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Highlights

- Industry-leading performance and scale for the most demanding data-centric applications
 - Manage fluctuating business demands with dynamic, private cloud capacity
 - Minimize risk with secure delivery of data and services on a proven, reliable platform
 - Streamline deployment and increase responsiveness with built-in virtualization and innovative resource sharing
 - Increase energy efficiency with more performance-per-watt
 - Open innovation for Linux, AIX® and IBM i
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IBM Power System E870

*Scalable enterprise server for critical applications,
with open innovation for private clouds*

The emerging measures of IT performance focus on agility to enable growth and respond to change, while effectively managing risk and resources. Expectations continue to rise for increased service levels and secure application access, as data explodes and budgets are squeezed. At the same time, more complex application architectures and the current rate of change create unforeseen challenges that strain even the most talented IT teams in the industry.

The IBM® Power® E870 is a high-performance, secure, enterprise system optimized for the compute-intensive performance demands of large-scale, mission-critical transaction, database and analytics applications. With up to 80 IBM POWER8® processor cores, up to 16 TB of memory, an efficient modular design, built-in IBM PowerVM® virtualization technologies and Capacity on Demand innovation, the Power E870 server can consistently sustain high service levels across hundreds of virtual workloads on a single system.

Industry-leading POWER8 performance

Built with innovation that puts data to work across the enterprise, IBM Power Systems™ provide the foundation for organizations to bring insight to the point of impact twice as fast. The Power E870 server is a reliable, scalable, symmetric multiprocessing (SMP) system that delivers exceptional performance using enterprise POWER8 processors, each a Single Chip Module (SCM) with either eight or ten cores running over



4 GHz and simultaneous multithreading executing up to eight threads per-core. Each SCM has dual memory controllers to support up to 2 TB of memory and utilize up to 128 GB off-chip eDRAM L4 (off-chip) cache to deliver up to 230 GB/sec of sustained memory bandwidth. I/O bandwidth is also dramatically increased via dual PCIe Gen3 I/O controllers integrated onto each SCM to further reduce latency. A single 4- or 8-socket Power E870 can deliver over twice the performance per-core of competitors,¹ enabling applications to run faster and be more responsive.

IBM Active Memory™ Expansion (AME) is an option which can increase the effective memory capacity of the system, enabling a partition to perform significantly more work with the same physical amount of memory resource. POWER8 processors contain an accelerator to provide the compression/decompression of memory content, and memory may expand up to 100 percent.

Built-in PowerVM virtualization

PowerVM is the family of technologies deeply integrated to deliver industry-leading virtualization on IBM POWER® processor-based systems. PowerVM Enterprise Edition license entitlement is included for active cores on a Power E870 server, providing advanced virtualization technologies to optimize efficiency, increase throughput and help lower costs.

In addition to inherent Logical Partitioning provided by firmware, PowerVM has IBM Advanced Micro-Partitioning™ and the Virtual I/O Server (VIOS), designed to allow businesses to increase system utilization, while helping to ensure applications continue to get the resources they need. VIOS allows for the sharing of disk and optical devices as well as communications and Fibre Channel adapters to help drive down complexity and systems and administrative expenses. Also included is support for Multiple Shared Processor Pools, which enables automatic, nondisruptive balancing of processing power

between partitions assigned to the shared pools, and Shared Dedicated Capacity, which helps optimize use of processor cycles.



PowerVM Enterprise Edition also offers Live Partition Mobility (LPM) and Active Memory Sharing. LPM allows a partition to be relocated from one server to another with virtually no impact to the applications running inside the partition. LPM is designed to enable servers to work together to help maintain application availability, balance resource demands of critical workloads across multiple systems and respond to ever-changing business demands. PowerVM Active Memory Sharing is an advanced memory virtualization technology that intelligently flows memory from one partition to another for increased utilization and flexibility of memory usage. With this memory virtualization enhancement IBM i, AIX, and Linux partitions can share a pool of memory and have PowerVM automatically allocate the memory based on the workload demands of each partition.

As the price of energy increases and capacity limits become more common, optimization of available power has become increasingly vital. Deploying mission-critical applications onto IBM Power Systems using PowerVM virtualization technologies provides you the best way to maximize your service to clients while minimizing your energy consumption. Consolidating older, underutilized systems onto more a more powerful, efficient Power E870 server can deliver dramatic benefits from a reduction in energy consumption.

Optimized for the rigorous demands of enterprise computing

Enterprise Power Systems deliver fit-for-purpose technology that optimizes workloads, data and cloud to support your most critical business requirements and help you engage your customers—all while providing data security, efficient management, incredible availability and unmatched scalability.

A completely integrated approach to the design, development, and testing of each and every Power server ensures the resiliency required for today's enterprise IT infrastructure. Unique reliability, availability and serviceability features help avoid unplanned downtime and loss of data. The POWER8 processor and memory subsystem uses First Failure Data Capture mechanism for fault detection and isolation, and incorporates advanced technology and design techniques for soft error avoidance. Spare processor fabric and memory bus data lanes are integrated, as are spare bit lanes within L2 and L3 caches. Processor Instruction Retry and Alternate Processor Recovery provide for the continuous monitoring of processor status, with the capability to restart a processor, if certain errors are detected, or redirect the workload to an alternate processor, all without disrupting application execution.

