



IBM @server® p5 510 and p5 510 Express offer IBM POWER5 technology in a 2U rack drawer package

Overview

IBM @server® p5 510 and IBM @server® p5 510 Express Rack-mount Servers (9110-510) give you new tools for managing On Demand Business, greater application flexibility, and innovative technology—all designed to help you capitalize on the On Demand Business revolution.

The p5-510 Express comes in a 2U rack drawer package. It is available in a 1-way or 2-way configuration using state-of-the-art, 64-bit, copper-based POWER5™ microprocessors running at 1.5 GHz.

The p5-510 is very similar to the p5-510 Express server except that the POWER5 microprocessor operates at 1.65 GHz. To simplify, both products are referred to as p5-510 except where a distinction needs to be made between the Express offering and the non-Express offering.

The new POWER5 microprocessor provides many performance and reliability advances over the POWER4™ architecture. Chief among the enhancements is Simultaneous Multi-Threading (SMT), which is designed to significantly boost performance by allowing two code streams to concurrently access the several execution units on the processor.

The p5-510 has a base of 512 MB of main memory that can be expanded to 32 GB for faster performance and exploitation of 64-bit addressing as used in large database applications.

The p5-510 contains five bays. Four of the five are front-accessible, hot-swap-capable DASD bays and can accommodate up to 587.2 GB of disk storage. The fifth bay is used for a slimline DVD-ROM or DVD-RAM.

Other integrated features include:

- Three 64-bit PCI-X slots
- Service Processor
- Two 10/100/1000 Ethernet ports, limited purpose serial ports, USB ports, and HMC ports
- Dual channel Ultra320 SCSI controller
- External SCSI port
- Hot-swap power and cooling
- Redundant power (optional) and cooling

Dynamic LPAR is supported on the p5-510, allowing up to two partitions. In addition, the optional Advanced POWER™ Virtualization feature supports up to 10 partitions per processor.

IBM Cluster Systems Management (CSM) V1.4 for AIX® 5L and Linux™ on POWER is supported on the p5-510. For hardware control, a Hardware Management Console (HMC) is required. Additionally, the p5-510 is added to the hardware models supported with the IBM @server® pSeries® Cluster 1600 running CSM.

The p5-510 is backed by a three-year warranty.

Key prerequisites

If installing AIX on the system (one of these):

- AIX 5L for POWER V5.2 with the 5200-04 Recommended Maintenance Package (APAR IY56722 plus APAR IY62266), or later
- AIX 5L for POWER V5.3 with the 5300-01 Recommended Maintenance Package (APAR IY62267), or later

If installing Linux on the system (one of these):

- SUSE LINUX Enterprise Server 9 for POWER, or later
- Red Hat Enterprise Linux AS for POWER Version 3, or later

At a glance

IBM @server® p5 510 and IBM @server® p510 Express offer:

- Outstanding value for entry UNIX® servers
- Powerful, symmetric multiprocessing (SMP) on demand server
- 2U rack-mount configuration
- One 1-way or 2-way, state-of-the-art, 64-bit POWER5 processor
 - 1.5 GHz processor on the p5-510 Express
 - 1.65 GHz processor on the p5-510
- Performance and capacity needed by demanding on demand applications
- Up to 32 GB of memory
- Up to 587.2 GB of internal disk storage
- Four hot-swap disk bays and three PCI-X slots for feature expandability
- One slimline media bay for DVD-ROM or DVD-RAM
- Dynamic logical partitioning (LPAR)

For ordering, contact:

Your IBM representative, an IBM Business Partner, or the Americas Call Centers at

800-IBM-CALL

Reference: RE001

Planned availability dates

April 22, 2005, for feature numbers 7612, 7449, and 8649.
February 18, 2005, for all other features.

This announcement is provided for your information only. For additional information, contact your IBM representative, call 800-IBM-4YOU, or visit the IBM home page at: <http://www.ibm.com>.

IBM eServer p5 510 and p5 510 Express

The standard features in the IBM eServer® p5 510 and p5 510 Express include:

- Rack-mount (2U) configuration
- 1-way and 2-way SMP design (one processor card)
- POWER5 64-bit processor
 - p5-510 Express
 - 1-way 1.5 GHz with no L3 cache
 - 2-way 1.5 GHz with 36 MB L3 cache (available April 22, 2005)
 - p5-510
 - 1-way 1.65 GHz with 36 MB L3 cache
 - 2-way 1.65 GHz with 36 MB L3 cache
- 512 MB of DDR-I 266 MHz ECC memory
 - Expandable to 32 GB
- Four hot-swap disk drive bays
- One slimline media bay:
 - One DVD-ROM (optional — default)
 - One DVD-RAM (optional)
- Three PCI-X slots:
 - 64-bit, 3.3 volt, 133 MHz (long)
- Integrated:
 - Dual 10/100/1000 Ethernet
 - Dual Channel Ultra320 SCSI controller
 - One external SCSI port
 - Service Processor
 - Hot-swap and redundant fans
 - Two USB ports
 - Two limited purpose serial ports
 - Two HMC ports
- 700 watt power supply, base (redundant power optional)
- AIX 5L V5.2 or V5.3, or later, operating system, or SUSE LINUX Enterprise Server 9 for POWER, or later, or Red Hat Enterprise Linux AS for POWER Version 3, or later.

The minimum p5-510 configuration must include a processor, a processor entitlement, memory, power supply, HDD, a bezel and hardware indicator, a power cord, and a language group specify. The IBM/OEM Rack-mount Drawer Rail Kit (#7166) is not part of the minimum configuration. The defaults, if no choice is made, are:

1-way Processor, 1.5 GHz	(#7609)
One processor entitlement	(#7442)
512 MB memory DIMM	(#4443)
Power supply, 700 watt, base	(#7989)
73.4 GB hard disk drive	(#3274)
IBM bezel and hardware	(#7998)
Language group specify	(#9300 or 97xx)
Power cord	(#6458, #6460, #6469-#6479, #6487, #6488, #6493-#6496, #6660, #6669, #6670, #6680, #6687)

A keyboard, mouse, graphics adapter, and monitor are available as options.

Value Paks are only available as initial order.

If you order a p5-510 Express with a 1-way POWER5 1.5 GHz processor (#7609) or a 2-way POWER5 1.5 GHz processor (#7612), or a p5-510 with a 1-way POWER5 1.65 GHz processor (#7610), or a 2-way POWER5 1.65 GHz processor (#7611) and a minimum configuration of memory, disks, and media device, you will qualify for a processor entitlement at no additional charge. The number of processors, total memory, quantity/size of disk, and presence of a media device are the only features that determine if a customer is entitled to processor entitlements at no additional charge. You will be entitled to a discounted AIX operating system license or may choose to purchase the system with no operating system. The discounted AIX operating system license is processed via a feature number on AIX.

The minimum criteria for processor entitlements at no additional charge are 1 GB of memory per active processor, two 73.4 GB hard disk drives, and a DVD-ROM. A DVD-RAM may be substituted for the DVD-ROM.

You may make changes to the standard features as needed and still qualify for processor entitlements at no additional charge and a discounted AIX operating system license. Selection of memory or disk drives smaller than those defined as the Value Pak minimums will disqualify the order as a Value Pak.

Express Value Pak 1:

1-way 1.5 GHz processor (1 x #7609)
1 GB memory (Default: 1 x #4444)
2 x 73.4 GB disk drive (#3274)
1 DVD-ROM (#2640)

Receive one processor entitlement (#8642) at no additional charge. One processor is entitled.

Express Value Pak 2 (available on April 22, 2005):

2-way 1.5 GHz processor (1 x #7612)
2 GB memory (Default: 1 x #4447)
2 x 73.4 GB disk drive (#3274)
1 DVD-ROM (#2640)
One processor entitlement (#7449)

Receive one processor entitlement (#8649) at no additional charge. Two processors are entitled.

Value Pak 3:

1-way 1.65 GHz processor, 36 MB L3 cache (1 x #7610)
1 GB memory (Default: 1 x #4444)
2 x 73.4 GB disk drive (#3274)
1 DVD-ROM (#2640)

Receive one processor entitlement (#8643) at no additional charge. One processor is entitled.

Value Pak 4:

2-way 1.65 GHz processor (1 x #7611)
2 GB memory (Default: 1 x #4447)
2 x 73.4 GB disk drive (#3274)
1 DVD-ROM (#2640)
One processor entitlement (#7444)

Receive one processor entitlement (#8644) at no additional charge. Two processors are entitled.

Reliability, availability, and serviceability (RAS)

Reliability, fault tolerance, and data integrity: The reliability of the model 510 system starts with components, devices, and subsystems that are designed to be fault-tolerant. During the design and development process, subsystems go through rigorous verification and integration testing processes. During system manufacturing, systems go through a thorough testing process designed to help ensure the highest level of product quality.

