

IBM @server pSeries 660 Model 6H1



IBM @server pSeries 660 Model 6H1 mounted in a 7014-T00 rack

Highlights

- **Outstanding price/performance, scalability and packaging flexibility in a powerful SMP rack-mounted server**
- **World-class reliability, availability, serviceability features for critical e-business applications**
- **Rugged, NEBS Level 3 design ideal for telecommunications and Web farms**

Expandable technology for high performance

The IBM @server pSeries™ 660 Model 6H1 is a rugged, high-performance rack-mounted mid-range UNIX® server with superior availability and expandability for growing e-business applications. It is part of the IBM @server product line — advanced servers that can help lower costs, improve efficiency and speed e-business transformation.

Driving e-business

The pSeries 660 Model 6H1 can run many Web-enabled e-business enterprise applications—including enterprise resource planning, supply chain management and customer relationship management—to effectively integrate suppliers, business partners and customers for improved efficiency and customer service. What's more, the Model 6H1 offers a better price/performance than previous IBM UNIX mid-range servers.

The combination of high-performance, compliance with carrier-grade standards such as NEBS (Network Equipment Building System) Level 3 and ample peripheral attachment capabilities make the Model 6H1 particularly well suited for the complex demands of telecommunications providers or other companies requiring Web farms, such as Internet Service Providers (ISPs) or Application Service Providers (ASPs).

The Model 6H1 offers large memory capacity and up to six advanced 64-bit RS64 IV microprocessors running at up to 750 MHz for high levels of performance and price/performance. For applications with less demanding performance requirements, the Model 6H1 also offers one-, two- and four-way 64-bit RS64 IV microprocessors running at 600 MHz. The processors utilize innovative copper and silicon-on-insulator (SOI) technology. The result is high performance with less power consumption and lower heat generation for higher levels of reliability and system availability.

The base 256MB of main memory can be expanded to 32GB for enhanced performance and exploitation of 64-bit addressing used in large database and enterprise applications. The entry-level, one-way system has either a 600 MHz microprocessor with 2MB of Level 2 (L2) cache or 750 MHz with 8MB of L2 cache (a special memory subsystem in which frequently used data values are duplicated for quick access). Larger configurations with two-, four- or six-way processors at up to 750 MHz and with 8MB of L2 cache per processor are available to help meet growth needs.

Designed for flexibility

The rack-drawer design of the Model 6H1 provides ease of growth in processor as well as I/O and memory capacity. It includes a standard rack-mounted processor drawer and an I/O drawer with 14 hot-plug PCI slots for configuration flexibility. Up to two I/O drawers may be installed for a total of 28 PCI slots. Integrated 10/100 Mbps Ethernet, SCSI-2 F/W and Ultra2 SCSI controllers are standard in each I/O drawer, leaving all slots available for additional use.

In its maximum configuration, the Model 6H1 features one processor drawer with six 750 MHz processors and two I/O drawers for a total of 15 EIA units (15U) of rack space. Depending on the number of attached I/O drawers, up to three pSeries 660 systems can be installed in an IBM 7014-T00 (36U) or up to four in a 7014-T42 (42U) rack. As a result, customers benefit from significant power and capacity while saving valuable floor space.

The Model 6H1 is designed to meet the critical requirements of e-business for medium- and large-size organizations. With powerful processors, memory and data

storage capacity and expandability, it is an excellent application server for enterprise resource planning systems. Along with NEBS Level 3 standards compliance, the Model 6H1 offers other features that are of special value to telecommunications service providers, including redundant power supplies and -48v DC.

The Model 6H1 fully supports accepted open industry standards that are critical for e-business. Used as either a standalone, multiuser application or database server, it is designed to participate in most installed UNIX and PC networks, thus helping to leverage existing applications.

Clustering alternatives

Clustering enables 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 64 Model 6H1 systems.

