HP Fills Out Integrity Family of HPC Servers — Introduces Mid-Range Consolidation Line

Analyst: David Reine

Management Summary

Can you think of two more frightening words in the English language than *"Trust Me"*? Whether you have gone to the hair stylist or to look for a used car, you do not want to hear "trust me". Generally, we believe what we can see, what we can touch. When people make promises to us, we cast a wary look in that direction. This is also true in the world of information technology where vendors make promises every day. Unfortunately, in a world where major changes can occur every 90 days and processing power doubles every 18 months, many of these promises are broken. Fortunately, for some, the technological improvements are so dramatic, that we forget the promises.

When we last looked in on Hewlett-Packard (HP) in July, it had just introduced a new line of servers based upon the *Itanium-2* microprocessor. HP was making promises, also. The primary goal of this new line of high performance servers, named *Integrity,* was to provide a low-cost, high-tech consolidation platform made up of commodity components. HP designed Integrity to replace the multiple, disparate families of servers that populated the HP landscape, including *PA-RISC, Alpha*, and *MIPS*-based non-stop servers. With the capability to run *Windows*, *HP-UX*, and *OpenVMS* simultaneously in separate partitions, Integrity provided HP with the ideal vehicle to support mission-critical applications on a variety of operating system platforms on a single, adaptive platform.

Although the Integrity roadmap identified five separate product lines within the family, HP only introduced models in two. The first, the entry-level consolidation server, consisted of dual- and quad-CPU platforms, with the *rx2600* and the *rx5670*. The second was the high-end, with *Superdome*, with the capability to support from 16 up to 64 CPUs within a single high-performance server chassis. Unfortunately, they did not introduce models for the mid-range consolidation requirement, with 4-16 CPUs, the high-performance technical computing platform, or the high-reliability capability for non-stop computing. The IT community has been waiting patiently for HP to return to the announcement stage to fulfill their promises by filling in the blanks in the middle of their 64-bit strategy. To find out more about the new, recently announced servers in the HP Integrity family, and to find out about improvements made to performance throughout the line, please read on.

Integrity Announcement Review

We reviewed the June Hewlett-Packard (HP) announcement introducing the *Integrity* family of 64-bit *Itanium 2* servers[1]. This line complemented the announcement of the *ProLiant 500* and *700* families of servers, based upon the 32-bit *Xeon* microprocessor, which refreshed that line. Initially introducing products at the entry (*rx2600, rx5670*) and enterprise (*Superdome*) level, with promises in the 8-16 CPU mid-range, Integrity provided a 64-bit environment for consolidation of *HP-UX, OpenVMS, Linux*, and *Windows* applications.

In order to differentiate their family of commodity Itanium 2 servers from others on the market, HP implemented entry-level scalability with the *zx1* chipset and high-end scalability with the *SX1000* chipset. This enabled the integration of up to 64 Itanium 2 CPUs in a single, scale-up server. The SX1000 is also the same chipset implemented in the *PA-RISC* version of Superdome, ensuring a smooth transition for anyone migrating from the PA-RISC architecture to Integrity. Now, enterprises with databases constrained by the addressability limitations of the *IA-32* architecture can expand essential enterprise solutions, such as *SAP* and *SAS*, to previously unattainable performance levels.

New Integrity Servers

In order to complement the dual- and quad-CPU entry-level servers, HP has now introduced a new 4-way server, the *rx4640*, a 4U rack-mount model. (See Exhibit 1, at right.) Fulfilling the promise of the original announcement, HP has also introduced two new mid-range products, the *rx7620*, an 8-way server, and the *rx8620*, scalable up to 16 Itanium 2 processors. At the high-end, in addition to significant performance enhancements for the Integrity Superdome, HP has introduced the Integrity *XC6000 High Performance Technical Computing (HPTC) Cluster,* based upon the rx2600 as a cluster node. Complementing this model is an addition to the ProLiant Family, the *XC3000 HPTC Cluster*, based upon the ProLiant *DL360* and *DL380* as computing nodes.

---

[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.

Exhibit 1 —
HP Integrity Product Set

- Entry Level Servers
  - **cx2600** – 2-Way for Telcom Network/Service Providers
  - rx2600 – Dual Processor
  - **rx4640** – Quad-Processor
  - rx5670 – Quad-Processor
- Mid-Range Servers
  - **rx7620** – up to 8-Way Server
  - **rx8620** – up to 16-Way Server
- Enterprise Level Servers
  - Superdome – up to 64 CPUs
  - **XC6000** – up to 512 Clustered CPUs

