



## HP Expands Server Toolkit — Provides Enhanced Options for Data Center

Analyst: David Reine

### Management Summary

Every professional mechanic or home handyman knows that you need the “right” tool to do the job. This entails making an initial investment to ensure that you have a complete set of screwdrivers, both slotted and Phillips-head, and a complete set of wrenches, both open-end and box-end, standard and metric, to be sure that you can handle any requirement, as well as a set of hex keys or Allen wrenches, in addition to any number of power tools. Sure, you can use the proverbial “adjustable” wrench that can be sized to fit any purpose (you know – One-Size-Fits-All, *just not very well*). However, this type of tool is known to slip, or even strip the threads of the hard-to-find expensive bolt, causing you to make an unexpected investment in both time and money. As an old familiar saying goes, “you can pay me now, or pay me later.” Unfortunately, “pay me later” often turns out to be a larger figure!

Having the right set of tools is equally important in the data center of any organization large or small. As we have learned over the past few years, the total cost of ownership (TCO) of an I.T. infrastructure entails much more than simply the acquisition cost. Data centers around the world have become choked with inefficient and poorly managed servers, storage, and administrative resources. In many cases, servers are only being used at 15% to 20% of their capacity. Unfortunately, the organization must account for 100% of the electrical power required to run these resources and cool the data center, as well as 100% of the floor space occupied by a virtual plethora of under-utilized hardware. In order to reduce the TCO of the data center, many enterprises have engaged in programs to consolidate their application set on the latest multi-socket, multi-core processors. The goal: virtualizing multiple applications on a single platform to utilize available processing resources more fully. Some of these applications are CPU-intensive; others are I/O-intensive. Each requires a specific set of configuration parameters in terms of the number of processors, the amount of memory, the number of I/O ports, etc.

As with the professional mechanic, one server size does not necessarily fit all application environments. One large business may be focusing on a rack or blade environment for their data center, a different architecture for their branch offices, and a tower format for their remote requirements, all of them scalable to a different degree. The CPU-intensive applications may be looking for multi-socket nodes, while the virtualization environments could require greater memory scalability. In order to simplify an application rollout, the organization needs to find an I.T. vendor that not only offers a wide variety of server options, but also offers a common interface that will support all of them. HP already announced a wide variety of servers based upon Intel’s newest architecture, the *Xeon 5500 Series Processor*. They have now followed that up with the first announcement of support for Six-Core AMD Opteron™ Processors. To learn more about how HP can reduce the TCO of your data center with scalable, energy-efficient options that can consolidate and virtualize your environment, please read on.

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## Complexity in the Enterprise Data Center

Today's enterprise data center is a complex mix of mission- and business-critical applications often running on an older, under-utilized set of both proprietary and open architecture servers. As a result, the enterprise I.T. staff must maintain and support, potentially, thousands of servers and multiple operating environments, spanning many years and processor generations. This server sprawl has created a great deal of complexity in the data center, and complexity always adds cost to the organization's operational budget. Simplifying the infrastructure, and reducing the TCO of the data center, has thus become a major focus of the enterprise executive team.

Many enterprises have looked at changing the I.T. environment, and consolidating their older x86 platforms onto a network of new, multi-socket, multi-core x86 servers to simplify the infrastructure. However, when deployed with a single application resident, these servers would still only utilize a fraction of the CPU resources available, in many cases less than 20% of server compute cycles. This wastes not only valuable I.T. resources, but natural energy resources as well, adding significantly to the TCO of the data center. Equally as important, these enterprise data centers are *application-centric*, not *platform-centric*. The CIO has to be concerned with retaining the investment that the enterprise has made in these mission- and business-critical applications, along with the investment made in support and management software. The question then becomes: *How can the data center reduce the TCO without negatively impacting the performance and reliability of the IT infrastructure?*

In order to reverse this trend, simplify the I.T. architecture, and lower data center TCO, the I.T. staff must change the paradigm of the enterprise data center, focusing on the consolidation of mission- and business-critical servers, as well as infrastructure servers, and the virtualization of these platforms to improve server utilization. In addition, the data center must be concerned with the implementation of programs to support "green" I.T. – to lower energy consumption and help to reduce the TCO of the IT environment.

Ideally, the I.T. staff would select a single server architecture that would satisfy the needs of the application set and propagate that configuration throughout the enterprise, to simplify the deployment and support of the infrastructure. However, the enterprise architecture is a heterogeneous mix of OLTP, database, infrastructure, and HPC (high

performance computing) applications, some requiring high levels of I/O, others demanding the highest processing capabilities. In order to improve server utilization, some of these platforms need to be virtualized, requiring significantly more memory than many of the CPU-intensive applications. Quite simply, one architecture, one server, will not suffice. **One size does not fit all!** The data center needs to be populated with a variety of platforms, each scalable according to the resource needs of the application. Not only that, but an enterprise usually consists of multiple environments, with a *bladed, rack or tower environment* for the data center, branch office, and remote office or departmental needs.

