



## IBM @server® p5 590 server



To succeed in an on demand world, enterprises need computer systems with the power to compete in a global marketplace, the reliability to operate around the clock, the agility to react swiftly to changing market conditions and the flexibility to run the applications required to meet their objectives. Businesses should be able to achieve those challenges without adding unnecessary complexity or costs.

The IBM @server® p5 590 server is designed to deliver outstanding performance at a price-point that will transform IT economics. Equipped with advanced 64-bit POWER5 processors in up to 32-way 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.

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### Highlights

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- ***Provides the power to run mission-critical applications with up to 32 IBM POWER5™ processors***
- ***Built with high-end reliability, availability and serviceability (RAS) for an on demand world***
- ***Offers exceptional flexibility by supporting IBM AIX 5L™, Linux® and i5/OS™ operating systems***

With advanced IBM Virtualization Engine™ system technologies such as Advanced POWER™ Virtualization plus Capacity on Demand (CoD) options, the p5-590 can scale rapidly and seamlessly to address changing needs. It can execute the AIX 5L, Linux and i5/OS 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 @server p5 590 server features advanced fifth-generation 1.65 GHz POWER5 microprocessors to deliver outstanding performance. With these powerful processors, the p5-590 can perform work in less time than the top-of-the-line IBM @server pSeries® system, the pSeries 690.

POWER5 processors can run 64-bit applications today, while concurrently supporting 32-bit applications to enhance flexibility. The POWER5 processor features simultaneous multi-threading,<sup>1</sup> allowing the processor 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 microprocessors 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 eight-way 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-way processing, greatly enhancing the performance of the system.

#### **Exceptional scalability options**

The p5-590 server starts with an eight-way entry configuration, but it can be easily scaled up to a 32-way 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 Virtualization Engine systems technologies and the operating system (OS). Different processors may run separate workloads, 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 AIX 5L™ and SUSE LINUX Enterprise Server 9 operating systems also implement dynamic LPAR which allows clients to dynamically allocate system resources to application partitions without rebooting. Dynamic LPAR technology enhances the security of applications with Evaluation Assurance Level 4+ (EAL4+) and Controlled Access Protection Profile (CAPP) certification.

The p5-590 also includes Advanced POWER Virtualization which provides Micro-Partitioning™ and Virtual I/O Server capabilities which allow 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 Virtual I/O Server allow the sharing of expensive disk drives and communications and Fibre Channel adapters to help drive down complexity and systems/administrative expense. 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.

All of these capabilities allow server resources to be readjusted 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 266 MHz DDR1 memory in its basic configuration, the p5-590 server can be scaled to 1TB. In addition 8GB to 128GB of 533 MHz DDR2 memory, useful for high-performance applications, is also available. 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 36.4GB or 73.4GB 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 and a primary and redundant optional integrated battery backup feature may be installed in the system frame. For more capacity, an expansion frame is available allowing a maximum of eight I/O drawers. This

results in a maximum of 160 PCI-X slots and 128 disk bays accommodating up to 9.3TB of internal disk storage.

The p5-590 server can be upgraded to an IBM **@server** p5 595 server, to provide even greater performance and scalability. The p5-595 offers up to 64 processors, 2TB of memory, up to 240 PCI-X slots, up to 192 disk bays and up to 14.0TB of internal disk storage.

#### **Mission-critical application availability**

The p5-590 server is designed to provide new levels of proven, mainframe-inspired RAS 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.

Future planned capabilities will enhance RAS features.\* A redundant service processor is planned to help the available 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 will 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.

The p5-590 server is backed by worldwide IBM service and support. The one-year end-to-end limited warranty includes AIX 5L operating system support, hardware fixes, staffed phone hardware support and call tracking.

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

**Flexibility to run needed applications**

The p5-590 server provides the flexibility to run AIX 5L, Linux or i5/OS 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 specially 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 applications available, it offers businesses the freedom to use the right applications for their needs. 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 and offers expert service and support.

i5/OS is the next generation of OS/400®, building on and extending the capabilities of that operating system. Up to two p5-590 processors may be allocated to run i5/OS applications. i5/OS can help streamline processes and deploy business applications faster with its integrated, pre-tested database and middleware. By supporting a comprehensive set of open and SQL standards, it also allows outstanding flexibility and code portability.

