

IBM @server pSeries 670



Robust IBM @server pSeries 670 mid-range server

Highlights

- ***Delivers outstanding price/performance in a mid-range UNIX® server***
- ***Designed with the power, scalability and flexibility to consolidate mission-critical applications on a single server***
- ***Provides self-management capabilities for uninterrupted operation and lower total cost of ownership***

Setting the mid-range standard

When introduced, the IBM @server pSeries™ 690 enterprise server set the standard against which UNIX servers are measured. Now, IBM brings this leading-edge technology to a wider range of businesses with the IBM @server pSeries 670 mid-range server.

The pSeries 670 is an innovative 4- to 16-way symmetric multiprocessor (SMP) server that incorporates mainframe-inspired technology from IBM @server zSeries™ servers. Like the pSeries 690, it features advanced POWER4™ microprocessors as well as true logical partitioning (LPAR)

and self-management capabilities that help provide superior availability and help reduce total cost of ownership.

What does this advanced technology mean to medium-size organizations? It allows the consolidation of multiple front-end business applications onto a single, easy-to-manage server. And, there are fewer servers to manage and maintain, resulting in greater flexibility in matching resources to changing business demands. The pSeries 670 also provides the scalability and reliability to handle mission-critical, backend database serving in addition to high-performance computing tasks. And it delivers these capabilities with impressive price/performance and business flexibility.

Building on the best

The pSeries 670 is an integral part of the IBM @server product line—advanced servers that can help lower costs, improve efficiency and speed e-business transformation. The foundation of this server is innovative technology from across IBM. For example, the system draws on decades of mainframe experience as well as IBM leadership in open UNIX systems to deliver industry-leading technological capabilities.

The pSeries 670 incorporates the same 64-bit POWER4 microprocessors as the pSeries 690—the most powerful pSeries server available.¹ These copper/silicon-on-insulator (SOI) chips are so advanced that they have twice received the best workstation/server processor award from *MicroDesign Resources*.² These chips are also a major reason why the pSeries 690 has won an *eWeek eXcellence Award*³ and a *VAR Business Editor's Choice Award*.⁴

POWER4 represents the first “SMP-on-a-chip” design for UNIX servers. Two processors with Level 2 (L2) cache are incorporated on each chip. In this configuration, a single POWER4 chip can deliver over 100GB/sec. of data from L2 cache to the processor.

Advanced multichip module (MCM) packaging, similar to that used in IBM **@server** zSeries servers, places up to eight POWER4 processors into a package that can fit in the palm of your hand. To further enhance performance, 128MB of Level 3 (L3) cache is packaged with the MCM. L3 cache helps stage information more effectively from processor memory to application programs.

But superior business performance involves much more than processor speed. It requires the ability to move information into, through and out of the server in response to user demand. To accomplish this, the pSeries 670 offers maximum memory of 128GB with a memory bandwidth of more than 100GB/sec. Aggregate I/O bandwidth is a robust 6GB/sec.

This combination of powerful processor and superior bandwidth means that the pSeries 670 can handle high performance computing (HPC) workloads in addition to demanding commercial applications. That makes this server a cost-effective choice for medium-size organizations.

A flexible package

The physical packaging of the pSeries 670 offers a great deal of flexibility and plenty of room for growth. A single rack contains the processors and up to three I/O drawers. Each I/O drawer can contain up to 16 hot-swappable disk drives of 18.2GB, 36.4GB or 73.4GB for a maximum data capacity of 3.5TB.

Each drawer also contains up to 20 PCI slots for a maximum of 60 per system. These slots support the latest 64-bit adapters and offer backward

compatibility for 33 MHz 32-bit cards, thus providing investment protection and ample room for growth. All PCI slots are hot-plug/“blind-swap”—adapters can be added or removed without moving the I/O drawer to a service position and without system interruption. The pSeries 670 also has recoverable PCI busses, where parity errors do not cause a system failure.

Optional dual battery backup units are available to further enhance system reliability should a power outage occur.

The pSeries 670 UNIX server offers true logical partitioning. Each system can be divided into as many as 16 “virtual” servers, each with its own system resources such as processors, memory and I/O. This approach allows the pSeries 670 to provide greater flexibility in matching resources to workloads. Based on business requirements, resources can be assigned in any combination for business-critical applications, resulting in more efficient use of the system.

Late in 2002, the pSeries 670 will be enhanced to dynamically reconfigure partitions—while still operating—to meet changing workload demands even better.

