



Dell Expands Server Family — Introducing the PowerEdge with Opteron

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Management Summary

When the typical consumer goes shopping for a major appliance, he/she will usually head for the nearest “big box” or discount center to check out the various options available. We go to Sears, Best Buy, or even a Sam’s Club, where we can find a wide variety of products to choose from in all price ranges. If you are a recent college graduate looking to set up a first apartment and you need a washing machine, for example, you may have different requirements than a family of four. The intelligent consumer will have questions regarding functions, size, and energy consumption. The major discount centers carry a wide variety of machines, from GE to Whirlpool to Maytag, but where can you find a salesperson with **enough knowledge to simplify the experience** and ensure that you purchase the model that fits your budget and your needs? If you go to a specialty store that only carries one or two brands, you are more likely to find a trained salesperson, rather than a high school student who was in the toaster department yesterday. However, you may end up with a model that is close to your needs, but not exactly the right fit. You also need to find a reputable store that stands behind their products with a warranty that will be honored.

The same scenario is true for the enterprise data center faced with the issues of improving performance while at the same time mitigating risk. When a CIO or IT manager needs to purchase new platforms to **consolidate** a network of underutilized servers, or to **migrate** a legacy RISC application, he needs to be sure that the servers he adds to the data center will support the enterprise’s mission-critical applications and that they will do so with the highest performance and lowest total cost of ownership. If your application set consists of commodity *Windows* and *Linux* applications, and does not include programs that may require a specialized RISC server, such as IBM’s *System p* or Sun’s *SPARC* family, there are two options before you: an x86 platform based on Intel’s *Xeon* processor or AMD’s *Opteron*. Both microprocessors are dual-core, however, each has different design characteristics and energy consumption curves. High-performance computing applications have different requirements than on-line transaction processing applications. You, and your vendor, need to understand the differences and how they affect performance and cost.

With the recent announcement of the new *PowerEdge SC1435* and *6950*, Dell has joined the ranks of those vendors who offer both Xeon and Opteron solutions. To see how Dell can help you select the right platform for your environment, please read on.

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The Open Systems Data Center

Open systems data centers face many of the same issues that their proprietary brethren faced many years ago – and some that are unique to a commodity environment. The never-ending requirement to provide additional processing capacity still exists, as does the need to control costs. This has led to the proliferation of x86 servers, with growing energy bills, and an often-unacceptable level of utilization. The need to better manage this infrastructure and increase server utilization to improve costs and compute cycles has lead some back to the future, i.e., “introducing” virtualization back into a data center where the virtualized mainframe once ruled over the domain like a transistorized T-Rex. **Data centers designed to support a *scale-out architecture* are starting to evolve into *scale-in environments*, where virtualization can change utilization ratios from 15 – 20% to a more efficient level of around 75%.** Furthermore, the end-of-life of many proprietary systems, such as Hewlett-Packard’s *Precision Architecture (HP-PA)*, has lead many to install dedicated, but poorly utilized, open systems replacement platforms, with a newfound importance to investment protection.

Software licensing is another factor causing undue stress to the data center budget. As the infrastructure grows, the replication of the operating system and application set increase in direct proportion to the number of sockets, or the number of cores, throughout the enterprise.

There has always been a need to improve the return on investment (ROI) and reduce the total cost of IT ownership (TCO), but now, a changing work paradigm has shifted more emphasis onto availability and the need for higher reliability. The eight-hour workday has been replaced by a culture of 24x7x365. The internet has encouraged a worldwide thirst for information and access. The enterprise network must be available all-day, everyday. The enterprise must be able to increase the flexibility and agility of the IT infrastructure. It must have the ability to respond to changing business

needs, to transition system resources to the application that needs them, **when it needs them.** Further, the platforms must be scaleable, and the CIO cannot afford to purchase at the top of the line – he must leave some headroom for growth. With that, however, come commensurate increases in overhead, such as personnel to manage the data center and energy to run and cool it.

