IBM Power Systems

The ultimate system for compute intensive workloads





Highlights

- · Cloud ready dynamic efficiency
- Data ready business analytics
- Security ready enhanced compliance
- · Optimized for compute intensive workloads
- · Delivered with a superior client experience
- Built on IBM® POWER®, virtualized with PowerVM®
- Enterprise systems, entry systems, and systems for HPC
- Industry solutions based on IBM AIX®, IBM i, Linux
- · Broad range of IBM Systems Software

Smarter Computing

Today, we are in the midst of a technology shift driving growth and innovation. Cloud, analytics, social business, and mobile solutions aren't simply remaking computing, they are remaking business. These new applications are driving the huge growth in data volumes and variety, *and* the need for systems with the compute intensive performance to process it. This new era represents an opportunity for organizations to reshape the value they deliver, but cost, complexity and risk are standing in the way. So how can companies make sure their IT infrastructure is ready now for what's next?

At IBM, we believe there's an answer—we call it Smarter Computing—the IT infrastructure that enables the opportunities presented on a smarter planet. It's a strategy that leverages cloud to speed time to market and improve efficiency, that unlocks the power of big data to deliver more actionable insight, and secures critical information to reduce risk and help business enhance their compliance policies.



Cloud ready - dynamic efficiency

More than 70 percent of the typical IT budget is tied up in operations and maintenance. Cloud server technologies can help improve IT operations efficiency to enable companies to invest in business innovation. Through its PowerVM virtualization software, IBM Power Systems™ provides dynamic efficiency for a cloud infrastructure. PowerVM virtualization provides intelligent, dynamic resource allocation for rapid response to workload demands, enabling consistently high service levels across hundreds of virtual workloads on a single system.

Data ready - business analytics

As businesses react to the explosive growth of data, they need to store it, secure it and, most importantly, extract actionable insight from it. IBM Power Systems are designed for the compute intensive performance demands of database and business analytics workloads, enabling faster business insights to be realized from processing structured and unstructured data in real time.

Security ready - enhanced compliance

The evolution of highly networked, data-intensive workloads has introduced significant security risks to IT infrastructures. And, the increasing prevalence of social, mobile, virtualization and cloud technologies present a profound security challenge. IBM Power Systems help companies enhance their security and compliance practices with policy-based PowerSC software to simplify security and lower compliance costs.

Optimized for compute intensive workloads

IBM has a full range of Power Systems servers, compute nodes and blades, each of which delivers leadership compute intensive performance and scalability in its class. A totally integrated approach to the design, development, and testing of each and every Power server, blade or compute node ensures the resiliency required for today's IT infrastructure.

All Power Systems server models include innovative reliability, availability and serviceability features that help avoid unplanned downtime. And, with Capacity on Demand, Hot-Node Add and Active Memory Expansion—Power Systems enterprise servers ensure businesses can keep their most important applications available, even as they add capacity to handle new business demands.

IBM offers a full range of IBM Power Systems software technologies that enable businesses to fully exploit Power Systems servers. Designed and optimized specifically for Power Systems, IBM's offerings include IBM PowerVM virtualization software,

IBM PowerHA software for high availability, PowerSC software for security and compliance, and IBM Systems Director with IBM Active Energy Manager for platform and energy management. IBM's integrated approach to developing the systems and software together enables high system utilization, high resiliency and simplified management. In addition, IBM Power Systems offers thousands of popular industry applications from ISVs running on a choice of AIX, IBM i and Linux operating systems.

Delivered with a superior client experience

Businesses that rely on IBM Power Systems servers don't just value leading technology and applications. They value the exceptional client experience that IBM provides throughout the business solution lifecycle that helps them drive rapid and lasting business value.

Clients can gain valuable insights and advice from fitfor-purpose infrastructure workshops to help them with architectural design choices. They also can take advantage of simple, pre-configured and pre-loaded to get a fast start with deploying a private cloud or an analytics solution. The proven methodologies of the IBM Migration Factory, help clients accelerate moving a critical database or application from x86 commodity servers. The expertise of IBM Upgrade Factory enables clients to help leverage new technologies faster and improve systems resiliency. IBM Power Systems servers even 'call home' if they detect an issue, so a potential problem may be fixed before it occurs.

Clients can also tap into the deep security expertise of our IBM Global Technology Services and IBM Lab Services teams for a broad range of infrastructure design, implementation, management and optimization projects. They also have the peace of mind that comes from working with the global network of experienced IBM Business Partners.



