

WHITE PAPER

HP's Itanium 2-Based Systems Products and Services

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INTRODUCTION

HP offers a variety of workstation and server products that are based on the Itanium 2 architecture — and it plans to expand Itanium 2 microprocessors to the full extent of its enterprise server line throughout 2003. IDC has written a comprehensive white paper describing the Itanium 2 architecture itself — how it works and how it is expected to evolve over the next few years. This document is a companion to the full document. It provides a brief description of HP's Itanium 2-based products and how they work and how HP plans to expand its product line of Itanium 2-based servers. It also provides a brief overview of the hardware/software ecosystem that is growing up around HP's Itanium 2-based workstation and server products.

The expanding product line is the result of many years of planning, starting in the mid-1990s, when HP and Intel agreed to work together to codevelop the Itanium architecture. Today, both companies are providing Itanium 2 products to customers and to the marketplace at large, including HP's customers worldwide, independent software vendors (ISVs) that are developing technical and commercial applications, and HP's indirect sales channel, which distributes servers worldwide.

HP'S ITANIUM 2-BASED SYSTEMS PRODUCTS

S E R V E R S

HP is building up its inventory of Integrity Itanium 2-based servers, working to expand the line from the current two-entry server systems to a full line of six server models, ranging from 2-processor and 4-processor servers to highly scalable 64-processor servers. In addition, server models with more than 128 processors are scheduled to ship in 2004. The full extent of HP's ambitious plans to move from several lines of RISC-based servers today to a unified enterprise line of Itanium-based servers and 32-bit ProLiant servers by 2005 is still playing out.

HP's commitment to make the Itanium 2 platform a success in its own line of enterprise servers is underscored by its plans to take the same architecture to servers with 8–16 processors in midrange server systems and then to 32, 64 — and eventually 128 — processors in a Superdome server system.

SUPPORTING THE HP INTEGRITY ITANIUM 2 SERVER ECOSYSTEM

HP is enabling sales of its Integrity Itanium 2-based servers by working with partners to build a complete ecosystem that surrounds the Itanium 2-based servers. For example, in the manageability arena, HP provides customers with consistent manageability tools, such as the HP Insight Manager and the HP Servicecontrol Manager that are shipped with the IA-32-based HP ProLiant and RISC-based HP9000 lines of servers today, respectively. In addition, HP is committed to providing

a single systems-level management application, code-named Nimbus, which will unify HP Servicecontrol Manager and HP Insight Manager 7 and will support servers running HP-UX, Linux, and Microsoft Windows, as well as other operating systems. This unified management approach will make it easier for HP customers to integrate Itanium 2-based servers into their existing computing environment — and to manage across multiple partitions within scalable servers.

HP will also support high availability (HA) for both data and applications. HP offers a suite of high availability and disaster-tolerant solutions across the spectrum of HP-UX, Linux, and Microsoft Windows server operating environments, with HP MC/ServiceGuard (which will inherit features from Compaq's TruCluster clustering software) for HP-UX and for Linux, and Microsoft Cluster Service for Windows Server 2003, Enterprise Edition. Moving forward, HP will continue its solutions approach by testing and optimizing all components of an Itanium 2-based server solution, including manageability, HA, interoperability, and performance.

In addition, HP also offers a range of professional services aimed at helping users evolve to the Integrity line of Itanium 2-based servers from their existing RISC-based server platforms. These services include evaluation and planning, porting and migration, implementation, management and support, education, and financing. Importantly, HP will support multiple operating systems on its Integrity line of servers, including HP-UX 11i Unix, Microsoft Windows 2003, and Linux in 2003, and adding OpenVMS and NSK in 2004. HP will offer a consistent service level agreement (SLA) across all the operating systems running on the Itanium 2-based servers. This supports business agility, allowing customers to react to changes in their IT and business environment. These services will assist customers that want to start a new Unix project on an Itanium 2-based server, to scale up Windows or Linux workloads on Itanium 2-based servers, to standardize on the Itanium 2-based server platform, or to consolidate workloads on scalable Itanium 2-based servers.

THE RX2600 AND RX5670 SERVERS

HP announced the HP two-processor HP Server rx2600 and the four-processor HP Server rx5670 on the same day as the announcement of the Itanium 2 microprocessor (formerly code-named McKinley). Initial demand for these Itanium 2-based servers already exists in the scientific/technical/engineering space due to the need to leverage 64-bit addressing to handle large datasets and to use Itanium's floating-point capabilities for compute-intensive workloads. Over time, however, Itanium 2-based servers will gain speed in commercial sales, particularly as more packaged commercial applications become available for Itanium versions of HP-UX Unix (HP-UX 11i), Microsoft Windows (Windows 2003), and Linux.

Importantly, 64-bit addressing can play a major role in improving database performance — reducing scans of large databases that used to take hours to complete to just a few minutes of search time. This happens because 64-bit addressing allows the server to directly address multigigabyte "chunks" of the database at once. That was not possible with 32-bit server systems, which have a 4GB limit on the amount of data that can be directly addressed at any point in time.