The model 510 system L3 cache and system memory offers ECC (error checking and correcting) fault-tolerant features. ECC is designed to correct environmentally induced, single-bit, intermittent memory failures and single-bit hard failures. With ECC, the likelihood of memory failures will be substantially reduced. ECC also provides double-bit memory error detection that helps protect data integrity in the event of a double-bit memory failure. System memory also provides 4-bit packet error detection that helps to protect data integrity in the event of a DRAM chip failure. The system bus, I/O bus, and PCI buses are designed with parity error detection.

Disk mirroring and disk controller duplexing are also provided by the AIX operating system. Linux supports DASD mirroring (RAID 1). This is supported in software using the md driver. Some of the hardware RAID adapters supported under Linux also support mirroring.

The Journaled File System maintains file system consistency and reduces the likelihood of data loss when the system is abnormally halted due to a power failure.

PCI extended error handling (EEH)¹: In the past, PCI bus parity errors caused a global machine check interrupt, which eventually required a system reboot to continue. In the POWER5 systems, new I/O drawer hardware, system firmware, and AIX interaction have been designed to allow transparent recovery of intermittent PCI bus parity errors and graceful transition to the I/O device available state in the case of a permanent parity error in the PCI bus. This mechanism is called PCI EEH. EEH-enabled adapters respond to a special data packet generated from the affected PCI slot hardware by calling system firmware, which will examine the affected bus, allow the device driver to reset it, and continue without a system reboot. Currently, Linux does not support the EEH behavior.

¹ Indicates that this RAS function is not supported under Linux.

Memory error correction extensions: The standard memory has single-error-correct and double-error-detect ECC circuitry designed to correct single-bit memory failures. The double-bit detection is designed to help maintain data integrity by detecting and reporting multiple errors beyond what the ECC circuitry can correct. The memory chips are organized such that the failure of any specific memory module only affects a single bit within an ECC word (bit scattering), thus allowing for error correction and continued operation in the presence of a complete chip failure (Chipkill™ recovery).

The memory also utilizes memory scrubbing and thresholding to determine when spare memory modules, within each bank of memory, if available, should be used to replace ones that have exceeded their threshold value (dynamic bit steering).

Redundancy for array self-healing: Although the most likely failure event in a processor is a soft single-bit error in one of its caches, there are other events that can occur, and they need to be distinguished from one another. For the L1, L2, and L3 caches and their directories, hardware

and firmware keep track of whether permanent errors are being corrected beyond a threshold. If exceeded, a deferred repair error log is created. Additional run-time availability actions, such as CPU vary off² or L3 cache line delete, are also initiated.

L1 and L2 caches and L2 and L3 directories on the POWER5 chip are manufactured with spare bits in their arrays that can be accessed via programmable steering logic to replace faulty bits in the respective arrays. This is analogous to the redundant bit steering employed in main storage as a mechanism that is designed to help avoid physical repair, and is also implemented in POWER5 systems. The steering logic is activated during processor initialization and is initiated by the built-in self-test (BIST) at power-on time.

L3 cache redundancy is implemented at the cache line level. Exceeding correctable error thresholds while running causes a dynamic L3 cache line delete function to be invoked.

² Indicates that this RAS function is only available for a Linux operating system running the 2.6 kernel.

Service Processor: The Service Processor included in the model 510 gives you an immediate means to diagnose, check status, and sense operational conditions of a remote system, even when the main processor is inoperable.

The Service Processor enables firmware and operating system surveillance, several remote power controls, environmental monitoring (only critical errors are supported under Linux), reset, boot features, remote maintenance, and diagnostic activities, including console mirroring. The Service Processor can place calls to report surveillance failures, critical environmental faults, and critical processing faults.

Fault monitoring functions

- BIST (built-in self-test) and POST (power-on self-test) check the processor, L3 cache, memory, and associated hardware required for proper booting of the operating system every time the system is powered on. If a noncritical error is detected or if the errors occur in the resources that can be removed from the system configuration, the booting process is designed to proceed to completion. The errors are logged in the system nonvolatile RAM (NVRAM).
- Disk drive fault tracking can alert the system administrator of an impending disk failure before it impacts customer operation.
- The AIX or Linux log (where hardware and software failures are recorded and analyzed by the Error Log Analysis [ELA] routine) warns the system administrator about the causes of system problems. This also enables IBM service representatives to bring along probable replacement hardware components when a service call is placed, thus minimizing system repair time.

Mutual surveillance: The Service Processor monitors the operation of the POWER Hypervisor firmware during the boot process and watches for loss of control during system operation. It also allows the POWER Hypervisor to monitor Service Processor activity. The Service Processor can take appropriate action, including calling for service, when it detects the POWER Hypervisor firmware has lost control. Likewise, the POWER Hypervisor can request a Service Processor repair action if necessary.

First Failure Data Capture, a full-spectrum diagnostics strategy: Diagnosing problems in a computer is a critical requirement for autonomic computing. The first step to producing a computer that truly has the ability to self-heal is to create a highly accurate way to identify and isolate hardware errors. IBM has implemented a server design that builds in hardware error-check stations that capture and help to identify error conditions within the server. Each of these checkers is viewed as a diagnostic probe into the server, and, when coupled with extensive diagnostic firmware routines, allows quick and accurate assessment of hardware error conditions at run-time.

FFDC check stations are carefully positioned within the server logic and data paths to help ensure that potential errors can be quickly identified and accurately tracked to an individual field replaceable unit (FRU). These checkers are collected in a series of Fault Isolation Registers, where they can easily be accessed by the Service Processor. All communication between the SP and the FIR is accomplished "out of band." That is, operation of the error-detection mechanism is transparent to an operating system. This entire structure is "below the architecture" and is not seen, nor accessed, by system-level activities.

Environmental monitoring functions

- Temperature monitoring increases the fan speed rotation when ambient temperature is above the normal operating range.
- Temperature monitoring warns the system administrator of potential environmental related-problems (for example, air conditioning and air circulation around the system) so that appropriate corrective actions can be taken before a critical failure threshold is reached. It also performs an orderly system shutdown when the operating temperature exceeds the critical level.
- Fan speed monitoring provides a warning and an orderly system shutdown when the speed is out of the operational specification.
- Voltage monitoring provides a warning and an orderly system shutdown when the voltages are out of the operational specification.

Error handling and reporting: In the unlikely event of system hardware or environmentally induced failure, the system run-time error capture capability systematically analyzes the hardware error signature to determine the cause of failure. The analysis will be stored in the system NVRAM. When the system can be successfully rebooted either manually or automatically, the error will be reported to the AIX or Linux operating system. ELA can be used to display the failure cause and the physical location of failing hardware.

With the integrated Service Processor, the system has the ability to automatically send out an alert via phone line to a pager or call for service in the event of critical system failure. A hardware fault will also turn on the two Attention Indicators (one located on the front of the system unit and the other on the rear of the system) to alert the user of an internal hardware problem. The indicator may also be turned on by the operator as a tool to allow system identification. For identification, the indicators will flash, whereas the indicator will be on solid when an error condition occurs.

Availability enhancement functions

- The auto-restart (reboot) option, when enabled, can reboot the system automatically following an unrecoverable software error, software hang, hardware failure, or environmentally induced (ac power) failure.

Serviceability: Model 510 is designed for customer setup of the machine and for the subsequent addition of most features (adapters/devices)². For a fee, IBM Service can perform the installation.

- Model 510 allows customers to replace service parts (customer replaceable unit) if they want to. Model 510 has incorporated LEDs that will indicate the parts needing to be replaced.
- Model 510 allows support personnel to remotely log into a system to review error logs and perform remote maintenance. The model 510 Service Processor enables the analysis of a system that will not boot.
- The diagnostics consist of Stand-alone Diagnostics, which are loaded from the DVD-ROM drive, and Online Diagnostics.
- Online Diagnostics¹, when installed, are resident with AIX on the disk or system. They can be booted in single-user mode (service mode), run in maintenance mode, or run concurrently (concurrent mode) with other applications. They have access to the AIX Error Log and the AIX Configuration Data.
 - Service mode allows checking of system devices and features.
 - Maintenance mode allows checking of most system resources.
 - Concurrent mode allows the normal system functions to continue while selected resources are being checked.
- The System Management Services (SMS) error log is accessible from the SMS menu for tests performed through SMS programs. For results of Service Processor tests, access the error log from the Service Processor menu.

Note: Because the 9110-510 system has an optional DVD-ROM (#2640) and DVD-RAM (#5751), alternate methods for maintaining and servicing the system need to be available if the DVD-ROM or DVD-RAM is not ordered; an external Internet connection must be available to maintain or update system microcode to the latest required level.