Built on POWER, virtualized with PowerVM

POWER processor technology is a reduced instruction-set computing (RISC) architecture that spans applications from consumer electronics to supercomputers. POWER processors are at the forefront of both commercial and technical or high



performance computing. So, in addition to excelling at commercial workloads like DB2 database and SAP applications, POWER is also behind many of today's top supercomputers. With BlueGene, it helped fuel breakthroughs in the science of the human genome. It is on board the Mars rovers. With IBM Watson™, POWER helped outperform human beings on Jeopardy!, an American quiz-show. Today IBM Watson continues to advance the science of text based analytics and natural language processing for industries such as healthcare, finance and customer service.

POWER processors provide the foundation for designing systems for both traditional transaction processing and compute intensive workloads like Web, analytics, mobile and social applications. To achieve maximum performance, POWER processor-based systems are designed with EasyOptimize technologies that enable the system to tune automatically to specific workloads. For example, Intelligent Threads technology dynamically switches the processor threading mode to deliver optimal performance for different workloads. TurboCore mode

on selected systems also offers the option to optimize the system for frequency and cache utilization delivering the maximum per core performance for database and transaction workloads. Active MemoryTM Expansion helps reduce memory costs by enabling physical memory to be logically expanded up to 100 percent for some workloads—such as SAP.

Businesses are leveraging virtualization and cloud technologies not only to reduce the costs and maximize their IT infrastructure investments but also to provide more flexibility, higher application availability and improve response time to business needs. PowerVM virtualization is designed and optimized specifically for the POWER processor and enables trusted and scalable virtualization of workloads based on AIX, IBM i and Linux. PowerVM software enables companies to achieve very high levels of efficiency— with 80 percent to 90 percent sustained utilization in some cases—while delivering dynamic flexibility in deploying and managing virtual machines.



The latest POWER7+TM processor technology generation delivers the ultimate in scalable compute intensive performance, with additional resiliency and security features. To handle the high growth of data and the growing importance of analytics applications, POWER7+ features a massive 10 MB of on chip L3 cache per core. The POWER7+ processor is also designed with EasyOptimize capability that monitors PowerVM virtual workloads for best processor and memory placement and performance. Enhanced resiliency features of POWER7+ include the ability—transparently to the application—to automatically activate spare cache resources and provide dynamic repair of node-to-node bus communications. For enhanced performance of encrypted file systems and IPsec network traffic, POWER7+ also offers hardware encryption support with cryptographic accelerators.

PowerVM offers Micro-Partitioning® with the ability to run up to 20 partitions per POWER7+ processor core, and dynamically move processor, memory, and I/O resources between partitions to support changing workload requirements. PowerVM Live Partition Mobility enables active partitions to be moved between servers—no matter what size of partition you are running—virtually eliminating application downtime for planned systems maintenance. Live partition mobility can also be used to migrate workloads between POWER6®, POWER7® and POWER7+ processor-based servers without an application outage.

VMControl complements PowerVM by providing automated virtualization management that minimizes time to provision virtual machine images and enables management of system pools. VMControl also provides a consistent and comprehensive virtualization management capability across multiple hardware

platforms and hypervisors, to simplify and streamline the management of virtualized server, storage and network resources. With Power Systems, PowerVM and VMControl virtualization software supports up to 1,000 virtual machines on a single system, providing massive consolidation capability for exceptional efficiency and costs savings.

Enterprise Systems

IBM Power Enterprise Systems enable faster business insights with the highest service levels of performance, resiliency, scalability and virtualization flexibility for critical data and applications. Enterprise systems are designed to be at the core of an enterprise IT infrastructure and include Capacity on Demand (on selected servers) to respond quickly and efficiently to changing business demands.

IBM Power 795: The most powerful system ever with up to 256 POWER7 processor cores and 16 TB of memory enables capability to consolidate up to 1,000 Virtual Machines.

IBM Power 780: Modular high-end system with up to 128 POWER7+ cores and 4 TB of memory in four nodes delivers leadership flexibility, scalability and resiliency vs. all other competitive servers.

IBM Power 770: Innovative modular server that provides non-disruptive growth from four to 64 POWER7+ processor cores, all with enterprise class RAS.

IBM Power 760: ENERGY STAR-qualified for virtualized consolidation of medium sized business workloads and demanding environments where uptime is critical, features one to four

processor sockets and 12 to 48 POWER7+ processor cores, with processor Capacity on Upgrade on Demand, and up to 2 TB of memory.

IBM Power 750: ENERGY STAR-qualified for server consolidation and virtualization projects, features one to four processor sockets and eight to 32 POWER7+ processor cores. The Power 750 is the server that was used by Watson, and is now enhanced with greater capacity, expanded and faster I/O capabilities, and even higher performance.

