



HP Doubles Their x86 Offering Adding Opteron to the Proliant Family

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Management Summary

A noted philosopher once said: *When you get to the fork in the road, take it.* Nobody is sure what Yogi Berra, infamous baseball catcher, meant by that (or anything else that he has said), but the image is clear. For Yogi, it did not matter which branch he took; someone else could be counted on to bring him home. When you or I reach a decision point, however, we need to have a map, or a plan, or we run the risk of wasting time and precious resources. Moreover, we run the risk of getting lost. In that sense, baseball is a lot simpler than our real world.

For Information Technology (IT) management in the data center, that fork in the road looming ahead represents *adaptability*, capable of leading the developers down two different paths. The first takes your programmers down the Intel *Itanium* Expressway, the other taking them onto the AMD *Opteron* Thruway, instead. Or, we could be like Yogi, and put two-thirds of them on the Intel path and the other two-thirds headed to AMD; Yogi was famous for that. **The fork represents the challenge of adaptability, how quickly can your data center staff react to the application platform requirements and deliver the correct solution for the problems ahead.**

The requirements faced by the data center are diverse, with mainframe-like processing environments, such as large-scale OLTP, and high-performance number crunching applications at the high-end, competing with significantly smaller infrastructure servers on the front-end. Moreover, somewhere in the middle, there is a mix of mid-range servers providing application services to a vast array of users throughout the corporate environment. In order to ensure that the IT staff has the correct resources, management must install a set of guidelines. These guidelines focus the development effort onto a defined set of industry standards to ensure that the enterprise can adapt to the right solution no matter what the application environment.

In terms of operating systems, the data center could be looking at UNIX or Linux. Perhaps there is a NetWare server in the mix. Most certainly, there will be local Windows servers throughout the enterprise. How does the IT management select the right set of platforms for the data center? There are any number of proprietary architectures to choose from in selecting a platform. None of them will do. Today's standards center on a finite number of alternatives. In the x86 world, those alternatives are Xeon and Itanium 2 from Intel, and AMD's Opteron for 32-bit and 64-bit processing. To see how Hewlett-Packard (HP) continues to evolve, and adapt to a changing environment, please read on.

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HP x86 Microprocessor Strategy

In a pair of announcements made during 2003, HP committed to the migration of their existing proprietary product lines with a new family of servers based upon the *Itanium 2* microprocessor, under the *Integrity* and *NonStop* banners. The mid-year introduction identified the intent to migrate the *HP-PA RISC*, *Alpha*, and *MIPS*-based servers to an *Itanium 2* architecture and announced the arrival of several entry-level and high-end servers¹. HP followed this introduction with a November announcement that added some beef to the entry servers and introduced a family of mid-range servers². Both of these moves were consistent with HP's three-tier philosophy to reduce cost and simplify change based upon industry-standard architectures, reusable components, and a consistent implementation. (See Exhibit 1.) HP's *Proliant* family remained a bastion to Intel's *Xeon* architecture at the entry-level. At the same time, *Integrity* satisfied the enterprise class requirements while *NonStop* provided a Fault Tolerant environment, both via *Itanium 2*.

HP has now evolved that two-pronged fork into a trident, with an extension to the x86 architecture to enable the smooth transition of application servers from a 32-bit to a 64-bit environment for *Windows* and *Linux* applications. Responding to customer demands for more performance, more reliability, and more scalability, HP has reworked the *Proliant* family, adding servers based upon AMD's *Opteron* microprocessor to those based upon Intel's *Xeon* chip. This gives more mission-critical application capability to the *Proliant* family. HP has made it perfectly clear, however, that *Opteron*-based *Proliant* servers are not competing with the *Integrity* family. They

are complementary to it. **Itanium 2 remains as HP's strategic 64-bit enterprise computing platform.** In fact, they believe that the introduction of *Opteron* will enhance the viability of *Itanium 2* servers by spurring the development of high-performance compilers and portability tools, increasing the migration of x86 ISV applications to a 64-bit environment. Furthermore, *Proliant* with *Opteron* will serve as a stepping stone to the more robust *Integrity* family.

