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Strategic Snapshot

POWERing eServer p5

Leveraging IBM's Innovative Standards for System Integration

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ABSTRACT

IBM's new eServer p5 systems offer a number of "firsts" that will positively affect IT customers and the market at large, and offer significant benefits to Systems Integrators. The eServer p5 along with recently announced eServer i5 systems are the first generation of commercially available solutions based on IBM's new POWER5 processor and the latest iteration of the company's venerable Power Architecture. However, the new features of the POWER5, including advanced virtualization, micropartitioning, and simultaneous multi-threading, are elements of the eServer p5 that provide a stylish bow around a well considered, notably flexible, highly scalable business computing package. Whether the customer is a small, medium, or large enterprise, the eServer p5 provides a depth and breadth of IT capabilities in a compact and cost-effective package that until recently was simply not available in the marketplace. In addition, the emergence of IBM's Power Architecture as an Innovative Industry Standard has profound implications for the Systems Integrators who work closely with business end users. What are some of the practical benefits innovative standards-based solutions provide? Specifically, IBM's Power platform offers Systems Integrators a proven means for extending business offerings and expanding customer engagements while reducing overall risks. In addition, embracing solutions such as the new p5 servers will help Systems Integrators ensure that their solutions deliver IT performance leadership recognized by businesses and the ISVs they depend on. In this paper, we discuss the dynamics of innovative industry standards as exemplified by IBM's POWER processor architecture, and demonstrate the business and technological benefits IBM's eServer p5 solutions provide systems integrators and their enterprise customers.

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Introduction

Business computing evolves through alternating cycles of innovation and standardization that profoundly affect enterprise customers and the systems integrators they work with. As IT vendors seek to achieve industry leadership and drive new products and strategies, the bedrock of industry-standard practices and technologies provide essential support for this innovation. Much of the complexity surrounding industry standards is due to their emergence from different starting points and through various processes. In a practical sense, standards provide the baseline that enables industry players to innovate in ways that would otherwise be impossible. Powerful initiatives such as IBM's On Demand, HP's Adaptive Enterprise, and multiple vendors' Utility Computing efforts are the strategic offspring of a variety of tangible industry standards.

While Industry Standard is a commonly used marketing slogan, its misuse has confused and diluted the term's meaning. In IT, commodity-style Industry Standards can be proposed and/or accepted by independent standards organizations or arise because a business process has been legislated or regulated. A technology can also achieve De Facto Industry Standard status through wide acceptance by vendors, supply chains, and customers. This is a somewhat slippery area since it is essentially the market that grants De Facto Standard status. In addition, over the past decade a third class of Innovative Industry Standards has evolved largely unrecognized as such by the IT industry and end users, though most have enjoyed these technologies' benefits.

The Business Benefits of a Long-term Power Strategy

Innovative Standards and Entrepreneurial Evolution

In essence, Innovative Standards offer a hybrid of Commodity and De Facto Standards that are entrepreneurial in nature and tend to be broadly or architecturally based so they can be leveraged across a wide range of IT and business processes. Some common examples include IBM's Power Architecture, Sun's Java, and Linux. These innovative "building blocks" are Renaissance technologies that promote value-added behavior. Innovative Standards are generally owned or initially controlled by single entities, but quickly gather communities of innovators who collaboratively leverage these architectures to their and the market's advantage. The evolution of Innovative Standards tends to rise continually, often rapidly, reflecting participant interest and enthusiasm. Innovative Standards can also play critical roles in times of change because their innate flexibility is appealing to businesses and systems integrators wanting to leverage new technologies while minimizing risk by basing their efforts and investments on robust, proven solutions.

Flexible, Integrated, Cost-Effective

Innovative Standards such as IBM's Power Architecture provide the basis of highly integrated, value-added vertical solutions, yet the building blocks themselves can be widely deployed horizontally. Due to the flexibility Innovative Standards offer, developers tend to utilize these architectures to create new market opportunities and gain a competitive advantage by delivering products to market faster than otherwise possible. By reducing the time to market for new solutions, developers can work more cost-effectively and deliver meaningful savings to systems integrators and their customers. As a result, consumers and integrators of POWER-based solutions often unknowingly benefit from the skills and enthusiasm and efficiency of multiple developers working on a uniquely large scale.