Entry Systems

IBM Power Entry Systems are affordable, easy-to-deploy and energy efficient, and they are backed by a trusted network of IBM Business Partners and industry solution providers.

IBM Power 740 Express: For small- to mid-size databases or as a consolidation platform with one or two processor sockets with six to 16 POWER7+ processor cores and up to 1024 GB of memory.

IBM Power 730 Express: Designed for rack to rack consolidations in dense IT environments with two processor sockets and eight to 16 POWER7+ processor cores.

IBM Power 720 Express: Designed for distributed application servers or integrated business solutions with one processor socket and four to eight POWER7+ processor cores.

IBM Power 710 Express: Infrastructure and application servers with one processor socket, and a choice of four to eight POWER7+ processor cores.



IBM PowerLinuxTM 7R2: Affordable and optimized for Linux environments, a 2U rack form factor, two-socket, highperformance, energy-efficient server with sixteen POWER7+ cores is ideal for running multiple application and infrastructure workloads in a virtualized environment.

IBM PowerLinux 7R1: Affordable and optimized for Linux environments, a one-socket, eight POWER7+ processor core server lowering the entry cost of big data analytics, open infrastructure solutions and traditional scale-out Linux workloads.

IBM Flex SystemTM p260 and p460 Compute Nodes: optimized for virtualization, performance and energy efficiency. These nodes offer 16 to 32 processor cores and are designed to run a wide variety of workloads in the IBM Flex System solution.

IBM BladeCenter® PS700, PS701, PS702, PS703, PS704 Express: Cost and energy efficient blades for application workload virtualization with four to 32 processor cores.

High Performance Computing Systems

Power Systems high performance computing systems are configured into highly scalable AIX and Linux clusters that offer extreme performance for demanding technical and scientific workloads such as computational chemistry, petroleum reservoir modeling, weather forecasting, climate modeling, and financial services.

IBM Power 775: Supercomputer that shares Watson's DNA and through the world's highest performance and energy efficiency dramatically reduces project concept to delivery time for the toughest challenges in science.

IBM Power 755: An ENERGY STAR-qualified high performance computing cluster node, designed for extreme parallel processing with 32 processor cores.



AIX - The future of UNIX

According to IDC, the IBM Power Systems platform with AIX technology is the leader in worldwide UNIX server revenue share. The introduction of the POWER7 and recent POWER7+ processors has helped accelerate migrations to the Power Systems and AIX platform from Oracle Solaris and HP-UX. An open standards—based UNIX operating system, IBM AIX software exploits decades of IBM technology innovation. According to ITIC's 2010-2011 survey, the IBM AIX operating system delivered the highest reliability scores among 19 different server operating system platforms, including Linux and other UNIX operating systems.²

AIX technology offers deep integration and optimization with PowerVM virtualization, PowerHA® high availability software, PowerSC security and compliance software as well as optimization through IBM's broader middleware and software stack, including IBM DB2® software, IBM WebSphere® Application Server software and IBM Rational compilers and development tools.

The latest AIX 7.1 release features new cluster-aware integration with PowerHA, as well the ability to run AIX 5.2 and AIX 5.3 Workload Partitions to facilitate application migration and reuse. The AIX operating system is available in three editions for a range of capability and flexibility for both mid-sized and large enterprises.

AIX 7 and the previous release, AIX 6, are binary compatible with previous versions of AIX including AIX 5LTM. This means that applications that ran on earlier versions will continue to run on AIX 7 or 6—guaranteed.³



IBM i - A system designed for business

IBM i running on an IBM Power Systems server offers an integrated, simple-to-manage platform for business applications with a proven reputation for exceptional resilience and low operational costs. Running applications based on IBM i has helped companies over many years to focus on innovation and on delivering new value to their business, and to lower the costs of managing their IT operations.

IBM i provides a fully integrated and optimized combination of relational database, trusted role and object based security model, as well as integrated networking and storage management capabilities required to run business applications. The integrated SQL standards-compliant DB2 for IBM i database includes a range of advanced database management utilities. IBM i also includes additional integrated middleware components such as multiple file systems, directory, an HTTP Web-server powered by Apache, a Web application server and a Web-services environment.

