



## Raising the Ceiling on HP Integrity — Intel and HP Roadmaps Breathe New Life for Itanium

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### Management Summary

When you start to shop for goods or services, do you check out the product reviews on the Internet? Do you ever wonder who posted the “rave”? Do you ever wonder who posted the “rant”? I have my doubts as to how many of these so-called “reviews” are legitimate. Was the “rave” posted by a thrilled consumer who can’t believe what a bargain they got, or was it posted by a company employee who was using a thesaurus to describe the advantages of his own project? And the “rant”, was it posted by a disgusted consumer who couldn’t believe how badly he had been taken, or by a rival company trying to dissuade you for ever buying such defective merchandise? I have just returned from a vacation at a resort hotel, after doing due diligence in trying to find the perfect destination. I checked out all of the reviews, some favorable, some not so. Those that were “not so” could not have been further from the truth! We had a wonderful time and just shook our heads at those “reviewers” who were so critical.

There are other times, however, when you know who the reviewer is and you suspect that there may be an ulterior motive to the conclusions being drawn. In a statement from Oracle on March 23<sup>rd</sup>, Oracle once again picks on their favorite punching bag, HP, and not so coincidentally takes a shot at Intel. Oracle has stated that they will no longer support Oracle products or its applications on the *Itanium* processor, claiming that Intel informed them that Itanium was at end-of-life and they (Intel) would focus on their x86 architecture, except that Paul Otellini, President and Chief Executive Officer of Intel said: *Not so fast*. He disputed that conclusion. Interestingly enough, when Oracle was only a software company, HP and Itanium were among Oracle’s most important server platforms; now that Oracle (with its Sun acquisition) is a hardware company with their own proprietary microprocessor architecture (*SPARC*), Itanium is dead *to them*. Is Oracle putting enterprises and government agencies that use Itanium at risk? Is Itanium dead? We don’t think so. With *Poulson* and *Kittson* already announced to supersede *Tukwila*, Itanium would appear to have plenty of life left in it. However, what of HP’s *Integrity* and *Superdome*? Is HP still committed to the Intel Itanium roadmap?

HP tells us that it will continue the development of Itanium-based Integrity platforms with its *HP-UX* operating system, along with a roadmap for the next decade. Furthermore, HP is committed to support their customers running existing versions of Oracle software on Itanium-based systems during that timeframe. Does retaining your existing application set on Itanium-based Integrity servers make sense to you, or do you want to initiate a multi-year migration to another application environment? If you see significant growth in the near future and believe that you need more of the same, only with faster processors and increased performance capability, perhaps you need to stay with your existing architecture. To learn more about where Intel is taking Itanium and where HP is taking Integrity, please read on.

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## Mission-Critical Data Center Issues

Today's enterprise data center is faced with a myriad of issues, starting with the sprawl of under-utilized servers that proliferate not only throughout the data center, but also throughout the enterprise as a whole. This sprawl contributes to an increase in the total cost of ownership (TCO) of the IT infrastructure, not only due to wasted compute cycles, but also due to the wasted resources required to operate the servers and cool the IT environment. In addition, the data center is spending an exorbitant amount for server administration and maintenance on this heterogeneous mix of under-utilized systems.

Today's enterprise data center needs to simplify the IT infrastructure in order to accelerate the deployment of mission-critical business applications, along with other middleware and Web-facing solutions, and also lower the TCO of that infrastructure. These data center requirements can be lumped into four categories:

- **High Performance** – to ensure highly-concurrent and virtualized processing;
- **Affordable scalability** – to lower the TCO of the IT infrastructure;
- **Availability** – to provide continuous access in a 24x7x365 Internet-connected world; and
- **Security** – to protect critical data and services, and management.