The last year has seen an unprecedented rise in energy costs, significantly greater than those experienced during the 1970’s when long lines at the gas pump changed the way we commuted to work and the very cars that we drove (at least for a little while). The costs to run a 7x24 enterprise continue to rise, almost as much as the costs to cool the environment from the heat created. **A 21st-Century CIO must find ways to reduce data center power consumption and the costs associated with it.** There is a need to consolidate the plethora of inefficient servers propagating the enterprise in order to improve performance per watt and to simplify systems management. The arrival of AMD on the x86 scene has changed the processing paradigm forever by leading to the introduction of consolidated 32-bit and 64-bit environments, multi-core open systems processors, and reduced energy consumption by every server in the environment.

Choice, Not Chance

The very design of the microprocessor can have a significant impact on the performance of mission-critical, enterprise applications. Single-threaded applications, for example may perform better on a server based on a single-core CPU with a higher clock speed. Some applications may take advantage of the memory management controller integrated into AMD’s Opteron processor. Others can utilize the larger cache of an Intel Xeon to improve performance. No single solution is ideal for every processing environment. The data center staff must evaluate the requirements of each application to see what architecture fits it best. Virtualization also factors into this equation, however, as a high-perfor-

mance computing application might merge very well with an OLTP application to take advantage of available CPU cycles while the OLTP application is awaiting the completion of another I/O.

When reviewing RFP responses, CIOs want to understand which company and products best meet their business needs. They do not want to be mired in microprocessor discussions or left weighing which processors to choose in a vendor's line-up. You do not want to settle for the best of a bad set of options; you want to have your choice of the best set of solutions. In the case of x86 servers, **the CIO should be evaluating vendors that can offer the most competitive platforms available that support the AMD Opteron and Intel Xeon microprocessor set and do not favor one over the other.** This will ensure that the CIO has a chance to choose the best servers for the enterprise application set.

Some vendors, such as Sun, have chosen one commodity architecture to complement their proprietary offering. Sun has selected Opteron as the open systems alternative to their *SPARC* servers. Others, such as IBM with its *System x*, have a representative set of platforms based on both architectures, AMD and Intel, to complement their own *POWER* family of *System p* servers. A third vendor, HP, carries a full-line of both CPUs, but HP chose to discontinue their proprietary offerings in favor of a third open CPU, Intel's *Itanium 2* - to satisfy the needs of their legacy base.

With no proprietary base to manage, Dell had been using Intel as a sole-source for its PowerEdge servers. They had committed to being the best source of high-performance, high-quality Xeon-based servers. Unfortunately, this did not always match the requirements of a customer base that was looking to give Dell even more business. Dell has adjusted to provide customers with all of the best options that the x86 market has to offer. Now, Dell has announced two new *PowerEdge* platforms based upon the Opteron architecture, the four-socket *PE6950* and the two-socket *SC1435*. These represent the first of many new AMD

Exhibit 1 – PowerEdge Design Enhancements

- **Industry-first programmable LCD** – for easy visual diagnosis of server faults (PE6950 only);
- **Draw-latch design** - for tool-less access;
- **ImageWatch** – a service to manage system image changes;
- **SAS drives** – for faster, more reliable data transmission and reduced thermal output;
- **TCP/IP Offload Engine** – to reduce host processor traffic;
- **Enhanced virtual technology** – to improve performance, management, and utilization under VMware ESX, Microsoft Virtual Server, and Xen; and
- **PCI-Express I/F** – to facilitate high performance Ethernet, RAID, InfiniBand, and Fibre Channel I/O.

platforms proposed by Dell.

The Dell Opteron Solution

These new Opteron models are part of Dell's ninth-generation of PowerEdge servers and include the same industry-standard design features (see Exhibit 1, above) as their latest Intel Xeon models¹. They have better price/performance, better performance per watt and lower power consumption, as well as a seamless upgrade path to quad-core CPUs, within the same thermal envelope, to protect the investment in PowerEdge platforms.

