

Flagship UNIX and Linux system designed to drive business innovation



IBM @server® p5 595 server



Highlights

- ***Provides the power for mission-critical workloads with up to 64 IBM POWER5™ processors***
- ***Helps to lower costs and ease administration by consolidating UNIX®, Linux® and i5/OS™ environments***
- ***Offers mainframe-inspired reliability, availability and serviceability (RAS) for an on demand world***

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 goals. The IBM @server® p5 595 server is designed to help companies conquer those challenges to achieve a competitive edge.

As the most powerful IBM @server p5 system, the p5-595 server can deliver exceptional performance, reliability, scalability and flexibility—enabling businesses to tackle workloads that were previously beyond the reach of a single UNIX system. Equipped with advanced 64-bit POWER5 processors in up to 64-way symmetric multiprocessing (SMP) configurations, this server provides the processing power for a full range of complex, mission-critical applications with demanding processing requirements, including business intelligence (BI), enterprise resource planning (ERP), transaction processing and ultra high performance computing (HPC). With twice the number of processors, twice the memory capacity and nearly three times the commercial performance of the previous top-of-the-line IBM @server pSeries® 690 server,¹ the p5-595 can ultimately help companies make decisions faster and drive business innovation.

Delivering advanced IBM Virtualization Engine™ systems technologies such as Advanced POWER™ Virtualization plus Capacity on Demand (CoD) options, the p5-595 server can scale rapidly and seamlessly to address the changing needs of an on demand environment. 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 tackle complex workloads

The *@server* p5 595 server features advanced fifth-generation POWER5 microprocessors, with lightning-fast speeds of 1.9 GHz or 1.65 GHz, to deliver exceptional performance. With these powerful processors, the p5-595 can process complex workloads, in much less time than the previous generation of IBM UNIX and Linux servers.

POWER5 processors can run 64-bit applications today, while concurrently supporting 32-bit applications to

enhance flexibility. The POWER5 processor features simultaneous multi-threading,² allowing the processor to run two application “threads”, at the same time, which can significantly reduce the time to complete tasks. With the p5-595, 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 p5-595 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 four books per server, the p5-595 system offers up to 64-way processing, providing significant performance gains over predecessor servers.

Exceptional scalability options

The p5-595 server starts with a 16-way entry configuration, but it can be scaled up seamlessly to a 64-way system. Adding processor power could not be easier: whenever an organization needs to improve performance, it can activate additional 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 p5-595 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 p5-595 server provides two configurations with four active and either 28 or 60 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 p5-595 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. p5-595 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 p5-595 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 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 p5-595 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 p5-595 server is designed to grow with a business by offering outstanding configuration flexibility. Processors, memory, I/O drawers, adapters and disk bays can be added to realize the potential power and capacity of the p5-595.

Equipped with 8GB of 266 MHz DDR1 memory in its basic configuration, the p5-595 server can be scaled to 2TB. In addition, 8GB to 256GB 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 help the p5-595 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 investment protection and 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, up to two expansion frames are available allowing a maximum of 12 I/O drawers. This results in a maximum of 240 PCI-X slots and 192 disk bays accommodating up to 14.0TB of internal disk storage.

Mission-critical application availability

The p5-595 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 p5-595 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 p5-595 can be clustered with HACMP designed to provide near continuous availability.

The p5-595 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.

Flexibility to run needed applications

The p5-595 server provides the flexibility to run AIX 5L, Linux and 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 p5-595 offers important cost-saving opportunities. Because Linux is an open source technology, it is much 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 p5-595 processors may be installed 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 p5-595 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.

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

p5-595 server at a glance

Standard configurations

| | |
|--------------------------------------|---|
| Microprocessors | 16 POWER5 1.65 or 1.9 GHz processors (two 8-way MCMs) |
| L2 cache | 7.6MB / MCM |
| L3 cache | 144MB / MCM |
| RAM (memory) | 8GB |
| Processor-to-memory bandwidth (peak) | 799.5 GBps ³ |
| L2 to L3 cache bandwidth (peak) | 972.8 GBps |
| RIO-2 I/O subsystem bandwidth (peak) | 72 GBps |
| I/O drawers | One |
| SCSI disk bays | 16 via one I/O drawer (36.4/73.4GB 15K rpm disks) |
| Internal disk storage | 2.3TB with I/O drawer |
| Adapter slots | 20 3.3v PCI-X (64-bit/133 MHz) via one I/O drawer |

Standard features

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| I/O ports | Two integrated dual Ultra3 SCSI controllers Two Hardware Management Console ports |
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System expansion

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| CoD configurations | 16 to 64 processors in single processor increments of one (via two to eight MCMs); 1.65 or 1.9 GHz POWER5 processors |
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| RAM | Up to 2TB of 266 MHz DDR1 266 MHz; up to 256GB of 533 MHz DDR2 |
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| I/O expansion | Up to eleven 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) |
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| Connectivity support (optional) | 2 Gigabit Fibre Channel; 10 Gigabit Ethernet |
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|--------------------------|---|
| POWER Hypervisor™ | LPAR Dynamic LPAR ⁴ Virtual LAN ⁵ |
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|--|---|
| Advanced POWER Virtualization² | Micro-Partitioning Shared processor pool Virtual I/O Server Partition Load Manager (AIX 5L only) |
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|-----------------------|----------------------|
| Battery backup | Up to two (optional) |
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p5-595 server at a glance

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 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 CUoD⁵
Reserve CoD
On/Off Processor CoD
On/Off Memory CoD⁵
Trial CoD

Capacity BackUp (optional)

Special configurations 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 AS3 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: 5,420 lb (2,458 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.

To interconnect p5-595 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.

@server p5 595: Flagship for UNIX and Linux computing

With the p5-595 server, outstanding, leading-edge performance, scalability, reliability and flexibility can be achieved at an extremely attractive price. Using innovative POWER5 processors and accessing advanced virtualization technologies such as dynamic LPAR, Micro-Partitioning and CoD, the p5-595 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.

With its expansive growth potential, extraordinary power and proven IBM technology, the @server p5 595 is ready to take your business to the next level.

For more information

To learn more about the IBM @server p5 595 server, please contact your IBM marketing representative or IBM Business Partner or visit the following Web sites:

- ibm.com/eserver/pseries
- ibm.com/servers/aix
- ibm.com/linux/power
- ibm.com/common/ssi

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.

¹ Based on rPerf (relative performance), an IBM estimate of commercial processing performance. Comparison between a 32-way p690 with 1.9 GHz POWER4+™ processors and a 64-way p5-595 with 1.9 GHz POWER5 processors.

² Not supported on AIX 5L V5.2

³ Using 533 MHz DDR2 memory

⁴ Available with AIX 5L and SLES 9 operating systems

⁵ Using 266 MHz DDR1 memory



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