High Performance Virtualization on the HP Z800 Workstation

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Introduction: Recent technological breakthroughs have enabled workstation applications to be run in a virtual environment with *near-native performance* for the first time. Through the innovation and collaboration of HP, Intel, NVIDIA, and Parallels it is now possible to virtualize 3D graphics, HD video, extremely large memory, multicore CPU's, and other advanced workstation features. Parallels Workstation Extreme is a new client virtualization product available for the HP Z800 workstation that takes advantage of these technologies to deliver a brand new workstation experience.

Benefits of Workstation Virtualization

Virtualization enables a single machine to do the work of several workstations at once. Some possible uses for this capability include:

- Digital Content Creation: Create and visualize faster, moving seamlessly between applications running on Linux and Windows
- Oil & Gas: Generate, model and visualize more exploration plans while running massive workloads near native performance with both Windows and Linux applications
- Manufacturing: Design, simulate and visualize your inventions faster by running design and simulation software on the same workstation at the same time across multiple operating systems
- Finance: Model, synthesize and visualize complex financial models at near native speed on a single workstation with full isolation between incompatible applications
- Sciences: Drive multiple complex and diverse scientific research modeling and visualization applications in medical labs, academia, hospitals, and R&D centers.
- Software Developers: Concurrently develop and debug graphics intensive applications (e.g. 3D games, 3D CAD applications) on a development workstation, while testing on a wide range of virtual target machines from the same machine
- All: Reduce clutter and operating expenses by consolidating multiple machines into one high performance workstation
- All: Support legacy operating environments on a new platform to maintain application compatibility

Key Enabling Technologies

The HP Z800 workstation is based on the new Intel® Xeon® processor 5500 series, which enables users to exploit Intel® Virtualization Technology for Directed I/O (Intel® VT-d). This extends Intel's Virtualization Technology roadmap for providing hardware assistance support for I/O device virtualization including virtualized graphics support. Intel VT-d is part of Intel's core logic that accelerates I/O virtualization by remapping I/O DMA transfers and device-generated interrupts. Intel VT-d improves system reliability by containing and reporting errant DMA to software, enhances security by supporting multiple protection domains under software control and providing a foundation for building trusted I/O, and improves I/O performance through direct assignment of a device to a VM. Intel VT-d provides virtualization software vendors like Parallels the opportunity to take advantage of hardware-based virtualization technology, enabling workstation users run both Windows and Linux based visualization applications in virtual machines with full graphics acceleration. The new Intel Xeon processor 5500 series which includes Intel® Turbo Boost and Intel® Hyper-Threading Technology delivers outstanding performance to enhance the virtualization performance.

NVIDIA's SLI® technology enables applications and users to optimize their productivity through the use of multi-gpu technologies. The latest SLI capability, SLI Multi-OS, a technology built into the NVIDIA® Quadro® FX 3800, FX 4800, and FX 5800 professional graphics solutions connects both the host and a guest virtual machine operating system in an Intel VT-d virtualized environment to its own dedicated GPU. With NVIDIA® SLI® Multi-OS, users running two Quadro graphics boards and two operating systems can now see accelerated performance that's practically identical to what they're used to with a dedicated OS and GPU.

Parallels Workstation Extreme is built on the Parallels FastLane architecture to provide blazing fast visualization performance by unlocking the potential of advanced hardware virtualization technologies including Intel Virtualization Technology (Intel VT-x & VT-d) and NVIDIA SLI Multi-OS for high-end graphics. Parallels Workstation Extreme is the enterprise virtualization solution that increases productivity for end users working with resource-intensive visualization applications and enables IT to improve its ability to support the business.