Feature	Benefits
Copper and SOI technology	<ul style="list-style-type: none"> • Provides significant performance increases over non-copper technologies • Offers improved reliability over processors without copper while reducing the heat produced
High system memory capacity (32GB)	<ul style="list-style-type: none"> • Enables complex e-business applications to execute quickly and efficiently
ECC Chipkill™ memory	<ul style="list-style-type: none"> • Significantly lowers number of memory failures that cause system outages, thus increasing system availability • Minimizes the potential for loss of business data
Rack-drawer configuration	<ul style="list-style-type: none"> • Allows for efficient utilization of floor space • Provides ease of growth in processor, I/O and storage capacity
Up to 28 hot-plug PCI slots	<ul style="list-style-type: none"> • Dramatically improve availability and provide uninterrupted growth in new adapters • Provide increased connectivity for e-business applications
Built-in service processor	<ul style="list-style-type: none"> • Continuously monitors system operations and takes preventive or corrective action for quick problem resolution and high system availability • Allows diagnostics and maintenance to be performed remotely
Hot-plug redundant power and cooling subsystems	<ul style="list-style-type: none"> • Allow uninterrupted operation if a power supply or fan becomes disabled
Dynamic Processor Deallocation	<ul style="list-style-type: none"> • Automatically deallocates resources when impending processor failures are detected so that applications continue to run uninterrupted
NEBS Level 3 compliance	<ul style="list-style-type: none"> • Offers rugged packaging required for telecommunications central office operations and other complex computing environments
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
SP™ Switch attachment	<ul style="list-style-type: none"> • Allows attachment to a high-speed SP Switch providing operational advantages in a cluster environment
AIX operating system	<ul style="list-style-type: none"> • Supports full interoperability and coexistence between 32- and 64-bit applications with processes that may run concurrently or cooperatively • UNIX 98 technology-compliant and first to achieve UNIX 98 Server registration • Provides an AIX binary compatible environment that helps assure continuing application availability across AIX releases when binary compatibility rules are observed
Linux® operating system	<ul style="list-style-type: none"> • Offers native support for 64-bit Linux applications • Enables access to thousands of Open Source applications • Provides common operating environment across IBM @server platforms

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 co-existence of old and new technology. The Cluster 1600 is especially suited for business intelligence environments with large databases and server consolidation where diverse workloads are more easily managed.

It is also an excellent choice for environments requiring horizontal growth, which involves replicating the same application across multiple servers as a business grows. The Cluster 1600 offers a highly scalable and reliable platform for hosting large and growing corporate data warehouses, or simplifying management of IT infrastructure and reducing total cost of ownership.

High availability, all day, every day

To help ensure that strategic applications remain available 24x7, the Model 6H1 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 maximize system availability, the pSeries 660 server has built-in fault and error correction functions. For main memory, Chipkill memory technology—developed by IBM for the S/390® mainframe server—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 customer'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.¹

The Model 6H1 also uses ECC (error checking and correcting) memory technology to enhance reliability and error correction of L1 data cache and L2 cache memory as well as main memory. This approach has significant advantages over the industry-standard parity memory technology. ECC technology can detect single and double errors and

correct all single bit errors. Parity memory can only detect, but not correct, single bit errors. Thus double bit errors may be missed altogether, which can lead to a complete system shutdown. The use of these advanced memory technologies, Chipkill and ECC, on the Model 6H1 helps protect the server from memory failures that can cause costly, unscheduled downtime.

Another unique availability feature of the Model 6H1 is Dynamic Processor Deallocation. In the unlikely event that a processor indicates an impending failure, this feature—working with the AIX operating system and service processor—is designed to dynamically take the processor offline. Its workload is reassigned automatically to other processors, and replacement can be scheduled during normal service to minimize system and application downtime.

Reliability and availability features also include redundant hot-plug cooling fans (standard) and power supplies (optional), which may be easily replaced without affecting system operations. Also available is a temperature monitoring capability that increases the fan speed in response to above-normal temperatures.

pSeries 660 Model 6H1 at a glance

Minimum configuration:

Processor 5U rack drawer

Microprocessor:	1-way 600 MHz RS64 IV or 1-way 750 MHz RS64 IV
Level 1 (L1) cache:	128KB data (ECC)/128KB instruction
Level 2 (L2) cache:	2MB (ECC), 600 MHz; 8MB (ECC) 750 MHz
RAM (memory):	256MB (ECC)
Memory bandwidth:	2.4GB per second
System bus:	Two busses, each 128 bits wide

Minimum configuration:

I/O 5U rack drawer

I/O slots:	14 hot-plug PCI slots
I/O bus width:	10 64-bit, 4 32-bit
I/O bus speed:	10@66 MHz(3.3v)/4@33 MHz(5v)
I/O bandwidth:	1GB per second—aggregate peak
Storage options:	Boot capability from externally attached disk drawers, or optionally, two internal boot disks that require two I/O slots; maximum internal disk capacity of 72.8GB

