



IBM System p5 590 server



Highlights

- ***Provides the power to run mission-critical applications with IBM POWER5™ technology***
- ***Helps to lower costs and ease administration by consolidating UNIX® and Linux® environments***
- ***Built with high-end reliability, availability and serviceability (RAS) features for an on demand world***

The IBM System p5™ 590 server is designed to deliver outstanding performance at a price-point that will transform IT economics. Equipped with advanced 64-bit IBM POWER5+™ processor cores in up to 32-core symmetric multiprocessing (SMP) configurations, this server is built to provide the processing power for a wide range of complex, mission-critical applications with demanding processing requirements—from database services to enterprise resource planning (ERP) and transaction processing.

With advanced System p™ virtualization technologies such as Advanced POWER™ Virtualization¹ standard plus Capacity on Demand (CoD) options, the p5-590 can scale rapidly and seamlessly to address changing needs, making it an excellent server platform for server consolidation. It can execute the IBM AIX 5L™ and Linux operating systems simultaneously, providing the flexibility to run the applications businesses need to achieve their goals. And, extensive mainframe-inspired reliability, availability and serviceability features can help ensure that the system will be ready for business, 24 hours a day, 7 days a week.

Fast processors for more work in less time

The System p5 590 server features advanced fifth-generation 2.1 GHz POWER5+ processor cores to deliver outstanding performance. With these powerful processors, the p5-590 can perform work in less time than the top-of-the-line IBM eServer™ pSeries® system, the pSeries 690.

POWER5+ processor cores can run 64-bit applications today, while concurrently supporting 32-bit applications to enhance flexibility. The processor features simultaneous multithreading¹, allowing it to run two application “threads” at the same time, which can significantly reduce the time to complete tasks. With the p5-590, you have the freedom to choose the operating environment and applications that best fit business needs and have the confidence that the system will be ready to handle future requirements as well.

Innovative packaging

The p5-590 server uses advanced Multichip Modules (MCMs) to accelerate performance and help ensure system reliability. Each dense MCM contains eight processor cores in an area that could fit in the palm of your hand. By decreasing the physical distance between processors, MCMs enable faster movement of information and increase reliability.

MCMs are assembled in “books,” each containing two 8-core MCMs. This form of packaging helps to insulate components from physical damage and

improves reliability. With up to two books per server, the p5-590 system offers up to 32-core processing, greatly enhancing the performance of the system.

Exceptional scalability options

The p5-590 server starts with an 8-core entry configuration, but it can be easily scaled up to a 32-core system. When an organization requires additional processing power, it can activate additional inactive processors (in one processor increments) or memory (in 1GB increments) already installed in the system frame, through Capacity on Demand (CoD) options. This resource is paid for when activated. With CoD, it is easy to respond transparently to either temporary spikes in demand or long-term increases in workloads.

Several types of CoD options are available for the p5-590 server. These options use resources already installed in the system but not activated at the time of original purchase:

- **Capacity Upgrade on Demand (CUoD)** allows companies to purchase additional permanent processor or memory capacity when needed.

- **Trial CoD** offers a one-time, 30-day trial at no additional charge to allow clients to explore the uses of added processor or memory capacity on their server.
- **Reserve CoD** allows companies to purchase processor features in pre-paid blocks of 30 processor days and activate them in full day increments in response to workload demand. The processors can be deactivated automatically when demand subsides.
- **On/Off CoD** enables processors or memory to be activated in full day increments as needed.

In addition, Capacity BackUp on Demand on the p5-590 server provides a configuration with four active and 28 inactive CoD processors to be installed at an offsite location. The system can be temporarily activated using On/Off CoD during unplanned outages in disaster recovery situations. IBM High Availability Cluster Multiprocessing (HACMP™) software, when installed, can automatically activate Capacity BackUp resources upon failover.

Virtualization and partitioning for workload consolidation

The p5-590 server can utilize logical partitioning (LPAR) technology implemented via System p virtualization technologies and the operating system (OS). Logical partitions allow the processors to run separate workloads in different partitions on the same server, thereby helping lower costs. p5-590 partitions are designed to be shielded from each other to provide a high level of data security and increased application availability. The supported operating systems also implement dynamic LPAR, which allows clients to dynamically allocate many system resources to application partitions without rebooting, simplifying overall systems administration and workload balancing, and enhancing availability.