While the HP zx1 chipset is used in servers with between two and four processors, HP is introducing the sx1000 chipset into all of its Itanium-based Integrity servers with eight or more processors in order to optimize system throughput and to enhance storage of large datasets of sizable L4 data caches next to the microprocessors.

The sx1000 is an HP chipset comprising five types of application-specific integrated circuits (ASICs) that support better utilization of CPU, memory, and I/O in multiprocessor server configurations. The sx1000 chipset supports both Itanium 2 and the HP PA-RISC 8800 RISC microprocessors that will be shipped by early 2004. In

this way, customers that purchase Itanium-ready servers but that acquire them initially with PA-8800 RISC chips running HP-UX 11i Unix will be able to make a smooth transition to Itanium 2 microprocessors when they are ready to do so. HP has built this board-replacement capability into its rp7400, rp8400, and Superdome Unix/RISC servers, allowing customers to move from RISC to Itanium 2 microprocessors at their own pace.

More important, HP is also introducing the mx2, a dual-processor module that boosts processor density within HP server cabinets. The mx2 will double up the Madison-generation of Itanium 2 microprocessors on a single "daughterboard" that plugs directly into existing server "sockets" on HP servers. IDC also notes that the sx1000 chipset will be able to support both single-processor and dual-processor CPU modules. That means that the sx1000 will work well with the mx2 module — and with dual-core microprocessors that will be shipped by HP in the future.

Details about HP's Integrity rx2600 and Integrity rx5670 Itanium 2–based servers are discussed in the sections below.

HP INTEGRITY RX2600

The HP Integrity rx2600 is based on one or two Itanium 2 microprocessors. Configured with up to 24GB of memory, this system can be deployed for technical or commercial applications running under 64-bit operating systems. It can also be deployed in workload-balancing clusters that divide up workloads, including Web-centric workloads and high-performance computing (HPC) workloads, to be run on small servers.

The HP Integrity rx2600 is a rack-optimized server that will often be used in tier 1 (the access tier) of multitier computing infrastructure. Typically, tier 1 computers run Web-centric workloads, and support file/print and networking workloads, in addition to working as security servers that support firewalls. In many cases, the rx2600 will be a building block for HPC clusters that harness the computing power of many individual servers through the use of clustering software or workload-balancing software and hardware interconnects between the servers. Volume shipments of the rx2600 will contribute to the growth of Itanium 2–based server unit shipments during 2003 and 2004. This ramp-up in volume shipments will be a sign that Itanium servers are moving past the early adoption phase and into the mainstream adoption phase for HP's technical and commercial customers. The HP rx2600 is priced from about \$5,500.

HP INTEGRITY RX5670

The HP Integrity rx5670 is a symmetrical multiprocessing (SMP) server with up to four Itanium 2 microprocessors. This system can be used to run packaged applications under Microsoft Windows 2003 or under the HP-UX 11i Unix operating system. Its support for Linux, Windows 2003, and HP-UX Unix give this server a broad inventory of applications from which to support customers' workload requirements. It is a platform that can be deployed with high-availability failover clustering software on servers that are deployed to support business-critical commercial applications.

The HP Integrity rx5670 is a rack-optimized server that will often be deployed in tier 2 (the application-serving tier) of multitier computing architecture. Typically, tier 2 computers run packaged applications, such as ERP and CRM, and ecommerce applications. They can also run custom applications that are specific to a vertical industry or specific enterprise to run mission-critical applications. In addition, this four-way server is scalable enough to be a database server for small and medium-sized businesses (SMBs) or for technical or commercial workgroups within enterprises. The HP rx5670 is priced from about \$27,000.

A FULL LINE OF INTEGRITY SERVERS

Throughout the second half of 2003, HP will continue to introduce the latest generation of Itanium 2 processors, running at frequencies of 1.5GHz or more throughout the rest of its enterprise server product line, ranging all the way to the Superdome server, with 64 processors (later configurations will have more than 64 processors). This growing list of Itanium 2-based server models is expected to contribute to growth in Itanium 2-based server sales in 2H03.

WORKSTATIONS

HP currently offers two workstations that are based on the 64-bit Itanium 2 microprocessor architecture. Both of these workstations are capable of running a variety of operating systems — HP-UX 11i Unix, Microsoft Windows XP 64-Bit Edition, Microsoft Windows 2003, or Linux — providing access to a variety of packaged applications. Many of the early adopters of Itanium 2 architecture were in the high-performance computing and technical computing spaces, which accounts for the large inventory of HPC applications that are already available to run under 64-bit operating systems on Itanium 2 platforms.

The HP zx2000 and zx6000 workstations combine Itanium 2 microprocessors with HP's zx1 chipset, which accelerates system performance. Brief descriptions of the zx2000 and zx6000 workstations appear in the sections below.