Service Agent: The Service Agent is available at no additional charge. When installed on an @server® system, the Service Agent can enhance IBM's ability to provide the system with maintenance service.

The Service Agent:

- Monitors and analyzes system errors and, if needed, can automatically place a service call to IBM without customer intervention
- Can help reduce the effect of business disruptions due to unplanned system outages and failures
- Performs problem analysis on a subset of hardware-related problems and, with customer authorization, can report automatically the results to IBM Service

Online customer support (OCS)': OCS for hardware problem reporting may be performed via remote login by eServer specialists. The Electronic Service Agent™ software can also be used for this capability.

AIX Support offerings will be under AIXSERV and Electronic Service Agent.

Statement of general direction

IBM intends to provide High Availability Cluster Multi-Processing (HACMP™) V5.2 support on the p5-510 running AIX 5L V5.2 and V5.3 by second quarter 2005.

All statements regarding IBM's plans, directions, and intent are subject to change or withdrawal without notice.

Business Partner information

If you are a Direct Reseller - System Reseller acquiring products from IBM, you may link directly to Business Partner information for this announcement. A PartnerWorld ID and password are required (use IBM ID).

BP Attachment for Announcement Letter 105-058

<https://www.ibm.com/partnerworld/mem/sla.jsp?num=105-058>

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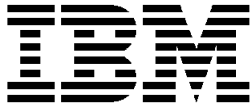
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IBM US Announcement Supplemental Information

February 8, 2005

Hardware Installation — (available in the U.S., AP, and EMEA)

This service can be ordered at the time of purchase and is available as an option in eConfig. This service helps clients with installation of their new IBM @server® p5 510, 520, or 550, which are customer setup units (CSU). This service includes:

- Installation of the IBM @server® p5 510, 520, or 550 by an onsite IBM System Services Representative (SSR)
- Successfully running all diagnostics

IBM eServer® Customer Technology Center (CTC)

The IBM @server® CTC provides software services for IBM Business Partners and small and medium businesses.

The CTC:

- Is part of the IBM @server® development laboratory
- Is available for projects worldwide
- Assists IBM Business Partners and customers in developing and enhancing On Demand Business applications
- Helps with all phases of application development
- Reuses proven software components to greatly shorten the development cycle and help ensure quality solutions
- Has worked with IBM Business Partners and customers worldwide to deliver core business applications that are optimized for an eServer environment

The IBM @server® CTC is an organization of highly skilled application programmers, most of whom have their roots in @server® development labs. They are part of IBM @server® and have the mission to ensure successful @server® deployments. They are experienced with developing solutions with WebSphere®, Java™, and other On Demand Business technologies.

The CTC works with customers and IBM Business Partners on a worldwide basis, using efficient development processes to speed application deployment and minimize costs. They specialize in modernizing legacy applications with the latest technologies. The CTC can also work hand-in-hand with Business Partners and your customers to help them build similar application skills.

To engage the CTC for your next pSeries® project, contact:

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IBM Tivoli® security

Tivoli security-ready clients and agents are planned to be preinstalled on pSeries POWER5™ servers running AIX® 5L V5.2 beginning in August 2004. Preinstalled Tivoli security-ready clients and agents for POWER4+™ and POWER4™ pSeries servers running AIX 5L V5.2 are planned to also be available beginning in August 2004. IBM intends to preinstall security-ready clients and agents on eServer and pSeries POWER™ servers that support AIX 5L V5.3 in the future.

The preinstalled security clients and agents software, when coupled with optional, extra-cost server-based IBM Tivoli security management solution offerings, are designed to help pSeries customers address a fundamental and heightened customer need for more secure on demand systems.

Tivoli security (identity) management solutions are designed to provide two critical layers of additional defense provided by firewalls, anti-virus software, and intrusion-detection software — a security control layer and a security policy compliance layer.

The Tivoli control layer determines which server users can access and what users may view and do. The Tivoli security compliance layer helps to ensure that customers are in, and remain in, compliance with security policies while helping assess security risk and initiating responses to security events.

Highlights IBM Tivoli security-ready clients/agents: Now every eServer and pSeries POWER5, POWER4+, and POWER4 server with AIX 5L V5.2 is available with preinstalled Tivoli security-ready client and agent software:

- Client for IBM Tivoli Access Manager for Operating System AIX
- Agent for IBM Tivoli Identity Manager
- Agent for IBM Tivoli Risk Manager
- Client for IBM Tivoli Security Compliance Manager

To use each Tivoli security-ready client or agent, acquisition of the following corresponding server-based Tivoli security management product offering is required:

- IBM Tivoli Access Manager for Operating System AIX
- IBM Tivoli Identity Manager
- IBM Tivoli Risk Manager
- IBM Tivoli Security Compliance Manager

When preinstalled, the security-ready clients/agents are designed to help to simplify the implementation and enablement of Tivoli security management solutions. The solutions enable a consistent enforcement of security

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management policies across eServer, pSeries, and AIX 5L, as well as across heterogeneous server environments running UNIX®, Linux™, and Microsoft™ Windows™ operating systems.

Optional IBM Tivoli security management offerings for pSeries AIX 5L: Tivoli security-ready clients and agents for eServer and pSeries AIX 5L servers enable Tivoli security management software running on an eServer or a pSeries AIX 5L server to provide and manage two different layers of security (a control layer and a security policy compliance layer) for each connected and enabled server client. One Tivoli security management server can manage up to thousands of eServer or pSeries AIX 5L server clients. Security management capabilities include:

- **Secure and manage the pSeries AIX 5L Server:** IBM Tivoli Access Manager for Operating System AIX is optional, extra-cost server-based enablement software that provides multiple eServer or pSeries AIX 5L server clients with IBM mainframe-class security. Access Manager can lock down and harden the AIX 5L operating system at the root level, thereby helping to secure applications and protect data, meet customer security audit requirements, and reduce security administration costs.
- **Set up and manage the users:** IBM Tivoli Identity Manager is optional, extra-cost server-based enablement software that automates the creation and management of multiple user accounts. Identity Manager helps to significantly shorten the time for provisioning users from weeks to minutes and automatically discovers invalid user accounts.
- **Manage security operations:** IBM Tivoli Risk Manager is optional, extra-cost server-based enablement software that centrally monitors, reports, and manages security events. Risk Manager helps to radically improve the administration of the whole security management environment.
- **Audit security policies for compliance:** IBM Tivoli Security Compliance Manager is optional, extra-cost server-based enablement software that checks the server system, middleware, and applications for vulnerability and adherence to customer security policies. Security Compliance Manager determines violations against security policies that are provided by IBM or modified or written by the customer.

Complementary security offering: IBM Tivoli Directory Server

- **Store users and their identities:** IBM Tivoli Directory Server is server-based enablement software. Director Server is foundational service software for building security-rich, standards-compliant identity infrastructure solutions. It provides a robust, lightweight directory access protocol (LDAP) and offers a choice of providing simple user ID and password authentication or robust digital certificate-based authentication. Directory Server is provided as a part of the AIX 5L V5.2 Expansion Pack.

Customer value: Tivoli security management solutions for AIX 5L can significantly help meet the heightened and growing customer need for a more secure on demand IT and server operating environment.

Tivoli security-ready client and agent software provides customer value when preinstalled. Preinstallation with AIX 5L will help save installation planning and implementation time when the clients/agents are security-enabled by Tivoli security management (server) offerings.

Significant additional customer value is provided when the Tivoli security-ready clients/agents are connected to and enabled by Tivoli security management (server) software:

- Helps protect and optimize IT resources by controlling who has access to what
- Helps reduce the cost of security administration and support
- Helps manage complexity with a single user sign-on and unified user experience
- Helps validate compliance against security policies and audits requirements

IBM value: Tivoli security-ready clients/agents and Tivoli security management solution offerings further differentiate the value of eServer, pSeries, and AIX 5L when compared to UNIX competitors such as HP and Sun Microsystems. When marketed and sold together as an integrated security management solution, eServer, pSeries, AIX 5L, and Tivoli are a winning combination.