*Note: Newly announced products are in **bold**.*

Entry-Level Severs

HP designed the rx2600 as a powerful, cost-effective, dual-processor entry point into their Itanium 2 family with a 2U footprint. HP now complements that model with the *cx2600*, a model designed specifically for the telecommunications industry, to carry heavy loads in carrier networks. The cx2600 enables a carrier to deploy fewer servers to handle a greater load of voice and data traffic. This enables operators to save millions of dollars, with the same commodity-based building blocks used by the rx2600, Itanium 2, Linux, and HP-UX, significantly improving price-performance over previous solutions. **HP engineered the cx2600 specifically for this demanding role with improved networking designed to support the ever-increasing traffic flow demanded by the "always-on" adaptive enterprise.**

The introduction of the reliable rx4640 to meet the most demanding enterprise-level computing requirements, provides a more compact quad-processor alternative to the rx5670. Designed to a 4U-form factor with redundant, hot-plug power supplies, fans and disk drives, the rx4640 requires only about half of the rack space as the 7U rx5670. This means that you can install ten rx4640 drawers in a standard rack, rather than being limited to five rx5760 drawers as previously. Like the rx2600 and rx5760, the rx4640 uses the high-performance

HP *zx1* chipset and is upgradable to future Itanium processors. This includes the next generation Itanium 2, planned for 2004, and the HP *mx2* dual-processor module, which will double the processor density in the same space, with the same power, during 1H2004. The rx4640 is available with HP-UX, Linux and an evaluation version of OpenVMS in 2003, with Windows availability in 1H2004.

Mid-Range Servers

Complementing the entry-level servers, HP has now introduced a pair of scalable, open-systems, mid-range hosts: the *Integrity rx7620* and the *Integrity rx8620*. The rx7620, capable of scaling up to 8 Itanium 2 CPUs, supports up to 64 GB of memory, while the rx8620 scales up to 16 processors, with support for up to 128 GB of memory. Like the entry-level servers, these mid-range hosts also provide a high level of operating system flexibility with support today for *HP-UX* and Microsoft *Windows Server 2003*. *Linux* (Red Hat Enterprise version) is scheduled for availability in 1H04, *Windows Datacenter Edition* is scheduled for 1H04 on the RX8620, while *OpenVMS* support for *Alpha* customers is slated for 2005 availability. *Windows Server 2003 Enterprise Edition* will also be available for the rx8620 during 1Q04. **Flexibility in configurations and competitive pricing allow these platforms to scale the required performance for any application from web services to mission-critical application provider.**

In order to reduce costs and to improve utilization of existing assets, HP has implemented vertical scaling within the mid-range servers. Through a partitioned server environment, IT staff can configure a variable number of processors within each partition. **This improves the CPU efficiency from under 50% to around 80-90% in an optimized environment.**

The hard partitioning technology used in these Integrity servers enables the data center to run multiple, different operating systems concurrently on either platform. The rx7620 may be configured into 2 hard partitions, while the rx8620 can have 4 partitions when extended with a *Server Expansion Unit (SEU)*. The SEU is an expansion chassis that provides additional I/O resources to the 8620 and supplements the I/O and partitioning capabilities of the server.

Exhibit 2 —
Server Expansion Unit Features

- 16 high-performance, hot-plug 64 bit PCI-X slots @ 133MHz
- 4 disk drive bays
- 2 removable media bays
- Support for 2 additional partitions
- Redundant and hot-swappable fans and power supplies
- Redundant line cords for dual grid support
- 9U rackmount chassis
- Compliant with Fault Tolerant Power Compliance Specification

---

Connection to the SEU doubles the I/O capability of the 8620. It is not available on the 7620. Exhibit 2 (above) details the significant SEU features.

Combined with HP's On Demand features, this makes these mid-range servers ideal for consolidating environments in an adaptive enterprise with disparate servers currently co-existing. HP's On Demand features include the capability for instant Capacity on Demand (iCOD) to add inactive CPUs to a virtual HP-UX partition, when that workload increases. **Inactive CPUs will also activate upon CPU failure, with the inactive CPU replacing the failed CPU at no additional charge, and without rebooting**. In addition, the mid-range servers have the ability to add and remove inactive processors as needed, in a temporary fashion (TiCOD). This permits adjustments for planned and unplanned **temporary spikes** in compute demand. A third option, in a leasing environment, is for Pay Per Use (PPU), where HP's charges are usage-based, i.e., the data center only pays for the actual consumed resources by transaction. Like a utility, electricity, water, etc., the resources are always there. You pay for them when you use them.

The rx7620 occupies only 10U of rack space, while the rx8620 fills 17U by itself, plus an additional 9U for the optional SEU. The current scalability of these systems, combined with the promise to double CPU density in the future, is a plus. Add in the high availability

---

features (see Exhibit 3), and upgradability to future Itanium technology, then the rx7620 and the rx8620 become ideal platforms to protect an investment made in mission-critical Itanium systems today.