POWER8 servers utilize industry-leading Chipkill memory on custom DIMMs (CDIMMs) that offer additional DRAM sparing and support dynamic deallocation of memory DIMMs for predictive errors, or even substitution using memory not yet activated via Capacity on Demand.

The Power E870 server system infrastructure is designed with hot-plug, hot-swappable, redundant components including system fans and power supplies. PCIe adapters are also hot-swappable. A new System Control Unit provides isolated, redundant service processors and clock oscillators, with dynamic failover, even on a single node Power E870 system. And Active Memory Mirroring for Hypervisor, which is designed to prevent a system outage in the event of an uncorrectable error in memory being used by the system hypervisor, is now offered as an integral component of every Power E870 server.

These inherent availability features help to increase system availability and allow more work to be processed without disruption. For enhanced server availability, the Power E870 server can be clustered with IBM PowerHA® SystemMirror® for disaster recovery (DR) or IBM DB2® pureScale® software for continuous database availability.

Demonstrating outstanding performance across multiple database solutions and multiple operating systems, the Power E870 server shows its true heart and soul when entrusted with a company's most treasured IT asset—the database of its critical information. And to resolve the need for security and privacy that comes with highly networked, data-intensive applications, Power Systems offers built-in security competitors can't match. Real-time data encryption, sophisticated application isolation, and compliance alerts and reporting ensure that data is safe, company and industry compliance standards are met, and costs are minimized.

Cloud capacity for flexibility and non-disruptive growth

Enterprise Power servers leverage a modular design that can support a significant range of processor, memory and I/O expansion, allowing clients to tailor their system to their unique requirements. Additionally, Power enterprise servers offer Capacity on Demand (CoD) innovation that provides a business with tremendous flexibility to respond to changing business requirements and increase responsiveness. Clients can install processors or memory and activate them on a 30-day trial with Trial CoD, a day-to-day basis with Elastic CoD, or permanently via Capacity Upgrade on Demand (CUoD). Additionally, Utility CoD allows clients to install processors and have them automatically activated as needed on a minute-to-minute basis.

Power Enterprise Pools enhances flexibility by enabling unique mobile Capacity on Demand activation resources to be dynamically re-allocated within a defined pool of Power E870 and/or POWER7+™ 770 systems. This resource management is controlled by the user via simple HMC commands. No additional paperwork is required and IBM does not need to be notified. This simplicity of operations provides new flexibility to address fluid capacity requirements and the changing application landscape of a large-scale, virtual cloud infrastructure. A Power Enterprise Pool is especially appealing to clients who deploy multiple systems to maintain application availability in the event of a failure, or to provide a maintenance window. Not only can workloads easily move to alternate systems but now the activations may move as well.

Feature	Benefits
Industry-leading POWER8 performance	<ul style="list-style-type: none"> • Increase customer satisfaction by improving application response time • Infrastructure cost savings from a reduction in the number of servers and software costs • Improved efficiency in operations from consolidating multiple workloads on fewer systems • Scale more simply on systems optimized for mission-critical database and transaction applications
Built-in PowerVM virtualization capability	<ul style="list-style-type: none"> • Improves system efficiency, which lowers operational expense • Provides flexibility in responding to changing business requirements • Enables energy savings and maintains application availability • Provides the ability to handle unexpected workload peaks by sharing resources • Enables consolidation of multiple AIX, IBM i and Linux workloads
Optimized for the rigorous demands of enterprise computing	<ul style="list-style-type: none"> • Better customer satisfaction due to improved performance and application availability • Perform more work with existing resources • Get more work done with less disruption to your business • Faster repair when required due to sophisticated system diagnostics
Cloud capacity for flexibility and growth	<ul style="list-style-type: none"> • Share resources within a pool of systems to balance workload or respond to events • Capacity Upgrade on Demand enables non-disruptive growth, increasing system capacity without forcing everything to stop • Capacity may be increased temporarily, only for as long as required, metered on a daily or even a minute-by-minute basis • Align expense with usage without sacrificing performance or future growth options • Reduce the cost of deploying a high availability/disaster recovery infrastructure
Open innovation for mobile and big data applications	<ul style="list-style-type: none"> • Allows clients the flexibility to select the right application, database and operating system combinations without deploying disparate servers for each • Broaden application access more simply and affordably • Helps keep deployment in the mainstream

Open innovation for mobile and big data applications

POWER architecture is the heart of the OpenPOWER Foundation, a growing community built around an open technology platform to foster new opportunities and design the next generation of applications and technologies. Leveraging open standards, Power Systems provides developers with tools tuned for a platform that boosts productivity and performance by removing constraints imposed by commodity architectures.