IBM Tivoli Security Management Solutions information sources

- Worldwide
 - Tivoli sales support — www.ibm.com Web site
 - <http://www-306.ibm.com/software/tivoli/solutions/security/>
 - Tivoli technical support
 - <http://www-306.ibm.com/software/support/probsub.html>
- Tivoli security sales
 - IBM Direct: Bob Kalka
 - IBM Business Partners: Rob Ciampa rciampa@us.ibm.com
- Americas
 - Tivoli sales and technical support: U.S. phone number 800-426-7378
 - Tivoli security sales: Craig J. Lund
 - Tivoli technical support
 - <http://www-306.ibm.com/software/support/probsub.html>
- Asia Pacific
 - Tivoli security sales: Con Yianakos con1@au1.ibm.com
 - Tivoli security support: Chris Thompson
 - Europe, Middle East, and Africa
 - Tivoli security sales: Pierre Bertin
 - Tivoli security support: Dexter Henderson henderde@uk.ibm.com

Information on features and external devices supported by Linux on the model 510 can be found at:

<http://www-1.ibm.com/servers/eserver/pseries/linux>

Certain external machine types supported on the model 510 require that specific I/O adapters be installed in the model 510. If those I/O adapters are not supported by SUSE LINUX Enterprise Server 9 for POWER, or later, or

Red Hat Enterprise Linux AS for POWER Version 3, the external machine types cannot be ordered unless the system will be running a different operating system on the model 510 that supports the I/O adapter. The configurator will produce a validation error, and the configurator user will have to remove the external machine type from the initial order.

Some functions and features are not available when the model 510 is used with Linux only.

Dynamic logical partitioning

The new dynamic LPAR function provides enhanced resource management for the p5-510. Dynamic LPAR allows available system resources to be quickly and easily configured across multiple logical partitions to meet the rapidly changing needs of your business. Dynamic LPAR also allows you to add new system resources such as hot-plug PCI adapters into your system's configuration without requiring a reboot. As many as two LPARs are supported in a 2-way model 510 without the Advanced POWER Virtualization feature (#7432). If the Advanced POWER Virtualization feature (#7432) is installed in the system, up to 10 dynamic LPARs per processor (20 per 2-way processor card) are supported in the stand-alone SMP server configuration on the p5-510. Dynamic LPAR requires the use of a HMC.

Dynamic LPAR is supported by the following levels of the AIX and Linux operating systems:

- AIX 5L for POWER V5.2, or later
- SUSE LINUX Enterprise Server 9, or later

Dynamic LPAR is not supported by the current version of Red Hat Enterprise Linux AS for POWER Version 3.

An IBM Rack-mounted HMC or Desktop HMC is required to manage POWER5 processor-based servers implementing partitioning. Multiple partitions and multiple POWER5 processor-based servers can be supported by an HMC, located locally or remotely attached to the eServer.

The HMC is not required for a partition to run, but is required for an IBM eServer p5-510 system to create, define, and change the partition.

Advanced POWER Virtualization

Advanced POWER Virtualization (#7432) allows customers to create partitions in units of less than one CPU (sub-CPU LPARs) and allows the same system I/O to be virtually added to these partitions. The feature also includes a software component that provides cross-partition workload management. Advanced POWER Virtualization combines three components:

- Firmware feature to turn on Micro-Partitioning™ (#7432)
- Software feature to do the I/O virtualization
- Software feature providing partition load management

At initial order entry, selecting feature number 7432 will result in Micro-Partitioning being enabled during manufacturing, and the enabling software media and publications will be shipped to the customer. When ordering feature number 7432 as an MES, an activation key will be posted on an IBM Web site, and the customer must retrieve it and install it on the system. The IBM Web site is

<http://www-912.ibm.com/pod/pod>

Other features of Advanced POWER Virtualization:

- If any processors in a system have the Virtualization feature, all active processors must have it.
- Once the Virtualization feature is installed in a system, it cannot be removed.
- Virtual Ethernet and Virtual Storage are part of Advanced POWER Virtualization.
- Partition Load Manager provides automated CPU and memory resource management across AIX 5.2/5.3 logical partitions.

Advanced POWER Virtualization is supported by the following levels of the AIX and Linux operating systems:

- AIX 5L for POWER V5.3, or later
- SUSE LINUX Enterprise Server 9, or later
- Red Hat Enterprise Linux AS for POWER Version 3, or later

Publications

The following information will be shipped with the 9110-510. Additional copies are available. To order, contact your IBM representative.

Title	Order number
IBM eServer Hardware Information Center CD-ROM	SK3T-8159
IBM eServer Safety Information	G229-9054
Start Here for eServer	SA41-5156
IBM Statement of Limited Warranty	Z125-4753
IBM License Agreement for Machine Code	Z125-5468
Pointer Sheet for Machine Internal Code License Agreement	GC52-1065

Hardware books such as installation guides, user's guides, and service guides are available to download or view at

http://www.ibm.com/servers/eserver/pseries/library/hardware_docs

AIX documentation can be found at

<http://www.ibm.com/servers/aix/library/techpubs.html>

The Publication Notification System (PNS) is available by order number/product number. Customers currently subscribing to PNS will automatically receive notifications by e-mail. Customers who want to subscribe, can visit the PNS Web site location at

<http://service5.boulder.ibm.com/pnsrege.nsf/WebMessages/WelcomeENUS>

The publications listed on the notification can be ordered by calling the Publication Support Group in Raleigh at 800-879-2755, option 1. The IBM Publications Center Portal

<http://www.ibm.com/shop/publications/order>

The Publications Center is a worldwide central repository for IBM product publications and marketing material with a catalog of 70,000 items. Extensive search facilities are provided, as well as payment options via credit card. Furthermore, a large number of publications are available online in various file formats, which can currently be downloaded free of charge.

Note: PNS subscribers most often order their publications via the Publication Center.

Services

Integrated Technology Services

IBM services include business consulting, outsourcing, hosting services, applications, and other technology management.

These services help you learn about, plan, install, manage, or optimize your IT infrastructure for e-business. They can help you integrate your high-speed networks, storage systems, application servers, wireless protocols, and an array of platforms, middleware, and communications software for IBM and many non-IBM offerings. IBM is your one-stop shop for IT support needs.

For details on available services, contact your IBM representative or visit

<http://www.ibm.com/services/>

For details on education offerings related to specific products, visit

<http://www.ibm.com/services/learning/index.html>

Select your country, and then select the product as the category.

Technical information

Physical specifications

- Width: 483 mm (19 in)
- Depth: 686 mm (27 in)
- Height: 89 mm (3.5 in)
- Weight:
 - Minimum configuration: 16.8 kg (37 lb)
 - Maximum configuration: 23.2 kg (51 lb)

Operating environment

- Temperature: (nonoperating) 5° to 45°C (41° to 113°F); Recommended temperature (operating) 5° to 35°C (41° to 95°F)
- Relative humidity: 8% to 80%
- Maximum wet bulb (power off): 27°C (80°F)
- Operating voltage: 100 to 127 or 200 to 240 V ac (auto-ranging)
- Operating frequency: 47/63 Hz
- Power consumption: 475 watts (maximum — 2-way 1.65 GHz)
- Thermal output: 1,622 Btu/hour (maximum — 2-way 1.65 GHz)
- Power-source loading
 - 0.500 kVA (maximum configuration — 2-way 1.65 GHz)
 - Maximum altitude: 3,048 m (10,000 ft)

Noise level and sound power

- Sound power: 6.0 bels idle/6.1 bels operating

EMC conformance classification: This equipment is subject to FCC rules and shall comply with the appropriate FCC rules before final delivery to the buyer or centers of distribution.

- U.S.: FCC Class A
- Europe: CISPR 22 Class A
- Japan: VCCI-A
- Korea: Korean Requirement Class A
- China: People's Republic of China commodity inspection law

Homologation — Telecom Environmental Testing (Safety and EMC): Homologation approval for specific countries has been initiated with the IBM Homologation and Type Approval (HT&A) organization in LaGaude. This pSeries model and applicable features meet the environmental testing requirements of the country telecom and have been designed and tested in compliance with the Full Quality Assurance Approval (FQAA) process as delivered by the British Approval Board for Telecom (BABT), the U.K. telecom regulatory authority.

Product safety/country testing/certification

- UL 1950 Underwriters Laboratory, Safety Information
- CSA C22.2 No. 950-M86
- EN60950 European Norm
- IEC 950, Edition 1, International Electrotechnical Commission, Safety Information
- Nordic deviations to IEC-950 1st Edition, as outlined in document EMKO-TSE (05-SEC) 200/93

General requirements: The product is in compliance with IBM Corporate Bulletin C-B 0-2594-000 Statement of Conformity of IBM Product to External Standard (Suppliers Declaration).

Hardware requirements

IBM eServer p5 510 and p5 510 Express minimum system configuration: The model 510 server can be configured to incorporate two processors, 32 GB of system memory, three PCI adapters, and a media device, as desired. This flexibility is made available through the many optional features for the model 510.