The PE6950 is an eight-core, 4U server designed to support mission-critical applications, including CRM, ERP, business intelligence, and financial management. (Dell supports ERP through a joint collaboration with SAP). The PE6950 also provides a platform for the consolidation of IT infrastructure throughout the enterprise using an integrated virtualization capability. As such, the PE6950 is certified to operate with both

¹ See **The Clipper Group Navigator** dated July 18, 2006, entitled *Dell Provides New Servers with Premium Services*, available at <http://www.clipper.com/research/TCG2006061.pdf>.

the Dell/EMC storage offering and *VMware*. The PE6950 also serves as an ideal migration platform for the transition of mission-critical UNIX (RISC) applications that have been orphaned by their legacy platforms. The PE6950 starts at \$6,499. The SC1435 targets the web server community and has the capability to perform high-performance computing (HPC) activities in a cluster environment. It can also serve as a mission-critical application server for SMB enterprises, starting at only \$1,299.

Both models support dual-core AMD Opterons running at 2.8GHz with built-in virtualization features. They support DDR2 memory and the PCI-Express interface. They also include Serial Async (SAS) drives running at either 10K or 15K RPM, and an integrated NIC as a TCP/IP offload engine.

The PE6950 has plenty of headroom and is configurable with the following.

- A two socket or four-socket engine with 1GHz *HyperTransport* technology,
- Up to 2MB of L2 cache and up to 64GB of DDR2 ECC memory over 16 DIMMs;
- Seven PCI-Express expansion slots and a dedicated RAID PCIe slot; and
- Multiple SAS disk options supporting up to 1.5TB of hot-plug disk storage.

A typical PE6950 consumes 20% less energy than a comparable PE6850 running the commodity SPECjbb2005 benchmark, employing AMD's *PowerNow!* technology, to reduce power consumption.

The SC1435 is a 2-socket platform for compute-intensive applications that has a 129% improvement in performance and a 107% improvement in performance per watt compared to the Xeon-based SC1430. It is optimized for high-performance clusters, providing easier management, maintenance, and service and configurable with a range of options.

- Up to two dual-core Opteron 2200 CPUs with 1GHz *HyperTransport* technology,
- 2MB of L2 cache and up to 32GB of DDR2 ECC memory over 8 DIMMs;
- One PCIe x8 or one PCI-X controller;

- Up to 1TB of internal storage.

Both servers support a variety of *Windows Server 2003 Editions*, along with Red Hat and SUSE *Linux*. In addition, the PE6950 supports both Microsoft's *SQL Server 2005* and *Oracle Database 10g* to solve all of the enterprise database needs. Dell and Oracle have collaborated to integrate Oracle's *Enterprise Manager* into Dell's *OpenManage* suite to provide a simplified solution to the management of an Oracle application infrastructure from a single console. Because of its consolidation and virtualization capabilities, *PowerEdge* helps you lower the TCO of your IT infrastructure with lower licensing costs for both the Operating System and horizontal applications.

Dell provides a full set of systems management tools to facilitate the deployment, monitoring, and change management of the IT infrastructure, not only from Dell, but also from trusted partners such as Microsoft, Altiris, and Novell. Dell also provides a full set of IT infrastructure services, including consolidation, deployment, training, and maintenance, with their *Platinum Plus* maintenance program.

Conclusion

The IT server market has become a big poker game. In poker, you need jacks or better to open; in the data center, you need a pair – Intel and AMD – to stay in the game. Dell has finally shown their hand and it contains a pair of aces – the PE6950 and the SC1435. No matter what your IT environmental requirements are, HPC to OLTP, CRM to ERP, Dell has the x86 technology to both scale-out the architecture to meet increasing user demand and the scale-in architecture to virtualize your enterprise.

Dell is now a full-service provider to their base - enterprises looking for Opteron do not have to go elsewhere. Neither do you.



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