Reliable Roadmaps Show Systems Integrators the Way

Increasing Benefits by Reducing Risk

The potential risk/reward IT platforms offer is a key consideration for virtually every enterprise customer. Bleeding-edge performance may satisfy the daydreams of IT staff, but dependability and reliability are generally way ahead of performance on the list of business computing requirements. Such dependability has been well understood and appreciated by IBM Power customers over the platform's nine generations. That same longevity and its associated evolution also tangibly demonstrate IBM's long-term commitment to Power. What does that mean to systems integrators? Both that IBM has invested considerable time and effort into making Power the successful platform it has become, and that the company is dedicated to stretching Power's horizons and expanding the benefits customers have come to rely on. Systems Integrators also enjoy significant investment protection when backwards compatibility is maintained through the standard, as IBM has done with previous generations of POWER processors and continues to do with its latest iteration, the p5.

Leveraging Current Efforts for Future Opportunities

Another benefit of building products and solutions based on Innovative Standards such as IBM Power is that the effort of bringing solutions to market is spread across many players, more easily enabling the critical mass needed to drive success. At the same time, best practices for the technology are not necessarily market-specific, which means that applications driving vertical markets can also support the development of underlying horizontal opportunities. The long-term effects of this are twofold. First, current customers of these solutions become the immediate beneficiaries of new and emerging solutions. Equally important, though, is that while success breeds success, it also attracts competition. When developers see their competitors prospering, they tend to explore ways they can reap similar benefits. This competition among developers nets expanded options for customers and the Systems Integrators who serve them. By adopting platforms such as IBM Power which have enjoyed wide developer support, enterprise customers are enabling short-term IT success and ensuring long-term access to the solutions their businesses depend on.

IBM's Power Architecture: A Trusted Solutions Platform

IBM's Power is best known as the underlying architecture of the company's eServer pSeries and iSeries solutions, and as the 64-bit anchor of the company's On Demand initiative. POWER-based solutions offer a pervasive, Renaissance approach to IT that reaches across both business and consumer markets. IBM Power is used by hundreds of manufacturers, supported by thousands of developers, and depended upon by millions of business and consumers. POWER processors are the building blocks in products ranging from automotive control systems to entertainment and game consoles; from enterprise storage systems to desktop computers and HPC systems. Although IBM owns rights to the core Power Architecture, it licenses the technology and works with a wide range of companies to create custom ASICs (application-specific integrated circuits) for industries such as tele-communications, data processing, and digital image and sound processing. In some cases, POWER chips have become standard products for their market segment.

The Power Architecture began its life in IBM's Advanced Computing Systems where it was initially designed as an experimental RISC technology. As illustrated in Table 1, the Power Architecture has evolved into an Innovative Standard across technology as well as the platform for three of IBM's flagship operating systems; AIX, i5/OS, and Linux.

Table 1: Highlights of POWER's History and Innovation

Year	Event	Comment
1965	IBM Advanced Computing Systems (ACS)	First ideas for Power
1970s	RISC technology developed for the experimental 801 project	To build a high-speed telephone switching network
1985 – 1989	First RISC-based Computers, Virtual Resource Manager (VRM) and AIX v1 & v2	Development and prototyping continues
1990	First POWER chip introduced for technical computing (32-bit)	RS/6000 introduced running AIX v3
1991	PowerPC Alliance formed	with Motorola and Apple
1993	POWER2 introduced for technical computing systems (32-bit)	IBM's first RS/6000 POWER2
1995	PowerPC AS for AS/400 brings 64-bit computing to commercial space	For commercial applications
1997	PowerPC RS64 for RS/6000 brings 64-bit computing to commercial UNIX space IBM delivers a 32-bit PowerPC processor for NASA's Pathfinder Mission to Mars	AS/400 and RS/6000 adopt same processor Lockheed Martin altered the chip to create the radiation-hardened onboard flight computer for the Sojourner rover
1998	POWER3 brings 64-bit and multiprocessor capabilities to technical computing PowerPC RS64 II updates for commercial lines stays separate	First POWER chip compatible with PowerPC RS/6000 renamed eServer pSeries AS/400 renamed eServer iSeries
1999	IBM ships its one-millionth copper PowerPC chip; introduces the PowerPC 440 embedded IBM and Nintendo announces a multi-year $1 billion technology agreement to support Nintendo's next home video game console, GAMECUBE IBM sells its chip technology to Cisco Systems	The one-millionth sale occurs less than a year after IBM introduces copper-based processors A high-profile entry into the consumer electronics market Part of a larger strategy outlines a strategy to supply chips to the communications industry
2000	IBM combines high-speed PowerPC processors and other television set-top box components onto a single "system-on-a-chip" solution for vendors such as Samsung	Expands Power Architecture solutions for consumer electronics
2001	POWER4 introduction – two architectures merged into one design; First chip used for technical and commercial computing	For AIX 5L, OS/400 and Linux
2002	IBM 300 millimeter (mm) semiconductor facility opened in Fishkill, NY	Expands IBM's high-end "foundry" manufacturing services, as well as custom and standard chip offerings
2003	Apple and IBM introduce the PowerPC G5 BladeCenter JS20, brings 64-bit PowerPC technology to blade servers for the first time	The world's first 64-bit desktop processor A significant addition to IBM's blade products/solutions strategy
2004	POWER5 introduction	Continues one chip for all systems and workloads approach. Incorporated into IBM eServer i5 and p5 systems