In order to reduce the server sprawl that is manifest throughout most older data centers, today's IT staff is looking toward servers with high performance based upon multi-core processors, with multiple threads per core – thus consolidating the sprawl of older, under-utilized servers and virtualizing each core to achieve higher efficiency and better resource utilization. These servers also need to be scalable – so that the staff can expand application deployment dynamically in response to a changing business climate. In order to parallelize the IT architecture, the IT staff must depend upon multi-threaded, multi-process applications to take advantage of these new hardware capabilities.

As the number of applications per server rises, along with the number of users per system, the reliability, and availability of the system becomes a major CIO concern. Mission-critical RAS<sup>1</sup> features become a necessity.

<sup>1</sup> Reliability, Availability, and Serviceability.

When each server is connected to the Internet, the number of sales queries can rise dramatically, and if the response is not immediate, that potential customer could be lost to the competition. Furthermore, each deployment requires higher security in order to protect important corporate and customer data. The IT staff must have an efficient method of encryption in order to protect the data in their charge.

The staff must be able to accelerate the deployment of new platforms through a converged infrastructure, in order to reduce complexity and increase ease of use. It requires tight integration between the operating system and the myriad mission-critical, web, and business applications residing on their servers. It goes without saying that the enterprise must:

- Optimize valuable data center floor space and energy resources;
- Take advantage of the densest architectures possible with the lowest energy and cooling requirements for new deployments;
- Protect the investment that *the enterprise must make today to ensure that today's purchase will not be obsolete tomorrow*;
- Ensure the ability to upgrade to the next generation of server hardware as an essential requirement in any current procurement decision.

What servers make up this complex data-sharing nightmare? First, and foremost, are the mission-critical *UNIX* applications servers. This class of server is primarily deployed on one of three platform families: HP's *Integrity Servers*, running *HP-UX*, IBM's *Power Systems*, running *ALX*, and Oracle's (née Sun) *Sun Fire Systems*, running *Solaris*. At the same time, many Internet infrastructure applications run on commodity Intel *Xeon* x86 servers under the *Windows*, *Linux*, or *Solaris* operating systems. Due to a variety of reasons, many of these platforms are anywhere from three-to-five-years old, inefficient, and expensive to operate. This is the result of continuing maintenance charges based on much higher original prices (when compared to today's performance/price ratio), energy consumption, and costly software licensing, which often is based on per core pricing that costs more to do the work when older processors are doing the work. ***Why are five-year-old systems still responsible for the most important enterprise applications?***

First of all, we cannot ignore the economy.

Many CIOs are hesitant to make large capital investments. However, in the data center where an ROI of less than a year is common, reluctance may be more a result of the FUD factor – the fear, uncertainty, and doubt, associated with upgrading or changing server platforms. In many cases, the future is uncertain. While the AIX server platform is based upon IBM's proprietary POWER architecture and Oracle's is based upon Sun's proprietary SPARC microprocessor, the Integrity platform is based upon Intel's *Itanium* microprocessor, designed specifically for mission-critical UNIX environments with mainframe-class RAS, in addition to many of the same features as Intel's *Xeon* architecture. In the past, Itanium had been burdened with multiple delays. Today, however, Intel's Itanium is well represented by the quad-core *Tukwila* processor, deployed last year, while, at the same time, Intel is planning for an eight-core version, known internally as *Poulson*.

Furthermore, a year after the announcement of the purchase of Sun Microsystems by Oracle, the acquisition was finally completed, which became a year of indecision waiting for government approval of the acquisition, not only in the U.S., but in Europe as well. While Oracle/Sun was in stealth mode, many Sun-based data centers began to question Oracle's intentions with regard to SPARC. The CIOs at these enterprises were concerned with the lack of a specific hardware roadmap for SPARC-based systems and a similar lack of definition on plans for their Solaris operating system. The most recent new product for the SPARC family is the *UltraSPARC* processor known as *Niagara*, which was released in 2008, two years ago. This further aggravated the issues of an aging server infrastructure, with CIOs reluctant to invest in Sun Fire systems.