Exhibit 1 – HP's Three Tiers of x86 Computing

1. **Proliant Family** – Entry-level, volume product; leading x86 price/performance charge for mono-to 8-way servers in the *Windows* and *Linux* space.
2. **Integrity Family** – Enterprise-class servers for scalable performance and reliability across 128 processors in a mission-critical environment.
3. **NonStop Family** – Fault Tolerant family of servers designed to deliver bulletproof data integrity in a mainframe environment.

Proliant Announcement

HP is committed to adhering to industry standards. They believe that standards are the key to being an adaptive enterprise. In that vein, they have responded to customer demands and reshaped the *Proliant* family of entry-level servers by including systems based upon AMD's *Opteron* technology to the Intel *Xeon*-based servers already in the product line. Why *Opteron*? AMD designed *Opteron* to provide simultaneous 32-bit and 64-bit computing capabilities without sacrificing performance and to provide a smooth transition for those applications evolving to a 64-bit architecture. In addition, *Opteron* also provides several new features to improve overall

¹ See **The Clipper Group Navigator** dated July 29, 2003, entitled *HP Takes First (Super-Sized) Step Toward Product Line Consolidation (Simplification)*, at <http://www.clipper.com/research/TCG2003034.pdf>.

² See **The Clipper Group Navigator** dated January 6, 2004, entitled *HP Fills Out Integrity Family of HPC Servers-Introduces Mid-Range Consolidation Line* at <http://www.clipper.com/research/TCG2004001.pdf>.

Exhibit 2 – Opteron Features

- Support for 3 **HyperTransport links** to provide up to 6.4GB/s peak I/O bandwidth per processor.
- Provides **64-bit addressing** to enable 256 Terabytes of memory address space to improve the performance of large databases.
- Scales from **1 to 8 processors** utilizing the same infrastructure.
- Includes **integrated memory controller** to reduce memory access latency in SMP systems to improve productivity.
- Includes **low-power processors** to enable increased compute density without compromising performance while managing data center TCO.

scalability and performance. (See Exhibit 2, above.) The Intel Xeon architecture is not standing still, however. Intel will add 64-bit extensions to their IA-32 technology to enable 32-bit applications to access larger amounts of memory. These extensions do not run code written for the Itanium processor. HP will continue to offer servers tailored for the IA-32 environment with the Proliant family, while the Itanium micro-processor evolves with the Integrity line. Their intention is to focus microprocessor solutions into the environment for which they are best suited, i.e., Xeon for Web and Infrastructure Servers, Opteron for high performance computing along with 32/64 bit compatibility, and Itanium for datacenter consolidation efforts. Note that all of the x86 applications have a common look and feel through HP's *Insight Manager*.

Opteron Servers

The first model defined for the Opteron line is the DL145, with the DL585 to follow by end of June and the BL25p by year-end.

DL145

Optimized for the high performance computing environment, this 1U rack-

mounted server is configurable with one or two Opteron 200 CPUs running at 1.6, 1.8, or 2.2 GHz. Capable of supporting up to 16GB of memory, the DL145 has exhibited outstanding performance characteristics. Using the WebBench 5.0 benchmark as a criterion, the DL145 is 44% faster than the Proliant DL140 in mono-processor mode, and 57% faster when both are configured as dual CPUs. The DL140 uses the Xeon DP processor as a CPU.

DL585

Scheduled to be available during 2Q04, the DL585 will ship as a 4U rack-mounted chassis in configurations of up to four Opteron 800 processors, with speeds of 1.6, 1.8 and 2.2 GHz. Any application that requires high bandwidth and low latency access to system memory will benefit from Opteron's HyperTransport technology, delivering 6.4 GB/sec throughput. This is especially true for high performance cluster computing but is also applicable to a large number of commercial applications as well. With a maximum memory of 64GB, the DL585 is positioned to excel in the data center with compute-heavy environments such as high performance computing, ERP/CRM, and large database applications, taking advantage of the DL585's resiliency features. These include hot-plug, redundant fans and power supplies, hot-plug drive bays, and advanced ECC memory protection.