Each model 510 must include a minimum of the following items:

- One system central electronics complex (CEC) enclosure with the following items:
 - One power cord (#6458, #6460, #6469-#6479, #6487, #6488, #6493-#6496, #6660, #6669, #6670, #6680, #6687)
 - One language group, specify (#9300 or #97xx)
- Choose one processor card from:
 - POWER5 processor — 1-way 1.5 GHz, No L3 Cache (#7609)
 - POWER5 processor — 2-way 1.5 GHz, 36MB L3 Cache (#7612)
 - POWER5 processor — 1-way 1.65 GHz, 36MB L3 Cache (#7610)
 - POWER5 processor — 2-way 1.65 GHz, 36MB L3 Cache (#7611)
- One or two processor entitlements:
 - #7442 or #8642 for processor card #7609
 - #7443 or #8643 for processor card #7610

- 2 x #7449, or 1 x #7449 and 1 x #8649 for processor card #7612
- 2 x #7444, or 1 x #7444 and 1 x #8644 for processor card #7611

Note: #8642, #8643, #8649, and #8644 are part of a Value Pak configuration.

- Choose 512 MB minimum memory from:
 - 512 MB memory (2 x 256 MB DIMMs)(#4443)
 - 1024 MB memory (4 x 256 MB DIMMs)(#4444)
 - 2048 MB memory (4 x 512 MB DIMMs)(#4447)
 - 4096 MB memory (4 x 1024 MB DIMMs)(#4445)
 - 8192 MB memory (4 x 2048 MB DIMMs)(#4449)
 - 16384 MB memory (4 x 4096 MB DIMMs)(#4450)
- Choose disk drive from:
 - 36.4 GB Ultra320 15,000 RPM (#3277)
 - 73.4 GB Ultra320 10,000 RPM (#3274)
 - 73.4 GB Ultra320 15,000 RPM (#3278)
 - 146.8 GB Ultra320 10,000 RPM (#3275)
- Power Supply 700 watt, base (#7989)
- IBM bezel and hardware (#7998)

RAID: Hardware-assisted internal RAID is not available on the model 510.

HMC: The HMC must have HMC for POWER5 Licensed Machine Code V4.4 provided in APAR MB00691. Version 4.4 is planned to be available on HMC shipments on February 18, 2005. For details, visit

<http://techsupport.services.ibm.com/server/hmc/power5>

V4.4 is planned to be generally available on HMC shipments on February 18, 2005.

Software requirements: If installing AIX on the system (one of these):

- AIX 5L for POWER V5.2 with the 5200-04 Recommended Maintenance Package (APAR IY56722 plus APAR IY62266), or later

Note: The Advanced POWER Virtualization feature (#7432) is not supported on AIX 5L for POWER V5.2.
- AIX 5L for POWER V5.3 with the 5300-01 Recommended Maintenance Package (APAR IY62267), or later

If installing Linux on the system (one of these):

- SUSE LINUX Enterprise Server 9 for POWER, or later
- Red Hat Enterprise Linux AS for POWER Version 3, or later

Notes

- Not all p5-510 system features available on the AIX operating system are available on the Linux operating systems.
- Dynamic LPAR is not supported by the current version of Red hat Enterprise Linux AS for POWER Version 3.

Information on features and external devices supported by Linux on the model 510 can be found at

<http://www-1.ibm.com/servers/eserver/pseries/linux>

Limitations

System

- Integrated serial ports are not supported when the HMC ports are connected to a Hardware Management Console. Either the HMC ports or the integrated serial ports can be used, but not both.
- The integrated serial ports are supported only for modem and async terminal connections. Any other applications using serial ports require a separate serial port adapter to be installed in a PCI slot. The integrated serial ports do not support HACMP™ configurations.

Processor cards

- Only one processor card may be installed in the system.
- Processor cards are soldered to the planar.
- All processors installed in the system must be entitled:
 - #7609 requires 1 x #7442 or 1 x #8642
 - #7610 requires 1 x #7443 or 1 x #8643
 - #7611 requires 2 x #7444 or 1 x #7444 and 1 x #8644
 - #7612 requires 2 x #7449 or 1 x #7449 and 1 x #8649

Power supply

- The base machine contains one ac power supply with a second available for redundancy.

Dynamic logical partitioning

- This function is supported by AIX and only in the Linux 2.6 kernel and is currently available only in SUSE LINUX Enterprise Server 9 for POWER.

Redundant power supply/fans

- Second optional ac power supply (#7989)
- Redundant fans standard

System memory

- A maximum of 32 GB of system memory
- A minimum of 512 MB
- Memory DIMMs feature number 4443 must be ordered and installed in pairs. Memory DIMM feature numbers 4444, 4445, 4447, 4449, and 4450 must be ordered and installed in quads.
- 512 MB (2 x 256 MB) Memory DIMM feature number 4443 is the only DIMM that can be installed in pairs. When additional memory is added to a system with feature number 4443 installed, an additional feature number 4443 must be added to the original pair to make a quad; then one additional quad may be added to the system. Memory DIMM feature numbers 4444, 4445, 4447, 4449, and 4450 must be ordered and installed in quads.
- Memory feature numbers may be mixed within a system.

Figure 1. Memory features

Feature	Feature number	Minimum quantity	Maximum quantity
512 MB (2 x 256 MB DIMMs)	4443	0	2
1024 MB (4 x 256 MB DIMMs)	4444	0	2
2048 MB (4 x 512 MB DIMMs)	4447	0	2
4096 MB (4 x 1024 MB DIMMs)	4445	0	2
8192 MB (4 x 2048 MB DIMMs)	4449	0	2
16384 MB (4 x 4096 MB DIMMs)	4450	0	2

PCI card slots: The model 510 has three 3.3 V, 133 MHz, 64-bit PCI-X slots.

Graphics adapters

- A graphics adapter, keyboard, and mouse are not required in the minimum configuration.
- The maximum number of graphics adapters supported in the model 510 is one.

I/O adapters

- Refer to **Figure 2** for additional I/O adapter limitations.

Figure 2. I/O adapter features

I/O Adapter	Feature number	Max qty	Slot priority	Size
2-port USB PCI	2738	1	1,2,3	Short
8-Port Async	2943	3	1,2,3	Short
128-Port Async	2944	3	1,2,3	Short
Artic 960 Hx 4-ports	2947	3	1,2,3	Long
2-Port Multiprotocol GXT135P Graphics Accelerator	2962	3	1,2,3	Short
10/100 Ethernet	2849	1	1,2,3	Short
Gigabit Ethernet	4962	3	1,2,3	Short
10/100/1000 Ethernet	5700	3	1,2,3	Short
PCI-X Ultra320 SCSI RAID	5701	3	1,2,3	Short
2-port 10/100/1000 Ether.	5703	3	1,2,3	Long
2-port Gigabit Ether.-SX	5706	3	1,2,3	Short
PCI-X Ultra320 SCSI	5707	3	1,2,3	Short
2 Gb Fibre Channel	5712	3	1,2,3	Short
10 Gigabit Ethernet SR	5713	3	1,2,3	Short
10 Gigabit Ethernet LR	5716	3	1,2,3	Short
2-port Async IEA-232	5717	1	1,2,3	Short
	5723	3	1,2,3	Short

Storage devices/Bays

- The model 510 has four DASD bays.
- The media bay can contain an optional DVD-ROM (#2640 or follow-on) or an optional DVD-RAM (#5751 or follow-on).
- If SUSE LINUX Enterprise Server 9 for POWER, or later, or Red Hat Enterprise Linux AS for POWER Version 3, is being installed in the system, feature number 2640 or 5751, or follow-ons, are required.

Note: Because the 9110-510 system has an optional DVD-ROM (#2640) and DVD-RAM (#5751), alternate methods for maintaining and servicing the system need to be available if the DVD-ROM or DVD-RAM is not ordered; an external Internet connection must be available to maintain or update system microcode to the latest required level.

Figure 3. Storage device features

Device	Maximum quantity	Media bay	Feature number
DVD-ROM (IDE)	1	Media 1	2640
DVD-RAM (IDE)	1	Media 1	5751
36.4 GB 15,000 RPM Ultra320 SCSI Disk, Hot-swap	4	DASD 1-4	3277
73.4 GB 10,000 RPM Ultra320 SCSI Disk, Hot-swap	4	DASD 1-4	3274
73.4 GB 15,000 RPM Ultra320 SCSI Disk, Hot-swap	4	DASD 1-4	3278
146.8 GB 10,000 RPM, Ultra320 SCSI Disk, Hot-swap	4	DASD 1-4	3275

Linux operating system: For customers installing SUSE LINUX Enterprise Server 9 for POWER, or later, or Red Hat Enterprise Linux AS for POWER Version 3, or later, refer to the following Web site for information on supported I/O adapters and storage devices

<http://www.ibm.com/servers/eserver/pseries/hardware/factsfeatures.html>

Planning information

Customer responsibilities: Customer setup

Cable orders: No cables required

Security, auditability, and control

This product uses the security and auditability features of host software and application software.