Just recently, Oracle announced the *SPARC T3* series; however, doubt still remains regarding the long-term future of SPARC, as many see Oracle primarily as a software company. Additional concerns have been raised by Oracle's decision to move to a new pricier and less flexible Sun hardware support policy. As a result, many of these data centers are now migrating away from SPARC and toward competing UNIX platforms.

The solution to data center concerns is simple. The data center needs an environment with a converged architecture, with tight integration between all components, and a roadmap cover-

ing the next decade to ensure that the CIO can protect the continuing investment being made in enterprise infrastructure. Using Intel's Itanium in the converged infrastructure of HP's Integrity is one answer.

### The Intel Itanium Processor

As with the mainframe and magnetic tape, we are continually hearing reports on the imminent death of Itanium. However, like the others, Itanium lives on! In a direct contradiction to a statement made by Oracle, Intel has stated that their work on Intel Itanium processors and server platforms is going to continue with multiple generations of processors currently in development and on schedule. While *Tukwila*, a 65-nm processor with four cores, has already been delivered, *Poulson*, Intel's next-generation 32-nm, 8-core Itanium chip, is on track to more than double the performance of the existing *Tukwila* architecture in early 2012. Intel also has committed to *Kittson*, the successor to *Poulson*. *Kittson* is an officially committed roadmap product from Intel for Itanium servers beyond *Poulson* and also is in active development, although no details as to core count or functionality are available.

*Poulson* is both socket- and application-compatible with *Tukwila*, making it an ideal upgrade target for servers already deployed with the Itanium processor. It can protect the investment that the enterprise has made in both servers and applications, enabling the data center to continue to support their existing infrastructure. *Tukwila*, the Intel *Itanium 9300*, was designed to support four cores with two threads per core, with up to 24MB of cache on the *Itanium 9350*, the highest performing Itanium, running at 1.73 GHz. The *Itanium 9350* has a throughput of 4.80GT/s and consumes up to 185 Watts.

On the other hand, *Poulson*, with a 32nm process, has been designed with 8 cores and 54MB of on-board memory, including a 32MB L3 shared cache, consisting of eight 4MB blocks, one per core, and consuming up to only 170 watts. There is no specification, yet, of the number of threads on each core, although speculation is that each core will have *Hyper-Threading* of four threads per core.

In addition, there is 2MB of L2 data cache, 4MB of L2 instruction cache, and 2.2MB of director cache. With a Quick Path Interconnect (QPI) of 6.4GT/s between processors and across

multiple system boards, Poulson has a QPI 33% faster than the 9300 series. Poulson will have a 12-instruction wide pipeline<sup>2</sup> for increased instruction throughput, twice that of the 9300, along with new data and instruction pipelines, a new floating-point pipeline, as well as a new instruction buffer. In addition, Intel will continue its tradition of improving the RAS features in order to achieve mainframe reliability and resiliency, along with improving the power management functionality to reduce overall power consumption, improving performance per watt.

### The HP Integrity Platform

HP is confronting the IT sprawl that is manifest throughout every mission-critical data center, with the world's first mission-critical converged infrastructure using the Integrity platform. Built on the industry's premier blade platform, HP brings a standards-based and modular architecture to mission-critical computing. In doing so, HP is eliminating the proprietary, static silos that have driven up costs and complexities in the past. HP is continuing their development and innovation of Itanium-based Integrity server platforms with its HP-UX<sup>3</sup> operating system, using a roadmap that extends out more than 10 years. Last year, HP launched the industry's most modern mission-critical architecture in more than a decade. With the availability, today, of Integrity platforms using the Intel Itanium 9300 family (Tukwila)<sup>4</sup>, along with the release of the next generation specification for the Poulson micro-processor, HP will be able to keep pace with IBM Power and Oracle SPARC upgrades.

In addition, HP has announced that it will continue to support customers running existing versions of Oracle software on Integrity servers, both existing and future platforms, during the same timeframe. At the same time, HP has asked its customers who use Oracle applications on Integrity to request from Oracle continuing development of Oracle applications for Itanium servers, instead of deserting them.