HP ZX2000

The HP zx2000 is a uniprocessor workstation based on a single Itanium 2 microprocessor that supports both 2D and 3D Advanced Graphics Port (AGP) graphics. AGP provides a performance boost for graphics-intensive applications that have been available on IA-32-based workstations. It is available in two form factors: a 4U rack-optimized configuration designed for use in a computer room or scalable visualization cluster and/or as a desk-side tower configuration for use in workgroups.

The zx2000 workstation benefits from Itanium 2's floating-point capabilities, which provide performance that is more than twice as fast as that of traditional IA-32 microprocessors, including both the Pentium and Xeon microprocessors from Intel. It will also benefit from 64-bit computing, which will provide 64-bit addressing due to the workstation's support for 64-bit operating systems. This 64-bit capability allows end users to sift through large scientific/technical datasets much more quickly than with 32-bit processors since it allows them to break through the 4GB limit that can be directly addressed by 32-bit technology — and extend that to hundreds of gigabytes, if needed. These Itanium-based workstation platforms offer significantly higher price/performance than many 64-bit RISC workstations in the marketplace.

In terms of specifications, the zx2000 has a 1.5MB on-chip L3 cache to enable fast processing of data-intensive applications. HP's zx1 chipset, with 6.4GBps of system processor bandwidth, will enhance fast and efficient transfer of data to large data-stores. The zx2000 supports up to 500GB of internal storage. It also supports two forms of storage devices through the use of both IDE and Ultra320 SCSI drives. Typically, graphical applications are data intensive, and their delivery and storage of large datasets is central to the efficient operation of graphical workstations. The zx2000 workstation is list priced from \$4,000.

HP ZX6000

The HP zx6000 workstation is based on one or two Itanium 2 microprocessors. It provides customers with a number of configuration options as a platform for 2D or 3D AGP graphics. First, it is available in uniprocessor and dual-processor versions,

providing support for more demanding applications and for databases that support applications running on the workstation. In addition, the zx6000 workstation is available in two form factors: a 2U rack-optimized configuration and/or as a desk-side tower configuration.

The "packaging" of this workstation is built on the concept of "performance density," in which high-performance capabilities are provided to end users in a 2U form factor. In addition, the zx6000 benefits from the enhanced floating-point capabilities of the Itanium 2 processor and its support for fully 64-bit data processing to support the most data-intensive workloads. This workstation leverages the HP zx1 chipset to optimize internal system bandwidth, and the system's 8.5GBps memory bandwidth allows applications to move data to 24GB of RAM and 438GB of Ultra320 SCSI internal storage. The zx6000 workstation is list priced from \$6,000 for a uniprocessor version and \$12,000 for a dual-processor version.

C H A L L E N G E S

HP's Integrity Itanium-based servers will compete head-on with other Itanium-based servers from other systems vendors, according to the new business model for industrywide adoption of Itanium-based technology and the associated volume economics of that adoption. HP is off to a fast start because of its years of codevelopment of Itanium microprocessor technology with Intel and its plans to quickly implement on top of Itanium 2 microprocessors throughout its enterprise server line. However, there will be more than 20 server competitors in this Itanium-based server market, and IDC will be watching this space carefully, on an ongoing basis, to see which server vendors perform best in terms of market share.

C O N C L U S I O N : W H A T ' S N E X T

HP will build out its Integrity Itanium 2-based server line by introducing volume servers (servers priced less than \$25,000), midrange enterprise servers (servers priced from \$25,000 to \$499,999), and high-end servers (servers priced at \$500,000 or more), starting with the delivery of the Madison microprocessor in mid-2003. By the end of 2003, HP expects that it will have delivered Itanium 2-based servers in every price range, for both the technical and commercial server markets.

For HP, this rollout of Itanium 2-based servers is the culmination of a process that began in 1994 when it was looking for a way to bring volume economics into the world of enterprise computing then built around RISC-based servers. IDC notes that HP was a pioneer in RISC computing, beginning in the mid-1980s, and that it rode that technology wave for 15 years. But with Itanium, HP will be building servers around a microprocessor architecture that will be adopted by many other systems vendors — a phenomenon that has the potential to reduce the price of microprocessors as engines of enterprise computing. It plans to leverage the Itanium "wave" for the next 15–20 years. While that vision of volume sales for Itanium has yet to play out fully, IDC expects servers that are based on Itanium 2 architecture (both from HP and other server vendors) to grow from more than 40,000 server unit shipments, including models of all sizes, in 2003 to more than 320,000 server unit shipments in 2006.

By marketing entry-class servers first, HP is encouraging customers to evaluate, test, and deploy Itanium 2-based servers for both technical and commercial applications. At the same time, it is providing platforms that will allow ISVs to build up the inventory of applications to run under multiple operating systems, including Microsoft Windows, HP-UX Unix, and Linux. With the introduction of Itanium 2 microprocessors, the zx1 and sx1000 chipsets, and the mx2 processor module, IDC expects HP to accelerate its introduction of Itanium 2-based servers. This will allow HP's long-planned vision for Itanium to play out across the entire spectrum of its enterprise server line.

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