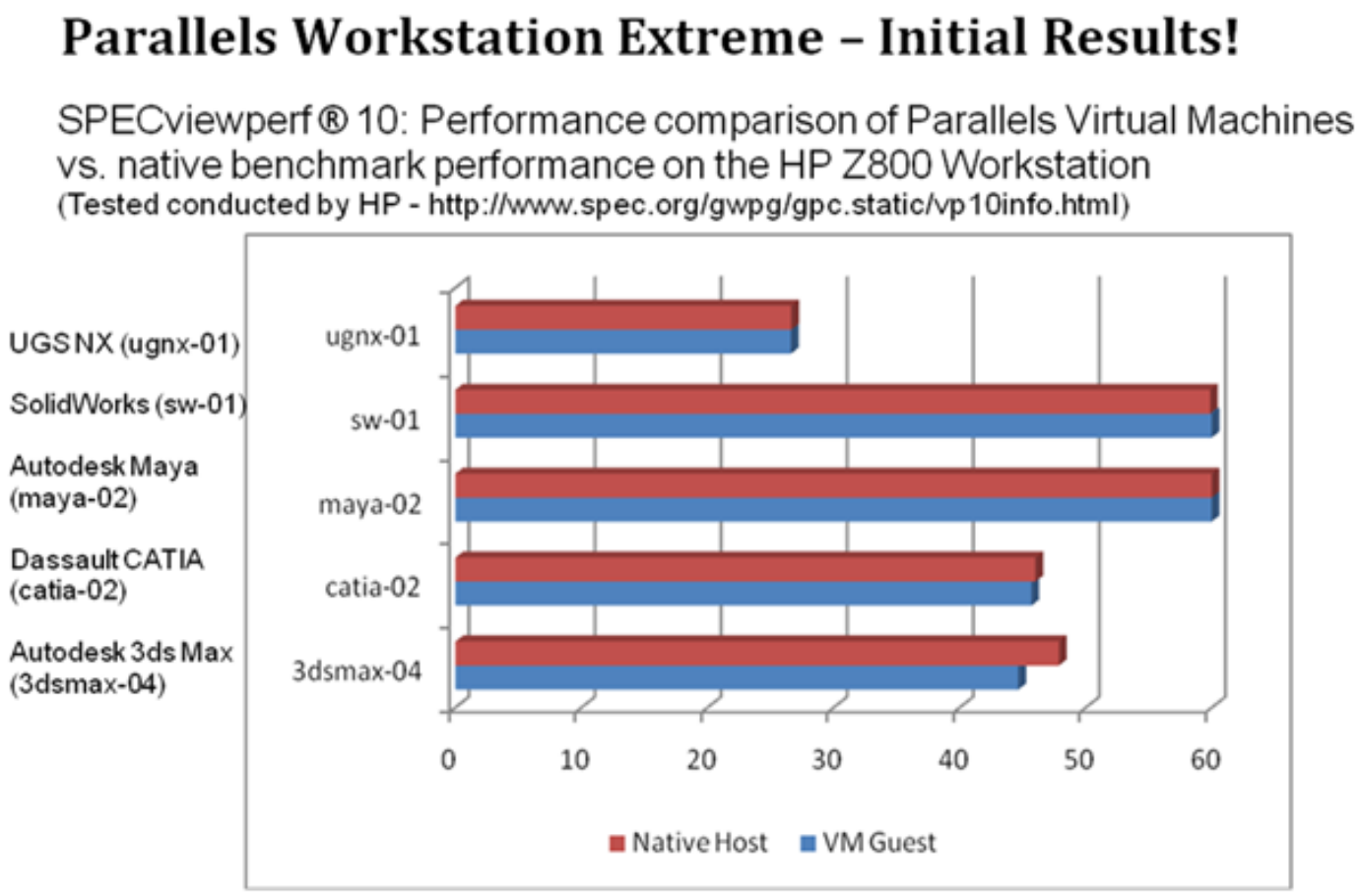
How does it work?
The block diagram below illustrates how these enabling technologies are used by workstation hypervisors to present a virtual hardware environment to guest operating systems.

Figure 1: Block Diagram. One graphics card is used by the Host OS. A second graphics card is mapped to a virtual workstation

Performance Measurements

As can be seen below in Figure 1, benchmarks run in Parallels Workstation Extreme virtual machine guests on the HP Z800 workstation run with near-native performance.

Figure 2. Performance comparison of Parallels Workstation Extreme virtual machine guests vs. native benchmark performance on the HP Z800 Workstation



Getting Started

Starting in June 2009, customers will be able to order Parallels Workstation Extreme as an option on the HP Z800 Workstation.
For more information:
HP Z Workstations
http://www.hp.com/united-states/campaigns/z-workstations/
http://www.hp.com/large/products/workstations.html
Parallels Workstation 4.0 Extreme
www.parallels.com/extreme
Intel® Workstation Processors & Virtualization
http://www.intel.com/products/workstation/processors/index.htm
http://www.intel.com/technology/virtualization/
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