<sup>2</sup> Applications do not have to be recompiled to take advantage of Poulson's 12-instruction pipeline.

<sup>3</sup> The latest update to HP-UX 11i v3 advances the mission-critical converged infrastructure with HP-UX innovations that simplify availability and consolidation.

<sup>4</sup> See [The Clipper Group Navigator](#) entitled *Simplifying the Data Center Environment with a Mission-Critical Converged Infrastructure* dated May 18, 2010, and available at <http://www.clipper.com/research/TCG2010025.pdf>.

HP has a full range of Integrity servers, from blades and rack mount systems for the smaller or mid-sized enterprise, to their *Superdome* platform and *NonStop* servers for the more sophisticated enterprise. *OpenVMS* is also supported on the new HP Integrity blade and rackmount servers. With all of these systems designed with the same converged architecture, they are capable of consolidating and automating everything from the start.

### HP Integrity Blades

HP has delivered three new Integrity blades to offer 2.5x the compute density compared to traditional rack mount servers: the *BL860c i2*, *BL870c i2*, and *BL890c i2*. All three are based upon the Itanium 9300 and feature HP's unique *Blade Link* technology, combining multiple blades to create 2-, 4-, and 8-socket systems. HP *Virtual Connect Flex-10*<sup>5</sup> offers increased network scalability and configuration flexibility with up to 20 times more networking bandwidth. These blades bring Integrity capabilities and the *Matrix Operating Environment* to a *c-Class* form factor.

### HP Integrity Rackmount Servers

The HP Integrity rackmount server line-up includes entry-class and mid-range options. The entry-class server, the HP *Integrity rx2800 i2*, with 1-to-4 quad-core processors, provide the flexibility needed for a variety of workloads, multiple operating environments, and future business growth, all at the price/performance your enterprise expects.

The mid-range HP Integrity servers, with dual-core processors, are flexible, available servers for business computing needs, incorporating high-end functionality in the mid-range market, perfect for multi-OS consolidation, scale-up, and performance applications. The *rx2800* can be configured with up to two processors with eight cores, up to 96GB of memory, and up to 2.4TB of internal storage.

### HP Integrity Superdome

The HP *Superdome 2* is HP's ultimate mission-critical platform. For over 10 years, *Superdome* has been HP's flagship, high-end Integrity server. It has powered some of the world's most demanding, mission-critical environments. *Superdome* is the solution of choice for many

<sup>5</sup> See [The Clipper Group Navigator](#) entitled *HP Builds a Greener Environment Through a Virtualized Networking Infrastructure* dated December 5, 2008, and available at <http://www.clipper.com/research/TCG2008062.pdf>.

enterprise-class customers that require high availability, rich virtualization capabilities, and long-term investment protection. With breakthrough innovations, such as the *Superdome 2 Crossbar Fabric* and *Power-on-Once* technology, the all-new Superdome 2 is well positioned for the next decade of mission-critical computing.

With Superdome 2, HP pioneers a new category of modular, mission-critical systems that scale up, out, and within to consolidate application tiers on a common platform. It includes innovative features to ensure reliability and flexibility (See Exhibit 1, on the next page). It supports up to 128 Itanium 9300 quad-core processors, running at up to 1.73GHz, with up to 4TB of memory, all in order to increase scalability, improve memory, and provide better compute power without compromising performance. In fact, Superdome 2 provides a four times improvement in performance in half of the space.

### **HP Integrity NonStop Servers**

HP Integrity NonStop systems<sup>6</sup> deliver 24x7x365 application availability with a mission-critical converged infrastructure, offering the best choice for critical and complex enterprise applications. This is especially crucial for payment systems at financial institutions, which now also must support the proliferation of multi-media and hand-held devices from mobile operators, global manufacturing companies who are required to “follow the sun”, hospitals with centralized patient records, and public sector organizations protecting national security.