The p5-590 also includes Advanced POWER Virtualization, which provides IBM Micro-Partitioning™ and Virtual I/O Server (VIOS) capabilities, allowing businesses to increase system utilization, while helping to ensure applications continue to get the resources they need. With these virtualization

technologies, multiple copies of operating systems can be run on the same system, reducing the number of servers needed and helping to reduce software licensing costs. Micro-Partitioning technology allows processors to be finely divided (up to ten micro-partitions per processor for a maximum of 254 per p5-590 server. Micro-partitions can be defined in increments as small as 1/100th of a processor) so that more work can be executed on a single processor.

Innovations such as VIOS allow the sharing of expensive disk drives and communications and Fibre Channel adapters to help drive down complexity and systems/administrative expenses. The shared processor pool allows for automatic non-disruptive balancing of processing power between partitions assigned to the shared pool—resulting in increased throughput and utilization.

IBM System Storage™ technology offers additional virtualization and partitioning capabilities within the storage infrastructure for the p5-590. The TotalStorage® DS8000™ product line offers the capability to have two storage partitions, each handling different and demanding workloads. This allows

server partitions or two servers to share a single physical storage server, helping to provide a more cost effective environment and return on investment. And the IBM SAN Volume Controller offers a way to simplify management of SAN disk arrays by creating virtual large storage pools, helping to enhance utilization and reduce total cost of ownership.

Every p5-590 system must be attached to an IBM Hardware Management Console (HMC). The HMC is a dedicated system unit that provides the systems administrator an interface for configuring and managing the resources of the p5-590. For redundancy, connection of two HMCs is supported. Among the leading-edge functions controlled using the HMC are virtualization technologies, Capacity on Demand and management of clustered environments. The HMC also provides tools for problem determination and service support. Its use allows server resources to be readjusted dynamically so that companies can respond more readily to changes in requirements. In addition, more services can be consolidated on each server—which can lower licensing costs, reduce

the complexity of server management and increase throughput and system utilization.

Extensive configuration options

The p5-590 server offers outstanding configuration flexibility so the system can grow with a business. Processors, memory, I/O drawers, adapters and disk bays can be added to realize the potential power and capacity of the p5-590.

Equipped with 8GB of DDR2 memory in its basic configuration, the p5-590 server can be scaled to 1TB. The server features 7.6MB L2 and 144MB L3 caches in each MCM to help stage information more effectively from processor memory to applications. These caches allow the p5-590 system to run workloads significantly faster than predecessor servers.

The processor MCMs, memory and I/O ports are packaged into protective books, which in turn are packaged into a 24-inch system frame. This frame, which provides 42 EIA units (42U) of rack space, uses a bulk power

subsystem with redundant hot-plug bulk power assemblies. At least one integrated I/O drawer is required in the frame, providing PCI-X adapter slots and 16 hot-swappable Ultra3 SCSI disk bays for 73.4GB or 146.8GB 15K rpm disk drives. With support for 64-bit adapters and backward compatibility for 32-bit cards, the adapter slots provide ample room for growth.

Up to four I/O drawers may be installed in the system frame. One is eliminated if a media drawer or an integrated battery backup feature is installed. For more capacity, an expansion frame is available allowing a maximum of eight additional I/O drawers (one is eliminated if a redundant battery backup feature is installed). Thus a maximum of 160 PCI-X slots and 128 disk bays accommodating up to 18.7TB of internal disk storage is possible.

Today, IBM is one of few vendors that can provide storage solutions that encompass a full spectrum of products—tape, disk, SAN, NAS and storage software—to help deliver superior consolidation and administration of

your organization's data efficiently, cost-effectively and with less time and effort. This range of IBM System Storage products, together with the p5-590 server, can help optimize an IT environment to achieve an outstanding server and storage combination, helping to keep business-critical data available and readily accessible.

The p5-590 server can be upgraded to an IBM System p5 595 server, to provide even greater performance and scalability. The p5-595 offers up to 64 processor cores, 2TB of memory, up to 240 PCI-X slots, up to 192 disk bays and up to 28.7TB of internal disk storage.

To help clients leverage their investments in System p servers, IBM is committed to enhancing those investments as advancements are made in processor technologies. As a result, IBM plans to provide an upgrade path from the current p5-590 and p5-595 servers using POWER5 technology to the next generation of IBM POWER6™ processor-based enterprise servers.*

* All statements regarding IBM's future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only.