High-End Servers

Complementing Superdome at the high end of the 64-bit Integrity family is the HP XC6000 Cluster[2]. Using an rx2600 node as the building block, the XC6000 combines simplicity with outstanding scalability in creating a Linux-based high-performance computing environment. Originally reserved for university or scientific applications, this Linux compute cluster is now finding its way into enterprise production environments due to its openness, flexibility, performance, reliability, and low cost scale-out architecture. In the past, Linux-based clusters lacked the proper management and support infrastructure to create a robust production environment. Now, however, HP has introduced a new way to increase performance while lowering costs and remain a step ahead of comparable packaged cluster designs in two regards: the underlying technical design and the integrated solution.

By using the rx2600 as the building block, HP has delivered outstanding performance and disk and memory capacity in a scale-out package, with configurations from 34 CPUs to 512, and performance from 204 GFLOPS to 3 TFLOPS. The XC Cluster employs important single-system characteristics. Users see the system as a single entity for login and resource access, and job execution. Administrators can control the system from a single node and use it to perform system management, performance monitoring, and hardware diagnostics. This avoids the complexity of standard cluster administration. In addition, the XC systems employ node specialization with specific administrative tasks being assigned to specific nodes within the cluster, reducing the inter-node communication that can impair performance. **This capability provides the flexibility needed to deploy a configuration to meet unique installation requirements that are not available in standard Linux clusters.**

XC also includes a full array of software

---

[2] HP has also introduced the XC3000 Cluster based upon ProLiant DL360/380 nodes with 32-bit Xeon architecture.

Exhibit 3 - High Availability Features
- Dynamic Processor Resilience
- Main Memory and Cache protection
- Instant Capacity on Demand (iCOD)
- Address Control Path Protection
- Redundant Power and Cooling

necessary to be regarded as *turnkey*. The system software consists of a *Red Hat* compatible version of Linux, cluster software, a job scheduler, *MPI* libraries and drivers, and HP's *Math Library*. Significantly, **HP tests all of this as an integrated unit at the engineering level**. This compares quite favorably with other clusters that may pass the enormous responsibility for software acquisition to the data center and require them to verify the integration. In addition, HP provides a complete development suite, including Intel compilers and Etnus's *TotalView*, as well as a complete catalog of commercial applications.

Although there are no new product announcements for the Integrity Superdome, it is worth noting that, since its introduction, Superdome has strengthened its hold as the transactional performance leader with a rating in excess of 1 Million TPM. This is an increase of more than 20% from the original HP-UX and *Oracle* measurement and more than 25% greater than the test with Windows. It is also worth noting that the Integrity Superdome runs 86% faster than its PA-RISC brother, the HP 9000 Superdome, which is rated at just under 550,000 TPM.

Conclusion

It is readily obvious from the content of HP's latest announcement that they are serious about filling in the missing pieces of the Integrity family and fulfilling the promises of this past summer. With the Non-Stop architecture the only piece of the Itanium 2 puzzle remaining to be delivered, **HP has staked a claim to leadership in the Itanium market that will be hard to dislodge.**

About The Clipper Group, Inc.

The Clipper Group, Inc., is an independent consulting firm specializing in acquisition decisions and strategic advice regarding complex, enterprise-class information technologies. Our team of industry professionals averages more than 25 years of real-world experience. A team of staff consultants augments our capabilities, with significant experience across a broad spectrum of applications and environments.

➢ *The Clipper Group can be reached at 781-235-0085 and found on the web at www.clipper.com.*

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 or at 781-235-0085 Ext. 23. (Please dial "1-23" when you hear the automated attendant.)*

Regarding Trademarks and Service Marks

The Clipper Group Navigator, **The Clipper Group Explorer**, **The Clipper Group Observer**, **The Clipper Group** *Captain's Log,* and *"clipper.com"* are trademarks of The Clipper Group, Inc., and the clipper ship drawings, *"Navigating Information Technology Horizons"*, and *"teraproductivity"* are service marks of The Clipper Group, Inc. The Clipper Group, Inc., reserves all rights regarding its trademarks and service marks. All other trademarks, etc., belong to their respective owners.

Disclosure

Officers and/or employees of The Clipper Group may own as individuals, directly or indirectly, shares in one or more companies discussed in this bulletin. Company policy prohibits any officer or employee from holding more than one percent of the outstanding shares of any company covered by The Clipper Group. The Clipper Group, Inc., has no such equity holdings.

Regarding the Information in this Issue

The Clipper Group believes the information included in this report to be accurate. Data has been received from a variety of sources, which we believe to be reliable, including manufacturers, distributors, or users of the products discussed herein. The Clipper Group, Inc., cannot be held responsible for any consequential damages resulting from the application of information or opinions contained in this report.