Even within the x86 architecture itself, the data center has options. There are servers based upon Intel's *Xeon* architecture and other platforms based upon AMD's *Opteron* technology. Even within these families, there are options. The *Intel® Xeon® processor 5500 series* is a quad-core CPU designed for dual-socket systems, while the *Intel® Xeon® processor 7400 series* is a 6-core design, scalable to four-socket systems. AMD matches these designs with their quad-Core AMD Opteron™ Processors and their six-Core AMD Opteron™ Processors, scaling to eight sockets.

What the enterprise with multiple requirements needs is an I.T. vendor who can provide the right platform for the right application. With their *HP ProLiant* and *BladeSystem* portfolios, HP can provide a heterogeneous mix of blades, racks, and towers to meet the data center's needs. In fact, HP has recently complemented their Intel-based ProLiant servers with a complete line of bladed and rack-mounted servers based upon the technology Six-Core AMD Opteron™ Processors.

### Six-Core AMD Opteron™ Processors

AMD has just announced the availability of a 6-core Opteron processor, complementing the quad-core Opteron announced last year. This processor has been specifically developed in support of the enterprise data center's need for improved throughput, expanded virtualization capabilities, energy efficiency, and better economics resulting in a lower TCO. Designed to the same power envelope as its 4-core predecessor it enables increased capabilities for an HPC environment or increased database performance, while reducing TCO through maintaining the same energy specifications as previous versions. The innovative features in Opteron that enable these improved performance and consolidation capabilities are listed in Exhibit 1, on the next page.

### Exhibit 1 – Opteron Features

- **HyperTransport Technology (HT) Assist** – to reduce cache traffic between processors;
- **Increased HT3 Bandwidth** – to increase the interconnect rate from 2GT/s up to a maximum of 4.8GT/s, to improve overall system balance and scalability;
- **Integrated Memory Controller** – to increase fault tolerance and reduce system downtime and improve system reliability, and significantly increase performance;
- **AMD-P Power Management** technologies – with **Enhanced AMD PowerNow!** Technology to reduce data center energy consumption, **Dual Dynamic Power Management** to reduce idle power consumption and permit per-processor power management in multi-socket designs, **AMD CoolCore** technology to cut off power to unused transistor areas to reduce power consumption and lower heat generation, **AMD PowerCap Manager** to enable the I.T. staff to put a cap on the P-state level of the cores via the BIOS, and **AMD SmartFetch** technology to allow inactive cores to enter a “halt” state and draw less power; and
- **AMD-V technology** – to enable the translation of virtual to physical addresses in hardware rather than software, I/O virtualization, and the migration of a virtual machine between two physical machines running AMD Opteron technology. This feature is also known as Rapid Virtualization Indexing (RVI).

Source: AMD

- *With six cores*, up to 128GB of RAM and the ability to manage virtual machines dynamically with outstanding performance, Six-Core AMD Opteron™ Processors provide the AMD Virtualization (AMD-V) technology that the enterprise requires to consolidate underutilized systems
- *With six cores*, Six-Core AMD Opteron™ Processors deliver a significant performance improvement over four cores, operating within the same power and thermal envelopes, providing outstanding performance per watt results with no increase in data center energy consumption.
- *With six cores*, the data center can build a scalable infrastructure that will enable the I.T. staff to utilize platforms fully that support 2, 4, or 8 processors with up to 48 cores and 96 threads, for the growing needs of the enterprise.
- *With six cores*, these new HP platforms can replace older platforms and maintain compatibility with your existing I.T. infrastructure, running your mission- and business-critical applications with increased performance, but maintaining the thermal envelope.
- *With six cores*, AMD has designed these features into two distinct families: the *AMD Opteron 2400 Series* and the *AMD Opteron 8400 Series*. The data center can deploy the Opteron 2400, replacing the Opteron 2300, in a two-socket server, while deploying the Opteron 8400, replacing the Opteron 8300, in a four-socket or eight-socket system. The 2400 processors come with a frequency of 2.2, 2.4, or 2.6GHz for low-power, standard-power, and performance-optimized requirements.
- With the six-core AMD Opteron CPU, HP has complemented their ProLiant family of servers with seven new models to enable the data cen-

ter to deploy exactly what the enterprise needs where they need it.

### The HP Server Solution

Today’s data center is getting a brand-new sound – with terms such as consolidation, virtualization, cloud computing, and energy efficiency dominating the conversation. With the recent availability of the newest AMD Opteron processors, HP has jumped into the 6-core server space with both feet, with the announcement of three new ProLiant BL Server Blades and four new ProLiant DL rack-mounted Servers all based on the AMD Opteron 2400 or 8400 microprocessor, to complement their ProLiant portfolio. (See Exhibit 2, on the next page.) Along with the improvements already made to their latest generation of ProLiant, HP can now provide their AMD-based client data centers with the most advanced features that HP can provide, combined with the latest innovations from AMD, to enable the enterprise to deploy the densest server environment possible and still remain within the limits of data center energy consumption.