Feature	Benefits
POWER4 microprocessors	<ul style="list-style-type: none"> • Provide improved system performance and higher reliability in a smaller, more efficient package (“SMP-on-a-chip”) • Expand performance levels for SMP commercial applications • Enable capacity to grow to 16 processors
Copper and SOI technology	<ul style="list-style-type: none"> • Improve processor performance and reliability while using less power and producing less heat to help conserve energy
L3 cache	<ul style="list-style-type: none"> • Provides increased application performance
High memory and I/O bandwidth	<ul style="list-style-type: none"> • Remove performance bottlenecks that can occur when fast processors must wait for data to be moved through the system
Up to 128GB ECC Chipkill™ memory	<ul style="list-style-type: none"> • Allows exploitation of 64-bit addressing for large database or HPC applications • Provides growth options with much greater throughput • Significantly lowers number of memory failures that cause system outages, thus increasing system availability
Logical partitioning	<ul style="list-style-type: none"> • Permits multiple applications to be consolidated on a single server, reducing the number of systems to manage and maintain • Offers greater flexibility in using available capacity and matching resources to changing business requirements
64-bit system architecture	<ul style="list-style-type: none"> • Supports larger amounts of memory so applications can keep more information in fast-access memory, thus allowing applications to run faster
Up to 60 PCI hot-plug adapter slots and 3.5TB of internal disk storage	<ul style="list-style-type: none"> • Provide growth options for significantly increased capacity • Support many commonly used adapters for increased availability at a lower cost
Hot-swappable disk drive bays	<ul style="list-style-type: none"> • Provide greater system availability and smooth growth by allowing swapping or adding of disk drives without powering down the system
Redundant hot-plug power and cooling subsystems	<ul style="list-style-type: none"> • Enhance system availability since cooling fans and power supplies can be changed without interrupting operations
Built-in service processor	<ul style="list-style-type: none"> • Continuously monitors system operations and takes preventive or corrective actions for quick problem resolution and high system availability • Allows diagnostics and maintenance to be performed remotely
Dynamic processor, L2/L3 cache and PCI bus slot deallocation	<ul style="list-style-type: none"> • Designed to automatically deallocate resources when impending failure is detected, so applications can continue to run uninterrupted.
Concurrent 32- and 64-bit application support	<ul style="list-style-type: none"> • Allows running 32- and 64-bit applications at the same time, helping to protect existing investments while enabling a move to more advanced technology
SP™ Switch attachment	<ul style="list-style-type: none"> • Allows attachment to a high-speed SP Switch providing consolidation and operational advantages in a cluster environment
IBM @server Cluster 1600	<ul style="list-style-type: none"> • Provides centralized management of multiple systems • Provides ability to handle unexpected workload peaks by sharing resources • Allows for more granular growth so user demands can be readily satisfied
Linux® operating system	<ul style="list-style-type: none"> • Offers support for 32-bit Linux applications • Enables access to thousands of Open Source applications • Provides a common operating environment across IBM @server platforms
AIX® operating system	<ul style="list-style-type: none"> • Delivers maximum throughput for mixed workloads without the need for complex system configuration or tuning • Provides upward binary compatibility to help preserve software investments • Extends application choices with Linux affinity

Clustering alternatives

Clustering allows multiple servers to be interconnected into a single computing resource for improved availability, scalability, manageability and performance. With the IBM **@server** Cluster 1600 and AIX operating system, companies can mix or match up to 128 nodes and servers (512 via special order), including up to 32 pSeries 670 systems.

An LPAR of a pSeries 670 is viewed by Cluster 1600 as just another node or server in the cluster. Up to 16 LPARs⁵ per system and up to 128 LPARs per cluster are supported.

Designed to save money and deliver the right amount of performance, the Cluster 1600 provides cluster management from a single point-of-control, continuous access to business-critical data and applications, and investment protection through the coexistence of old and new technology. The Cluster 1600 is especially suited for server consolidation where diverse workloads are more easily managed. It is also an excellent choice for environments requiring horizontal growth (i.e., replicating the same application across multiple servers as a business grows). The Cluster 1600 with the pSeries 670 offers a highly scalable and reliable platform for hosting extremely large and growing corporate data warehouses, or

simplifying management of an information technology (IT) infrastructure and reducing costs.

Lower cost of computing

The pSeries 670 is designed to participate in Grid Computing—an emerging technology that creates “virtual” computing resources across an intranet or the Internet using industry-standard protocols. By harnessing unused computing “cycles,” Grid Computing allows organizations to make more efficient use of existing resources. Businesses can gain additional computing power while lowering their overall cost of computing.