Core business systems such as ERP and CRM are crucial elements in responding to market needs. They manage and deliver the data and provide the reliability, availability, and security that business—and customers—demand. Mobile applications that access these systems are now mission-critical and cannot effectively run as isolated applications with their own set of data. The Power E870 server offers the scale, computational speed, data bandwidth, low latency and resiliency required to provide immediate, reliable responses to mobile users when they need it most.

For Linux-based applications, the Power Integrated Facility for Linux (Power IFL) offers integrated operations, improved performance and reliability, combined with scale-out market affordability. By deploying these applications on a Power E870 server, clients can take advantage of application affinity and a shared IT infrastructure for their core systems and systems of engagement to better extend their business securely and reliably.

Businesses are amassing a wealth of data and Power Systems, built with innovation to support today's data demands, can store it, secure it and, most importantly, extract actionable insight from it. Power Systems' open, data-centric design combines computing power, big memory, memory bandwidth, and broad data pathways to process and move data through applications in ways that are easier to consume and manage.

IBM Power System E870 at a glance

Configuration options	Per building block	System maximum
Processor cores	32 x 4.02 GHz POWER8 40 x 4.19 GHz POWER8	64 x 4.02 GHz POWER8 80 x 4.19 GHz POWER8
Sockets	Four	Eight
Level 2 (L2) cache per core	512 KB	
Level 3 (L3) cache per core	8 MB eDRAM shared L3	
Level 4 (L4) cache	Up to 128 MB eDRAM L4 (off-chip) per socket	
Enterprise memory	32 CDIMMs Up to 4 TB of 1600 MHz DDR3 Up to 8 TB of 1600 MHz DDR4	64 CDIMMs Up to 8 TB of 1600 MHz DDR3 Up to 16 TB of 1600 MHz DDR4
Integrated PCIe adapter slots	8 PCIe Gen3 x16	16 PCIe Gen3 x16

IBM Systems
Data Sheet

IBM Power System E870 at a glance

Expansion features (optional – operating system dependencies)

DVD bay	One	
Max PCIe Gen3 I/O Drawers (12 PCIe Gen3 slots each)	4	8
Max DASD/SSD I/O Drawers (24 SFF bays each)	64	64

Standard features

System control unit	One
Flexible Service Processors	Two in system control unit
IBM POWER Hypervisor™	LPAR, Dynamic LPAR; Virtual LAN (Memory to memory interpartition communication)
PowerVM Enterprise Edition (included)	Micro-partitioning (up to 20 micro-partitions per processor); Multiple Shared Processor Pools; Virtual I/O Server; Shared Dedicated Capacity; Live Partition Mobility (LPM) and Active Memory Sharing* (AMS)
RAS features	<ul style="list-style-type: none"> Processor Instruction Retry Alternate Processor Recovery Selective dynamic firmware updates Chipkill memory with DRAM sparing Dynamic L2 and L3 cache column repair Memory controller replay buffer L4 bank delete Dynamic inter-node bus repair Redundant service processors with automatic failover Redundant system clocks with dynamic failover Redundant, hot swappable power supplies and cooling fans Concurrent add/repair of I/O drawers Hot- swappable disk bays in EXP24S Hot-plug/blind-swap PCIe slots Dynamic processor deallocation Extended error handling on PCIe slots Active Memory Mirroring for Hypervisor

IBM Power System E870 at a glance

Capacity on Demand features (optional)	Processor and/or Memory Capacity Upgrade on Demand (CUoD) Elastic Processor and/or Memory Capacity on Demand (CoD) Trial Processor and/or Memory CoD Utility CoD Power Enterprise Pools	
Operating systems	AIX, IBM i and Linux for Power [†]	
High availability	Power HA Editions	
Power requirements	Operating voltage: 200 to 240 V ac	
System dimensions	7 EIA (12U) space in a 19-inch rack	12 EIA (12U) space in a 19-inch rack
Warranty	24x7, same day response for one year; on-site (varies by country). Warranty service upgrades and maintenance are available.	

Why IBM?

IBM understands that applications and business processes have differing demands and that one size does not fit all. To ensure that technology aligns to business rather than the other way around, IBM offers a full portfolio of Power Systems and software.

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.

For more information

To learn more about the Power E870 server, please contact your IBM representative or IBM Business Partner, or visit the following website:

ibm.com/systems/power/hardware/e870/index.html

Additionally, IBM Global Financing provides numerous payment options to help you acquire the technology you need to grow your business. We provide full lifecycle management of IT products and services, from acquisition to disposition.

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Actual available storage capacity may be reported for both uncompressed and compressed data and will vary and may be less than stated.

¹ Based on published SPEC industry benchmarks SPECjbb2013 and SPECfp_rate2006 comparing a Power E870 (80-core, 4.19 GHz) vs. systems using Intel Xeon E7-4890 v2 (Ivybridge-EX) or SPARC T5 processors, as of October 6, 2014

* Operating system support required

† See Facts and Features for specific supported operating system levels



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