The newest generational round of innovation from HP has provided the data center with a *Sea of Sensors* to monitor every facet of the enterprise server operation. In addition, HP has provided a *Dynamic Power Capping* capability, new *Smart Array* controllers with up to twice the performance of the previous generation, a new ProLiant *Onboard Administrator* that enables the PowerNow! feature, and high efficiency *Common Power Supplies* for all of their new servers<sup>1</sup>. With this new *Thermal Logic Technology*, HP can enable the data center to triple its application capacity, tailor configurations

<sup>1</sup> Dynamic Power Capping and Common Power are not available on the ProLiant DL585.

## Exhibit 2 – HP ProLiant Opteron Models

### *ProLiant Blade Servers*

- **BL685c** – Supports up to 4 AMD 8400 6-core CPUs or 4 AMD 8300 quad-processors with up to 256GB of memory in 32 DIMMs; includes two integrated dual port 10GbE adapters
- **BL495c** – Supports up to 2 AMD 2400 CPUs with up to 128GB of memory in 16 DIMMs; includes an integrated dual port 10GbE adapters
- **BL465c** - Supports up to 2 AMD 2400 CPUs with AMD Dual Dynamic Power Management and up to 64GB of registered DDR2 DIMMs; supports up to two mezzanine I/O expansion slots

### *ProLiant Rack Servers*

- **DL785** – A 7U server that supports up to 8 AMD 8400 CPUs with up to 512GB of memory over 64 DIMMs and 11 standard PCI-e expansion slots and 7 optional; includes dual port NC371i multi-function Gigabit server adapters with TOE and iSCSI support and internal storage to support 8 SFF SAS drives
- **DL585** – A 4U server that supports up to 4 AMD 8400 CPUs with up to 256GB of memory over 32 DIMMs and 9 standard I/O expansion slots; includes dual port NC371i multi-function Gigabit server adapters with TOE and iSCSI support and internal storage to support 8 SFF SAS/SATA drives
- **DL385** – A 2U server that supports up to 2 AMD 2400 CPUs with up to 128GB of memory in 16 DIMMs and 16 SFF SAS/SATA drives
- **DL165** - A 1U server that supports up to 2 AMD 2400 CPUs with up to 64GB of memory in 8 DIMMs and 4 SFF SAS/SATA drives

Source: HP

for maximum energy savings, and still limit power consumption to half of that of their previous generation. With HP *Insight Control*, the I.T. staff can simplify setup and operations, reducing operational expenses.

With their newest ProLiant servers and AMD Opteron technology, HP enables the data center to get more work done with half the servers and to simplify the transition with tools such as *Insight Server Migration* software for ProLiant and *Insight Remote Support*. Often, ProLiant servers with AMD technology can cost less to acquire than similar configurations of ProLiant servers with Intel technologies. In addition, the TCO potentially could be less, with each Xeon 5550 consuming 95W, while a similar Opteron 2435 consumes 75W.

In fact, the lower operating and software costs for the new 6-core AMD Opteron-based models drives the TCO down to a point where the ROI to replace 14 ProLiant G5 servers acquired in 2007 with 4 new ProLiant G6 servers, can be as low as 11 months. Furthermore, **the ROI for replacing 42 ProLiant G4 servers acquired in 2005 with four G6 platforms can be as low as three months!** With these figures on the table, why would any enterprise retain older systems in the data center? HP further simplifies the process of upgrading or replacing x86 servers, or deploying virtualization, with the availability of HP *Insight Server Migration* software, with a single interface, for ProLiant to provide an automated, accurate, and affordable way to migrate existing servers, and

*their contents*, to the newest HP BladeSystem or ProLiant technology, or to the latest virtualization platform from VMware, Microsoft, or Citrix. This automated process enables the I.T. staff to save time and reduce errors, further reducing the TCO of the data center infrastructure.

## Conclusion

With this new round of announcements, adding the 6-core Opteron processor to ProLiant, HP has increased the options available to the enterprise. The data center can now deploy exactly what they need, where they need it, and when they need it. With the availability of platforms based upon both Intel's Xeon and AMD's Opteron technologies, the enterprise does not have to settle for a generic one-size-fits-all solution. Based upon commodity benchmark results, or testing your own mission-critical applications, the data center can configure and deploy a specific solution to meet the changing business environment.

Deploying the “right” platform will enhance the ROI in these tough economic times, lowering the TCO of the I.T. infrastructure. If your enterprise is looking to deploy the “right” server, take a look at the capabilities provided to by HP with ProLiant.



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### ***About the Author***

***David Reine*** is Director, Enterprise Systems for The Clipper Group. Mr. Reine specializes in enterprise servers, storage, and software, strategic business solutions, and trends in open systems architectures. He joined The Clipper Group after three decades in server and storage product marketing and program management for Groupe Bull, Zenith Data Systems, and Honeywell Information Systems. Mr. Reine earned a Bachelor of Arts degree from Tufts University, and an MBA from Northeastern University.

- ***Reach David Reine via e-mail at [dave.reine@clipper.com](mailto:dave.reine@clipper.com) or at 781-235-0085 Ext. 123. (Please dial “123” when you hear the automated attendant.)***

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