High availability, all day, every day

To help ensure that strategic applications remain available 24x7, the pSeries 670 features an integrated service processor—a computer within a computer—that constantly monitors the system’s vital signs. In the event of a malfunction, the service processor is capable of “calling home” by automatically dialing out to an IBM service center, often before any problem is apparent to users or system administrators. In this fashion, the service technician may be able to correct the problem and restore system function remotely without interruption or downtime.

To further maximize system availability, the pSeries 670 server has built-in fault and error correction

functions. For the main memory, Chipkill memory technology—developed by IBM for mainframe servers—detects multiple bit errors and corrects most of them transparently. If the error rate exceeds the critical threshold, a maintenance action is initiated automatically by the system, to be resolved at the user’s convenience. IBM studies indicate that systems with Chipkill memory are up to 100 times less likely to experience an outage due to memory failure.⁶

In addition, pSeries 670 uses ECC (error checking and correcting) memory technology to enhance reliability and error correction of L2 and L3 cache memory as well as main memory. ECC technology is designed to detect single and double errors and correct all single bit errors.

In addition, redundant, spare main memory chips are provided. Through a technique known as bit steering, these spares can be dynamically activated and replace a failing memory chip in the event multiple bit memory errors exceed a threshold.

The use of advanced memory technologies—ECC. Chipkill and bit steering—helps protect the server from memory failures that can cause costly, unscheduled downtime. These automatically invoked functions are part of the innovative IBM **@server** architecture.

pSeries 670 at a glance

Minimum configuration

Microprocessor:	4-way SMP (one 4-way MCM); 1.1 GHz POWER4
RAM (memory):	4GB
Internal disk drive:	Two 18.2GB Ultra3 SCSI
Internal disk bays:	8 hot-swappable
Media bays:	Five (four available)
Expansion slots:	10 PCI (64-bit)
PCI bus width:	32- and 64-bit

Standard features

I/O adapters:	Two integrated Ultra3 SCSI controllers
Ports:	Two serial, two ports for connecting Hardware Management Console for pSeries

System expansion

SMP configuration:	8-, 16-way SMP (one or two 8-way MCMs); 1.1 GHz POWER4
RAM:	Up to 128GB
PCI expansion slots:	Up to 60 hot-plug adapters
Internal disk storage:	Up to 48 hot-swappable disk bays; up to 3.5TB (18.2GB, 36.4GB and 73.4GB disk drives available)
Optional battery backup:	Up to two
Attachment:	SP System Attachment Adapter for use in a Cluster 1600 configuration

RAS features

Copper, SOI microprocessors
Chipkill, bit-steering memory
ECC L2 cache, L3 cache
Service processor
Hot-swappable disk bays
Hot-plug PCI slots, power supplies and cooling fans
Dynamic Processor Deallocation
Dynamic deallocation of L2/L3 cache, logical partitions and PCI bus slots
Redundant power supplies and cooling fans
Battery backup (optional)

Operating systems

AIX 5L™ Version 5.1
SuSE Linux Enterprise Server Version 7

Power requirements

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

System dimensions

79.7"H x 30.9"W x 58.8"D (202 cm x 79 cm x 149 cm);
Weight 2,605 lb (1,184 kg)*

Warranty

Onsite 24x7 for one year (limited) at no additional cost

* With acoustic doors. Weight will vary when disks, adapters and other peripherals are installed.

A unique availability function of the pSeries 670 is the ability to dynamically deallocate faulty processors, L2 cache, logical partitions and PCI bus slots. It also can automatically bypass failing L3 cache, thus redirecting work to other resources to avoid interruption. This function, working with the AIX operating system and service processor, causes failing resources to be taken offline so replacement may be scheduled during normal service to minimize system and application downtime.

Additional reliability and availability features include redundant hot-plug cooling fans and power supplies, which may be replaced without affecting system operations. Also included are environmental monitoring functions such as temperature monitoring that increases the fan speed in response to above-normal temperatures.

For near-continuous availability, from two to 32 pSeries 670 servers can be clustered with High Availability Cluster Multiprocessing (HCAMP) software from IBM. This clustering solution minimizes downtime of systems and applications for both planned and unplanned outages and provides a superior base for high availability, an essential ingredient of business-critical environments.

Better management

To help companies deal effectively with increased complexity, IBM announced Project eLiza™—a blueprint for self-managing systems. Its goal is to create an intelligent IT infrastructure that responds to unexpected capacity demands or to system failures. By using technology to minimize human intervention, businesses can react faster to changing circumstances while at the same time control spiraling pressure on critical skills, software and service/support costs.

The pSeries 670 incorporates many leading self-managing system capabilities from across the IBM @server product line. Examples include the service processor, dynamic processor and cache memory deallocation functions, and Chipkill memory.