Standard features

Integrated ports:	Keyboard, mouse, four serial, one parallel
Integrated bays:	Diskette drive, CD-ROM or DVD-RAM, one additional media bay
Integrated controllers:	SCSI-2 F/W (internal), Ultra2 SCSI (external), 10/100 Mbps Ethernet

System expansion

Processor:	2- or 4-way, (600 MHz) RS64 IV SMP; 2-, 4- or 6-way (750 MHz) RS64 IV SMP
Level 2 (L2) cache:	4MB/processor (600 MHz) or 8MB/processor (750 MHz)
RAM:	Up to 32GB (Chipkill)
I/O:	Second 5U rack drawer 14 hot-plug PCI slots and 2 media bays additional
External storage:	IBM 2104 Expandable Storage Plus (Ultra3 SCSI), IBM 7133 Serial Disk System (SSA), IBM 2105 Enterprise Storage Server™
Attachment:	SP System Attachment Adapter for use in a Cluster 1600 configuration

RAS features

Copper, SOI microprocessors
Chipkill RAM memory
ECC L1 data cache, L2 cache
Service processor
Hot-plug PCI slots, power supplies (optional) and cooling fans
Dynamic Processor Deallocation
Redundant power supplies (optional) and cooling fans
NEBS Level 3 compliance

Operating systems

AIX 5L™ Version 5.1 or Version 4.3.3
Linux 2.4 available from one or more IBM Linux Distribution Partners

System dimensions

(Rack drawer and I/O drawer)

17.5" W x 32.3" D x 8.6" H (445 mm x 820 mm x 218 mm) each
Weight — 90 lb (41 kg)*

Power requirements

220 volts AC/-48 volts DC

Warranty

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

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

For near continuous availability, two Model 6H1 servers can be clustered in a single rack with High Availability Cluster Multiprocessing (HACMP), UNIX disaster recovery 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 for e-commerce.

Better management

To help organizations 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 controlling spiraling pressure on critical skills, software and service/support costs.

The Model 6H1 incorporates many leading self-managing system capabilities from across the IBM @server

product line. Examples include the service processor, Dynamic Processor Deallocation and Chipkill memory.

The AIX advantage

The Model 6H1 system is matched with AIX, 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 widely recognized as state-of-the-art in systems and network management.

AIX delivers Java™ technology, Web performance and scalability enhancements for managing large, complex e-business installations. Web-based remote management tools control the system and monitor key resources such as network availability, file system status and processor workload. AIX incorporates Workload Manager which can help ensure that critical applications remain responsive even during periods of peak system demand. AIX runs across all pSeries and RS/6000® servers for greater compatibility and investment protection.

The latest release of AIX, AIX 5L Version 5.1 adds new functionality to further enhance security, system availability and Workload Manager. In fact, the systems management and Internet/Web-application services of AIX 5L rank as industry leaders.²

Native Linux

The Linux operating system is available for the Model 6H1 from one or more major Linux distributors. These distributors can provide a full complement of Open Source tools and applications. Linux runs natively on the Model 6H1 and does not require the use of AIX. Full service and support for Linux is available from IBM Global Services or a Linux distributor.

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 Model 6H1 represents the IBM **@server** product line 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 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.

Tools for managing e-business

The Model 6H1 is backed by a comprehensive suite of offerings and resources that provide value at every stage of IT implementation. These tools can help customers test possible solutions, obtain financing, plan and implement applications and middleware, manage capacity and availability, improve performance, and obtain technical support across the entire infrastructure.

The result is an easier way to handle the complexities and rapid growth of e-business. 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 Model 6H1 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 Model 6H1 offerings with a framework for delivery of system and performance information via the Web.

For more information

To learn more about the pSeries 660 Model 6H1, 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/eserver/clusters

ibm.com/servers/solutions

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Server Group
Route 100
Somers, NY 10589

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¹ IBM Chipkill Memory white paper available at www.pc.ibm.com/pc/qtechinfo/MCGN-46AMQP.html

² *2001 UNIX Function Review*, D.H. Brown Associates, Inc., March 2001 and *IBM Flexes UNIX Muscle with AIX 5L*, D.H. Brown Associates, Inc., May 2001