BL25p Blade

The HP BL25p, available by the end of 2004, is the first blade server from a major vendor using AMD's Opteron technology. Using the Opteron 200 at 2.2 GHz, in mono- and dual-processor configurations, and up to 8GB of memory, enables HP to deliver the industry's best blade performance along with HP's system management to aid in blade deployment. HP can support up to eight blades in a single 6U drawer.

Opteron Roadmap

HP has already announced additional plans for each of the Opteron servers in the Proliant family. These plans include

availability of a 2.4GHz microprocessor in 3Q04 and a 2.6GHz processor by 4Q04.

New Intel Xeon Servers

The newest members of the Proliant server family, announced for the Xeon microprocessor, are available for installation now with the 3.2 GHz Xeon microprocessor. These models include the DL360 and DL380 delivering top performance for the most demanding 32-bit applications. HP's current plans call for the upgrade of five models – the BL20p, DL360, DL380, ML350, and ML370 –to Intel's *Nocona* architecture, the new Xeon with 64-bit extensions, by 3Q04.

Xeon Roadmap

Nocona's 64-bit extension technology will enable 32-bit platforms to access larger amounts of memory. These servers will support 64-bit extended operating systems from Microsoft, Red Hat and SuSE. They will provide an ideal environment for scale-out applications in parallel workloads, but they will not be able to execute code written for Intel's 64-bit Itanium architecture.

Intel believes that "one size does not fit all" and will introduce *Nocona* into the \$50B server market. The capability for 64-bit addressing is not the only enhancement to the IA-32 architecture, however. Other enhancements include:

- Hyper-Threading Technology
- PCI Express
- DDR2 Memory Support
- Enhanced Power Management
- SSE3 Instructions, and
- High-definition Audio

In addition to *Nocona*, there is also a plan to transition the Xeon MP servers in the Proliant 500/700 series from the Xeon MP architecture to a new microprocessor in 2005, currently referred to as *Potomac*.

Itanium 2 Roadmap

HP continues to view the Itanium architecture as the 64-bit platform for

enterprise customers who require the highest levels of scalability. They believe that Itanium 2 is the environment that will not only drive Windows and Linux further into the enterprise data center, but also provide the best platform for HP-UX in the same environment. As a logical successor to RISC, Itanium 2 provides superior transactional processing performance, with the Integrity *Superdome* playing leapfrog with IBM's *pSeries* at the top of the TPM ratings. Itanium 2 is recognized for outstanding compute capability in the High Performance Computing arena as demonstrated by the results of the Linpack and SpecFP benchmarks. **With the highest scalability in the industry, HP can drive the Superdome to 128 processors**, creating the basis for an ideal architecture for HP-UX in mission-critical technical computing.

Integrity will also form the foundation for the HP NonStop Product, HP's leading fault-tolerant solution. NonStop has the capability to recover transparently from multiple hardware and/or software faults.

Plans are already in place to transition Itanium 2 in 2004 to Itanium 2 9M, and then, in 2005, to Intel's *Montecito*.

Conclusion

The industry will have to give credit where credit is due. Despite their obvious commitment to Intel and Itanium, HP has not hesitated to jump into the AMD Opteron waters and raise sails to catch a favorable wind. The adaptability of their engineering to respond so quickly to a rising demand from their customer base should encourage anyone who has committed to HP's Adaptive Enterprise technology to follow suit. Moreover, the rising tide, or level, of 32-bit applications migrating to 64-bit cannot help but improve the environment for HP's mainstream Integrity product family of 64-bit data center processors.



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