The AIX advantage

The pSeries 670 system is matched with AIX 5L, the advanced UNIX operating system from IBM. Providing real value in reliability, availability and security, AIX is tuned for e-business application performance and is recognized as state of the art in systems and network management.

AIX delivers Java™ technology, Web performance and scalability enhancements for managing large and complex e-business installations.

Web-based remote management tools control the system and monitor key resources such as adapter and network availability, file system status and processor workload. AIX also incorporates Workload Manager, which can help ensure that critical applications remain responsive even during periods of peak system demand. And AIX runs across all pSeries and IBM RS/6000® servers for greater compatibility and investment protection.

Greater application choice

The IBM @server product line is about uncompromising flexibility in selecting, building and deploying the applications a business needs. Toward that end, IBM offers one of the industry's broadest range of platforms and operating systems. IBM is committed to industry-standard, cross-platform technologies—such as Java, XML, HTML, SOAP and UDDI—that are at the heart of a flexible e-business infrastructure. Support for these standards in our key middleware—including DB2® Universal Database™, WebSphere®, Application Server and MQSeries®—means that companies won't be locked into a single platform as their businesses grow. As a result, they always have the flexibility to deploy applications in a cost-effective way.

The pSeries 670 represents the IBM @server commitment to true application flexibility through open standards. In addition to including enhanced Java scalability and performance, AIX 5L provides integrated Linux system-compatible Application Programming Interfaces (APIs) that allow popular Linux and Open Source applications to run on AIX with a simple recompilation. The AIX Toolbox for Linux Applications (distributed "AS IS" with AIX 5L) provides compilers, utilities, editors, debuggers and other application development tools to aid in this recompilation.

Linux

The Linux operating system is available for the pSeries 670 from SuSE as the "SuSE Linux Enterprise Server" which includes a full complement of Open Source tools and applications. Linux runs natively in a logical partition of the pSeries 670 and does not require the use of AIX. Linux applications can share the same resources and benefit from the performance advantages of the pSeries 670. Full service support for Linux is available from IBM Global Services or SuSE.

Tools for managing e-business

The IBM @server product line is backed by a comprehensive suite of offerings and resources that provides value at every stage of IT implementation. These tools can help companies test possible solutions, obtain financing, plan and implement applications and middleware, manage capacity and availability, improve performance and obtain technical support across their entire infrastructure. The result is an easier way to handle the complexities and rapid growth of e-business.

An excellent example is Capacity Upgrade on Demand (planned for the second half of 2002), that allows inactive processors to be pre-installed in the server, then activated incrementally, for a fee, when needed.

In addition, IBM Global Services experts can help with business and IT consulting, business transformation and total systems management services, as well as customized e-business solutions.

Backed by IBM

The pSeries 670 is backed by worldwide service and support from IBM. Our commitment behind every system sold is to provide the highest possible customer satisfaction.

Availability support is enhanced with advanced maintenance and diagnostic capabilities built into the pSeries 670 offerings with a framework for delivery of system and performance information via the Web.

Summary

The IBM @server pSeries 670 is, quite simply, the most powerful, most flexible and most scalable mid-range UNIX server available today.

By harnessing advanced technology from larger IBM servers, like the zSeries and pSeries 690, the pSeries 670 can deliver higher performance, advanced reliability and a lower total cost of ownership to a wide range of users, whether in smaller organizations or departments or in enterprise datacenters.

Such leading-edge features as true logical partitioning, self-managing technology and high scalability put the pSeries 670 in the forefront for

consolidating computing solutions. It's also an ideal server for back-end database serving. And excellent reliability characteristics make the pSeries 670 a superior choice for mission-critical environments.

In short, the pSeries 670 is a high-end server in a mid-range package, delivering outstanding power, flexibility and manageability.

For more information

To learn more about the IBM *@server* pSeries 670, contact your IBM marketing representative or IBM Business Partner or visit the following IBM Web sites:

- ibm.com/eserver/pseries
- ibm.com/eserver/clusters
- ibm.com/servers/aix
- ibm.com/ibmlink



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¹ SPEC cpu 2000 benchmarks as of July 31, 2002 available at www.spec.org

² Source: www.mdronline.com, January 30, 2002

³ Source: www.eweek.com, February 22, 2002

⁴ Source: www.varbusiness.com, December 10, 2001

⁵ 16 LPARs per p670 are supported in clusters with industry standard interconnects (e.g. Gigabit Ethernet). If the p670 is interconnected to either an SP Switch or SP Switch2, the maximum number of LPARs per p670 is four.

⁶ IBM Chipkill Memory white paper available at www.pc.ibm.com/qtechinfo/MCGN-46AMQP.html