These are ultra-robust servers delivering better than mainframe class of service out of the box. They are ideal for supporting workloads requiring 100% application availability, real-time high-volume transaction processing, and exceptional security, scaling to handle billions of transactions, across hundreds of terabytes of data, in real time.

HP Integrity NonStop servers utilize Intel’s Itanium processor, but also employ a common modular architecture with HP’s ProLiant family, thus extending HP’s converged infrastructure. The majority of the line, including *BladeSystem* and rackmount configurations, utilizes

<sup>6</sup> See [The Clipper Group Navigator](http://www.clipper.com/research/TCG2008035.pdf) entitled *HP Adds Blades to NonStop Architecture – Improves Performance, No Impact on Reliability* dated June 26, 2008, and available at <http://www.clipper.com/research/TCG2008035.pdf>.

### **Exhibit 1 –**

#### **Integrity Superdome Features**

- A modular, bladed design, common components, and standard racks.
- 100+ innovations to ensure reliability and resiliency.
- 450% reliability boost, plus a host of self-diagnosing and self-healing features.
- Fault-tolerant Crossbar Fabric that intelligently routes transactions to the fastest, optimal pathways between blades and I/O.
- Architected for 64-socket scalability and designed to scale from 8 to 256 cores and more.
- A 4x improvement in performance, in one-half the size and at a lower entry price point.
- Power-on-once technology with hot-swappable components, online replaceable crossbars, and the innovative Superdome 2 Analysis Engine for predictive error handling and analysis.
- Flexible I/O scaling to precisely provision and repurpose capacity where needed.
- Three packages for scale-as-you-grow flexibility, offered in 8-socket, 16-socket and 32-socket configurations.

Source: HP

the Itanium 9100; however, HP has recently announced the availability of the HP *Integrity NonStop BladeSystem NB54000c*, which is deployed with the newest Itanium processor, the quad-core Itanium 9300. The NB54000c supports up to 16 processors per node, with cluster scalability up to 4060 CPUs, with up to 192TB of memory, in support of the most rigorous processing requirements, with a common modular architecture. The NB54000c extends the high end of NonStop computing, and thus helping to protect the investment that mission-critical enterprises have made in HP NonStop platforms, doubling server performance within the same footprint and utilizing simple blade swap upgrades to improve performance.

### **Conclusion**

As we have seen with the announcement of the Integrity NonStop NB54000c, HP continues to invest in the Integrity platform and the Itanium microprocessor. They have stated that they

remain committed to delivering a competitive, multi-generational roadmap for HP-UX and other operating systems, such as NonStop and OpenVMS, that run on the Itanium architecture. HP, in fact, has already moved ahead of Oracle into second place in the UNIX market, while Oracle (Sun) has lost share, falling into third, all since Oracle announced it would acquire Sun in April of 2009. Oracle's "announcement" of end-of-life for Itanium is an act of disinformation, appearing to be an attempt to force customers into purchasing Sun servers in a desperate move to slow their declining market share.

Staying with Integrity and Itanium makes sense for the short to medium term for the mission-critical enterprise, especially if the alternative is migration of the entire set of applications to a new platform and a new environment. HP has indicated that it is committed to Itanium/Integrity for the next decade and, in addition, has committed to supporting existing versions of Oracle software on existing, and future, Integrity platforms. As long as your needs are satisfied by *existing* Oracle software, HP will continue to support it. Oracle's decision to stop supporting new versions of Itanium cannot help the company in the eyes of their customers. If Oracle wishes to placate this segment, then they may have to review this position.

And what of the future of Itanium and Integrity? HP and Intel have stated that they are both firmly committed to continuing the development and innovation of Itanium-based Integrity server platforms with its HP-UX operating system for the next decade and beyond. If you need more of what you have – more processing power, more convergence, less energy waste, and a smaller footprint – then HP's Integrity platform may be the answer.



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