The customer is responsible for evaluation, selection, and implementation of security features, administrative procedures, and appropriate controls in application systems and communications facilities.

IBM Electronic Services

IBM Global Services has transformed its delivery of hardware and software support services to put you on the road to higher systems availability. IBM Electronic Services is a Web-enabled solution that provides you with an exclusive, no-additional-charge enhancement to the service and support on the IBM eServer. You should benefit from greater system availability due to faster problem resolution and preemptive monitoring. IBM Electronic Services is comprised of two separate, but complementary, elements: IBM Electronic Services news page and IBM Electronic Service Agent™.

The IBM Electronic Services news page provides you with a single Internet entry point that replaces the multiple entry points traditionally used by customers to access IBM Internet services and support. The news page enables you to gain easier access to IBM resources for assistance in resolving technical problems.

The IBM Electronic Service Agent is no-additional-charge software that resides on your IBM eServer system. It is designed to proactively monitor events and transmit system inventory information to IBM on a periodic, customer-defined timetable. The IBM Electronic Service Agent tracks system inventory, hardware error logs, and performance information. If the server is under a current IBM maintenance service agreement or within the IBM warranty period, the Service Agent automatically reports

hardware problems to IBM. Early knowledge about potential problems enables IBM to provide proactive service that maintains higher system availability and performance. In addition, information collected through the Service Agent will be made available to IBM service support representatives when they are helping answer your questions or diagnosing problems.

To learn how IBM Electronic Services can work for you, visit

<http://www.ibm.com/support/electronic>

Terms and conditions

Special Bids: Requests for Special Bid Offerings should be directed to your IBM representative or IBM Business Partner.

Volume orders: Contact your IBM representative.

IBM Global Financing: No

Warranty period: Three years

Warranty service: If required, IBM provides repair or exchange service depending on the types of warranty service specified for the machine. IBM will attempt to resolve your problem over the telephone, or electronically via an IBM Web site. You must follow the problem determination and resolution procedures that IBM specifies. Scheduling of service will depend upon the time of your call and is subject to parts availability. If applicable to your product, parts considered customer replaceable units (CRUs) will be provided as part of the machine's standard warranty service. Service levels are response time objectives and are not guaranteed. The specified level of warranty service may not be available in all worldwide locations. Additional charges may apply outside IBM's normal service area. Contact your local IBM representative or your reseller for country- and location-specific information.

CRU service: IBM provides replacement CRUs to you for you to install. CRU information and replacement instructions are shipped with your machine and are available from IBM upon your request. CRUs are designated as being either a Tier 1 or a Tier 2 CRU.

Tier 1 CRU Installation of Tier 1 CRUs is your responsibility. If IBM installs a Tier 1 CRU at your request, you will be charged for the installation.

For machines with on-site same-day response service, IBM will replace a Tier 1 CRU part at your request, at no additional charge.

Tier 2 CRU: You may install a Tier 2 CRU yourself or request IBM to install it, at no additional charge.

Based upon availability, CRUs will be shipped for next-business-day delivery. IBM specifies, in the materials shipped with a replacement CRU, whether a defective CRU must be returned to IBM. When return is required:

- Return instructions and a container is shipped with the replacement CRU.
- You may be charged for the replacement CRU if IBM does not receive the defective CRU within 30 days of your receipt of the replacement.

The following parts have been designated as Tier 1 CRU parts:

- Blowers
- HDDs
- CD/DVD drive board
- CD/DVD slimline drive
- Line cord
- Power supplies
- Processor voltage regulator
- VPD card
- Keyboard
- Mouse
- External cables
- Display
- Mechanical covers

On-site service: IBM will repair the failing machine at your location and verify its operation. You must provide a suitable working area to allow disassembly and reassembly of the IBM machine. The area must be clean, well-lit, and suitable for the purpose.

- 9 hours per day, Monday through Friday, excluding holidays, next-business-day (NBD) response

ServiceSuite™ and ServiceElect (formerly ESA) maintenance

For ServiceElect (Z125-5510) and ServiceSuite (Z125-5745) Statements of Work:

Warranty service upgrades

On-site service: IBM will repair the failing machine at your location and verify its operation. You must provide a suitable working area to allow disassembly and reassembly of the IBM machine. The area must be clean, well-lit, and suitable for the purpose. The following service selections are available as warranty upgrades for your machine type.

For machines with on-site same-day response service, IBM will replace a Tier 1 CRU part at your request, at no additional charge. For additional information on the CRU service, see warranty information.

- 9 hours per day, Monday through Friday, excluding holidays, 4-hour average, same-business-day response
- 24 hours per day, 7 days a week, 4-hour average response
- 24 hours per day, 7 days a week, 2-hour average response

Maintenance services: If required, IBM provides repair or exchange service depending on the types of warranty service specified for the machine. IBM will attempt to resolve your problem over the telephone or electronically, via an IBM Web site. You must follow the problem determination and resolution procedures that IBM specifies. Scheduling of service will depend upon the time of your call and is subject to parts availability. If applicable to your product, parts considered CRUs will be provided as part of the machine's standard maintenance service. Service levels are response time objectives and are not guaranteed. The specified level of warranty service may not be available in all worldwide locations. Additional charges may apply outside IBM's normal service area. Contact your local IBM representative or your reseller for country- and location-specific information.

CRU service: IBM provides replacement CRUs to you for you to install. CRU information and replacement instructions are shipped with your machine and are

available from IBM upon your request. CRUs are designated as being either a Tier 1 or a Tier 2 CRU.

Tier 1 CRUs: Installation of Tier 1 CRUs is your responsibility. If IBM installs a Tier 1 CRU at your request, you will be charged for the installation.

For machines with on-site same-day response service, IBM will replace a Tier 1 CRU part at your request, at no additional charge.

Tier 2 CRUs: You may install a Tier 2 CRU yourself or request IBM to install it, at no additional charge.

Based upon availability, CRUs will be shipped for NBD delivery. IBM specifies, in the materials shipped with a replacement CRU, whether a defective CRU must be returned to IBM. When return is required:

- Return instructions and a container is shipped with the replacement CRU.
- You may be charged for the replacement CRU if IBM does not receive the defective CRU within 30 days of your receipt of the replacement.

The following parts have been designated as Tier 1 CRU parts:

- Blowers
- HDDs
- CD/DVD drive board
- CD/DVD slimline drive
- Line cord
- Power supplies
- Processor voltage regulator
- VPD card
- Keyboard
- Mouse
- External cables
- Display
- Mechanical covers

On-site service: IBM will repair the failing machine at your location and verify its operation. You must provide a suitable working area to allow disassembly and reassembly of the IBM machine. The area must be clean, well-lit, and suitable for the purpose. The following service selections are available as maintenance options for your machine type.

- 9 hours per day, Monday through Friday, excluding holidays, NBD response
- 9 hours per day, Monday through Friday, excluding holidays, 4-hour average, same-business-day response
- 24 hours per day, 7 days a week, 4-hour average response
- 24 hours per day, 7 days a week, 2-hour average response

Maintenance service (ICA)

The preferred go-to-market offerings are ServiceElect and ServiceSuite. However, ICA legacy contracts will still be available for current customers until they are withdrawn.

Warranty service upgrades

On-site service: IBM will repair the failing machine at your location and verify its operation. You must provide a suitable working area to allow disassembly and reassembly of the IBM machine. The area must be clean, well-lit, and suitable for the purpose. The following service selections are available as warranty upgrades for your machine type.

For machines with on-site same-day response service IBM will replace a Tier 1 CRU part at your request, at no additional charge. For additional information on the CRU service, refer to the warranty information.

- 9 hours per day, Monday through Friday, excluding holidays, 4-hour average, same-business-day response
- 24 hours per day, 7 days a week, 4-hour average response
- 24 hours per day, 7 days a week, 2-hour average response

Maintenance services: If required, IBM provides repair or exchange service depending on the types of warranty service specified for the machine. IBM will attempt to resolve your problem over the telephone or electronically, via an IBM Web site. You must follow the problem determination and resolution procedures that IBM specifies. Scheduling of service will depend upon the time of your call and is subject to parts availability. If applicable to your product, parts considered CRUs will be provided as part of the machine's standard maintenance service. Service levels are response time objectives and are not guaranteed. The specified level of warranty service may not be available in all worldwide locations. Additional charges may apply outside IBM's normal service area. Contact your local IBM representative or your reseller for country- and location-specific information.