**Benefits of clustering**

Clustering—an advanced computing technique designed to promote higher performance, scalability, availability and manageability—allows hundreds of IBM @server p5 servers to be interconnected to form a single, unified computing resource known as an IBM @server Cluster 1600. Using Cluster Systems Management (CSM) software for AIX 5L or Linux, 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 ensuring 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 @server pSeries High Performance Switch (HPS) may be used. The HPS approach offers the maximum performance, scalability and throughput for parallel message-passing high performance computing (HPC) applications.

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## p5-590 server at a glance

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### Standard configurations

Microprocessors	Eight POWER5 1.65 GHz processors in a single MCM (16-way system with eight processors inactive)
L2 cache	7.6MB / MCM
L3 cache	144MB / MCM
RAM (memory)	8GB
Processor-to-memory bandwidth (peak)	399.7 GBps <sup>2</sup>
L2 to L3 cache bandwidth (peak)	422.4 GBps
RIO-2 I/O subsystem bandwidth (peak)	48 GBps
I/O drawers	One
SCSI disk bays	16 via one I/O drawer (36.4/73.4GB 15K rpm disks)
Internal disk storage	1.1TB with I/O drawer
Media bays	3
Adapter slots	20 3.3v 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
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### System expansion

CoD configurations	8 to 32 processors in single processor increments of one (via one to four MCMs); 1.65 GHz POWER5 processors
RAM	Up to 1TB 266 MHz DDR1; Up to 128GB 533 MHz DDR2
I/O expansion	Up to seven additional I/O drawers, each providing 20 3.3v 64-bit PCI-X slots and up to 16 disk bays (36.4/73.4GB 15K rpm disks)
Connectivity support (optional)	2 Gigabit Fibre Channel; 10 Gigabit Ethernet
POWER Hypervisor™	LPAR Dynamic LPAR <sup>3</sup> Virtual LAN <sup>1</sup>
Advanced POWER Virtualization <sup>1</sup>	Micro-Partitioning Shared processor pool Virtual I/O Server Partition Load Manager (AIX 5L only)
Battery backup	Up to two (optional)

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## p5-590 server at a glance

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### RAS features

Copper and silicon-on-insulator (SOI) microprocessors  
Selective dynamic firmware updates (planned for 2Q 2005)  
IBM Chipkill™ ECC, bit-steering memory  
ECC L2 cache, L3 cache  
Service processor  
Redundant service processor (planned for 2H 2005)  
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<sup>4</sup>  
Reserve CoD  
On/Off Processor CoD  
On/Off Memory CoD<sup>4</sup>  
Trial CoD

### Capacity BackUp (optional)

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

### Operating systems

AIX 5L Versions 5.2/5.3  
SUSE LINUX Enterprise Server 9 for POWER (SLES 9) or later  
Red Hat Enterprise Linux AS 3 for POWER Update 4 (RHEL AS 3) or later  
i5/OS V5.3

### 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).

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

## @server p5-590: Outstanding price/performance

With the IBM @server p5 590 server, high-end price/performance, scalability, reliability and flexibility can be achieved at an attractive price. Using innovative POWER5 processors 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.

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

## For more information

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

- [ibm.com/eserver/pseries](http://ibm.com/eserver/pseries)
- [ibm.com/servers/aix](http://ibm.com/servers/aix)
- [ibm.com/linux/power](http://ibm.com/linux/power)
- [ibm.com/common/ssi](http://ibm.com/common/ssi)

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

Many of the features described in this document are operating system dependent and may not be available on Linux. For more information, please check:

[ibm.com/servers/eserver/pseries/linux/Whitepapers/linux\\_pseries.html](http://ibm.com/servers/eserver/pseries/linux/Whitepapers/linux_pseries.html)

<sup>1</sup> Not supported on AIX 5L V5.2

<sup>2</sup> Using 533 MHz DDR2 memory

<sup>3</sup> Available with AIX 5L and SLES 9 operating systems

<sup>4</sup> Using 266 MHz DDR1 memory



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