This year, 2004, marks the end of the third decade of Power as an architecture with unmatched scalability, and also sees the debut of the new POWER5 processor, the first generation of Power technology to benefit from IBM's new state-of-the-art 300mm chip fabrication plant in Fishkill, NY. IBM drives Power's evolution within the company through solutions including eServer pSeries, eServer iSeries systems, and BladeCenter JS20, as well as computing grids and high performance computing (HPC) installations.

Innovative Standards through Partnerships and OEMs

In keeping with Power's position as an Innovative Standard, IBM also leverages the Power Architecture through significant partner relationships in many markets. The reason for Power's popularity and market reach is both simple and elegant. IBM approaches Power as an architecturally based solution instead of a platform-specific chip like Intel's Xeon and Itanium offerings or Sun's UltraSPARC. The result is that the Power Architecture's capabilities provide a wide variety of innovation-enabling building blocks that drive evolution to a unique depth and breadth of IT products and markets.

- **Desktops and Servers:** Apple and Motorola are the best known Power licensees, who use the architecture to drive Apple's Macintosh personal computers. Apple is using the PowerPC 970 microprocessor, the same technology that drives IBM's own BladeCenter JS20 blade server, in its G5 desktop and Xserve products.
- **Games, Cars, and Storage Arrays:** Power-based consumer electronics products include the current generation of Nintendo's GameCube consoles, and Sony Group has also licensed access to IBM's Power microprocessor technology. Motorola, a PowerPC licensee, embeds Power technologies in automobile and transportation applications including computerized fuel injection, GPS, and other navigation solutions. EMC deploys Power in its Symmetrix storage system controllers.
- **Embedded Power:** IBM has embedded Power Architecture technologies in several classes of products including embedded memory, such as SRAM, DRAM, and CAM, leading to denser memory, lower standby power requirements, and higher performance. Power technology is also found in MPEG audio and video compression systems providing the basis of digital broadcast (both HDTV and DBS) as well as the decoding used in home DVD and VCD players, and set-top boxes for use in next-generation Web browsing, internet gaming, ecommerce, and email. IBM works with ISVs including WindRiver, MontaVista, and Data Design provide embedded solutions for a range of Power-based products.
- **Function-Specific Power:** IBM also offers a variety of custom chips and ASICs, the essential building blocks of the Power Architecture, and helps partners build custom ASICs from the design phase, to embedded memory, packaging, cores, and finished products. Overall, Power cores are used in 40% of the ASICs IBM ships.

Repeatedly IBM also has demonstrated how creating and following a well-considered product roadmap produces quantifiable benefits for the company and its customers and partners. Through IBM's efforts, Power has become well established as a reliable IT platform with an illustrious past and a bright future. In addition, the critical role POWER5, like the POWER iterations before it, plays in IBM's overarching On Demand initiative, is evidence the company's dedication to deliver strategically-focused 64-bit solutions across a wide range of IT business needs. Consequently, POWER remains a platform that systems integrators can adopt without concern and recommend without question.

POWER and IBM eServer p5

IBM's new eServer p5 provides enterprise solutions that boast one foot entrenched in past pSeries accomplishments and the other planted firmly on new or enhanced features. Among the benefits p5 solutions offer are:

- Engineered for reliability, availability, serviceability. Additionally, the p5 leverages IBM's unique mainframe-derived self-managing and self-healing capabilities.
- A new modular design that provides unmatched system flexibility and capacity. In addition, the p5's Capacity Upgrade on Demand (CUoD) feature, and cross-partition workload balancing help reduce complexity, increase system utilization, and make eServer pSeries an even better IT consolidation platform.
- Increased security capabilities with AIX expansion pack software that supports consistent security policy enforcement across heterogeneous infrastructures.
- Reduced migration risk via AIX 5L's support of binary compatibility of applications across multiple generations of Power-based hardware, which also helps improves hardware acquisition, transition, and operations costs.
- The current availability of over 2,000 eServer pSeries applications and continuing adoption of the p5 platform by major ISVs signals both the success of IBM's Power Architecture and its position as a viable, vital business computing platform