CRU service: IBM provides replacement CRUs to you for you to install. CRU information and replacement instructions are shipped with your machine and are available from IBM upon your request. CRUs are designated as being either a Tier 1 or a Tier 2 CRU.

Tier 1 CRUs: Installation of Tier 1 CRUs is your responsibility. If IBM installs a Tier 1 CRU at your request, you will be charged for the installation.

For machines with on-site same-day response service, IBM will replace a Tier 1 CRU part at your request, at no additional charge.

Tier 2 CRUs: You may install a Tier 2 CRU yourself or request IBM to install it, at no additional charge.

Based upon availability, CRUs will be shipped for next-business-day delivery. IBM specifies, in the materials shipped with a replacement CRU, whether a defective CRU must be returned to IBM. When return is required:

- Return instructions and a container is shipped with the replacement CRU.
- You may be charged for the replacement CRU if IBM does not receive the defective CRU within 30 days of your receipt of the replacement.

The following parts have been designated as Tier 1 CRU parts:

- Blowers
- HDDs
- CD/DVD drive board
- CD/DVD slimline drive
- Line cord
- Power supplies
- Processor voltage regulator
- VPD card
- Keyboard
- Mouse
- External cables

- Display
- Mechanical covers

On-site service: IBM will repair the failing machine at your location and verify its operation. You must provide a suitable working area to allow disassembly and reassembly of the IBM machine. The area must be clean, well-lit, and suitable for the purpose. The following service selections are available as maintenance options for your machine type.

- 9 hours per day, Monday through Friday, excluding holidays, NBD response
- 9 hours per day, Monday through Friday, excluding holidays, 4-hour average, same-business-day response
- 24 hours per day, 7 days a week, 4-hour average response
- 24 hours per day, 7 days a week, 2-hour average response

Usage plan machine: No

IBM hourly service rate classification: Two

When a type of service involves the exchange of a machine part, the replacement may not be new, but will be in good working order.

Field-installable features: Yes

Model conversions: No

Machine installation: Customer setup. Customers are responsible for installation according to the instructions IBM provides with the machine.

Graduated program license charges apply: Yes; the applicable processor group is D5.

Licensed machine code: IBM machine code is licensed for use by a customer on the IBM machine for which it was provided by IBM under the terms and conditions of the IBM License Agreement for Machine Code, to enable the machine to function in accordance with its specifications, and only for the capacity authorized by IBM and for which the customer has paid. Machine code may sometimes be referred to as “Licensed Internal Code” or “LIC” in documentation or on the machine with which the machine code was delivered. All such code, whether referred to or marked as machine code, Licensed Internal Code, or LIC is subject to the IBM License Agreement for Machine Code.

Should it become necessary for IBM to make changes to machine code, IBM will make the changes available at the IBM [server](mailto:server@ibm.com) p5 technical support page on ibm.com. If the machine does not function as warranted and your problem can be resolved through your application of machine code changes, you are responsible for downloading and installing the designated machine code changes as IBM specifies. You may request IBM to install machine code changes; however, you may be charged for the installation of such changes.

You can obtain the agreement by contacting your IBM representative or at

http://www-1.ibm.com/servers/support/machine_warranties/machine_code.html

Educational allowance: A reduced charge is available to qualified education customers. The educational allowance may not be added to any other discount or allowance.

Prices

The following are newly announced features on the specified models of the IBM eServer® 9110 machine type:

Description	Model	Purchase price	MMMC ³	CSU		
eServer MT 9110	510	\$50	\$21	Yes		
³ Monthly minimum maintenance charge						
Description	Feature number	Purchase price		Initial/ MES/ both	CSU	RP MES
Machine type/model 9111-510						
Integrate with DR400 — IBM TotalStorage® Retention Solution	0705	\$ 0		Initial		
CCS Customer Service Specify (U.S.)	0986	NC		Initial		
PCI SCSI Adapter 16-Bit Differential External Y Cable	2114	225		Both	Yes	No
Converter Cable, VHDCI to P, Mini 68-pin to 68-pin, 0.3M	2118	50		Both	Yes	No
2.5M 16-bit SCSI-2 System-to-System Cable	2425	108		Both	Yes	No
LC-SC 50 Micron Fiber Converter Cable	2456	83		Both	Yes	No
LC-SC 62.5 Micron Fiber Converter Cable	2459	83		Both	Yes	No
External USB 1.44 MB Diskette Drive	2591	83		Both	Yes	No
IDE Slimline DVD-ROM Drive	2640	378		Both	Yes	No
2-Port USB PCI Adapter	2738	250		Both	Yes	No
POWER GXT135P Graphics Accelerator with Digital Support	2849	381		Both	Yes	No
ARTIC 960Hx 4-Port EIA™-232 Cable	2861	354		Both	Yes	No
4-Port X.21 Cable	2863	417		Both	Yes	No
4-Port V.35 (DTE) Cable	2864	700		Both	Yes	No
Asynchronous Terminal/Printer Cable EIA-232	2934	37		Both	Yes	No
Asynchronous Cable EIA-232/V.24	2936	61		Both	Yes	No
8-Port Asynchronous Adapter EIA-232/RS-422, PCI bus	2943	1,162		Both	Yes	No
128-Port Asynchronous Controller, PCI bus	2944	1,079		Both	Yes	No
IBM ARTIC 960Hx 4-Port Multiprotocol PCI Adapter	2947	3,021		Both	Yes	No
Cable, V.24/EIA-232	2951	146		Both	Yes	No
Cable, V.35	2952	267		Both	Yes	No
Cable, V.36/EIA-499	2953	212		Both	Yes	No
Cable, X.21	2954	146		Both	Yes	No
2-Port Multiprotocol PCI Adapter	2962	1,666		Both	Yes	No
Serial-to-Serial Port Cable for Drawer/Drawer	3124	67		Both	Yes	No
Cable for Rack/Rack	3125	67		Both	Yes	No
73.4 GB 10,000 RPM Ultra320 SCSI Disk Drive Assembly	3274	750		Both	Yes	No
146.8 GB 10,000 RPM Ultra320 SCSI Disk Drive Assembly	3275	1,400		Both	Yes	No

Description	Feature number	Purchase price	Initial/MES/both	CSU	RP MES
36.4 GB 15,000 RPM Ultra320 SCSI Disk Drive Assembly	3277	\$ 1,771	Both	Yes	No
73.4 GB 15,000 RPM Ultra320 SCSI Disk Drive Assembly	3278	2,715	Both	Yes	No
L200P Flat Panel Monitor	3636	1,645	Both	Yes	No
IBM T541H /L150p 15-in TFT Color Monitor	3637	625	Both	Yes	No
IBM C220p 21-inch Color Monitor, Business Black, and Cable	3638	829	Both	Yes	No
ThinkVision™ L170p Flat Panel Monitor	3639	829	Both	Yes	No
Service Package	3752	62	Both	Yes	No
Serial Port Converter Cable, 9-Pin to 25-Pin	3925	21	Both	Yes	No
Asynch Printer/Terminal Cable, 9-pin to 25-pin, 4M	3926	76	Both	Yes	No
6-Foot Extender Cable for Displays (15-pin D-shell to 15-pin D-shell)	4242	83	Both	Yes	No
Extender Cable — USB Keyboards, 2M	4256	42	Both	Yes	No
512 MB (2x256 MB) DIMMs, 208-pin, 266 MHz DDR SDRAM	4443	550	Both	Yes	No
1024 MB (4x256 MB) DIMMs, 208-pin, 266 MHz DDR SDRAM	4444	1,100	Both	Yes	No
4096 MB (4x1024 MB) DIMMs, 208-pin, 266 MHz DDR SDRAM	4445	3,550	Both	Yes	No
2048 MB (4x512 MB) DIMMs, 208-pin, 266 MHz DDR SDRAM	4447	1,700	Both	Yes	No
8192 MB (4x2048 MB) DIMMs, 208-pin, 266 MHz DDR Stacked SDRAM	4449	12,375	Both	Yes	No
16 GB (4x4096 MB) DIMMs, 208-pin, 266 MHz DDR Stacked SDRAM	4450	45,000	Both	Yes	No
Rack Status Beacon Cable, Junction Box To Drawer Or Status Beacon	4691	10	Both	Yes	No
Rack Status Beacon Cable, Junction Box Daisy Chain	4692	10	Both	Yes	No
10/100 Mbps Ethernet PCI Adapter II	4962	412	Both	Yes	No
Customer Service Specify Software Preinstall	5001	NC	Initial		
	5005	0	Initial		
IBM Gigabit Ethernet-SX PCI-X Adapter	5700	1,416	Both	Yes	No
IBM 10/100/1000 Base-TX Ethernet PCI-X Adapter	5701	1,066	Both	Yes	No
PCI-X Dual Channel Ultra320 SCSI RAID Adapter	5703	3,000	Both	Yes	No
IBM 2-Port 10/100/1000 Base-TX Ethernet PCI-X Adapter	5706	1,599	Both	Yes	No
IBM 2-Port Gigabit Ethernet-SX PCI-X Adapter	5707	2,124	Both	Yes	No
PCI-X Dual Channel Ultra320 SCSI Adapter	5712	658	Both	Yes	No