More than 150,000 midsize businesses rely on the simplicity, resiliency and cost-effectiveness of IBM i to run thousands of applications from ISVs serving virtually every industry. Its reputation for security, resiliency and ease of use derives from the integration of IBM i with its built-in DB2 database, web services, networking and storage management capabilities. ITG reports that costs to use Power Systems and IBM i 7.1 average 44 percent less than x86 servers and Microsoft Windows⁴ Server and SQL Server, and 57 percent less than for x86 servers with Linux and Oracle databases.

The latest IBM i 7.1 release includes significant enhancements to DB2 for i, including integrated XML support and column level encryption. Solid State Disk (SSD) drives can be utilized with the IBM i operating system, which automatically moves frequently accessed data for optimal application performance. IBM RPG, a common language for transaction processing applications, was also enhanced to simplify integration with a broad range of client applications and devices, including web services, mobile devices and XML. With regular and easy-to-deploy Technology Refreshes, IBM continues to extend the capabilities of IBM i 7.1, with new capabilities such as PowerVM Partition Suspend/Resume and Live Partition Mobility.



PowerLinux - Industry standard solutions tuned to the task

Both Red Hat and SUSE Linux run natively on POWER processor-based systems, offering a scalable PowerLinux alternative for open source applications. Reducing server sprawl through consolidation and virtualization is a key priority for many companies today and PowerLinux with PowerVM provides a scalable, optimized, and cost competitive alternative to running Linux on commodity x86 servers.

POWER processors provide optimal performance for big data analytics projects. Using IBM software, PowerLinux helps businesses gain new insights from big data with solutions like IBM InfoSphere® BigInsights™ to analyze data-at-rest and InfoSphere Streams to analyze data-in-motion. Using the IBM PowerLinux Big Data Solution for Apache Hadoop, application developers can take advantage of optimizations designed by IBM engineers to allow Hadoop to excel on Power. The deep integration and optimization of analytics workload performance on PowerLinux enables businesses to deliver Linux analytics services faster.

Increasingly, companies are also relying on Linux for business applications that are designed for their industry and customized to their specific business needs. PowerLinux provides a highly secure, resilient and fully optimized stack for industry applications. With optimized systems tuned with PowerLinux, businesses can deliver Linux services with higher quality compared to x86 commodity servers.

Today, Linux is also the low cost deployment platform of choice for vital applications like web, e-mail, and social media collaboration services. PowerLinux offers competitively priced POWER servers and more efficient server virtualization with PowerVM versus x86 commodity server alternatives. With scalable and secure PowerVM virtualization, PowerLinux helps businesses deliver Linux application services with superior economics.



PowerHA - Resiliency without downtime

Smarter computing by nature requires businesses to raise their services delivery levels, fueling 24×7 high availability demands for their applications and IT infrastructure. PowerHA SystemMirror for AIX and IBM i is a high availability clustering solution for both data center and multisite resiliency. PowerHA is designed to protect business applications from outages of virtually any kind, helping ensure round-the-clock business operations.

The best high availability and disaster recovery plans involve an integrated approach to resiliency spanning across applications, operating systems, servers and storage. That's why PowerHA software offers deep integration and optimization between PowerHA SystemMirror software and AIX and IBM i. The PowerHA solution is optimized for IBM System Storage devices, such as the DS8000 system (for large enterprises) and the Storwize V7000 system (for midsize businesses), as well as our IBM storage software solutions such as Metro Mirror, Global Mirror, IBM System Storage SAN Volume Controller and IBM FlashCopy technologies.

PowerSC – Security and compliance: trusted and automated

Security and compliance are intrinsic to today's business processes, development and daily operations and should be factored in to the initial design of any IT or critical infrastructure solution, not added after the fact. By building security and compliance into the overall design of a system, application or cloud infrastructure, businesses are better able to deploy innovative solutions that reduce risk while cost-effectively addressing audit requirements.



IBM offers solutions to protect data from threats and unauthorized access on Power Systems servers running AIX, IBM i and Linux workloads. Data encryption capabilities to protect file systems, data and backup are an integral part of the AIX and IBM i operating systems, both of which also support role-based access control. Whether you want to manage the security of your Power servers, or include other elements in your infrastructure—IBM solutions provide intuitive administration that helps you to define, enforce and audit your business security policy.

In addition, IBM PowerSC software provides a security and compliance solution optimized for virtualized environments on Power Systems servers running PowerVM and AIX software. PowerSC helps companies enhance compliance management and demonstration through industry profiles and policy-based security compliance reporting with real-time alerts for compliance violations. PowerSC software enables automation of compliance standards and includes reporting for compliance measurement and audit. Compliance automation features include prebuilt system profiles that facilitate compliance with a variety of industry standards, such as the Payment Card Industry Data Security Standard. Additional PowerSC functionality includes compliance monitoring for network segregation, system trust status and system patch policy compliance.