Mission-critical application availability

The p5-590 server is designed to provide new levels of proven, mainframe-inspired RAS features for mission-critical applications. It comes equipped with multiple resources to identify and help resolve system problems rapidly. During ongoing operation, error checking and correction (ECC) checks data for errors and can correct them in real time. First Failure Data Capture (FFDC) capabilities log both the source and root cause of problems to help prevent the recurrence of intermittent failures that diagnostics cannot reproduce. Meanwhile, Dynamic Processor Deallocation and dynamic deallocation of PCI-X bus slots help to reallocate resources when an impending failure is detected so applications can continue to run unimpeded.

The p5-590 also includes structural elements to help ensure outstanding availability and serviceability. The I/O drawers include hot-swappable disk bays and hot-plug/blind-swap PCI-X slots that allow administrators to repair, replace or install adapters with the I/O drawer in place, which helps prevent system interruption and improves availability. Redundant hot-plug power and

cooling subsystems provide power and cooling backup in case units fail and allow for easy replacement. In the event of a complete power failure, Early Power Off Warning capabilities are designed to perform an orderly shutdown. In addition, both primary and redundant battery backup power subsystems are optionally available.

A redundant service processor is available to help the standard service processor prevent outages and identify failing components by continuously monitoring system operations and taking preventive action for quick problem resolution. Selective dynamic firmware update capabilities allow administrators to selectively update system firmware without taking down the server. For the ultimate in server availability, the p5-590 can be clustered with HACMP designed to provide near continuous availability. In addition, IBM System Storage with IBM Tivoli® software and services offer a wide range of high availability options, from local mirroring in a cluster server environment allowing faster recovery.

Flexibility to run needed applications

The p5-590 server provides the flexibility to run AIX 5L and Linux applications in separate micro-partitions. This will allow resources to be consolidated and help reduce total IT expenditures.

The AIX 5L OS is an industrial-strength IBM UNIX environment tuned for mission-critical applications and loaded with exceptional security, reliability and availability features. It delivers enhancements to Java™ technology, Web performance and scalability for managing systems of all sizes—from single servers to large, complex e-business installations. Web-based remote management tools give administrators centralized control of the system, enabling them to monitor key resources, including adapter and network availability, file system status and processor workload.

AIX 5L also incorporates Workload Manager, a resource management tool that specifies the relative importance of workloads to balance the demands of competing workloads and enhance system resources. Workload Manager can help ensure that critical applications remain responsive even during periods of peak system demand.

By supporting the Linux OS, the p5-590 offers important cost-saving opportunities. Because Linux is an open source technology, it can be less expensive to license than many proprietary operating systems. With a growing list of Linux open source applications available, it offers businesses the freedom to use the right applications for their needs.² The Linux OS is orderable from IBM and selected Linux distributors in packages that include a range of open source tools and applications. IBM is firmly committed to Linux on POWER and offers expert service and support.

Benefits of clustering

Clustering—an advanced computing technique designed to promote higher performance, scalability, availability and manageability—allows hundreds of IBM System p5 and eServer p5 servers to be interconnected to form a single, unified computing resource known as an IBM System Cluster 1600. Using Cluster Systems Management (CSM) software for the AIX 5L or Linux OSs,

up to 16 p5-590 servers may be included in a Cluster 1600 configuration. The result could be a reduction in the cost of data center administration, while helping to ensure continuous access to business-critical data and applications.

To interconnect p5-590 servers in a cluster, either an industry standard Ethernet (10/100/1000 Mbps) interconnection or an IBM eServer pSeries High Performance Switch (HPS) may be used. The HPS approach offers excellent performance, scalability and throughput for parallel message-passing high performance computing (HPC) applications.

System p5 590: Outstanding price/performance

With the IBM System p5 590 server, high-end price/performance, scalability, reliability and flexibility can be achieved at an attractive price. Using innovative POWER5+ processor cores and accessing advanced virtualization technologies such as dynamic LPAR, Micro-Partitioning and CoD, the p5-590 server can help complete more transactions, solve larger problems and

conduct more complex queries than predecessor servers. It does so with a smaller footprint, helping to consolidate the server infrastructure, reduce the complexity of systems administration and optimize required resources. The ability to use multiple operating systems simultaneously provides flexibility to run a wide variety of applications. And extensive RAS features are designed to help applications run reliably around the clock.

In addition, IBM System Storage disk, tape and software options can help extract additional value and increase price/performance of the p5-590 infrastructure. These storage products provide comprehensive virtualization, scalability, protection for growth and flexibility designed to help get more value out of investments.