POWER5 Virtualization: Helping Systems Integrators Increase the Value-Add

IBM's optional Advanced Power Virtualization hardware feature and Micro-Partitioning capabilities allow IBM customers to operate as many as ten virtual servers on each p5 processor, and to simultaneously support multiple operating systems including AIX5L V5.2, AIX 5L V5.3, and Linux (RedHat and Novell SUSE). This feature delivers two very specific benefits to both end users and Systems Integrators. First, Advanced Power Virtualization (in unison with IBM's Hypervisor technology) provides the means for increasing overall system/server utilization, which allows businesses to get more bang for their IT bucks. In addition, IBM's Micro-Partitioning technology makes the p5 an ideal platform for consolidating the workloads of multiple servers. What does this mean for Systems Integrators? Quite simply, that along with being a notably updated version of a venerable 64-bit computing platform, the IBM p5 also provides enterprises the unique ability to significantly reduce the costs and complexity of their IT infrastructures. In a business world obsessed with the concept of "value-add" IBM's p5 can, quite literally, add value that customers will enjoy for the life of their systems.

POWER5 and Systems Integrators: Leveraging Innovation for Success

Enterprise customers are certain to appreciate the p5's new and enhanced capabilities, but systems integrators will also enjoy significant benefits. With nine generations of POWER performance under its belt, IBM is more than a globally recognized IT vendor; the company is setting the pace for enterprise computing technical leadership. Intel and Sun are both quick to boast about their eventual migration to multi-core processor architectures, but IBM's was the first vendor to deliver such solutions with dual core POWER4-based eServer pSeries in 2001. Along with a reputation for technical superiority, IBM has weathered the recent stormy IT market far better than peers such as Sun, which seems stuck continuously in the doldrums, and HP, which has ongoing problems capitalizing on its Compaq assets and articulating a convincing IA-64 strategy. For many, POWER solutions represent ideal

migration or consolidation choices for both Sun's and HP's 64-bit customers, representing, as it does, a more flexible and adaptable solution than UltraSPARC, and a more convincing enterprise platform than Itanium. Beyond the sheer robustness of IBM and its p5 solutions, POWER and eServer pSeries are recognized and respected IT platforms worldwide. As a result, Systems Integrators can leverage IBM offerings globally, extending their own opportunities across many markets.

In addition, Systems Integrators will benefit from other elements of the p5 and its development environment. For one, IBM's decision to leverage aggressively the common hardware components across POWER5-based pSeries and iSeries eServers should translate into reduced prices, increasing the already notable price/performance offered by POWER-based systems. In addition, IBM's continuing promotion of its Express Portfolio strategy, leveraging the company's WebSphere, DB2, and Lotus middleware offerings as development environments has resulted in ISVs delivering mid-market applications developed for the Power environment, and growing opportunities in this space for Systems Integrators. Finally, IBM's notable leadership in Linux has helped to drive commercial Open Source solutions into enterprises of every kind. Given the enhanced 64-bit capabilities of the Linux 2.6 kernel, p5 solutions are likely to expand Open Source opportunities/capabilities for enterprise customers and the Systems Integrators who work with them.

What Does It All Mean?

By any measure, IBM's new POWER5-based eServer pSeries solutions offer a wide range of enhancements that provide a host of new or enhanced technological and business benefits of particular interest to system integrators. Technically, the p5 embodies both the ninth generation of IBM's Power Architecture and the future promise of the company's industry-leading microprocessor development effort. As a result, p5 servers deliver the latest iterations of IBM's vision of reliable, available, and serviceable (RAS) computing in a highly flexible and scalable modular solution. IBM's Virtualization Engine and the micro-partitioning capabilities of the p5 provide an ideal platform for consolidating computing workloads, reducing infrastructure complexity, and maximizing server utilization, all issues that contribute notably to p5 customers' ROI. In addition, the p5's mainframe-derived self-managing and self-healing capabilities allow the platform to be leveraged to maximize IT staff resources, a critical issue for reducing customers' total cost of ownership which, in turn, can potentially free budgets for increased SI opportunities.

Beyond technology, the p5 delivers a host of business benefits with profound implications. The Power Architecture's position as a tested, respected Innovative Industry Standard has helped make IBM's eServer pSeries the UNIX server of choice for thousands of organizations and enterprise ISVs. That considerable customer and developer support, in turn, lends additional gravity and stability to the bright future described in IBM's POWER roadmap. This mix of present capabilities and future commitments provides system integrators enterprise solutions that offer minimum of risk and maximum opportunities. In essence, POWER5 is the latest iteration of a known, proven, dependable, continually evolving 64-bit IT architecture. The pSeries' outright leadership in numerous applications and industries, and its growing influence in many others make POWER5 the enterprise IT platform to beat. As such, system integrators and their enterprise customers would do well to consider IBM's new p5 solutions.