Description	Feature number	Purchase price	Initial/MES/both	CSU	RP MES
2 Gigabit Fibre Channel PCI-X Adapter	5716	\$2,267	Both	Yes	No
10 Gigabit Ethernet-SR PCI-X Adapter	5718	5,000	Both	Yes	No
10 Gigabit Ethernet-LR PCI-X Adapter	5719	9,853	Both	No	No
2-Port Asynchronous IEA-232 PCI Adapter	5723	285	Both	Yes	No
IBM 4.7 GB IDE Slimline DVD-RAM Drive	5751	1,000	Both	Yes	No
Power Cable — Drawer to IBM PDU, 14-foot, 250 V/10 A	6458	14	Both	Yes	No
Power Cord (14-foot), Drawer To OEM PDU, (125 V, 15 A), Plug Type #4	6460	14	Both	Yes	No
(250 V, 15 A), United States, Plug Type #5	6469	14	Both	Yes	No
Power Cord (6-foot), To Wall (125 V, 15 A), Plug Type #4	6470	14	Both	Yes	No
To Wall (250 V, 15 A), United States, Plug Type #5	6487	14	Both	Yes	No
Power Cord (9-foot), To Wall/OEM PDU, (125 V, 15 A), Plug Type #70	6471	14	Both	Yes	No
(250 V, 16 A), Plug Type #18	6472	14	Both	Yes	No
(250 V, 10 A), Plug Type 19	6473	14	Both	Yes	No
(250 V, 13 A), Plug Type #23	6474	14	Both	Yes	No
(250 V, 16 A), Plug Type #32	6475	14	Both	Yes	No
(250 V, 10 A), Plug Type #24	6476	14	Both	Yes	No
(250 V, 16 A), Plug Type #22	6477	14	Both	Yes	No
(250 V, 16 A), Plug Type #25	6478	14	Both	Yes	No
(250 V, 10 A), Plug Type #6	6479	14	Both	Yes	No
(125 V, 15 A or 250 V, 10A), Plug Type #2	6488	40	Both	Yes	No
(250 V, 10 A), Plug Type #62	6493	14	Both	Yes	No
(250 V, 10 A), Plug Type #69	6494	14	Both	Yes	No
(250 V, 10 A), Plug Type #73	6495	14	Both	Yes	No
(250 V, 10 A), Plug Type #66	6496	14	Both	Yes	No
(250 V, 10 A), Plug Type #6, Insulated	6680	14	Both	Yes	No
Power Cord (14-foot), Drawer to OEM PDU (125 V,15 A), Plug Type #59 (DENAN marking)	6660	14	Both	Yes	No
(250 V, 15 A), Plug Type #57 (DENAN marking)	6669	14	Both	Yes	No
Power Cord (6-foot), To Wall (125 V, 15 A), Plug Type #59 (DENAN marking)	6670	14	Both	Yes	No

Description	Feature number	Purchase price	MMMC	Initial/ MES/ both	CSU	RP MES
To Wall, (250 V, 15 A), Plug Type #57 (DENAN marking)	6687	\$ 14		Both	Yes	No
IBM/OEM Rack-mount Drawer Rail Kit	7166	150		Both	Yes	No
AAP Software Pre-Install Indicator	7305	NC		Initial		
Advanced POWER Virtualization	7432	590		Both	Yes	No
One Processor Entitlement for Processor						
Feature #7609	7442	846		Both	Yes	No
Feature #7610	7443	1,146		Both	Yes	No
Feature #7611	7444	1,726		Both	Yes	No
Feature #7612	7449	1,578		Both	Yes	No
1-way 1.5 GHz POWER5 Processor Card, No L3 Cache	7609	1,357	\$59	Initial		
1-way 1.65 GHz POWER5 Processor Card, 36 MB L3 Cache	7610	1,957	69	Initial		
2-way 1.65 GHz POWER5 Processor Card, 36 MB L3 Cache	7611	1,381	83	Initial		
2-way 1.5 GHz POWER5 Processor Card, 36 MB L3 Cache	7612	1,079	76	Initial		
Ethernet Cable, 6M, HMC to System Unit	7801	12		Both	Yes	No
Ethernet Cable, 15M, HMC to System Unit	7802	26		Both	Yes	No
Power Supply, 700 Watt ac, Hot-swap, Base or Redundant	7989	375		Both	Yes	No
IBM Rack-mount Drawer Bezel and Hardware	7998	25		Both	Yes	No
OEM Rack-mount Drawer Bezel and Hardware	7999	25		Both	Yes	No
128-Port Asynchronous Controller Cable, 4.5 Meter	8131	50		Both	Yes	No
23cm (9-Inch)	8132	33		Both	Yes	No
RJ-45 to DB-25 Converter Cable	8133	100		Both	Yes	No
Rack Mountable Remote Asynchronous Node 16-Port EIA-232	8136	2,083		Both	Yes	No
Enhanced Remote Asynchronous Node 16-Port EIA-232	8137	1,329		Both	Yes	No
Zero-priced Value Pak Processor Entitlement for #7609	8642	0		Both	Yes	No
for #7610	8643	0		Both	Yes	No
for #7611	8644	0		Both	Yes	No
for #7612	8649	0		Both	Yes	No
Quiet Touch Keyboard — USB, Business Black, U.S. English, #103P	8800	83		Both	Yes	No
French, #189	8801	83		Both	Yes	No
Italian, #142	8802	83		Both	Yes	No
German/Austrian, #129	8803	83		Both	Yes	No
U.K. English, #166	8804	83		Both	Yes	No
Spanish, #172	8805	83		Both	Yes	No
Japanese, #194	8806	83		Both	Yes	No
Brazilian/Portuguese, #275	8807	83		Both	Yes	No
Canadian French, #058	8808	83		Both	Yes	No
Belgian/Dutch, #120	8810	83		Both	Yes	No

Description	Feature number	Purchase price	Initial/MES/both	CSU	RP MES
Swedish/Finnish, #153	8811	\$83	Both	Yes	No
Danish, #159	8812	83	Both	Yes	No
Bulgarian, #442	8813	83	Both	Yes	No
Swiss/French/German, #150F/G	8814	83	Both	Yes	No
Norwegian, #155	8816	83	Both	Yes	No
Portuguese, #163	8818	83	Both	Yes	No
Greek, #319	8819	83	Both	Yes	No
Hebrew, #212	8820	83	Both	Yes	No
Hungarian, #208	8821	83	Both	Yes	No
Polish, #214	8823	83	Both	Yes	No
Slovakian, #245	8825	83	Both	Yes	No
Czech, #243	8826	83	Both	Yes	No
Turkish, #179	8827	83	Both	Yes	No
LA Spanish, #171	8829	83	Both	Yes	No
Arabic, #238	8830	83	Both	Yes	No
Korean, #413	8833	83	Both	Yes	No
Chinese/US, #467	8834	83	Both	Yes	No
French Canadian, #445	8835	83	Both	Yes	No
Thai, #191	8836	83	Both	Yes	No
Russian, #443	8838	83	Both	Yes	No
Yugoslavian/Latin, #105	8839	83	Both	Yes	No
U.S. English (EMEA), #103P	8840	83	Both	Yes	No
Mouse — Business Black with Keyboard Attachment Cable	8841	62	Both	Yes	No
Southern Hemisphere Designator for Monitors	9004	0	Both	Yes	No
Language Group Specify — U.S. English	9300	NC	Initial		
Dutch	9700	NC	Initial		
French	9703	NC	Initial		
German	9704	NC	Initial		
Polish	9705	NC	Initial		
Portuguese	9707	NC	Initial		
Spanish	9708	NC	Initial		
Italian	9711	NC	Initial		
Canadian French	9712	NC	Initial		
Japanese	9714	NC	Initial		
Traditional Chinese (Taiwan)	9715	NC	Initial		
Korean	9716	NC	Initial		
Turkish	9718	NC	Initial		
Hungarian	9719	NC	Initial		
Slovakian	9720	NC	Initial		
Russian	9721	NC	Initial		
Simplified Chinese (PRC)	9722	NC	Initial		
Czech	9724	NC	Initial		
Romanian	9725	NC	Initial		
Slovenian	9727	NC	Initial		

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Description	Model	Feature number	Purchase price	Initial/MES/both/support
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