These outstanding features, offered at exceptional price/performance levels for high-end UNIX servers, help ease worries about hitting performance ceilings. The p5-590 scales easily, allowing processing power, memory and storage capacity to be added seamlessly.

p5-590 server at a glance

Standard configurations

Processor cores	Eight POWER5+ 2.1 GHz in a single MCM (16-core system with eight processor cores inactive)
L2 cache	7.6MB/MCM
L3 cache	144MB/MCM
RAM (memory)	8GB
Processor-to-memory bandwidth (peak)	405.5 GBps
L2 to L3 cache bandwidth (peak)	537.6 GBps
GX+ I/O subsystem bandwidth (peak)	89.6 GBps
I/O drawers	One
SCSI disk bays	16 via one I/O drawer (73.4/146.8GB 15K rpm disks)
Internal disk storage	2.3TB with I/O drawer
Adapter slots	20 PCI-X (64-bit/133 MHz) via one I/O drawer

Standard features

I/O ports	Two integrated dual Ultra3 SCSI controllers (per I/O drawer) Two Hardware Management Console ports
POWER Hypervisor	Dynamic LPAR Virtual LAN ¹
Advanced POWER Virtualization ¹	Micro-Partitioning Shared processor pool Virtual I/O Server Partition Load Manager (AIX 5L only)

System expansion

CoD configurations	8 to 32 processor cores in increments of one (via one to four MCMs); 2.1 GHz POWER5+ processor cores
RAM (memory)	Up to 1TB of DDR2 SDRAM running at 400 MHz or up to 512GB of DDR2 SDRAM running at 533 MHz
I/O expansion	Up to seven additional I/O drawers, each providing 20 64-bit PCI-X slots and up to 16 disk bays (73.4/146.8GB 15K rpm disks)
Media bays	Three via media drawer
Connectivity support	4 Gigabit Fibre Channel; 10 Gigabit Ethernet; 12x InfiniBand Switch

Battery backup

Up to two (optional)

p5-590 server at a glance

RAS features

Copper and silicon-on-insulator (SOI) processor cores
Selective dynamic firmware updates
IBM Chipkill™ ECC, bit-steering memory
ECC L2 cache, L3 cache
Standard and redundant service processor with automatic failover
Redundant system clock requiring system reboot
Hot-swappable disk bays
Hot-plug/blind-swap PCI-X slots
Hot-plug power supplies and cooling fans
Dynamic Processor Deallocation
Dynamic deallocation of logical partitions and PCI-X bus slots
Extended error handling on PCI-X slots
Redundant power supplies and cooling fans
Battery backup and redundant battery backup (optional)

Capacity on Demand features (optional)

Processor CUoD
Memory CUoD
Reserve CoD
On/Off Processor CoD
On/Off Memory CoD
Trial CoD

Capacity BackUp (optional)

Special configuration with predominantly inactive processor cores which can be temporarily activated in disaster recovery situations

Operating systems

AIX 5L V5.2 or later
SUSE Linux Enterprise Server 9 for POWER (SLES 9) or later
Red Hat Enterprise Linux AS 4 for POWER (RHEL AS 4) or later

Power requirements

200v to 240v; 380v to 415v; 480v AC

System dimensions

One frame: 79.7"H x 30.9"W x 66.2"D (2,025mm x 785mm x 1,681mm); weight: 2,735 lb (1,241 kg)*
Two frames: 79.7"H x 62.0"W x 66.2"D (2,025mm x 1,575mm x 1,681mm); weight: 4,956 lb (2,248 kg)*

Warranty

24x7, same day service for one year (limited) at no additional cost; on-site for selected components; CRU (customer replaceable unit) for all other units (varies by country).

* With acoustic door and integrated battery backup. Weight will vary when disks, adapters and other peripherals are installed.

For more information

To learn more about the IBM System p5 590 server, please contact your IBM marketing representative or IBM Business Partner, or visit the following Web sites:

- ibm.com/systems/p
- ibm.com/servers/aix
- ibm.com/linux/power
- ibm.com/common/ssi



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When referring to storage capacity, 1TB equals total GB divided by 1000; accessible capacity may be less.

All performance information was determined in a controlled environment. Actual results may vary. Performance information is provided "AS IS" and no warranties or guarantees are expressed or implied by IBM. Buyers should consult other sources of information, including system benchmarks, to evaluate the performance of a system they are considering buying.

¹ Not supported on AIX 5L V5.2

² For a full list of Linux on POWER applications, visit ibm.com/systems/linux/power/apps/all.html.