IBM Active Energy Manager – Sustainable IT infrastructure

Many companies are running into facilities management and energy challenges in their data center due to the explosion in data and growth in IT applications. Analysts have projected that

up to 70 percent of large enterprises will face the need for major changes to their data centers in the next few years. It is becoming critical for these companies to begin to create a more sustainable and cost efficient IT infrastructure. In addition, being socially responsible yields real business benefits. The POWER processor-based systems are highly energy efficient, often enabling enterprises to expand their IT capability without expanding their floor space or even energy consumption.

Power Systems energy management solutions with IBM Systems Director Active Energy Manager™ can monitor and control energy usage to help you manage energy efficiency in your data center. Each Power server has EnergyScale™ technology built into the POWER processor. Through consolidation and virtualization with PowerVM, businesses have realized dramatic energy savings. And with IBM Systems Director Active Energy Manager™, you can identify trends in your energy usage and thermal profile, turn off processor cores or limit the energy draw across one or a group of Power servers, and track environmental data from applications used to monitor air conditioning units, Uninterruptible Power Supplies and Intelligent Power Distribution Units.

As an example the Power 795 delivers over four times the compute capacity of the Power 595 in the same space and energy envelope. POWER7 and POWER7+ technology can potentially quadruple the capabilities of a data center without having to change the size, configuration or power and cooling infrastructure. Efficiencies in space, power, costs, and labor as well as the potential for new market opportunities await the company that focuses on building a more sustainable business

and IT infrastructure. Enable the sustainability of your business by improving the efficiency of operations, assets and people, while reducing costs, improving your public image, and opening the door to new opportunities.

IBM Systems Director – Management with automation

With platform management technologies on Power Systems servers, businesses not only get a complete picture of their systems and how well they are operating, but also the tools to deploy, optimize and maintain these systems at maximum effectiveness and efficiency. The result is optimized workload performance, energy efficiency and cost control. On Power Systems servers, server virtualization management is integrated with network and storage management for complete resource control.



IBM System Director Editions for Power are sized for every data center. It is simpler than ever for a single operator to manage both physical assets and virtual resources. With IBM Systems Director for platform management and Tivoli® for enterprise service management solutions, Power Systems offer a unified systems management solution that can improve service delivery. VMControl provides automated virtualization management and minimizes the time it takes to provision virtual images and manage system pools.

IBM services and financing for your Smarter Computing projects

From online self-evaluation tools and workshops to comprehensive assessments and complete migration services, IBM services teams and IBM Business Partner experts around the world can help you determine where to begin or how to make the most of your current Power Systems solutions.

Work with IBM Global Finance to explore the financing options most appropriate for your business. For more information on great rates, flexible payment plans and loans, and asset buyback and disposal, visit: ibm.com/financing

8202-E4D

8231-E2D

8205-E6D

8231-E1D

Machine type - model

IBM POWER7+ Entry Systems



For more information

Contact your IBM representative or IBM Business Partner or visit: ibm.com/power

To learn more about the IBM Power Systems, please contact your IBM marketing representative or IBM Business Partner, or visit the following website: ibm.com/power

Additionally, IBM Global Financing can help you acquire the IT solutions that your business needs in the most cost-effective and strategic way possible. We'll partner with credit-qualified clients to customize an IT financing solution to suit your business goals, enable effective cash management, and improve your total cost of ownership. IBM Global Financing is your smartest choice to fund critical IT investments and propel your business forward. For more information, visit: ibm.com/financing



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- ¹ IDC Quarterly Server Tracker Q210 release, August 2010
- ² ITIC 2009 Global Server Reliability Report: ibm.com/common/ssi/ fcgi-bin/ssialias?infotype=SA&subtype=WH&appname=STGE_PO_PO_USEN &htmlfid=POL03058USEN&attachment=POL03058USEN.PDF
- ³ More information on the binary compatibility of AIX can be found at ibm.com/systems/power/software/aix/compatibility/guarantee/index.html
- *More information on costs to use Power Systems and IBM i 6.1 can be found at ibm.com/common/ssi/fcgi-bin/ssialias?infotype=SA&subtype= WH&appname=STGE_PO_PO_USEN&htmlfid=POL03062USEN& attachment=POL03062USEN.PDF
- ⁵ On POWER7+ servers IBM i 6.1 uses virtualized I/O through an IBM i 7.1 partition or VIOS. Native I/O support requires #EB34 feature. POWER7+ 750 does not have #EB34



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