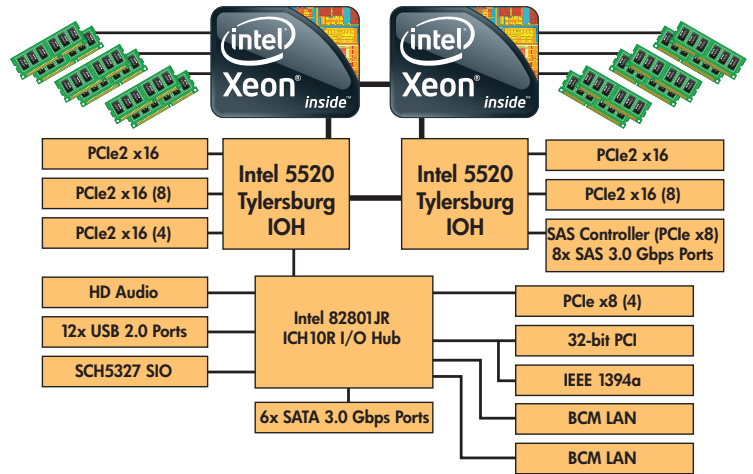


FIGURE 2

## HP Z800 Workstation Block Diagram



Screen images courtesy of Autodesk.

- 1 Four-, Six- and Eight-Core technologies are designed to improve performance of multithreaded software products and hardware-aware multitasking operating systems and may require appropriate operating system software for full benefits. Not all customers or software applications will necessarily benefit from use of these technologies.
- 2 Intel's numbering is not a measurement of higher performance.
- 3 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. See [www.intel.com/info/em64t](http://www.intel.com/info/em64t) for more information.
- 4 Maximum memory capacities assume 64-bit operating systems. Microsoft® Windows® 7 (32-bit) supports up to 4 GB (exact amount varies, depending on the system configuration; 32-bit Linux can support up to 8 GB. The Z820 supports registered DIMMS (RDIMM) unbuffered DIMMs (UDIMM), and load-reduced DIMMS (LRDIMM). See the HP Z820 Memory Configurations and Optimization and Memory Technology papers for more details on supported DIMMS.

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